FINAL FEASIBILITY STUDY

Historic Downtown Fort Pierce Retrofit SUN Trail

St. Lucie County, Florida

Financial Project ID:

440033-1

Prepared for:



Florida Department of Transportation

District Four

3400 West Commercial Boulevard

Fort Lauderdale, Florida 33309

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Section 1.0 Introduction

St. Lucie County applied for and received funding through the Florida Greenways and Trails System (FGTS) Shared-Use Nonmotorized (SUN) Trails program for the Feasibility Study of the Historic Downtown Fort Pierce Retrofit Trail from Georgia Avenue to North Causeway in Fort Pierce, Florida. The Florida Department of Transportation (FDOT), in conjunction with St. Lucie County and the City of Fort Pierce, is conducting this Feasibility Study for the proposed trail. A Feasibility Study represents a definition of a problem or opportunity to be studied, an analysis of the current mode of operation, a definition of requirements, an evaluation of alternatives, and an agreed upon course of action. This report examines proposed alternatives for the trail segment and the associated physical and natural considerations for each alternative. The trail will connect to the larger East Coast Greenway (ECG) footprint, with the North Causeway Trail to the north and the proposed Historic Highwayman Trail Gap to the south. See **Appendix A** for the SUN Trail Application with the potential trail locations.

The scope of this feasibility study included database and in-person field reviews of the alternatives provided in the SUN Trail Application submitted by St. Lucie County. Additionally, meetings were held with stakeholders and the public to discuss the alternatives (**Appendix B**). Where applicable, changes to the alternatives were identified and analyzed to minimize impacts.

Section 2.0 Background and History

The State of Florida created the SUN Trail program in 2015 to provide bicycle and pedestrian ways along state roads and transportation facilities. The State of Florida allots $25 million annually for the development of regionally significant greenways and trails projects (FDOT, 2018). The criteria required for projects to be eligible for funding through the SUN Trails program includes the following:

- Must be located on the SUN Trail Network (FGTS Land Trails Priority Map);
- Priority of the Metropolitan Planning Organization (MPO);
- Must be identified on who will operate and maintain the constructed trail; and
- Ready to be programmed and to begin the first/next phase of work (Birdsong).

The St. Lucie Transportation Planning Organization (TPO) conducted studies evaluating the need for bicycle and pedestrian facilities within the County including the *Bicycle and Pedestrian Systems Analysis* (St. Lucie County Urban Area MPO, 2007) and *St. Lucie Bicycle/Pedestrian Corridor Study Area of Interest Analysis* (St. Lucie TPO, 2012). The TPO also conducted a study on how to best implement ECG trails throughout the County. The ECG is an initiative focused on providing a connection along Florida's Atlantic Coast from the Georgia border to the Florida Keys. The main goal of the ECG is to "establish a

safe, traffic free pathway for muscle powered users as a connection between our eastern seaboards cities," as stated in the *East Coast Greenway Implementation Plan* (St. Lucie TPO, 2012). The highest priority for the ECG is to construct trails that are off of the roadways.

The Historic Downtown Fort Pierce Retrofit Trail would be considered a critical piece of the ECG network and would connect to the North Causeway ECG Trail and the proposed Historic Highwayman Gap Trail. The trail segment is included in the Go2040 Long Range Transportation Plan (LRTP) (St. Lucie TPO, 2016) for St. Lucie County.

Section 3.0 Purpose

This report includes an analysis of alternatives that are technically sound, environmentally sensitive, economically feasible, and socially acceptable that can be further evaluated in future development phases. Specifically, this study evaluates existing conditions and proposes recommendations. The evaluated areas include

- Design: does or does not meet SUN Trail Program criteria
- Social Features: Land Use, Community Cohesion, Relocations, Right-of-Way (ROW) or Easements Required, Community Services, Potential User Conflicts
- Cultural: Archaeological/ Historical Resource, Section 4(f)
- Natural: Threatened and Endangered Species, Wetlands/Surface Waters and Essential Fish Habitat, Upland Habitat, Outstanding Florida Waters/Aquatic Preserves, Floodplains
- Physical: Noise, Air Quality, Contamination

The purpose of this study is to conduct a fatal flaw analysis to determine which alternative and typical section(s) will best adhere to the SUN Trail program criteria as well as being cost feasible. The Environmental Opportunities and ROW Constraint Map (**Appendix C**) includes additional information.

3.1 SUN Trail Funding and Design Criteria

In order to be funded under the SUN Trail Program, the alternatives must meet the following SUN Trail Program Design Criteria:

- 10 to 14 feet in width (eight feet is allowed in rare cases)
- Multi-use (bicyclists, pedestrians, runners, skaters)
- Paved
- Separated from roadway (by at least five feet or by a physical barrier/railing)
- No significant amount of private property ROW or easements can be required

The alternatives that do not meet the design criteria, must consider other funding and design options. Additional details are provided in Section 5 - Preliminary Engineering Analysis.

Section 4.0 Project Description

The Historic Downtown Fort Pierce Retrofit Trail Segment includes constructing an approximately 2.3-mile long multi-use paved trail from Georgia Avenue to North Causeway Drive/SR A1A in St. Lucie County, Florida, as shown in **Figure 1**. The starting point of this segment is at the northern terminus of the Historic Highwayman Trail Gap, which is north of the Indian Hills Golf Course at Georgia Avenue. The ending point of this segment is at North Causeway Drive/SR A1A, which is the southern terminus of the North Causeway ECG Trail.

There is a gap in the project along Federal Highway/US 1 between Avenue M and Avenue H. The gap in the trail will not be studied under this Feasibility Study due to future work on Federal Highway/US 1 at Avenue H.

The proposed project will consist of constructing a 10 to 14-foot wide paved trail. Either asphalt or concrete could be used in sections of the trail. The study area for this project includes the proposed alternatives; a 20-foot buffer, which includes 10 feet on either side of the proposed trail centerline, surrounding each alternative to evaluate potential effects to listed species and for evaluating direct and secondary impacts to other resources including wetlands, social resources, and other natural resources; and a 500-foot buffer on each side of each alternative centerline for contamination analysis.

The alternatives developed by St. Lucie County and examined within this Feasibility Report include the Primary Alternative, South Alternative 1, South Alternative 2, and the Riverwalk Alternative. Details of each alternative are provided in Section 5 - Preliminary Engineering Analysis.

Figure 1: Project Location Map



Section 5.0 Preliminary Engineering Analysis

5.1 Historic Downtown Fort Pierce Retrofit Trail

St. Lucie County defined five alternatives in the SUN Trails Application: Primary Alternative, North Alternative 1, North Alternative 2, South Alternative 1, and South Alternative 2, see Appendix A for the map from the SUN Trails Application.

For the purpose of this Feasibility Study and as a comparison of impacts, four alternatives were developed and evaluated; Primary Alternative, South Alternative 1, South Alternative 2, and the River Walk Alternative described below. In addition, based on stakeholder input and data collection conducted, shifts or changes in the alternatives were evaluated and described in this report. It is important to note that there is now a gap in the project along Federal Highway/US 1 between Avenue M and Avenue H. The gap in the trail will not be included under this Feasibility Study due to future FDOT work on Federal Highway/US 1 at Avenue H. Given this change, North Alternative 1 and North Alternative 2 will not be evaluated under this project.

5.1.1 Primary Alternative

The original Primary Alternative that was identified in the SUN Trail Application submitted by St. Lucie County was modified to avoid fatal flaws such as ROW acquisitions. The modified Primary Alternative would still originate at Georgia Avenue, the northern end of the Indian Hills Golf Course, and would still terminate at North Causeway Drive/SR A1A. The first potion of the Primary Alternative starts on 3rd Street at Georgia Avenue and continues along the eastern side of 3rd Street to Citrus Avenue, where it has a break. The Primary Alternative picks back up on North 2nd Street at Orange Avenue and continues north to Avenue H. There is a 2nd break between Avenue H and Avenue M. At Avenue M the Alternative travels to the west to intersect Old Dixie Highway, and continues north to North Causeway Drive/SR A1A.

The final Primary Alternative is shown in **Figure 2.**

5.1.2 River Walk Alternative (New Alternative)

The River Walk Alternative provides a deviation from the Primary Alternative north of AE Backus Avenue. At the intersection of AE Backus Avenue and North 2nd Street the Alternative heads east and is proposed to connect with the existing Riverwalk path within Veterans Memorial Park. The proposed River Walk Alternative once connected to the existing Alternative would then continue under the Seaway Drive bridge and then follow the east side of Indian River Drive until it reaches Avenue H/Fisherman's Warf. The River Walk Alternative reconnects with the Primary Alternative at the intersection of Avenue H/Fisherman's Warf and North 2nd Street. The River Walk Alternative is shown in Figure 2.

Figure 2: Downtown Fort Pierce Retrofit Alternatives Map



5.1.1 South Alternative 1

The South Alternative 1 provides a deviation from the Primary Alternative at Citrus Avenue. South Alternative 1 would travel along the Florida East Coast (FEC) Railroad from north of Citrus Avenue to Orange Avenue. The alternative would continue east on Orange Avenue to intersect North 2nd Street and the Primary Alternative. This alternative would require ROW from the FEC Railroad. The South Alternative 1 is shown in Figure 2.

5.1.2 South Alternative 2

The South Alternative 2 would utilize the bridge on Citrus Avenue and travel east along the south side of Citrus Avenue to Indian River Drive. South Alternative 2 would use the pedestrian facilities present at Indian River Drive and Citrus Avenue to traverse to the north side of Citrus Avenue. The alternative would then travel back west to North 2nd Street, then travel north along North 2nd Street to Orange Avenue to intersect the Primary Alternative. The South Alternative 2 alternative is shown in Figure 2.

5.2 Considerations to Minimize Impacts

Changes to these alternatives were considered in order to reduce impacts to the natural and physical environments. Other impacts considered were confirming that the SUN Trail design criteria was and could be met in all areas. The design criteria included no private ROW acquisition, a minimum multi-use path width of 10 – 14 feet (eight-foot paths can also be used if necessary, but are not preferred), and a five-foot separation from any roadway unless a railing or physical barrier is installed.

For areas that cannot meet SUN Trail design criteria, other design options would be considered to minimize impacts to private and FEC ROW, and could include sharrows or bike lanes. The options would be considered by local agencies for further development and funding.

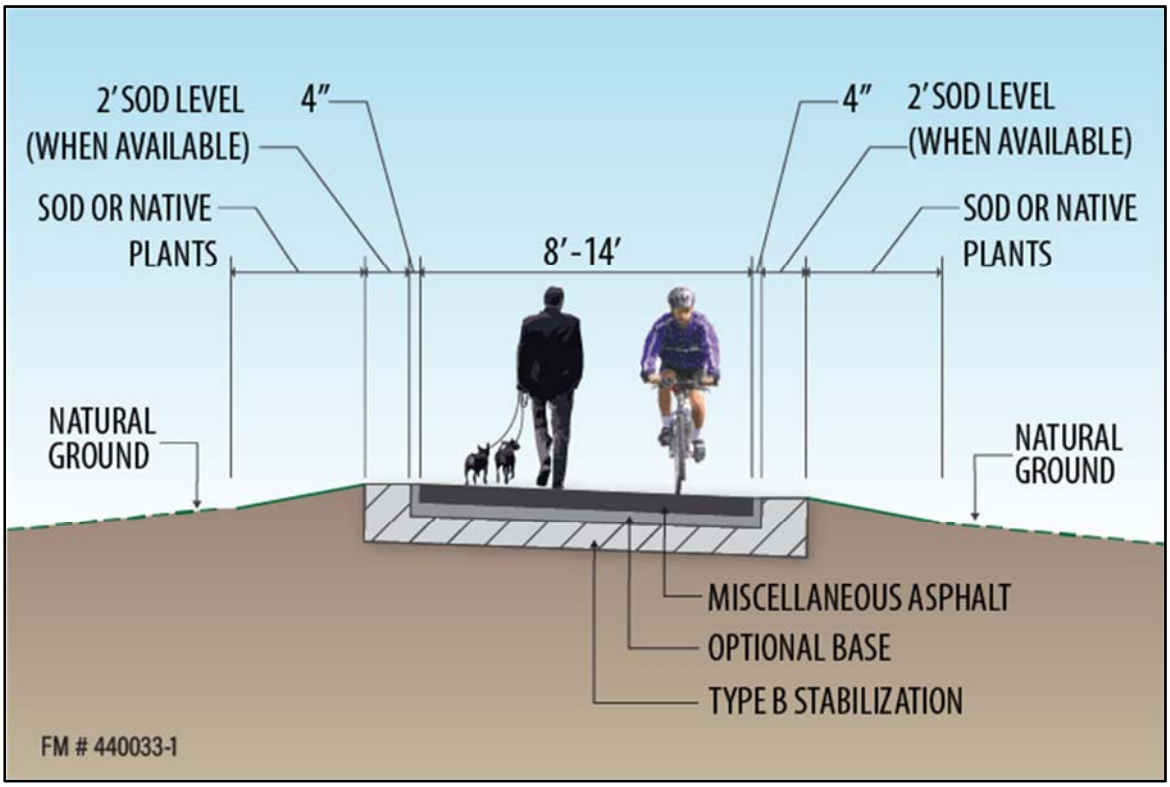
5.3 Typical Sections

Two typical sections were developed for this study, as described below.

5.3.1 At-Grade Typical Section – Proposed Multi-use Path Option

This typical section includes an eight- to 14-foot multi-use trail, two-foot on either side of the trail will be graded and sodded level when available and should be recoverable in all weather conditions. On the outside of the 2-foot recoverable area, a 1V:6H slope max is allowed to tie back into existing ground (see **Figure 3**).

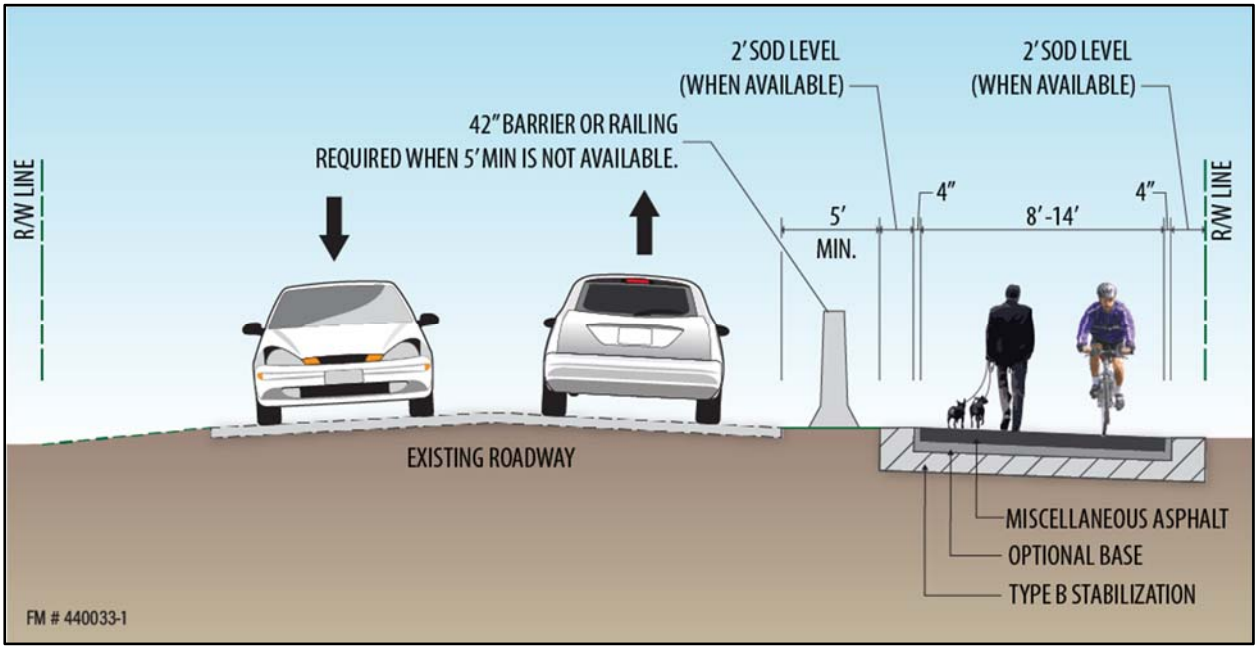
Figure 3: Proposed Multi-use Path Option



5.3.1 At-Grade Typical Section – Proposed Multi-use Path with Wall Option

This typical section includes an eight to 14-foot multi-use trail, two-foot on either side of the trail will be graded and sodded level when available and should be recoverable in all weather conditions. On the side of the typical that is adjacent to the roadway and is less than five feet away, a physical barrier or railing will be provided between the path and the roadway. Such barriers or railings serve both to prevent path users from making undesirable or unintended movements from the path to the roadway and reinforce that the path is an independent facility. The barrier or railing should be a minimum of 42-inches high. Other treatments such as rumble strips can be considered as alternatives to physical barriers or railings, where the separation is less than five feet (see **Figure 4**).

Figure 4: Proposed Multi-use Path with Wall Option



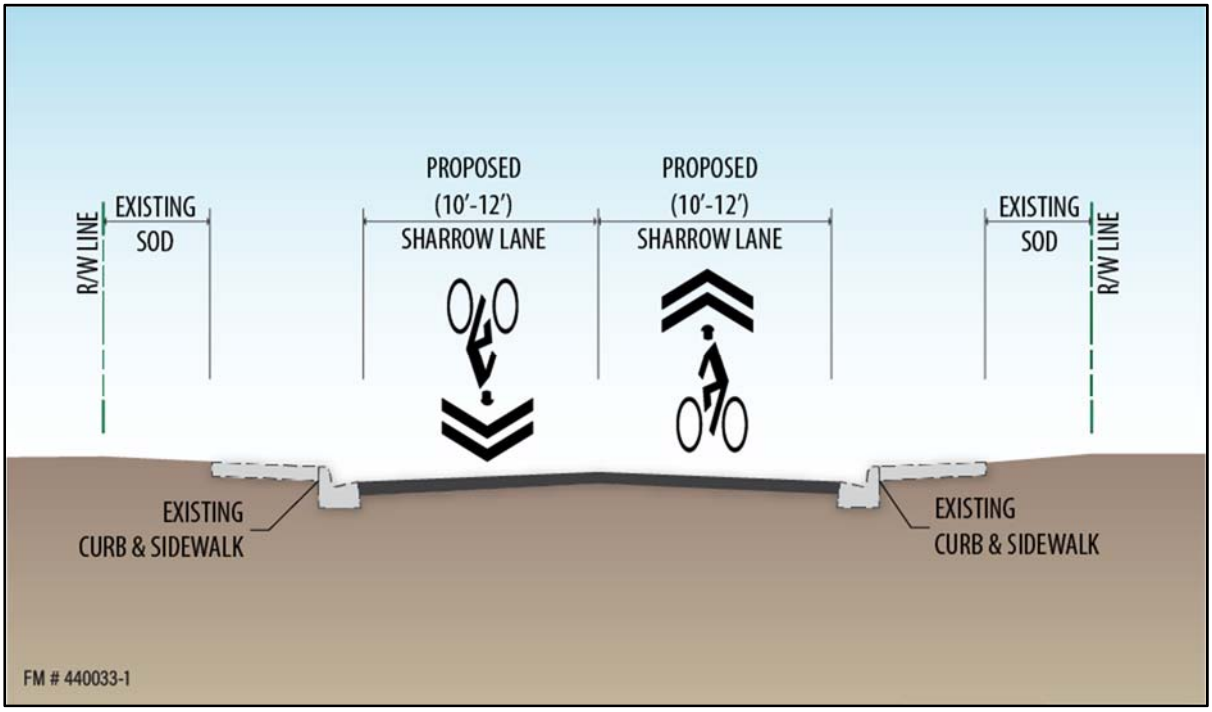
5.3.2 Options to be considered by Local Agencies for Further Development and Funding

In order to be funded under the SUN Trail Program, the alternatives must meet the following SUN Trail Program Design Criteria:

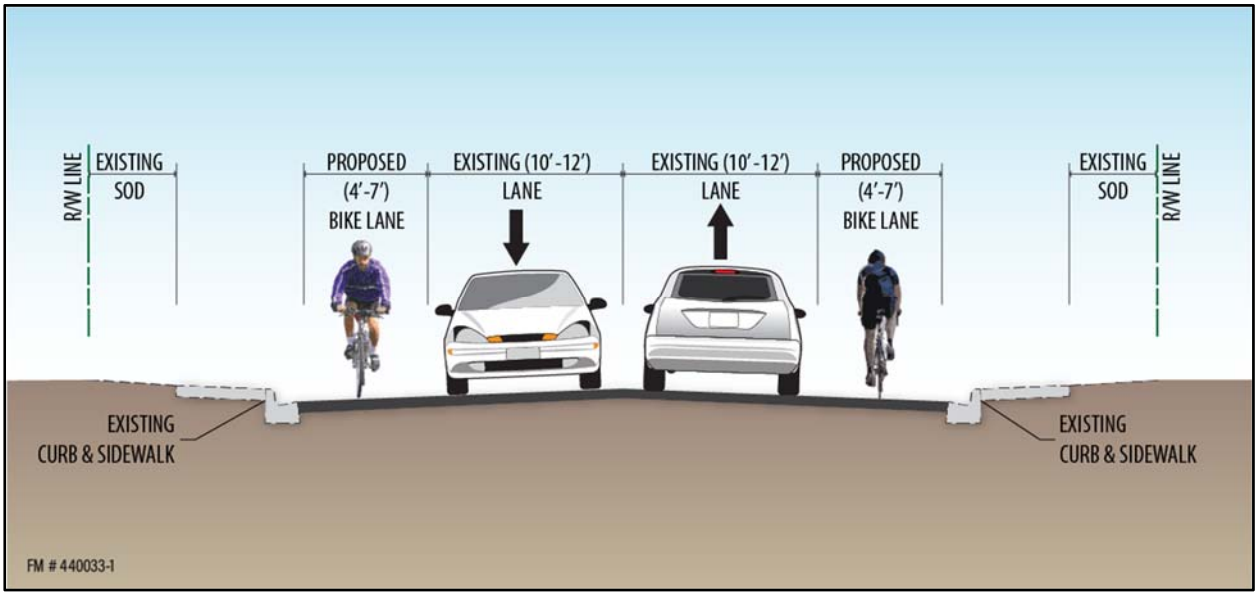
- 10 to 14 feet in width (eight feet is allowed in some cases)
- Multi-use (bicyclists, pedestrians, runners, skaters)
- Paved
- Separated from roadway (by at least five feet or by a physical barrier/railing)
- No significant amount of private property ROW or easements can be required

For areas that do not meet SUN Trail design criteria, other design options would be considered by local agencies for further development and funding. These options would include sharrows or bike lanes (**Figure 5**). Additional details regarding the locations for these options is provided in Appendix C.

Figure 5: Proposed Sharrow and Bike Lane Options



*To be explored by local agencies for further development and funding



*To be explored by local agencies for further development and funding

Section 6.0 Environmental Effects

Each of the alternatives described under Section 5 will be evaluated on the following criteria:

- Design: does or does not meet SUN Trail Program criteria (Section 5.3.3)
- Social Features: Land Use, Community Cohesion, Relocations, ROW or Easements Required, Community Services, Potential User Conflicts
- Cultural: Archaeological/ Historical Resource, Section 4(f)
- Natural: Threatened and Endangered Species, Wetlands/Surface Waters and Essential Fish Habitat, Upland Habitat, Outstanding Florida Waters/Aquatic Preserves, Floodplains
- Physical: Noise, Air Quality, Contamination

Additional details are provided in the following sections and summarized in the Alternatives Comparison Matrix in Section 9.

6.1 Social Features

Several social features surrounding the proposed Historic Downtown Fort Pierce Retrofit Trail alternatives were analyzed to identify any potential impacts to existing features and to determine the trail's compatibility with future planned features. Social features surrounding the alternatives for analysis included existing land use, future land use, community cohesion, relocations, ROW or easements which may be required, existing community services, and other potential user conflicts.

6.1.1 Existing Land Use

Existing land use within the study area was determined through the interpretation of 1" = 100' scale aerial photography, review of land cover Geographic Information Systems (GIS) data obtained from the South Florida Water Management District (SFWMD). Existing land use was mapped based on the Florida Land Use, Cover and Forms Classification System (FLUCFCS) (FDOT, 1999) for the proposed trail locations. The FLUCFCS maps for the Downtown Fort Pierce Retrofit Trail are depicted in **Appendix D**.

The existing land use for the Downtown Fort Pierce Retrofit Trail Primary Alternative can be described as fixed single-family units, commercial and services, other light industry, channelized waterways-canals, transportation, railroads and railyards, roads and highways, port facilities, and electrical power facilities.

The existing land use for the Downtown Fort Pierce Retrofit Trail South Alternative 1 can be described as commercial and services, sand and gravel pits, and railroads and railyards.

The existing land use for the Downtown Fort Pierce Retrofit Trail South Alternative 2 can be described as commercial and services, other light industry, railroads and railyards.

The existing land use for the Downtown Fort Pierce Retrofit Trail River Walk Alternative can be described as fixed single-family units, parks and zoos, roads and highways, port facilities, and electrical power facilities.

No adverse effects to existing land use are anticipated as a result of this project with any of the proposed alternatives.

6.1.2 Future Land Use

Future land use was determined based on a review of the Fort Pierce Future Land Use Map (FLUM) and the St. Lucie County Future Land Use, included as Appendix D.

The future land use of the Downtown Fort Pierce Retrofit Trail Primary Alternative consists of general commercial, central business district, medium density residential, high density residential, marine commercial, and industrial.

The future land use of the Downtown Fort Pierce Retrofit Trail South Alternative 1 consists of central business district and industrial.

The future land use of the Downtown Fort Pierce Retrofit Trail South Alternative 2 consists of general commercial, central business district, and industrial.

The future land use of the Downtown Fort Pierce Retrofit Trail River Walk Alternative consists of central business district, high density residential, industrial, and conservation and open space.

No adverse effects to future land use are anticipated as a result of this project with any of the proposed alternatives.

6.1.3 Community Cohesion

The project consists of adding missing links of the ECG trail systems through Fort Pierce. The project would not divide neighborhoods or increase social isolation. The project is expected to enhance community cohesion by adding a multi-use trail facility for pedestrians and bicyclists. The trails will promote recreational use and the Historic Downtown Fort Pierce Retrofit Trail will promote travel and tourism in Downtown Fort Pierce. These trails will provide connectivity between nearby neighborhoods and Downtown Fort Pierce.

6.1.4 ROW and Relocation Potential

As noted in Section 5.3.3, an alternative requiring an easement or ROW acquisition for a significant amount of land from a private landowner or the FEC railroad company does not meet the SUN Trail Program Design Criteria, so other design options would need to

be considered. The anticipated private/FEC ROW or easements that will be required for each of the alternatives is shown in **Table 1**.

Table 1: Private Right-of-Way or Easements Required

Alternative	Right-of-way or Easement Required (in acres)
Primary Alternative	0.0
Riverwalk Alternative	0.0
South Alternative 1	(+/-) 0.65
South Alternative 2	0.0

Primary Alternative: will require ROW or easements to complete the connection under the existing Citrus Avenue bridge along 3rd Street.

South Alternative 1: will require private or FEC ROW from Boston Avenue to Orange Avenue.

6.1.5 Community Services

Community facilities are shown in **Figure 6** and **Table 2**. No direct impacts are anticipated to any community services as a result of this proposed trail project. The proposed trail will provide bicycle and pedestrian facilities available for public use. The purpose of the project is to connect existing ECG trails; therefore, no negative impacts will occur to these trails.

Temporary access and noise impacts could occur during construction but are expected to be short-term. The study corridor is situated in a low residential populated area, with the majority of the noise sensitive locations being neighborhoods adjacent to the proposed trails.

Potential User Conflicts

Given the project is located in an urban downtown setting, potential user conflicts for the proposed trails are the necessary road crossings, a traffic circle, heavy delivery trucks to warehouses, on street parking, boat ramp users, park users (fishing), and confusion for novice riders.

Specialized road crossing, including cross walks, should be utilized to help increase the safety of the trail users. In addition, the other potential user conflicts can be minimized with the appropriate use of signage and wayfinding techniques.

Figure 6: Community Facilities



Table 2: Community Facilities

Community Facility	Address
Taylor Creek Commons	1851 N US Highway 1
Indian River Terminal Company	100 Terminal Drive
BOCC Rental – AGAPE	809 N 9th Street
Health Department	707 7th Street
Ft. Pierce Community Center	600 N Indian River Drive
Juvenile Courthouse Annex	435 N 7th Street
FPUA Substation	205 AE Backus Avenue
St. Lucie County Health Office/Clinic	408/412 Browns Court
State Government Building	337 N US Highway 1
St. Lucie County Health Department Complex	714 Avenue C
Ft. Pierce Branch Library	101 Melody Lane
Ft. Pierce City Hall	100 N US Highway 1
Healthy Kids	117 Atlantic Avenue
Court Administration	200 S 2nd Street
Federal Public Defender	216 S 2nd Street
St. Lucie County Courthouse	221 S Indian River Drive
Clerk of the Court	201 S Indian River Drive
St. Lucie County Courthouse Annex	218 S 2nd Street
Courthouse Parking Garage	271 S 2nd Avenue
State Attorney	415 S 2nd Street
State Attorney	411 S 2nd Street

6.1.6 Archaeological/Historical Resources

A search of the Florida Master Site File (FMSF) GIS data, identified the following Archaeological/Historical Resources. Locations of the resources are shown in the Environmental Constraints Map (**Appendix C**) and the FMSF data (**Appendix E**).

Primary Alternative

The search of the FMSF GIS data identified one National Register of Historic Places (NRHP)–listed resource, Moore's Creek Bridge (8SL1141), within the Primary Alternative. Three additional National Register–eligible resources, Dixie Highway (8SL1666), FEC Railroad-Lake Harbor Branch (8SL3014), and Bridge at Mile Post 240.1 (8SL3191), are within and adjacent to the Alternative. The Primary Alternative is also within two locally-designated districts: The Downtown Historic District and the Edgar Town Historic District.

South Alternative 1

The search of the FMSF GIS data identified one National Register–eligible resource, the FEC Railroad-Lake Harbor Branch (8SL3014), within the South Alternative 1. The South Alternative 1 is within one locally-designated district: The Downtown Historic District.

South Alternative 2

The search of the FMSF GIS data identified one National Register–eligible resource, the FEC Railroad-Lake Harbor Branch (8SL3014), within the South Alternative 2. One National Register–listed resource, the Sunrise Theater (8SL799), adjacent to the Alternative. The South Alternative 2 is within the locally-designated Downtown Historic District and aligned along the northern boundary of the locally-designated River's Edge Historic District.

River Walk Alternative

The search of the FMSF GIS data did not identify any National Register–listed or eligible resources within or adjacent to the River Walk Alternative. The River Walk Alternative is located along the boundaries of two locally-designated districts: The Downtown Historic District and the Edgar Town Historic District.

6.1.7 Section 4(f) Resources

Cultural resources that are listed in or determined eligible for listing in the National Register of Historic Places fall under the mandate of Section 4(f).

The SUN Trail program is state funded and Section 4(f) would not apply, however coordination with the City of Fort Pierce will continue. If federal funds are applied to future phases of the proposed trail, Section 4(f) would apply and coordination with Central Office - Office of Environmental Management (OEM) will be necessary for the following resources:

Moore's Creek Bridge (8SL1141) is National Register –listed, and Dixie Highway (8SL1666) and the Bridge at Mile Post 240.1 (8SL3191) are National Register –eligible. All three are located along the Downtown Fort Pierce Trail's Primary Alternative. The Sunrise Theater (8SL799) is National Register –listed and located adjacent to the Downtown Fort Pierce Trail's South Alternative 2. The FEC Railroad-Lake Harbor Branch (8SL3014) is National Register –eligible and located along the Downtown Fort Pierce Trail's Primary Alternative, South Alternative 1, and South Alternative 2.

6.2 Natural Features

The following data were reviewed to determine potential impacts to threatened and endangered species, essential fish habitat wetlands and essential fish habitat, uplands, floodplains, and other natural features within the vicinity of the project study area:

- Historical aerial photography from Google Earth and MapWise
- Efficient Transportation Decision Making (ETDM) Environmental Screening Tool (EST) (FDOT, 2018)
- Florida Natural Areas Inventory (FNAI) Standard Data Report for the project study area included in **Appendix F**
- U.S. Fish and Wildlife Service's (USFWS) Information for Planning and Consultation (IPaC) Trust Resources Report included in **Appendix G**
- Habitat and species-specific information obtained from the USFWS, the Florida Fish and Wildlife Conservation Commission (FWC), Florida Fish and Wildlife Research Institute (FWRI), Florida Geographic Data Library (FGDL), and FNAI
- FWC Eagle Nest Locator database (FWC, 2018)
- Species status assessments, species recovery plans, and other technical documents and reports for each of the listed species evaluated in this document
- The USFWS National Wetland Inventory (NWI) maps and GIS data (USFWS, 2018)
- The US Geological Survey (USGS) 7.5-Minute Quadrangle maps
- Natural Resources Conservation Service (NRCS) Soil Survey data
- National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) Essential Fish Habitat (EFH) Mapper (NOAA, 2018)
- The Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Maps (FIRM) (FEMA, 2018)

In addition to the review of the above-listed databases and resources, an environmental field review was conducted on April 19, 2018 to identify sensitive habitats and protected species within the proposed trail alternatives. During the environmental field review, biologists investigated the proposed Primary Alternative, South Alternative 1, South Alternative 2, and River Walk Alternative. In areas where a proposed new trail could potentially be constructed, the biologists assessed a 20-foot-wide area along the potential new trail alternatives (i.e., 10 feet on either side of the proposed trail centerline). This width was determined to be appropriate since the proposed trail would have a maximum width of 14 feet under the SUN Trail Program and will not require any shoulder construction. The entirety of the Primary Alternative and the South Alternative 2 will utilize existing pavement. A portion of the South Alternative 1 between Citrus Avenue and Orange Avenue will require construction of a new trail. A portion of the River Walk Alternative located on the north side of the causeway between Indian River Drive and the

existing concrete path that runs underneath the Seaway Drive bridge will require construction of a new trail.

6.2.1 Threatened and Endangered Species

Information on the potential occurrence of Federally and State-listed species within the project study area was reviewed using available literature and databases. In addition, during the environmental field review, biologists investigated those areas of potential new trail construction for the presence of listed species and/or potential impacts to habitat that support protected species. The results of the federal and state database and GIS reviews are summarized below.

The following species were identified in the FNAI and USFWS database reports that have no likelihood of occurrence in the project study area based on the lack of suitable habitat and/or the current level of development within the project study area: Florida panther (*Puma concolor coryi*), southeastern beach mouse (*Peromyscus polionotus niveiventris*), Audubon's crested caracara (*Polyborus plancus audubonii*), ivory-billed woodpecker (*Campephilus principalis*), Kirtland's warbler (*Setophaga kirtlandii*), piping plover (*Charadrius melodus*), red knot (*Calidris cantus rufa*), red-cockaded woodpecker (*Picoides borealis*), whooping crane (*Grus americana*), Miami blue butterfly (*Cyclargus thomasi bethunebakeri*), and Small's flax (*Linum carteri* var. *smalii*). Therefore, these species are not discussed further in the document. The proposed project is anticipated to have ***no effect*** on these species.

FNAI Standard Data Report

The FNAI Standard Data Report indicates that there is documented rare species habitat located within two miles of the project area, but not within the project study area itself. During the environmental field review, biologists assessed a 20-foot-wide area along the potential new trail alternatives. The area where a proposed new trail could potentially be constructed along South Alternative 1 (between Citrus Avenue and Orange Avenue) consists mostly of previously cleared, grass-covered ground with occasional trees and other vegetation (e.g., Brazilian pepper) in an industrial/commercial area. The area where a proposed new trail could potentially be constructed along the River Walk Alternative (on the north side of Seaway Drive between Indian River Drive and the existing concrete path beneath the Seaway Drive bridge) consists of maintained grass between a roadway and a parking lot. Refer to Section 6.2.3 of this document for photographs of these areas. No rare habitat was identified in these areas.

According to the FNAI Element Occurrence Report, a manatee aggregation site, a bird rookery, scrub habitat, and mangrove swamp habitat have been documented within two miles of the project area, but not within the project study area itself. The documented

manatee aggregation site and bird rookery are located east of the project area within the Indian River Lagoon. Because the proposed project does not have any components that will impact the Indian River Lagoon and because no in-water work is required, no impacts to the manatee aggregation site or bird rookery are anticipated from the proposed project. The documented scrub habitat is located approximately 0.75 miles west of the project area. No scrub habitat was observed within the proposed new trail alternative or adjacent to any of the Alternatives. During the environmental field review, biologists observed mangroves located along the River Walk Alternative, adjacent to the north of the existing concrete path that runs beneath the Seaway Drive bridge (**Figure 7**). The proposed River Walk Alternative in this location will utilize the existing pavement and will not require construction of a new trail; thus, no impacts to mangroves are anticipated from the proposed project.

Figure 7: Mangroves located along the Riverwalk Alternative



Photographs of the mangroves observed along the River Walk Alternative, adjacent to the north of the existing concrete path that runs beneath the Seaway Drive bridge. Left photo looking east. Right photo looking west.

According to the FNAI Element Occurrence Report, the following listed species have been documented within two miles of the project area, but not within project study area itself: Florida scrub-jay (*Aphelcoma coerulescens*), Johnson's seagrass (*Holophila johnsonii*), nodding pinweed (*Lechea cernua*), opossum pipefish (*Microphys brachyurus*), and osprey (*Pandion haliaetus*). The likelihood of occurrence of these species is addressed in **Table 3**.

The FNAI Standard Data Report also provides a Biodiversity Matrix Report which identifies rare species and natural communities that may be present based on habitat models and species range models. The Biodiversity Matrix Report identified scrub habitat as a documented natural community within the vicinity of the project study area and also

identified Johnson's seagrass, the West Indian manatee (*Trichechus manatus*), and the wood stork (*Mycteria americana*) as likely to occur within the vicinity of the project study area. The Biodiversity Matrix Report also identified the following Federally and State-listed species as having the potential to occur within the vicinity of the project study area: Sherman's fox squirrel (*Sciurus niger shermani*), Everglade snail kite (*Rostrhamus sociabilis plumbeus*), Florida scrub-jay, Florida burrowing owl (*Athene cunicularia floridana*), osprey, hawksbill sea turtle (*Eretmochelys imbricata*), Eastern indigo snake (*Drymarchon corais couperi*), gopher tortoise (*Gopherus polyphemus*), Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*), opossum pipefish, mangrove rivulus (*Rivulus marmoratus*), tiny polygala (*Polygala smallii*), coastal vervain (*Glandularia maritima*), celestial lily (*Nemastylis floridana*), coastal hoary-pea (*Tephrosia angustissima* var. *curtissii*), Piedmont jointgrass (*Coelorachis tuberculosa*), large-flowered rosemary (*Conradina grandiflora*), nodding pinweed, and giant orchid (*Pteroglossaspis ecristata*).. The likelihood of occurrence of these species is addressed in Table 3.

Table 3: Potential Federally- and State-Listed Fauna and Flora that May Occur within the Project Area

Common Name	Scientific Name	Federal Status	State Status[1]	Likelihood of Occurrence	Effect Determination
Mammals					
West Indian manatee	*Trichechus manatus*	FE	FE	High	**No effect**
Sherman's fox squirrel	*Sciurus niger shermani*	NL	SSC	Low	--
Birds					
Everglade snail kite	*Rostrhamus sociabilis plumbeus*	FE	FE	Low	**No effect**
Wood stork	*Mycteria americana*	FT	FT	Low	**No effect**
Florida scrub-jay	*Aphelocoma coerulescens*	FT	FT	Low	**No effect**
Florida burrowing owl	*Athene cunicularia floridana*	NL	ST	Low	--
Osprey*	*Pandion haliaetus*	NL	SSC*	High	--
Reptiles					

Common Name	Scientific Name	Federal Status	State Status[1]	Likelihood of Occurrence	Effect Determination
Hawksbill sea turtle	*Eretmochelys imbricata*	FE	FE	Low	**No effect**
Leatherback sea turtle	*Dermochelys coriacea*	FE	FE	Low	**No effect**
Loggerhead sea turtle	*Caretta caretta*	FT	FT	Low	**No effect**
Eastern indigo snake	*Drymarchon corais couperi*	FT	FT	Low	**Not Likely to Adversely Affect**
Gopher tortoise	*Gopherus polyphemus*	C	ST	Low	--
Fish					
Atlantic sturgeon	*Acipenser oxyrinchus oxyrinchus*	FE	FE	Moderate	**No effect**
Opossum pipefish	*Microphis brachyurus*	C	NL	Moderate	**No effect**
Mangrove rivulus	*Rivulus marmoratus*	C	NL	Low	**No effect**
Plants					
Fragrant prickly apple	*Harrisia fragrans*	FE	FE	Low	**No effect**
Lakela's mint	*Dicerandra immaculata*	FE	FE	Low	**No effect**
Tiny polygala	*Polygala smallii*	FE	FE	Low	**No effect**
Johnson's seagrass	*Holophila johnsonii*	FT	SE	Low	**No effect**
Coastal vervain	*Glandularia maritima*	NL	SE	Low	--
Celestial lily	*Nemastylis floridana*	NL	SE	Low	--
Coastal hoary-pea	*Tephrosia angustissima* var. *curtissii*	NL	SE	Low	--
Piedmont jointgrass	*Coelorachis tuberculosa*	NL	ST	Low	--

Common Name	Scientific Name	Federal Status	State Status[1]	Likelihood of Occurrence	Effect Determination
Large-flowered rosemary	*Conradina grandiflora*	NL	ST	Low	--
Nodding pinweed	*Lechea cernua*	NL	ST	Low	--
Giant orchid	*Pteroglossaspis ecristata*	NL	ST	Low	--

[1]Based on *Florida's Endangered and Threatened Species* updated January 2017 available on http://myfwc.com/wildlifehabitats/imperiled/

Federal Status: FE = Endangered, FT = Threatened, T(S/A) = Threatened due to similarity of appearance, SSC = Species of Special Concern, C = Candidate species, NL = Not Listed

State Status: FE= Federally Endangered, FT = Federally Threatened, FT(S/A) = Federally Threatened due to similarity of appearance, ST = State Threatened; Note: Coordination is not required with FWC for Federally-listed species

*Osprey nests are protected by FWC under Chapter 68A of the Florida Administrative Code (FAC) and under the Migratory Bird Treaty Act of 1918, as amended. The osprey is listed as a SSC only in Monroe County, Florida.

USFWS Data

The project study area, including all four alternatives, is located within the USFWS's Consultation Areas for the Florida scrub-jay, Everglade snail kite, piping plover, Audubon's crested caracara, manatee, and Atlantic coast plants. In addition, the project study area is located within the 18.6-mile core foraging area of two wood stork colonies (i.e., North Fork St. Lucie River colony and Sewal Point MC2-Bird Island colony). No USFWS-designated critical habitat for any protected species occurs within the project site. The USFWS's IPaC Trust Resources Report (**Appendix G**) provided by the USFWS identified 21 Federally and State-listed species that may be present in the project study area. Four (4) of the 21 species identified in the IPAC Trust Resources Report have some likelihood of occurrence in the project study area but were not identified in the FNAI Standard Data Report: leatherback sea turtle (*Dermochelys coriacea*), loggerhead sea turtle (*Caretta caretta*), fragrant prickly apple (*Harrisia fragrans*), and Lakela's mint (*Dicerandra immaculata*). The likelihood of occurrence of these species is also addressed in Table 3.

FWC Eagle Nest Locator Database

The bald eagle (*Haliaeetus leucocephalus*) is not a Federally- or State-listed species; however, it is protected under the Bald and Golden Eagle Protection Act, Migratory Bird Treaty Act, and FWC Management Plan regulations. According to the FWC's Eagle Nest Locator database, the closest documented bald eagle nest (SL014 – last known active in 2016) is located more than 1.5 miles northeast of the project study area. The proposed project is located well outside of the 200-meter (660-foot) nest protection zone. No impacts are anticipated to bald eagles or their nests from the proposed project.

Species Likelihood of Occurrence and Effect Determinations

Based on the Federal and State database and GIS reviews, as well as with the environmental field survey, those Federally- and State-listed species that may occur in the project area are identified in Table 3, along with their likelihood of occurrence within the project area. Table 3 also includes a determination of effect for Federally-listed species. Additional detail for each of these Federally-listed and State-listed species is provided below.

Federally-listed Fauna

Mammals

West Indian Manatee

The West Indian manatee is a large, aquatic mammal that reach lengths of nine to 10 feet and weigh approximately 1,000 pounds. They have two fore limb flippers and a large, round, flattened paddle-shaped tail. Manatees can tolerate a range of salinities, including freshwater rivers, estuarine bays, and marine coastlines. The year-round distribution of the Florida subspecies (*Trichechus manatus latirostris*) is generally restricted to peninsular Florida due to their need for warm water to survive the winter. Manatees in estuarine or marine environments regularly seek freshwater sources to drink, such as creeks or industrial outfalls. Manatees are generalist herbivores that feed on a variety of marine and freshwater vegetation. Because manatees are unable to tolerate prolonged exposure to temperatures below about 16°C (61ºF), they typically seek out warm-water refuges associated with electric power plant thermal outfalls or artesian springs.

The project area contains two estuarine habitats that are accessible to manatees: Moore's Creek and Taylor Creek. Additionally, the FNAI Standard Data Report documented a manatee aggregation site within the Indian River Lagoon at the mouth of Moore's Creek. The Primary Alternative crosses over Moore's Creek and Taylor Creek and is located in close proximity to the manatee aggregation site. Additionally, the River Walk Alternative is located just north of the manatee aggregation site. If the Primary Alternative were to be selected, the trail alternative would be limited to the existing paved area on the bridges over Moore's Creek and Taylor Creek. Likewise, if the River Walk Alternative were selected, the alternative would be limited to the existing paved areas in the vicinity of the manatee aggregation site. There would be no in-water work associated with the project. Thus, a determination of ***no effect*** has been made for the manatee.

Birds

Everglade snail kite

The Everglade snail kite (snail kite) is a medium-sized, gray or black raptor with broad, paddle-shaped wings, a square-tipped tail with a white base, and a long, hooked bill. This

bird feeds almost exclusively on the apple snail (*Pomacea paludosa*). Snail kites inhabit large, relatively clear and open freshwater marshes and the shallow vegetated edges of lakes where apple snails occur. Snail kites typically nest in small trees or shrubs (usually < 33 feet in height). The project study area falls within the USFWS consultation area for the snail kite; however, there is no designated USFWS critical habitat for this species within the project study area. During the environmental field survey, no snail kites or evidence of apple snails were observed. Due to lack of suitable habitat for the snail kite within the project study area, a determination of ***no effect*** has been made for the snail kite.

Wood Stork

The wood stork is a large, white wading bird with a dark gray head and neck, standing more than three feet tall with a five-foot wing span. It nests in inundated wetlands (typically marshes, cypress swamps, and mangrove swamps) and forages in shallow waters (two to 15 inches deep). Suitable foraging habitat for the wood stork includes freshwater marshes, swamps, lagoons, tidal creeks, flooded pastures, artificial ponds, managed impoundments, and seasonally flooded roadside or agricultural ditches. The project study area is located within the 18.6-mile core foraging area of two wood stork colonies (i.e., North Fork St. Lucie River colony and Sewal Point MC2-Bird Island colony). The closest documented wood stork colony (North Fork St. Lucie River colony) is located approximately 12 miles south of the project study area. During the environmental field survey, no wood storks or suitable habitat for this species were observed. As discussed in Section 6.2.2 of this document, there will be no impacts to wetlands from any of the project Alternatives. Based on a review of the USFWS's Wood Stork Effect Determination Key, a determination of ***no effect*** has been made for the wood stork.

Florida scrub-jay

The Florida scrub-jay (scrub-jay) has blue head, nape, wings, and tail with a pale gray on the back and belly. This species is endemic to Florida and is extremely habitat-restricted. It inhabits the low-growing oak scrub habitat (e.g., sand pine, xeric oak scrub, and scrubby flatwoods) that occurs on well-drained, sandy ridges on the central Florida peninsula. Optimal habitat includes scrub oak with oaks and other low-lying shrubs that are interspersed with numerous small patches of bare sand. Scrub-jays live in family groups that consist of a breeding pair and their offspring and they typically do not travel long distances. During the environmental field survey, no scrub-jays or scrub habitat were observed within the project area. Based on the lack of suitable habitat for this species within the project area, a determination of ***no effect*** has been made for the scrub-jay.

Reptiles

Eastern indigo snake

The eastern indigo snake is a glossy, iridescent, blue-black snake that is the longest snake in North America, reaching lengths of 8.5 feet (2.6 m). This species can be found in almost any habitat in Florida, including pine flatwoods, scrubby flatwoods, high pine, dry prairie, tropical hardwood hammocks, edges of freshwater marshes, agricultural fields, coastal dunes, and human-altered habitats. They are known to inhabit the burrows of other animals (e.g., armadillos, cotton rats, and land crabs) and particularly gopher tortoise burrows, though this is more prevalent where temperatures drop to below 50 degrees regularly in the winter. These snakes require large tracts of land for survival. Suitable habitat for this species is present within the project study area. No indigo snakes and no burrows were observed during environmental field survey. According to the *USFWS's July 2017 Eastern Indigo Snake Programmatic Effect Determination Key*, with the implementation of the *USFWS Standard Protection Measures for the Eastern Indigo Snake* (August 12, 2013; See **Appendix H**) during construction, a determination of ***may affect, not likely to adversely affect*** can been made for the proposed project.

Hawksbill sea turtle

The hawksbill sea turtle is a small- to medium-sized (up to three feet in length) marine turtle with a small head, distinctive hawk-like beak, and an elongated oval shell. The carapace has overlapping scutes and it is generally brown in color with splotches of yellow, orange, or reddish-brown. The hawksbill sea turtle feeds primarily on sponges and is most often associated with the coral reef habitats. This species can be found in shallow waters (rarely seen in water deeper than 65 feet) in association with rocky areas, coral reefs, shallow coastal areas, lagoons or oceanic islands, and narrow creeks and passes. Nesting may occur on almost any undisturbed beach with deep sand. The Primary Alternative crosses over two estuaries (Moore's Creek and Taylor Creek) and a portion of the River Walk Alternative is located adjacent to the Indian River Lagoon. If the Primary Alternative were to be selected, the trail alternative would be limited to the existing paved area on the bridges over Moore's Creek and Taylor Creek. Likewise, if the River Walk Alternative were selected, the alternative would be limited to the existing paved areas in the vicinity of the Indian River Lagoon. There would be no in-water work associated with the project. Thus, a determination of ***no effect*** has been made for the hawksbill sea turtle.

Leatherback sea turtle

The leatherback sea turtle is the largest of the sea turtles, at four to eight feet in length and 500-2,000 pounds in weight. It is easily identified by its size and its shell, which is covered by a firm, rubbery skin with seven longitudinal ridges. This species forages mainly on jellyfish, but also consumes sea urchins, squid, crustaceans, tunicates, fish, blue-green algae, and floating seaweed. This species is the most pelagic of the sea turtles

and adult females require sandy nesting beaches backed with vegetation and sloped sufficiently so the distance to dry sand is limited. The project area does not contain the preferred habitat for this species and because there will be no in-water work associated with the project, a determination of ***no effect*** has been made for the leatherback sea turtle.

Loggerhead sea turtle

The loggerhead sea turtle is a small- to medium-sized (averaging three feet in length) marine turtle with a large head, blunt jaws, a reddish-brown carapace. This species forages on mollusks, crustaceans, fish, and other marine animals. The loggerhead sea turtle inhabits pelagic environments, as well as nearshore areas (e.g., bays, lagoons, salt marshes, creeks, ship channels, coral reefs, rocky areas, and river mouths). Nesting occurs mainly on open beaches or along narrow bays with suitable sand. The Primary Alternative crosses over two estuaries (Moore's Creek and Taylor Creek) and a portion of the River Walk Alternative is located adjacent to the Indian River Lagoon. If the Primary Alternative were to be selected, the trail alternative would be limited to the existing paved area on the bridges over Moore's Creek and Taylor Creek. Likewise, if the River Walk Alternative were selected, the alternative would be limited to the existing paved areas in the vicinity of the Indian River Lagoon. There would be no in-water work associated with the project. Thus, a determination of ***no effect*** has been made for the loggerhead sea turtle.

Fish

Atlantic sturgeon

The Atlantic sturgeon is a large fish which is brown/tan in color with a whitish belly, rough, scale-less skin, and five rows of scutes on the top and sides of the body. It has a long forked heterocercal tail and a hard snout with four whisker-like barbels. It is anadromous, spending the majority of its life in brackish or marine environments, and migrating into freshwater to spawn. This species feeds in the sediment, consuming worms, snails, shellfish, crustaceans, and small fish. It inhabits nearshore marine environments, estuarine environments (e.g., bays, sounds, lagoons, river mouths, tidal rivers), and riverine habitats. The Primary Alternative crosses over two estuaries (Moore's Creek and Taylor Creek) and a portion of the River Walk Alternative is located adjacent to the Indian River Lagoon. If the Primary Alternative were to be selected, the trail alternative would be limited to the existing paved area on the bridges over Moore's Creek and Taylor Creek. Likewise, if the River Walk Alternative were selected, the alternative would be limited to the existing paved areas in the vicinity of the Indian River Lagoon. There would be no in-water work associated with the project. Thus, a determination of ***no effect*** has been made for the Atlantic sturgeon.

Opossum pipefish

The opossum pipefish is a relative large (7.6 inches in length) pipefish with small fins and a long snout (1.5-2.0 times the head length). It has a distinctive coloration with a sienna brown head, a series of dark red blotches forming a red stripe between the lateral and superior trunk ridges, a bright red lower snout with vertical black bard, and a red caudal fin with a central dark stripe. This species is known to occur within the Indian River Lagoon. They forage on small fish in dense vegetation. The Primary Alternative crosses over two estuaries (Moore's Creek and Taylor Creek) and a portion of the River Walk Alternative is located adjacent to the Indian River Lagoon. If the Primary Alternative were to be selected, the trail alternative would be limited to the existing paved area on the bridges over Moore's Creek and Taylor Creek. Likewise, if the River Walk Alternative were selected, the alternative would be limited to the existing paved areas in the vicinity of the Indian River Lagoon. There would be no in-water work associated with the project and a determination of ***no effect*** has been made for the opossum pipefish.

Mangrove rivulus

The mangrove rivulus is a small (lengths of up to 2.4 inches) fish, olive in color, with a flat back body, rounded tail fin, and often small black dots located throughout the body surface. This species consumes worms, copepods, and mosquito larvae. The mangrove rivulus inhabits mangrove forests and is an amphibious/fossorial species, meaning that it is capable of living on land and water. On land, they burrow and can typically be found hidden in rotten wet logs or under moist leaf litter. During the environmental field review, biologists observed mangroves located along the River Walk Alternative, adjacent to the north of the existing concrete path that runs beneath the Seaway Drive bridge (Figure 7). In the area of the mangroves, the proposed River Walk Alternative will utilize the existing pavement and will not require construction of a new trail; thus, a determination of ***no effect*** has been made for the mangrove rivulus.

State-Listed Fauna

Mammals

Sherman's fox squirrel

This large tree squirrel can reach a length of up to 27.6 inches (70 cm) and weighs from one to three pounds. This species varies in color from black to brown and has a black head, white ears, and a white snout with a long bush tail. Its diet consists of mostly longleaf pine seeds and turkey oak acorns, but they also consume fungi, fruit, and buds. This species inhabits open, fire-maintained longleaf pine, turkey oak, sandhill, and pine flatwood habitats. Other habitat types that might be utilized by this species include mixed hardwood pine, mature pine forests, cypress domes, pastures, the ecotone between bayheads and pine flatwoods, and other open habitats with pine and oaks. No fox squirrels or their nests

were observed during environmental field survey. Suitable habitat for the Sherman's fox squirrel was not observed within the project area and no adverse effects to this species are anticipated from the proposed project.

Birds

Florida burrowing owl

This small, ground-dwelling owl averages nine inches in height with a mean wingspan of approximately 21 inches. Burrowing owls have sandy brown plumage and are spotted and barred with brown and white. They typically dig burrows that are six to nine feet in length and up to three feet deep; however, they may also utilize gopher tortoise burrows or armadillo burrows. Burrowing owls inhabit open habitats with short groundcover and suitable habitats includes dry prairie, pasture land, agricultural fields, golf courses, airports, schools, and vacant residential lots. No burrowing owls or burrows were observed during the environmental field survey. However, the South Alternative 1 and River Walk Alternative may require construction of trail portions that are located in areas with suitable habitat for this species. ***A burrowing owl survey should be conducted during design and permitting of the project*** to determine the location of any burrows within the proposed project area. In the event that any project activities are to occur within 50 feet of a burrowing owl burrow, a FWC Incidental Take Permit would be required.

Reptiles

Gopher tortoise

This terrestrial tortoise averages nine to 11 inches in length with an oblong shell that is generally tan, brown, or gray. It can be identified by its stumpy, elephantine hind feet and flattened, shovel-like forelimbs adapted for digging. Gopher tortoises typically inhabit upland habitats that have the following general characteristics: well drained, sandy soils; abundant groundcover; relatively open canopy and sparse shrub cover. These habitat characteristics occur in a variety of Florida's native upland communities, including scrub communities, coastal strand, and pine flatwoods. Gopher tortoises dig extensive burrows for shelter and forage on low-growing plants. Gopher tortoises share their burrows with more than 350 other species, including the Eastern indigo snake, gopher frog, and Florida mouse, and are therefore referred to as a keystone species. Development pressures on many of the upland communities in Florida have been increasing. Thus, more disturbed habitats, such as fence rows, old fields, range lands, and canal banks have become important to gopher tortoises. Suitable habitat for this species can be found throughout the project study area. No gopher tortoises or burrows were observed during the environmental field survey. A gopher tortoise survey should be conducted along the selected trail alternative during the design phase of the project, prior to construction, and FWC gopher tortoise permitting guidelines should be implemented. If a 25-foot buffer

around a burrow cannot be maintained during construction, then the gopher tortoise must be relocated.

Other species

Osprey

The osprey is a raptor with a white underside and head, a brownish back, a dark brown streak that extends through their eye towards the back of the head, and streaks across the top of their head and breast. The osprey is listed as a species of special concern by FWC only within Monroe County, but the nests are protected by FWC in other parts of the state and under the Migratory Bird Treaty Act. In Florida, osprey habitat includes coasts, lakes, rivers, and swamps containing suitable nesting sites. Nesting typically occurs in large trees and on man-made structures/platforms. Osprey also nest in low lying sites, such as those found in mangrove swamps. Suitable habitat for the osprey be found within the project study area; however, no osprey or osprey nests were observed during the environmental field survey. No adverse effects to this species are anticipated from the proposed project.

Listed Plant Species

Federally-Listed Plants

Fragrant prickly apple

The fragrant prickly apple is rare, slender, columnar, solitary tree cactus with one to eight spiny, cane-like, stout, and succulent stems. The stems are up to 0.20 inches in diameter and have 10 or 12 ridges, with alternating deep, sharp, grooves. The flowers are showy, solitary, five to eight inches long, with a long, scaly floral tube. Petals are numerous, long and narrow, fragrant, white when open at night and turn pink the next morning. Typically, the fragrant prickly-apple also has one round, red, fruit, with wooly spines. Three populations of this species are known and these are restricted to 11 small disjunct sites along the Atlantic Coastal Ridge in eastern St. Lucie County. One of the three known populations occur on private land in residential areas and the other two occur in Florida's Savannas State Preserve, located south of the project study area. This species prefers early-successional sand pine scrub habitat and known sites are limited to the St. Lucie sand soil which is excessively well drained where water capacity, fertility, and organic matter content are all very low. No fragrant prickly apple was observed during the environmental field survey and no suitable habitat for this species occurs within the project area. Therefore, a determination of ***no effect*** has been made for the fragrant prickly apple.

Lakela's mint

Lakela's mint is a small (up to 1.3 feet tall), fragrant shrub that has 1-inch long, narrowly oval, opposite leaves, with rounded tips that have inrolled margins and are covered in glands. Flowers are less than 0.8 inches long, one to three per whorl, and rose-purple in color, with no spots or lines. Its growth is bushy in open sun and lax in shade and it forms small mats or domes of ascending to spreading or sprawling branches. The range of this species is extremely small and it is known for a single population that occurs in six isolated sites in southern Indian River and northern St. Lucie counties. It found in light shade or clearings in scrub along the Atlantic coastal ridge. No Lakela's mint was observed during the environmental field survey and no suitable habitat for this species occurs within the project area. Therefore, a determination of ***no effect*** has been made for the Lakela's mint.

Tiny polygala

The tiny polygala is an erect, relatively short-lived (germinating and dying within one year) herbaceous species that grows to a height of approximately four inches tall, has one to four unbranched stems, and a fragrant tap root. The plant is also characterized by two-inch long, lance-shaped leaves that extend radially from the base. The corolla is a greenish-yellow color with three petals. This species requires high light levels and open sand with little to no organic litter accumulation. The documented St. Lucie County population of this species occurs on a scrubby flatwoods knoll in Hobe Sand soils with sand pine, slash pine, and scrub live oak canopy trees. According to the US Department of Agriculture (USDA) NRCS Web Soil Survey, there are no Hobe Sand soils located within the project study area. No tiny polygala was observed during the environmental field survey and no suitable habitat for this species occurs within the project area. Therefore, a determination of ***no effect*** has been made for the tiny polygala.

Johnson's seagrass

Johnson's seagrass is a submerged sea grass and was the first marine plant to be listed under the Endangered Species Act. Its leaves are 0.8-2.0 inches in length and occur in pairs along a single stem. The leaves have a brown mid-rib and veins and occur at 0.5-2.0-inch intervals along the stem. Johnson's seagrass has one of the most limited geographic ranges of all seagrass species and is only known to occur between Sebastian Inlet and northern Biscayne Bay on the east coast of Florida. It is located in coastal sediments in shallow estuarine and marine waters (up to nine feet deep) and is often found on tidal deltas inside inlets and on sandy shoals. The Primary Alternative crosses over two estuaries (Moore's Creek and Taylor Creek) and a portion of the River Walk Alternative is located adjacent to the Indian River Lagoon. If the Primary Alternative were to be selected, the trail alternative would be limited to the existing paved area on the bridges over Moore's Creek and Taylor Creek. Likewise, if the River Walk Alternative were selected, the alternative would be limited to the existing paved areas in the vicinity

of the Indian River Lagoon. There would be no in-water work associated with the project and a determination of ***no effect*** has been made for Johnson's seagrass.

State-Listed Plants

Coastal vervain

Coastal vervain is a perennial herb with sprawling stems up to two feet long. Leaves are succulent and irregularly lobed and toothed. Its calyx has stalked glands and pointed lobes. The flowers are lavender in color with an orange throat, five-lobed, and tubular with each lobe approximately 0.5 inches long. This species occurs in disturbed, sandy areas on back dunes, dune swales, and coastal hammocks. No coastal vervain was observed during the environmental field survey and no suitable habitat for this species occurs within the project area. No adverse effects to this species are anticipated from the proposed project.

Celestial lily

The celestial lily is a perennial herb with a single, tall, slender stem. Its basal leaves are grass-like and can exceed two feet in length and the stem leaves are small and scattered along the stem. It has six dark blue flowers that are more than 1.5 inches across with spreading petals and sepals. This species inhabits wet, swampy habitats such as wet flatwoods, prairies, marshes, and the edges of cabbage palm hammocks. No celestial lily was observed during the environmental field survey and no suitable habitat for this species occurs within the project area. No adverse effects to this species are anticipated from the proposed project.

Coastal hoary-pea

The coastal hoary-pea is a perennial herb with straggling or arching stems (eight to 32 inches long). It has few scattered hairs and compound leaves with 11-17 opposite leaflets with conspicuous veins. The flowers are tiny and white to dark pink, typically pea-shaped with a large erect banner petal. This species inhabits scrub and sandy areas. No coastal hoary-pea was observed during the environmental field survey and no suitable habitat for this species occurs within the project area. No adverse effects to this species are anticipated from the proposed project.

Piedmont jointgrass

Piedmont jointgrass is a tall, tufted, perennial grass with erect or ascending culms in solitary or in small tufts. This particular jointgrass has three spikelets (1.3 - two mm wide) and the first glume has scattered small, or no, transverse ridges. Habitat includes depressional marshes, flatwoods, swamps, savannas, ponds, roadway ROW, and ditches. No Piedmont jointgrass was observed during the environmental field survey and

no suitable habitat for this species occurs within the project area. No adverse effects to this species are anticipated from the proposed project.

Large-flowered rosemary

Large-flowered rosemary is a perennial, evergreen, aromatic shrub that reaches a height of three to four feet and a width of one to two feet, with purple to lavender flowers. This species has hairy, glandular, needle-like, opposite leaves. It flowers year-round and the large, two-lipped, bright-blue-to-lavender colored flowers with dark spots on the lower lip. This species inhabits coastal scrub, pine scrub, dunes, and sandhill habitats with fine, deep soils. No large-flowered rosemary was observed during the environmental field survey and no suitable habitat for this species occurs within the project area. No adverse effects to this species are anticipated from the proposed project.

Nodding pinweed

Nodding pinweed is a perennial herb that has slender, erect, flowering stems, rising from a dense mat of spreading, older stems. It has short leaves (less than 0.4 inches) that are alternative and narrowly oval with pointed tips. The flowers of this species occur in tight clusters at the ends of short branches, with three tiny, purple or green petals and five sepals. The entire plant is covered with spreading, gray hairs. Habitat includes scrub and scrubby flatwoods. No nodding pinweed was observed during the environmental field survey and no suitable habitat for this species occurs within the project area. No adverse effects to this species are anticipated from the proposed project.

Giant orchid

The giant orchid is a perennial herb that has two to four erect, pleated, veined, basal leaves (six to 28 inches long and 0.5-1.5 inches wide). The flower stalk is 1.0-5.5 feet tall and leafless with a terminal spike of five to 30 flowers with a stiff floral bract beneath each flower. The sepals and petals are yellow-green and folded forward over the three-lobed lip. The prominent central lobe is maroon with green margins. This species is known to occur in sandhill, scrub, pine flatwood, and pine rockland habitats. No giant orchids were observed during the environmental field survey and no suitable habitat for this species occurs within the project area. No adverse effects to this species are anticipated from the proposed project.

6.2.2 Wetlands and Essential Fish Habitat

The USFWS's NWI data were reviewed to determine the presence of wetlands and other surface waters within the project study area. The findings below are based on the NWI data, as well as the environmental field review conducted on April 19, 2018. Wetland and

surface water impacts were calculated only in areas where a proposed new trail could potentially be constructed and do not include areas where the proposed trail alternative would utilize an existing paved surface. A 20-foot-wide trail alternative was used for the impact analysis, which includes ten feet on either side of the proposed trail centerline.

Estuarine and Marine Deepwater

The only wetland category identified by the NWI data within the project study area is estuarine marine and deep-water habitat (E1UBLx – estuarine, subtidal, unconsolidated bottom, subtidal). The Primary Alternative crosses over Moore's Creek south of Backus Avenue (Bridge No. 940029). The Primary Alternative also crosses over Taylor Creek between North 4th Street and North Causeway Drive/SR A1A (Bridge 945000). If the Primary Alternative were to be selected, the trail alternative would be limited to the existing paved area on the bridges over Moore's Creek and Taylor Creek. There would be no in-water work or work on the banks of Moore's Creek or Taylor Creek. Additionally, the River Walk Alternative is located in close proximity to the Indian River Lagoon; however, if the River Walk Alternative were selected, the alternative would be limited to the existing paved areas adjacent to the Indian River Lagoon and there would be no in-water work. **Figure 8** shows the location of these estuarine wetlands in relation to the project study area. Thus, no impacts to any wetlands or Other Surface Waters from the any of the proposed Alternatives are anticipated.

Essential Fish Habitat (EFH)

The NMFS EFH Mapper was reviewed to identify EFH within and adjacent to the project area. Moore's Creek and Taylor Creek are two waterbodies within the project study area that are understood to contain EFH. The Primary Alternative crosses over Moore's Creek south of Backus Avenue (Bridge No. 940029). The Primary Alternative also crosses over Taylor Creek between North 4th Street and North Causeway/SR A1A (Bridge 945000). If the Primary Alternative were to be selected, the trail alternative would be limited to the existing paved area on the bridges over Moore's Creek and Taylor Creek. There would be no in-water work or work on the banks of Moore's Creek or Taylor Creek. Additionally, the River Walk Alternative is located in close proximity to the Indian River Lagoon; however, if the River Walk Alternative were selected, the alternative would be limited to the existing paved areas adjacent to the Indian River Lagoon and there would be no in-water work. Thus, no impacts to EFH are anticipated from the Primary Alternative or any other Alternative.

Figure 8. Wetlands Map



6.2.3 Upland Habitat

The FLUCFCS data were reviewed to identify the natural upland habitat types within the project study area. Based upon the FLUCFCS maps, there are no natural, undeveloped

upland communities located within or adjacent to the project study area. As described in Section 6.1.1 of this document, the existing land use within the project study area is a mix of residential, commercial, industrial, and transportation. This finding was confirmed by the observations of biologists during the environmental field survey. The area where a proposed new trail could potentially be constructed along South Alternative 1 (between Citrus Avenue and Orange Avenue) consists mostly of previously cleared, grass-covered ground with occasional trees and other vegetation (e.g., Brazilian pepper) in an industrial/commercial area (**Figure 9**). The area where a proposed new trail could potentially be constructed along the River Walk Alternative (on the north side of Seaway Drive between Indian River Drive and the existing concrete path beneath the Seaway Drive causeway bridge) consists of maintained grass between a roadway and a parking lot (Figure 9).

Figure 9: Proposed New Trail Areas



Photographs of the area where a proposed new trail could potentially be constructed. Top photos were taken along the South Alternative 1 between Citrus Avenue and Orange Avenue. Top left photo looking northwest from a position east of Boston Avenue and west of the railroad tracks. Top right photo looking north from Boston Avenue. Bottom photograph shows the potential new River Walk Alternative on the north side of Seaway Drive (photograph looking northwest).

Upland habitat impacts are calculated only in areas where a proposed new trail could potentially be constructed and do not include areas where the proposed trail alternative would utilize an existing paved surface. No impacts to any natural upland habitats is anticipated from the any of the proposed Alternatives**.**

6.2.4 Outstanding Florida Waters/Aquatic Preserves

Section 403.061(27), Florida Statutes, grants the Florida Department of Environmental Protection (FDEP) the power to establish rules that provide for Outstanding Florida Waters (OFW) that are worthy of special protection based on their natural attributes. The list of designated OFW provided in Rule 62-302.700 (9), Florida Administrative Code, was reviewed. There are no OFW or aquatic preserves identified within or adjacent to the project study area.

6.2.5 Floodplains

The FEMA floodplain data were reviewed. These data are based on the FEMA FIRM. Portions of the project study area are located within the 100-year floodplain (Flood Zones A, AE, AH, and VE); however, floodplain impacts are calculated only in areas where a proposed new trail could potentially be constructed and do not include areas where the proposed trail alternative would utilize an existing paved surface. The only area where a proposed new trail alternative is located within the 100-year floodplain is along the River Walk Alternative, on the north side of the Seaway Drive bridge between Indian River Drive and the existing concrete path beneath the Seaway Drive bridge. This small area (0.04 acres) is located within Flood Zones AE and VE. **Figure 10** shows the FEMA flood zones within the project study area. **Table 4** shows the estimated floodplain impacts for each alternative.

Table 4: Floodplain Impacts (Acres)

FEMA Flood Zone	Primary Alternative	East Alternative 1	East Alternative 2	River Walk Alternative
Flood Zone (AE)	0.00	0.00	0.00	0.02
Flood Zone (VE)	0.00	0.00	0.00	0.02
Total	0.00	0.00	0.00	0.04

Note: Impact calculations are based on a 20-foot-wide trail alternative (which includes 10 feet on either side of the proposed trail centerline) only in areas where a proposed new trail could potentially be constructed.

Figure 10: Flood Zones



6.3 Physical Features

The proposed project's impact to nearby physical features, such as noise, air quality and potential contamination sites, were identified and evaluated.

6.3.1 Noise

The referenced project does not meet the criteria for a Type I project established in 23 CFR 772 and Chapter 18 of Part 2 of the FDOT *PD&E Manual*. Therefore, the project requires no analysis for highway traffic noise impacts. Because it is a trail project, no long-term noise impacts are anticipated.

6.3.2 Air Quality

The project is in an area that is designated as attainment for all of the National Ambient Air Quality Standards under the criteria provided in the Clean Air Act. Therefore, the Clean Air Act conformity requirements do not apply to the project. The project will have no effect on area-wide air quality levels and no screening analyses was required.

6.3.3 Contamination

A preliminary evaluation of the project area was conducted to determine if potential contamination sources occur and if the project would be affected by any known contaminants. This analysis included a review of FDEP's on-line data and aerial review. According to online FDEP data and the Contamination Locator Map (FDEP, 2018), there are known contamination sites occurring within 500 feet of the proposed alternatives centerlines as shown in **Table 5**. Based on this limited review, it is unlikely that a contamination source would be impacted by the current project scope; however, this final determination is made by the FDOT District Contamination Impacts Coordinator (DCIC).

Table 5: Potential Contamination Sites

Site Description (Type, Facility ID, Address, Status)	**Primary Alternative**	**South Alternative 1**	**South Alternative 2**	**River Walk Alternative**
Brownfields:				
• BF561101001 – Parcel 1, 322 North 2nd Street (Active Brownfield Cleanup)	X			X
• BF561101002 – Parcel 2, 125 A.E. Backus Avenue (Active Brownfield Cleanup)	X			X

Site Description (Type, Facility ID, Address, Status)	Primary Alternative	South Alternative 1	South Alternative 2	River Walk Alternative
• BF561101003 – Parcel 3, North 2nd Street (Active Brownfield Cleanup)	X			X
Petroleum / Storage Tank Contamination Monitoring (STCM):				
• 8631077 – Culligan Water Conditioning, 302 Georgia Avenue (Active Petroleum Cleanup)	X			
• 9202664 – Conchem, 250 Florida Avenue (Pending Petroleum Cleanup)	X			
• 8838094 – Debrooks Fishing Corner, 107 Fishermans Wharf (Pending Petroleum Cleanup)	X			X
• 9202212 – Egan Packing Co., 304 Boston Avenue (Pending Petroleum Cleanup)	X	X	X	
• 9300064 – FL East Coast Railway-Material Yard, 353 Florida Avenue (Pending Petroleum Cleanup)	X	X	X	
• 8520200 – CEMEX – Ft. Pierce District Shop, 1301 North 2nd Street (Pending Petroleum Cleanup)	X			
• 8518593 – Giant Oil #137, 511 S US Highway 1 (Active Petroleum Cleanup)	X	X	X	
• 9400513 – Kane & Grunbaum Property, 621 Southe US Highway 1 (Active Petroleum Cleanup)	X			
• 9814380 – Vacant Lot-SE of Courthouse, South US Highway 1 (Active Petroleum Cleanup)	X	X	X	
• 8516135 – Vak Express, 701 South US Highway 1 (Active Petroleum Cleanup)	X			
• 8516038 – Palmdale Oil Co Inc, 911 North 2nd Street (Active Petroleum Cleanup)	X			X

Site Description (Type, Facility ID, Address, Status)	Primary Alternative	South Alternative 1	South Alternative 2	River Walk Alternative
• 8516231 – Taylor Creek Marina, 1600 North 2nd Street (Active Petroleum Cleanup)	X			
Other Waste Cleanup:				
• ERIC_3834 – Qual-Krom, 301 Florida Avenue (Pending Other Cleanup / polluted soils and groundwater)	X			
• COM_259345 – Boston Avenue Project a/k/a Egan & Company a/k/a FEC Railway, 1900 Old Dixie Highway (Active Other Cleanup)	X	X	X	
• COM_82363 – HD King Electric Power Plant (Former), 311 N Indian River Drive (Active Other Cleanup)	X			X
Total Potential Contamination Sites	**18**	**5**	**5**	**6**

Note: Any '**X**' indicates potential contamination site is adjacent (within approximately 100 feet of the proposed centerline) to proposed alternative.

Section 7.0 Permit Requirements

The following permits are anticipated to be required for the proposed project:

- FDEP National Pollutant Discharge Elimination System (NPDES) General Permit
- Section 10/Section 404 Department of the Army Permit
- SFWMD Environmental Resource Permit

Section 8.0 Coordination

Numerous meetings were held with agency stakeholders to discuss the proposed project. Meeting materials are provided in Appendix B.

Table 6: Agency Stakeholders Meetings

Date	Meeting	Attendees	Comments
January 18, 2017	Pre-Project Kick-Off Meeting	FDOT, Atkins,	Provided a general overview of the SUN

Date	Meeting	Attendees	Comments
		St. Lucie County, City of Fort Pierce, St. Lucie TPO, and Treasure Coast Regional Planning Council (RPC)	Trail projects, potential locations, and any foreseen concerns or challenges
April 25, 2017	Local Agency Kick-Off Meeting	FDOT, Atkins, St. Lucie County, City of Fort Pierce, Janus Research, and Treasure Coast RPC	Discussed preliminary alternatives that were developed by Fort Pierce, Saint Lucie County, St. Lucie TPO, and the Treasure Coast RPC
September 20, 2017	City of Fort Pierce Design Coordination Meeting	FDOT, Atkins, St. Lucie County, City of Fort Pierce, St. Lucie TPO	General discussion of alternatives and issues that may arise; new potential alternatives were proposed
March 30, 2018	Design Coordination Meeting	FDOT, St. Lucie TPO	General discussion of alternatives and issues that may arise; new potential alternatives were proposed
May 9, 2018	Design Coordination Meeting	FDOT, Atkins, St. Lucie County, City of Fort Pierce, St. Lucie TPO	Decided on final alternatives to be evaluated

8.1 Public Kick-Off Meeting

A Public Kick-Off Meeting was held on October 10, 2017 at the Old City Hall, 315 Avenue A in Fort Pierce from 5 p.m. to 7 p.m. Notification of the meeting was sent to all land owners and residents within 300-feet of each alternative. A total of 24 members of the public attended the meeting. A brief presentation including the alternatives and potential environmental and user conflicts was presented during the meeting. Handouts and displays were provided detailing the Feasibility Study process and helping the public become familiar with the SUN Trails and study process.

A total of six comments were received from the public. The comments included questions, a suggestion of the trail placement, a suggestion of the material used to construct the trail, a suggestion of adding historical significance placement markers along the trail, and two letters of non-support of the trail.

8.2 Public Alternatives Analysis Meeting

A Public Alternatives Analysis Meeting was held on June 5, 2018 at the Old City Hall, 315 Avenue A in Fort Pierce from 5 p.m. to 7 p.m. Notification of the meeting was sent to all land owners and residents within 300-feet of each alternative. A total of 23 members of the public attended the meeting. A brief presentation including the alternatives and potential environmental and user conflicts was presented during the meeting and attendees were given the opportunity to ask questions and present comments. Handouts and displays were provided detailing the final potential alternatives that were developed and studied during the Feasibility Study process. No written public comments were received.

Section 9.0 Alternatives Comparison

This Section summarizes and compares the anticipated impacts for each of the alternatives identified during this feasibility study.

Table 7: Historic Downtown Fort Pierce Trail Alternatives Comparison Matrix

	No Build	Primary Alternative	South Alternative 1	South Alternative 2	River Walk Alternative
Meets SUN Trail Program Design Criteria	N/A	Yes (portions)	No (requires significant amount private ROW)	No	Yes (portions)
Social Features					
Existing Land Use	No adverse effects	No adverse effects	No adverse effects	No adverse effects	No adverse effects
Future Land Use	No adverse effects	No effect	No effect	No effect	No effect
Community Cohesion	No adverse effects; but does not enhance connectivity in the area and does not meet the intended purpose of the project.	Enhanced connectivity.	Enhanced connectivity.	Enhanced connectivity.	Enhanced connectivity.
Relocations	None	• No potential building relocations identified if project remains within existing ROW. • Relocation of existing overhead power lines near the southern terminus along 3rd Street.	No potential relocations identified.	No potential relocations identified.	No potential relocations identified.
ROW or Easements Required (Private/FEC)	None	Yes (portions)	Yes	Yes	No
Community Services	No adverse effects	No impacts to community services if project remains within existing ROW.	No community services will be impacted.	No community services will be impacted.	No community services will be impacted.
Potential User Conflicts	None	• Conflicts with road crossings could be handled with specialized road crossing, including cross walks. • Conflicts with heavy delivery trucks to warehouses. Minimize conflict with signage. • Conflicts with on street parking could be handled with signage or different alternative selection.	• Conflicts with road crossings could be handled with specialized road crossing, including cross walks. • Conflicts with heavy delivery trucks to warehouses. Minimize conflict with signage. • Conflicts with on street parking could be handled with signage or different alternative selection.	• Very steep and narrow bridge on Citrus Ave creates unsafe bicycle terrain. Minimize conflict by not using bridge. • Conflicts with road crossings could be handled with specialized road crossing, including cross walks. • Conflicts with on street parking could be handled	• Conflicts with boat ramp users. Minimize conflicts with signage. • Conflicts with park users (fishing). Minimize with signage and specific fishing and resting spots. • Conflicts with heavy delivery trucks to warehouses. Minimize conflict with signage.

	No Build	Primary Alternative	South Alternative 1	South Alternative 2	River Walk Alternative
				with signage or different alternative selection. • Traffic Circle conflicts and confusion for novice riders could be handled with signage.	
Cultural					
Archaeological/ Historical Resources	None	1 National Register-Listed bridge, 1 National Register-Eligible bridge, 1 National-Register-Eligible railroad, 1 National Register-Eligible roadway, 2 Fort Pierce-designated historic districts	1 National Register-Eligible railroad, 1 Fort Pierce-designated historic district	1 National Register-Listed structure, 1 National Register-Eligible railroad, 2 Fort Pierce-designated historic districts	2 Fort Pierce-designated historic districts
Section 4(f)	N/A	N/A	N/A	N/A	N/A
Natural					
Threatened and Endangered Species	No effect	No effects	No adverse effects	No effects	No effects
Wetlands/Other Surface Waters (acres)	None	None	None	None	None
Upland Habitat (acres)	None	None	None	None	None
Outstanding Florida Waters/Aquatic Preserves	None	None	None	None	None
Floodplains (acres)	No effect	None	None	None	0.04
Physical					
Noise	None	No effect	No effect	No effect	No effect
Air Quality	None	No effect	No effect	No effect	No effect
Contamination	None	See “Contamination Summary” table in Section 6 for sites identified. (Contamination Impacts to be determined by FDOT DCIC)	See “Contamination Summary” table in Section 6 for sites identified. (Contamination Impacts to be determined by FDOT DCIC)	See “Contamination Summary” table in Section 6 for sites identified. (Contamination Impacts to be determined by FDOT DCIC)	See “Contamination Summary” table in Section 6 for sites identified. (Contamination Impacts to be determined by FDOT DCIC)

Section 10.0 Conclusions and Recommendations

Based on the analysis conducted and summarized in this report, the Recommended Alternative is a combination of the Primary Alternative, Riverwalk Alternative, and South Alternative 1 (**Figure 11**). In addition to the summary provided below, there was a consensus for this alternative among the project partners, St. Lucie County, St. Lucie TPO, and the City of Fort Pierce. The following is a summary of impacts for the Recommended Alternative:

SUN Trail Design Criteria

As noted in Section 5.3.3, only certain portions of the Primary Alternative and Riverwalk Alternative meet the design criteria and can be funded under the SUN Trail Program. For these portions, two options should be considered: 10 to 14-foot multi-use path or eight-foot multi-use path and wall. Figure 11 provides details.

For the areas that do not meet the criteria, other design options would be considered by local agencies for further development and funding. The South Alternative 1 does not meet SUN Trail criteria because the entire section would require either private or FEC ROW. Ongoing coordination with the FDOT District 4, City of Fort Pierce, St. Lucie County, and St. Lucie TPO would be recommended to identify and explore design and funding options. Design options would include sharrows or bike lanes and these different options are outlined in Figure 11.

It is important to note that there is an opportunity for the Recommended Alternative between Avenue M and the North Causeway along Old Dixie Highway. Currently, there is not enough ROW for an eight to 14-foot multi-use path across the Old Dixie Highway Bridge. However, a separate local project is proposing improvements that would provide adequate space for an eight to 14-foot multi-use path. Following the presentation of three options to the City Commission on December 17, 2018, the City Commission, by consensus in a letter dated December 18, 2018, chose Option 3 as follows:

Option 3 – One-Way Bridge with East Coast Greenway Trail

- Establishes the East Coast Greenway on the one-way Bridge and Old Dixie Highway
- Minimal Right-of-Way Acquisition Required (approximately 0.25 acres)
- Eliminates the Blind Intersection at Old Dixie Highway and U.S. Highway 1
- Estimated Cost $2,600,000

Ongoing coordination with local project stakeholders is recommended.

Social Features

- Community Services: This alternative will not affect community cohesion or adversely impact community facilities. The project instead is an enhancement for the community as it provides recreational opportunities and multi-modal opportunities for the surrounding communities.
- Potential user conflicts for the proposed trails are the necessary road crossings, heavy delivery trucks to warehouses, on street parking, park users (fishing), and confusion for novice riders. Specialized road crossing, including cross walks, should be utilized to help increase the safety of the trail users. In addition, the other potential user conflicts can be minimized with the appropriate use of signage and wayfinding techniques.
- No potential building relocations identified, but relocation of existing overhead power lines would be required near the southern terminus along 3rd Street. While there are potential design conflicts with the east and west side along 3rd St, the west side presents more conflicts including limited ROW, impacts to 10 driveways/garage entrances, and on multiple street parking relocations.
- For this reason, the east side is chosen as the Recommended Alternative. Given the limited ROW constraints along the east side, existing utility poles are located within the path where the future trail is proposed, so will need to be relocated. One of the project partners, City of Ft. Pierce, has requested that the west side be considered for the recommended alternative, so additional design coordination is recommended during the design phase.

Archaeological/ Historical Resources

- There are several National Register-Listed and Eligible properties, and two Fort Pierce-designated historic districts located in the project vicinity. Continued coordination with the State Historic Preservation Officer (SHPO) will be required to assess and minimize impacts during final design of the project.

Natural Resources

- Floodplains: This alternative would result in a total of 0.04 acres of impacts to the 100-year floodplain (Flood Zones AE and VE).

Figure 11: Recommended Alternative



Wayfinding

The Historic Downtown Fort Pierce Retrofit Trail is considered a critical piece of the ECG network and would connect to the North Causeway ECG Trail and the proposed Historic Highwayman Trail Gap. In addition to the trail providing connectivity between nearby neighborhoods and Downtown Fort Pierce, the project could provide a connection to other network trails including the Highwaymen Heritage Trail located west of project. To ensure easy navigation and cohesion throughout the corridor, wayfinding signage and pavement markings are recommended to be placed throughout the corridor. The use of signage will also assist with minimizing potential user conflicts. All wayfinding signage design must follow MUTCD standards and would be coordinated during the project design phase.

Cost Analysis

A Preliminary Long-Range Estimate (LRE) was prepared for the Recommended Alternative that can be constructed using the SUN Trail funding (**Appendix I**). To be funded under SUN Trail Program, the following design criteria were considered: path must be 10 to 14 feet in width (eight feet in rare cases), a multi-use paved path, and separated from the roadway (at least five feet of separation is needed or a physical barrier/railing). To put a cost to these different options the LRE consists of five different sequences, each sequence represents a different section that meets SUN Trail Design criteria. The sequences do not link the project from beginning to end because there are certain sections along the preferred route that will require ROW or will need to be funded with money not from SUN Trail. The sections that are excluded and included from the LRE are highlighted in Figure 11**.** The LRE shows the estimated cost for a multi-use trail with an average width of 10 feet.

Section 11.0 References

Birdsong, R. (n.d.). *SUN Trail Program Process for Funding.* Retrieved from Florida Department of Transportation: http://www.fdot.gov/planning/systems/SUNTrail/SUN_Trail_Process_Eligibility_Selection.pdf

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St. Lucie Transportation Planning Organization. (2012). *St. Lucie TPO East Coast Greenway Implmentation Plan.* Kimley-Horn and Associates, Inc.

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Appendix A

St. Lucie County SUN Trail Application

Florida Department of Transportation
Shared-Use Nonmotorized (SUN) Trail Network Program
Individual Trail Application

PART I – ELIGIBILITY CRITERIA

Projects **must meet all** of the **eligibility criteria** to receive consideration for SUN Trail funding. SUN Trail will only fund paved multi-use trails.

1. **Will the project be developed as a paved multi-use trail within the Florida Department of Environmental Protection, Florida Greenways and Trails System (FGTS) Priority Land Trail Network and the SUN Trail Network?**

   ☒ **Yes** ☐ **No**

2. **Is the project identified as a priority by the applicable jurisdiction(s)?** If the project is within a boundary of a Metropolitan/Transportation Planning Organization (MPO), it must be a MPO priority. Projects outside of an MPO boundary must be identified as a priority of the county (inclusive of their municipalities), tribal government, and federal or state-managing agency. **Attach the prioritization list and complete Part V.**

   ☒ **Yes** ☐ **No**

   Indicate the priority number of the project: St. Lucie TPO: Priority 3

3. **Has an entity formally committed to operation and maintenance of the project? Complete and sign Part VI (CERTIFICATION OF WILLING MANGER).**

   ☒ **Yes** ☐ **No**

4. **Is the project consistent with the applicable comprehensive plan(s) or the long-term management plan(s)?**

   ☒ **Yes** ☐ **No**

   Indicate the type of plan(s) and date(s) of adoption. SLC GW&T Master Plan (2001); SLC Comp Plan (2010); ECG Plan (2016); Go2040 St Lucie TPO LRTP (2016)

Do not proceed to Part II if the project resulted in a "no" response in Part I.

PART II – PROJECT INFORMATION

Project Name: Historic Downtown East Coast Greenway Segment

Project Location (attach a labeled location map with aerial view, optional: submit shape files)

Municipality: Ft. Pierce, FL

County: St. Lucie County

FDOT District Number: 4

Termini Begin: Historic Highwaymen Segment terminus & 3rd Street

Termini End: North Causeway Drive

Total Length: 13,000 LF

Briefly describe the scope of the project: Project would connect the Historic Highwaymen East Coast Greenway Segment to the North Causeway East Coast Greenway connector segment.

PART III – PROJECT COSTS

Florida Statue requires a reasonable estimate of the project cost prior to adoption in the Department's Five Year Work Program. Use **Present Day Cost** values. Projects must follow appropriate design criteria and meet Americans with Disabilities Act requirements. If necessary, attach a separate spreadsheet.

Funding Phase(s) requested:

- ■ **Feasibility Study (FS)** ■ **Project Development & Environment (PD&E)**
- ■ **Preliminary Engineering/Design (PE)** ■ **Acquisition of right-of-way (ROW)**
- ■ **Construction (CON)** ☐ **Construction Engineering & Inspection Activities (CEI)**

Briefly describe any project work phases that are underway or completed.
The North 2nd Street roadway improvement project is approximately 25 percent complete with construction (which includes addition of 5 ft wide concrete sidewalks). The project is scheduled for completion in February 2017.

Proposed timeline and funding needs:

Phase	Proposed Year(s)	Amount(s) Requested	Matching Funds	Total Project Costs	Source(s) of Match
FS	1	50,000.00		50,000.00	
PD&E	2	175,000.00		175,000.00	
PE	3	230,000.00		230,000.00	
ROW	4	300,000.00		300,000.00	
CON	4,5	1,150,000.00		1,150,000.00	
CEI				0.00	
TOTAL	5		0.00	1,905,000.00	

PART IV – SELECTION CRITERIA

Projects may not meet all of the following selection criteria, a numerical ranking will not be calculated, and Individual Trail Projects with the greatest strengths will advance more quickly. **Optional**: provide attachments if additional space is needed.

1. **Does the project enhance the safety of bicyclists, pedestrians and motorists?**
   ■ **Yes** ☐ **No**
   If yes, check applicable attributes and briefly describe how the project meets the selection criteria.

   ■ Project includes a safety component.

   ■ Project is located in an area identified as a hazardous biking/walking zone or in an area with significant numbers of safety concerns.

   ■ Project implements a bicycle and pedestrian safety action plan. Provide the name of the plan and date of adoption. Go2040 Long Range Transportation Plan (2/3/16)

   ■ Other (list).

   Provides a safer corridor away from faster speed limit streets/roads by directing users to 2nd and 3rd St.

2. **Is the project recognized as having regional, state or national importance?**
   ■ **Yes** ☐ **No**
   If yes, check applicable attributes and briefly describe how the project meets the selection criteria.

   ■ Project is a component of a Regional Trail System prioritized by the Florida Greenways and Trails Council. List the Regional Trail System(s).
   East Coast Greenway (ECG) Southeast Region and the Florida GWT System Plan

   ■ Project is a component of a National Recreational Trail, East Coast Greenway or a trail that has other national importance. List the national recognitions.
   East Coast Greenway

   ■ Project implements an adopted regional bicycle, pedestrian or trail master plan. Provide the name of the regional plan(s). St. Lucie County Master Greenway Trail Plan; Southeast Florida Regional Greenways & Trails Master Plan; Go2040 LRTP

   ■ Other (list) A focal point in the St. Lucie Bicycle/Pedestrian Corridor Study Area of Interest Analysis by the St. Lucie Transportation Planning Organization.

3. **Is there an additional financial contribution committed to the project?**
Select the most appropriate response.

☐ Yes, funds are leveraged by multiple public/private sources of investments dedicated to this specific trail segment (i.e. federal, state, local, non-profit, private landowner contributions). If yes, what are the sources? _____

_____

What is the total percentage of match? _____

☐ Yes, funds are leveraged by at least one additional public/private source of investment dedicated to this specific trail segment.
If yes, what is the source? _____

What is the total percentage of match? _____

■ No, funds are not leveraged by public/private sources of investments dedicated to this specific trail segment.

4. **Does the project blend transportation modes by completing, improving or enhancing existing facilities?**

■ **Yes** ☐ **No**

If yes, check applicable attributes and briefly describe how the project meets the selection criteria.

☐ Project implements Complete Streets objectives and initiatives.
■ Project implements Safe Routes to Schools objectives and initiatives.
■ Project provides a direct connection to regional transit systems (i.e. rail stations, express or local bus routes).
■ Project is located in a designated multi-modal district.
■ Project has the potential to reduce vehicular congestion.
☐ Project improves access in a Bicycle Friendly Community or Bicycle Friendly University, as designated by the League of American Bicyclists. If yes, indicate the name of the designated community or university. _____

_____

☐ Project improves access in a Walk Friendly Community, as designated by the Pedestrian and Bicycle Information Center. If yes, indicate the name of the designated community. _____

■ Other (list) Connects two completed phases of ECG segments in St. Lucie County. Connects destinations such Historic Downtown Fort Pierce, including Ft. Pierce City Marina, Riverwalk, Historic Egdar Town, Manatee Education Center, and the Treasure Coast GWT loop, etc.

5. **Is the project ready for construction?** Select the most appropriate response.

Project is ready for immediate construction and all pre-construction phases are complete.

☐ **Yes** ■ **No**

Project is capable of near term development. The design is nearly complete and permitting is underway. This project includes pre-construction phases. If yes, include the schedule.

☐ **Yes** ■ **No**

Project proposal is feasible but still needs to be designed. Construction will occur in the future.

■ **Yes** ☐ **No**

6. **Does the project have a high level of documented public support?**

■ **Yes** ☐ **No**

If yes, select from the following and briefly explain how the project meets the selection criteria.

■ The greater community supports the project as demonstrated by recently adopted proclamations or resolutions expressing commitment. Provide the resolution number, adopted date and participating parties. Go2040 LRTP (Adopted 2/3/16) SLC Greenways and Trails Master Plan (Resolution 01-123)

■ Demonstration of public support is consistent across multiple entities representing the greater community, rather than a select few interest groups. Briefly explain. The St. Lucie TPO support represents the planning efforts for the City of Fort Pierce, City of Port St. Lucie, St. Lucie Village and the unincorporated areas of St. Lucie County.

■ Recent community surveys provide an indication of need and support. Briefly explain. Unified Planning Work Program FY 2016/17-17/18 Call for Projects Summary of Comments included specific public request (dated 1/20/16) for a multi-use trail system

☐ An advertised public meeting for discussing the project occurred. Provide the date and type of meeting.

☐ Other (list)

7. **Does the project have a significant immediate impact to the quality of life by enhancing economic opportunities and providing connectivity to destinations?**

☒ **Yes** ☐ **No**

If yes, check applicable attributes and briefly describe how the project meets the selection criteria.

☒ The project connects to or through federal, state or local conservation/recreation areas. List the conservation/recreation areas. Directly: Indian Hills Stormwater Park, Savannas Rec Area, and Savannas Preserve State Park. In the future: Indian River Lagoon Aquatic Preserve, Ft. Pierce Inlet State Park, Hope Sound National Wildlife Refuge, and JD State Park (nearest).

☒ The project connects people to jobs, businesses or civic resources.

☒ The project is located along or connects to a Florida Scenic Highway. List the Scenic Highway(s). Segments will lead to Indian River Lagoon-Treasure Coast Scenic Highway.

☐ The project is part of a public/private partnership where developers, linear corridor owners, small businesses, corporations, foundations or private sector partners are directly supporting the project.

☐ The project is located within a Rural Economic Development Initiative (REDI) Community defined pursuant to Section 288.0656, Florida Statutes. List the REDI area. _____

☐ The project is located within a Rural Area of Opportunity (RAO) defined pursuant to Section 288.0656, Florida Statutes. List the RAO area. _____

☐ Other (list) _____

8. **Does the project enhance or preserve environmental resources?**

☒ **Yes** ☐ **No**

If yes, check applicable attributes and briefly describe how the project meets the selection criteria.

☒ The project ensures the Florida Ecological Greenway Network (FEGN) maximizes protection of high priority linkages; the project is within a Priority 1 or 2 Critical Linkage as identified by the FEGN.
☐ The project restores or mitigates impacts of environmental degradation.
☒ The project incorporates water quality or drainage improvements.
☐ The project incorporates conservation initiatives to restore/maintain connectivity by reducing vehicle-caused wildlife mortality.
☐ The project's environmental impact assessment or statement does not identify specific issues.
☐ The project's environmental approval and permitting process is complete.

9. **Does the project facilitate a system of interconnected trails by closing a gap in the SUN Trail Network?**

☒ **Yes** ☐ **No**

If yes, how many miles of trail will be available once this gap is complete? ~30 Miles
List the trail names. AIA to Brevard County line

10. **The project includes cost-saving elements.**

☐ **Yes** ☒ **No**

If yes, briefly describe the potential for overall cost savings for completing this project in conjunction with another project (i.e. new/resurfacing roadway, redevelopment/new development project, trail phase/extending trail project). Remember to provide the other project(s) scope and schedule, the funding source, the funding year, and if funding is through FDOT, provide the Financial Management Number.

PART V – CERTIFICATION OF PROJECT PRIORITZATION

1. **For projects within a MPO/TPO boundary, complete the following information. If the project is outside of a MPO/TPO boundary, proceed to Part V – question #2.**

St Lucie Transportation Planning Organization

Name of Metropolitan/Transportation Planning Organization

Peter Buchwald, Executive Director

Name of Contact

466 SW Port St. Lucie Boulevard, Suite 111

Address

Port St. Lucie, Florida 34953

City, State and Zip Code

buchwaldp@stlucieco.org

Contact email

772-462-1593

Telephone Number

Signature: Peter Buchwald

Print Name: Peter Buchwald

Title: Executive Director

DATE: 06/20/2016

Signature confirms the requested project is consistent with MPO/TPO plans and documents, it is an eligible priority, the MPO/TPO supports the project and you possess authorization to submit the funding request.

2. For projects outside of a MPO/TPO boundary, complete the following information.

Intentionally Left Blank N/A

Name of County

Name of Contact

Address

City, State and Zip Code

Contact email

Telephone Number

Signature: _____

Print Name: _____

Title: _____

DATE: _____

Your signature confirms the requested project is consistent with applicable comprehensive plan(s) and/or the long-term management plan(s), it is an eligible priority, the County (tribal government, federal or state-managing agency) supports the project, and you possess authorization to submit the funding request.

PART VI – CERTIFICATION OF WILLING MANAGER(S)

The managing entity will provide routine regular maintenance, is responsible for the daily upkeep and operation of the trail to protect users, will reduce safety hazards that occur, and will ensure a quality level of service is maintained on the facility. Projects traversing multiple jurisdictional boundaries may have multiple managers. Submit the Certification of Willing Manager(s) for all proposed trail segments.

Routine Maintenance: Involves the day-to-day upkeep of a trail. Activities may consist of litter pick-up, trash removal, debris removal, soil and weed control, maintenance of drainage, graffiti removal, mowing, sweeping, sign replacement, shrub trimming and other regularly scheduled maintenance activities.

- For FDOT Constructed Trails Inside of FDOT ROW – FDOT will maintain the pavement and any bridge structures for a trail in its ROW, and will apply normal roadway maintenance standards such as mowing and litter control to the entire ROW inclusive of the trail. Beyond this, a local sponsor/agency will enter into a maintenance agreement with the department to undertake all other trail maintenance. The area of responsibility will be the footprint of the trail within FDOT ROW as defined by the District. The local agency/sponsor will be responsible for any mowing and litter control above FDOT roadway standards and maintenance of trail specific facilities, drainage, and features such as ornamental landscaping, wayside areas, benches, litter receptacles, and restrooms. The local sponsor/agency will be identified prior to programming the PD&E phase. The maintenance agreement detailing the full maintenance requirements of that entity must be executed prior to letting for construction.

- For FDOT Constructed Trails Outside of FDOT ROW – Trails that are constructed outside of FDOT ROW shall be maintained by an entity other than FDOT. The department will enter into an agreement or other form of documented commitment to ensure that a local sponsor/agency is committed to long-term trail maintenance. The local sponsor/agency will be responsible for all trail operation and maintenance needs which includes routine pavement and bridge structure repair, drainage, litter control, sweeping, vegetation management, and the maintenance of trail specific facilities and features such as ornamental landscaping, wayside areas, benches, litter receptacles, and restrooms.

RE: _____

Name of Project

_____

Address or Location of Project

FROM: St. Lucie County and City of Ft. Pierce

_____

Name of Managing Entity

Florida Department of Transportation
Shared-Use Nonmotorized Trail
Individual Trail Application

Mike Middbrook

Name of Contact

2300 Virginia Avenue

Address of Managing Entity

Fort Pierce, Florida 34982

City, State and Zip Code

middlebrookm@stlucieco.org

Contact email

(772) 462-2897

Telephone Number

Signature: Mike Middlebrook Digitally signed by Mike Middlebrook Date: 2016.06.20 14:44:34 -04'00'

Print Name: Mike Middlebrook

Title: Natural Resources Management Coordinator

DATE: 06/20/2016

Your signature serves as certification of (1) a commitment from your agency to maintain the facility requested and that your agency will enter into a Maintenance Memorandum of Agreement with the Department for the Project prior to the completion of design, or prior to the letting/advertisement for construction for any project proposed for a later phase; (2) the information in this application is true and accurate; (3) to comply with the Federal Uniform Relocation Assistance and Acquisition Policies Act (The Uniform Act) for any right-of-way actions required for the project; (4) lands developed with SUN Trail funds will be available for public use for the lifespan of the improvement; and (5) support of other actions necessary to fully implement the proposed project.

A separate application must be used for each project proposal that meets the minimum Individual Trail Eligibility Criteria. The applicable jurisdiction must p**rioritize and submit completed application(s) to your District Trail Coordinator no later than 5:00 p.m. on June 20, 2016.**

FOR FDOT USE ONLY
Application Complete ☐ **Yes** ☐ **No**

Project Eligible ☐ **Yes** ☐ **No**

Implementation Feasible ☐ **Yes** ☐ **No**

District Prioritization Number _____

Central Office Prioritization Number _____

Final Determination for inclusion in the Work Program ☐ **Yes** ☐ **No**

Historic Downtown Segment - North Indian Hills to North Causeway



2014 Ortho - Aerial

Legend

- Termini Begin
- Termini End
- Primary Route
- Alt Route
- Major Road

Disclaimer:

This map is intenteded for reference only. Most information contained within is conceptual. For more information about this map please contact the Environmental Resources Department Lands Division at 772-462-2897.

0 650 1,300 2,600 3,900 5,200 Feet

McGeeJ | 6/20/2016 | V:\Project Files\ERD Lands\G&T\MXD\Historic Downtown Segment FDOT Suntrail Map.mxd

St. Lucie County
Board of County Commissioners
Environmental Resources Department

Appendix B

Stakeholder Coordination and Public Meetings

Pre-Project Kick-Off Meeting

January 18, 2017

ST. LUCIE COUNTY ~ SUN TRAIL PROJECTS

General Meeting Notes

Project Kickoff Meeting with St. Lucie County, Florida Department of Transportation, Project Design Team & Agency Partners

WEDNESDAY, JANUARY 18, 2017
1:00 PM

Ecoheritage House at the Richard E. Becker Preserve
3398 Selvitz Road, Fort Pierce, FL 34981

Meeting arranged by the Florida Department of Transportation, District IV

NOTE TO READERS: This document reflects general meeting notes and key points of discussion raised during the project kickoff meeting with for the St. Lucie County SUN Trail projects funded by the Florida Department of Transportation. Meeting logistics were provided by St. Lucie County and the Treasure Coast Regional Planning Council. The meeting occurred on Wednesday, January 18, 2017 and was attended by various partner agencies and the project team. General meeting notes were prepared by Dr. Kim DeLaney, TCRPC.

Attendees

The meeting was attended by representatives of the following agencies:

- City of Fort Pierce (City)
- East Coast Greenway (ECG)
- Florida Department of Environmental Protection (FDEP) – Savannas State Park
- Florida Department of Transportation, District IV (FDOT)
- St. Lucie County – Environmental Resources Department (SLC ERD)
- St. Lucie Transportation Planning Organization (SL TPO)
- Treasure Coast Regional Planning Council (TCRPC)

Copies of sign-in sheets and meeting photos included as Attachment 1.

General Meeting Notes

- Participants welcomed and provided self-introductions.
- DeLaney (TCRPC) indicated of meeting to provide an overview of the SUN Trails program, recent funding allocations to projects in St. Lucie County, introduce the FDOT project team and process to local agency representatives, and identify initial implementation opportunities and challenges.

  Copy of meeting presentation is included as Attachment 2.

- DeLaney (TCRPC) provided overview of East Coast Greenway (ECG) project, which is a 3,000-mile trail project proposed along the east coast of the United States from Calais, Maine to Key West, Florida. Roughly 500 miles of the Greenway will be located along Florida's east coast, including St. Lucie County's segments. ECG is a centerpiece of the recently adopted Southeast Florida Regional Greenways and Trails Plan, and it is the only facility that traverses all seven counties in Southeast Florida.

- Maack (FDOT) provided overview of SUN Trails program; enacted by the Florida Legislature in 2014. Goal of program is to develop a statewide system of paved non-motorized trails as a component of the state-wide Florida Greenways and Trails System. Funding awards for the program's initial authorization of $25 million annually announced in October 2016. Per selection by the Florida Greenways and Trails Council, two-thirds of total funding awarded to Coast-to-Coast Connector and St. Johns River to the Sea Loop (identified as the top two regional trail systems in the state). Remaining third awarded to individual trails on the network selected and prioritized by FDOT. Overview of criteria used for selection and funding process for individual trails. Phases of project programming include: (1) Feasibility Study, (2) Project Development and Environment Study/Predesign Feasibility, (3) Preliminary Engineering/Design, and (4) Construction. Noted that SUN Trails funding could not be utilized for amenities associated with trail facilities, but rather, funding was exclusive for the ultimate development of the trails themselves.

- Broadwell (FDOT) indicated feasibility studies were focused on fatal flaws, and if none were identified, projects could advance to design if funding was available. Prior studies addressing alignment and feasibility to be utilized as a starting point, focused on avoidance and minimization in the layout of trails. Goal is to evaluate from federal National Environmental Policy Act (NEPA) perspective. It is also desirable for projects to adhere to Local Agency Program (LAP) criteria.

- Maack reviewed the funding awards for the five SLC projects including phase, amount of funding, and budget year. She noted the trail dimensions would ideally be twelve feet, but the program allows for trails as narrow as eight feet where there are constraints. Indicated there were no plans for a 2017 SUN Trails funding cycle, although additional funding could become available in a future year.

- Middlebrook (SLC ERD) provided overview of individual trail segments (images of project boards included as Attachment 3). SLC has divided the ECG into 18 miles of segments from Walton Road in Port St. Lucie to downtown Fort Pierce and the causeway. The funded segments were described as follows:

  (1) Savannas Preserve State Park segment is +/-12 miles; includes a connection to the existing trail within the Savannas Recreation Area. Facility proposed to be concrete not asphalt and will require trail bridges to cross wetlands and marshes on the alignment. Facility will also require amendments to the park management plan.
  (2) FEC Railroad Overpass segment is a +/-300 LF connection between the Savannas Recreation Area and Indian Hills Recreation Area. An easement from FEC will be required for the facility.
  (3) Indian Hills Recreation Area segment is +/-1.5 miles; will improve existing trail with paving to meet SUN Trails/ECG standards (rock surface to be widened and hardened). Funding is for the north/south segment on the western side of the property but SUN Trails funding cannot be

used for the loop portion. JPA between the City of Fort Pierce and FDOT to be executed to enable the transfer of funds. (this was done on March 2)

(4) Historic Highwayman segment is +/-2 miles; connects from the Indian Hills Golf Course to downtown Fort Pierce. Segment includes the consideration of industrial arts concepts, not to be funded with SUNTrail funds. Preliminary reviews suggest the western alignment may have fewer conflicts with ROW and golfers utilizing the golf course.

(5) Historic Downtown Retrofit segment is 2.5 miles along narrow ROW and historic infrastructure. The goal of facility is to tie in downtown features such as museums, marina, and art features with a connection to the North Causeway Bridge.

- Participants broke into groups arranged by project and reviewed conditions, project concepts, and initial opportunities and challenges. General and specific project summaries below. Comments are based on the discussion and are conceptual for consideration.

Savannas Preserve State Park segment:

- Walton Road includes an equestrian parking lot with potential wetland conflict.
- Suggested alignment for facility is through park, avoiding wetland, to connect to parking lot along pre-established trail (Gopher Tortoise Trail) running north of wetland.
- Consider a pedestrian signal at the park entrance, Walton Road is a county road
- Consider alignment's existing trails and adjacency to private back yards
- Uses to west of parking lot include Sandhill Crane Park and Port St. Lucie High School.
- Alignment could run north along existing firebreak; wooden boardwalk likely needed.
- SLD ERD/FDEP can provide GIS and LIDAR data to Kimley-Horn (FDOT project manager).
- Considereration of temporary closures for prescribed burns. Boardwalks present conflict issues with burns also.
- Need confirmation of SUN Trail criteria for access as park has dawn/dusk access restrictions.
- From PSL HS to Lennard Road, park contains significant wetlands and a new eagle's nest. Several alignment alternatives could be explored, including Lennard Road (ultimate 4-lane facility with county-owned ROW that could accommodate the trail segment), Hog Pen Ditch berm, fire breaks, McQuillen Road, FPL easement.
- Consideration of the FPL easement will be needed as well as SFWMD.
- Park management plan update underway; trail details to be added as a future amendment.
- Additional parties to include in project discussions: City of Port St. Lucie, HOAs for Savannas Club and Indian River Estates, School Board and principals of adjacent schools (Port St. Lucie High School, Savannas Elementary), St. Lucie County Conservation Alliance, Audubon, SFWMD, FPL.

Historic Highwayman segment:

- Consider Citrus Road overpass and connection to Depot Drive at northern end alignment
- Consider traveling under Citrus (N) thru FEC
- Consider easement through residential on southern connection
- Police station and park identified south of Georgia Street
- Indian Hills Golf Course is owned by the City of Fort Pierce

Historic Downtown Retrofit Segment:

- City of Fort Pierce may purchase Depot Drive (adjacent to port)
- Kayak ramp to be located at Citrus Avenue
- Alignment may require reconfiguration of bridge lanes by Citrus Avenue
- FDOT has made design changes to allow connection to the new North Causeway bridge a Dixie Hwy.

- Future meetings to be arranged as project components are advanced.

Next Steps

Distribution of Meeting Notes and Materials	FDOT lead with TCRPC support
Follow-Up Individual Project Team Meetings	FDOT Project Consultants lead
Determination of noted SUN Trails criteria (e.g., concrete versus asphalt construction; temporary closures for prescribed burns)	FDOT lead
Update Presentations to SLC, SL TPO, City of Fort Pierce, Other Agencies & Organizations	SLC lead with FDOT support

Attachments:

1 – Meeting Agenda, Sign in & Photos
2 – Meeting Presentation
3 – Project Boards prepared by SLC

ST LUCIE COUNTY SUN TRAILS

Project Kickoff Meeting

January 18, 2017

AGENDA

1. Welcome, Introductions & Purpose ..... Kim DeLaney, TCRPC
2. Overview of SUN Trails Program & Project Implementation ..... Lisa Maack, FDOT
3. Overview of Individual Projects ..... Mike Middlebrook, St Lucie County

PROJECT NAME	FUNDED ACTIVITY	FUNDING (YEAR)	LOCAL LEAD	CONSULTANT/FDOT LEAD
Savannas Preserve State Park	PreDesign Feasibility & Design	$500,000 (FY 2017) $750,000 (FY 2019)	**Chris Vandello (Park Manager)** 772-919-1760 Christopher.Vandello@dep.state.fl.us	**Lynn Kiefer (Kimley-Horn)** Direct: 772.794.4075 Main: 772.794.4100 Lynn.kiefer@kimley-horn.com
FEC RR Overpass	PreDesign Feasibility & Design	$275,000 (FY 2017) $305,885 (FY 2020)	**Mike Middlebrook (SLC)** 772-462-2897 middlebrookm@stlucieco.org **Jack Andrews (City of FP)** 772-467-3773 JAndrews@City-FtPierce.Com	**Lynn Kiefer (Kimley-Horn)** Direct: 772.794.4075 Main: 772.794.4100 Lynn.kiefer@kimley-horn.com
Indian Hills Recreation Area Trail Retrofit	Design & Construction	$80,000 (FY 2017) $408,434 (FY 2019)	**Jack Andrews (City of FP)** 772-467-3773 JAndrews@City-FtPierce.Com	**Lisa Maack (FDOT)** 954-717-2253 Lisa.Maack@dot.state.fl.us
Historic Highwayman Trail Gap	PreDesign Feasibility & Design	$100,000 (FY 2017) $ 100,000 (FY 2019)	**Jack Andrews (City of FP)** 772-467-3773 JAndrews@City-FtPierce.Com **Kori Benton (City of FP)** 772-467-3739 KBenton@City-FtPierce.Com	**Rudy Westerman/Ken Hardin (Janus)** (813) 636-8200 ken_hardin@janus-research.com **Beth Zimmer (Atkins)** (305) 514-3254 Beth.Zimmer@atkinsglobal.com
Historic Downtown Retrofit	PreDesign Feasibility	$275,000 (FY 2017)	**Jack Andrews (City of FP)** 772-467-3773 JAndrews@City-FtPierce.Com **Mike Middlebrook (SLC)** 772-462-2897 middlebrookm@stlucieco.org **Don West (SLC)** 772-462-1659 westd@stlucieco.org	**Rudy Westerman/Ken Hardin (Janus)** (813) 636-8200 ken_hardin@janus-research.com **Beth Zimmer (Atkins)** (305) 514-3254 Beth.Zimmer@atkinsglobal.com

4. Project Breakout ..... Project Managers
5. Regroup for Follow-Up Items & Next Steps ..... Kim DeLaney, TCRPC
    - Other Individuals to be Included Projects
    - Other Items

ST LUCIE COUNTY SUN TRAILS

PROJECT KICKOFF MEETING - JANUARY 18, 2017

SIGN-IN SHEET

NAME	ORGANIZATION	EMAIL
Jolly Jimenez	FDOT.	Jolly.Jimenez@dot.state.fl.us
Jack Andrews	City of Fort Pierce	JAndrews@city-FtPierce.com
Mike Forman	Kimley-Horn	Mike.Forman@kimley-horn.com
Tori O'Malley	Kimley-Horn	Tori.O'Malley@kimley-horn.com
Rudy Westerman	Janus Research	rudy_westerman@janus-research.com
Lynn Kiefer	Kimley-Horn	lynn.kiefer@kimley-horn.com
Beth Zimmer	Atkins	beth.zimmer@atkinsglobal.com
Chuck Broadbent	Fort Pierce Greenway	Chbroadbent@comcast.net
DON WEST	SLC Public Works	dwest@stlucie co. org
Wren Underwood	SLC ERD	underwoodw@stlucreco.org
Kori Benton	LOFP - Planning	KBenton@cityoftpierce.com
John Mach	DEP	john.mach@dep.state.fl.us
Doug Rogers	DEP - FPS	doug.t.rogers@dep.state.fl.us
Tris VANDELLO	DEP	Christopher.Vandello@dep.State.Fl.us
Lisa Maack	FDOT	Lisa.Maack@dot.State.fl.us
Peter Buchwald	St. Lucie TPO	buchwaldp@stlucieco.org ~~stlucietpo~~

ST LUCIE COUNTY SUN TRAILS

PROJECT KICKOFF MEETING - JANUARY 18, 2017

SIGN-IN SHEET

NAME	ORGANIZATION	EMAIL
Ann Broadwell	FDOT	ann.broadwell@dot.state.fl.us
Lynn Kelley	FDOT	Lynn.Kelley@dot.state.fl.us
Jenn McGee	SLC ERD	mcgeej@stlucieco.org
Kim DeLaney	TCRPC	KDELANEY@TCRPC.ORG

1-18-2017

Attachment 2

St Lucie County
East Coast Greenway Kickoff Meeting

January 18, 2017





Today's Agenda

1. Welcome, Introductions & Purpose
2. Overview of SUN Trails Program & Project Implementation
3. Overview of Individual Projects
   - Savannas Preserve State Park
   - FEC RR Overpass
   - Indian Hills Recreation Area Trail Retrofit
   - Historic Highwayman Trail Gap
   - Historic Downtown Retrofit
4. Project Breakout
5. Regroup for Follow-Up Items & Next Steps

East Coast Greenway – Treasure Coast Region





East Coast Greenway ALLIANCE

FDOT Florida Department of TRANSPORTATION

Shared-Use Nonmotorized (SUN) Trail Network Program

Lisa Maack, District 4 SUN Trail Program Coordinator
Florida Department of Transportation

4

1-18-2017

Shared-Use Nonmotorized (SUN) Trail Network

SUNTRAIL

- **Created under 339.81, F.S.**
- **To develop a statewide system of paved non-motorized trails as a component of the Florida Greenways and Trails System (FGTS)**
- **$25 million annually funded from new vehicle tag revenues**
- **Individual Trail Application period closed June 20, 2016**
- **FY 2017 Awards announced October 2016**

Framework for SUN Trail Funding Selection

SUN Trail Eligible (Priority Land Trails Network)

Top Regional Trail System

Coast-to-Coast Connector

Selected at December 2015 meeting

Second Regional Trail System

St. Johns River to the Sea Loop

Selected at March 2016 meeting

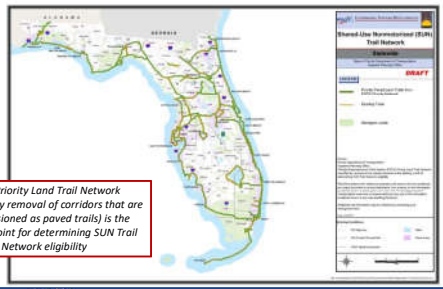
Selected by Florida Greenways and Trails Council (FDEP)

Individual Trail Category

Selected Summer 2016

Selected by FDOT

SUN Trail Network Map

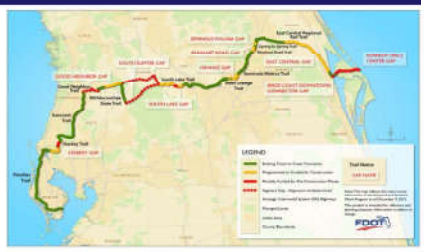


FGTS Priority Land Trail Network (modified by removal of corridors that are not envisioned as paved trails) is the starting point for determining SUN Trail Network eligibility

Top Regional Trail System

SUN Trail Eligible (Priority Land Trails Network)

Coast to Coast Connector



Selected by the Florida Greenways and Trails Council December 2015

Second Regional Trail System

SUN Trail Eligible
(Priority Land Trails Network)

St. Johns River to the Sea Loop



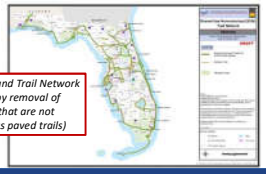


Selected by the Florida Greenways and Trails Council March 2016

Eligibility Criteria for Individual Trails

*There are four **eligibility criteria** a project **must meet** to receive consideration for SUN Trail funding. The applicable entity will transmit a priority list and project details to the respective FDOT District Trail Coordinator.*

1. Is the project a paved component of the Florida Greenways and Trails System (FGTS) Priority Land Trail Network, and therefore the SUN Trail Network?



FGTS Priority Land Trail Network (modified by removal of corridors that are not envisioned as paved trails)

Eligibility Criteria for Individual Trails

*There are four **eligibility criteria** a project **must meet** to receive consideration for SUN Trail funding. The applicable entity will transmit a priority list and project details to the respective FDOT District Trail Coordinator.*

2. Is the project identified as a priority by the applicable jurisdiction?

- If the project is within a boundary of the Metropolitan Planning Organization (MPO), it must be a MPO priority;
- For areas outside of a MPO boundary, the project must be identified as a priority of the county (inclusive of their municipalities), a tribal government, federal or state managing agency.

Eligibility Criteria for Individual Trails

*There are four **eligibility criteria** a project **must meet** to receive consideration for SUN Trail funding. The applicable entity will transmit a priority list and project details to the respective FDOT District Trail Coordinator.*

3. Has an entity formally committed to operation and maintenance of the project?



Suwannee River Greenway at Branford



Good Neighbor Trail, Brooksville



Little Econ Greenway, Orange County

Eligibility Criteria for Individual Trails

*There are four **eligibility criteria** a project **must meet** to receive consideration for SUN Trail funding. The applicable entity will transmit a priority list and project details to the respective FDOT District Trail Coordinator.*

4. Is the project consistent with the applicable comprehensive plan or the long-term management plan?



FDOT

October 11, 2016

Dick Kane, (850) 414-4590
dick.kane@dot.state.fl.us

Florida Department of Transportation Awards $44.4 Million for Bicycle and Pedestrian Trail Expansion in Florida

TALLAHASSEE – The Florida Department of Transportation (FDOT) announced today the selection of the first year of projects to receive funding under the Shared Use Nonmotorized (SUN) Trail program. A total of $44,434,543 million was awarded to 45 separate projects located across 21 counties throughout Florida. (See attached map and project list)

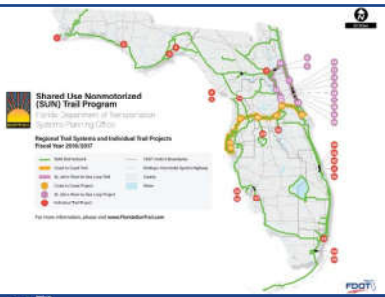
The projects include the construction of 11 separate trail segments, which will add or improve approximately 20 miles of trail to Florida's trail system. Another 34 projects will be in various preconstruction phases of work such as feasibility study, environmental review and design. The funds are for the current fiscal year (2016-17) and are immediately available to begin work.

SUNTRAIL

Process for Funding Individual Trails

Project Identification	•Identification of purpose, location and goals of the project; •Consistent with the community's vision, plans, and policies; •Consistent with transparent public involvement procedures.
Project Prioritization	•Identified priority of Metropolitan Planning Organization (MPO); •Identified priority of the county (inclusive of their citizens), tribal government, federal or state managing agency.
Project Selection & Programming	•Priority List and project details submitted to FDOT District by applicable entity; •District project evaluation and development of draft funding scenario; •Development of Statewide draft prioritization scenario; •Upon approval, projects are programmed into appropriate fiscal year of the five year Tentative Work Program.

Current Work Program Year (Fiscal Year 2016/2017)



Project Programming

Project Phases Include:

- **Feasibility Study (FS)** if necessary
- **Project Development and Environment Study (PD&E)**
- **Preliminary Engineering/Design (PE)**
- **Acquisition of Right-of-Way (ROW)** if necessary (will not be funded by SUNtrail funds)
- **Construction (CON)**

Maintenance

For FDOT Constructed Trails Inside of FDOT ROW – FDOT will maintain the pavement and any bridge structures for a trail in its ROW, and will apply normal roadway maintenance standards such as mowing and litter control to the entire ROW inclusive of the trail. Beyond this, a local sponsor/agency will enter into a maintenance agreement with the department to undertake all other trail maintenance. The area of responsibility will be the footprint of the trail within FDOT ROW as defined by the district. **The local agency/sponsor will be responsible for any mowing and litter control above FDOT roadway standards and maintenance of drainage and trail specific facilities and features such as ornamental landscaping, wayside areas, benches, litter receptacles, and restrooms.** The local sponsor/agency will be identified prior to programming the PD&E phase. The maintenance agreement detailing the full maintenance requirements of that entity must be executed prior to letting for construction.

For FDOT Constructed Trails Outside of FDOT ROW – Trails that are constructed outside of FDOT ROW shall be maintained by an entity other than FDOT. The department will enter into an agreement or other form of documented commitment to ensure that a local sponsor/agency is committed to long term trail maintenance. **The local sponsor/agency will be responsible for all trail operation and maintenance needs which includes routine pavement and bridge structure repair, litter control, sweeping, vegetation management, and the maintenance of drainage and trail specific facilities and features such as ornamental landscaping, wayside areas, benches, litter receptacles, and restrooms.** The local sponsor/agency will be identified prior to programming the PD&E phase. Each district will determine the appropriate form of commitment or agreement that will need to be executed prior to letting for construction.

Strategic, Effective and Efficient Investments

SUN Trail will not fund development of amenities associated with trail projects.

These amenities include but are not limited to:

- **Benches, trail furniture or seating areas;**
- **Bicycle racks, air stations or lockers;**
- **Buildings, restrooms, wayside structures or overlooks, shelters or picnic pavilions;**
- **Kiosks (regulatory and safety signage permitted);**
- **Landscaping (trail stabilization permitted);**
- **Litter or recycle receptacles;**
- **Parking areas or trailheads;**
- **Playgrounds, fitness equipment or structures;**
- **Promotional or educational materials;**
- **Sculptures, fountains or art; and**
- **Water fountains, spigots or showers.**

FDOT Florida Department of TRANSPORTATION

Questions or Comments?

SUN Trail Contact:

Lisa Maack
District 4 SUN Trail Program Coordinator
954-717-2253
Lisa.Maack@dot.state.fl.us
www.FloridaSunTrail.com

SUNTRAIL

Overview of Individual Projects









Indian Hills Rec Area



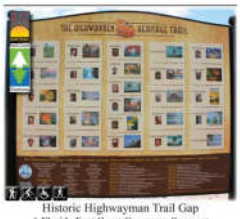
- Distance: 1.5 mi
- Improving Existing Infrastructure
- Underway
- Joint Agreement
- City or Ft Pierce
- FDOT JPA
- $80,000 FY17
- $408,434 FY19
- Design & Construction

FEC Railroad Overpass

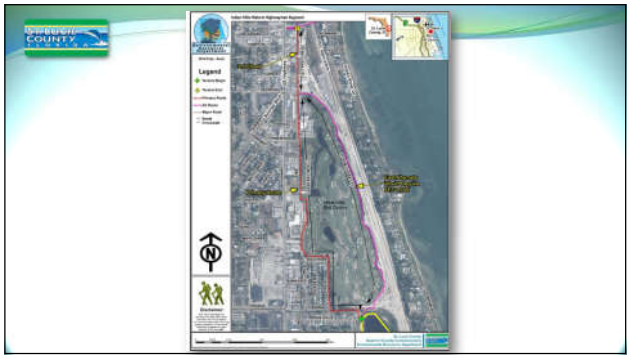


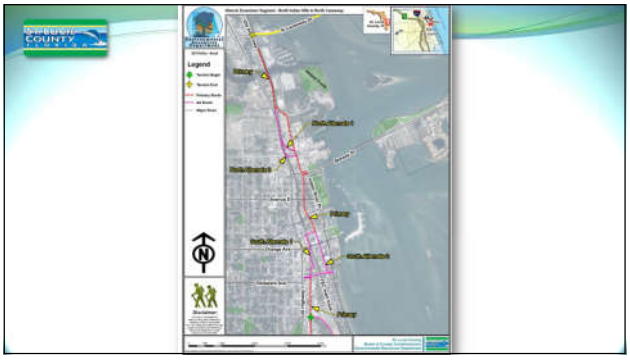
- Distance: 300 LF
- FEC Coordination
- Aerial Rights
- Cost
- Design
- Limited Options
- $275,000 FY17
- $305,885 FY20
- Feasibility & Predesign

Historic Highwaymen



- Distance: 2 mi
- Alignments
- Narrow ROW
- Old FEC ROW
- IH Golf Course Component
- Industrial/Art Component
- $100,000 FY17
- $100,000 FY19
- Feasibility & Predesign





Historic Downtown



- Distance: 2.5 mi
- Narrow ROW
- Historic Infrastructure
- City of Ft. Pierce & County Port Projects
- Edgar Town
- N. Causeway Bridge
- Traffic Congestion
- FEC Coordination
- Sharrows?
- $275,000 FY17
- Feasibility & Predesign

Discussion & Next Steps

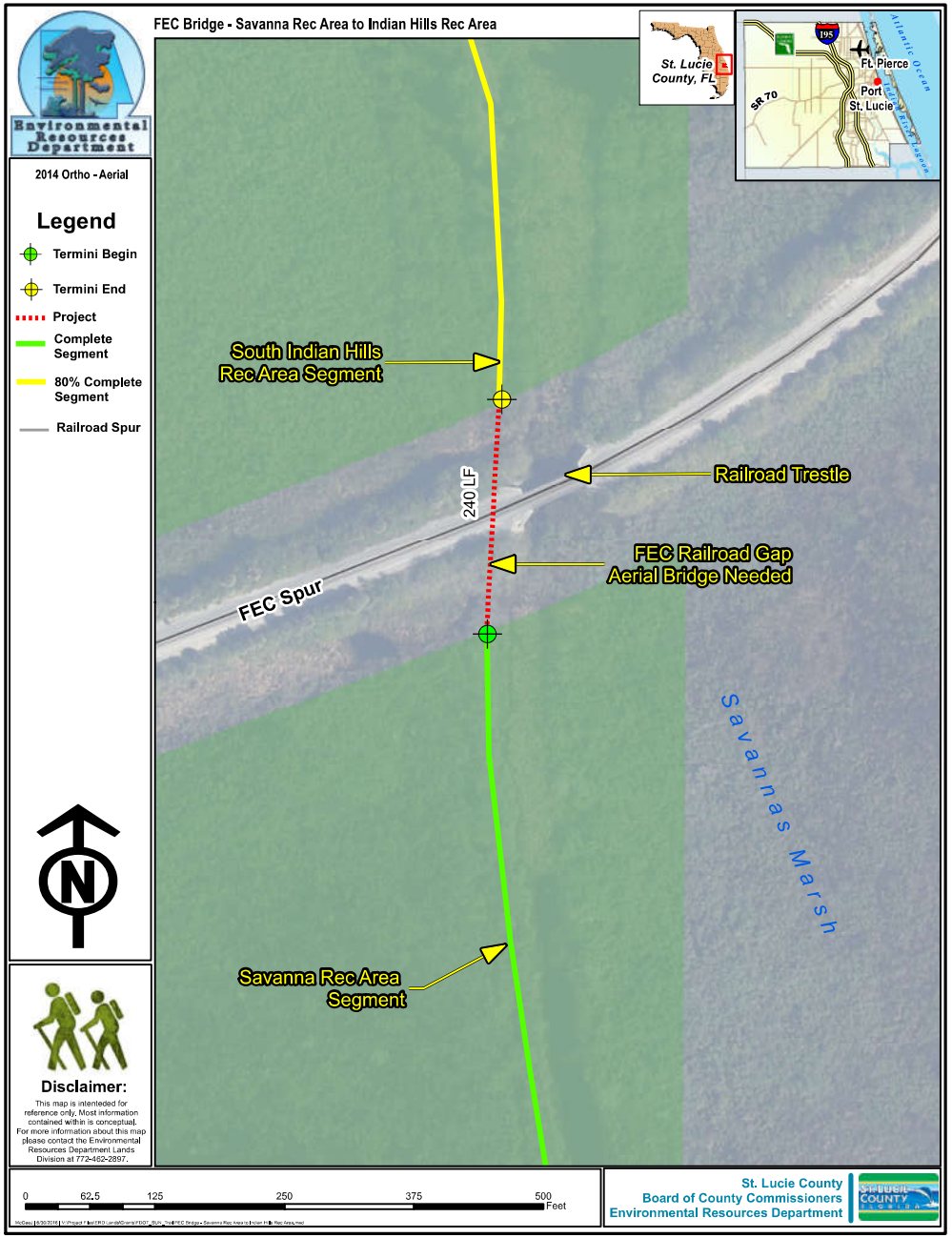
- Individual Project Summaries
- Other Individuals to be Included
- Timing for Follow-Up Activities
- Other Items

Thanks for Coming!

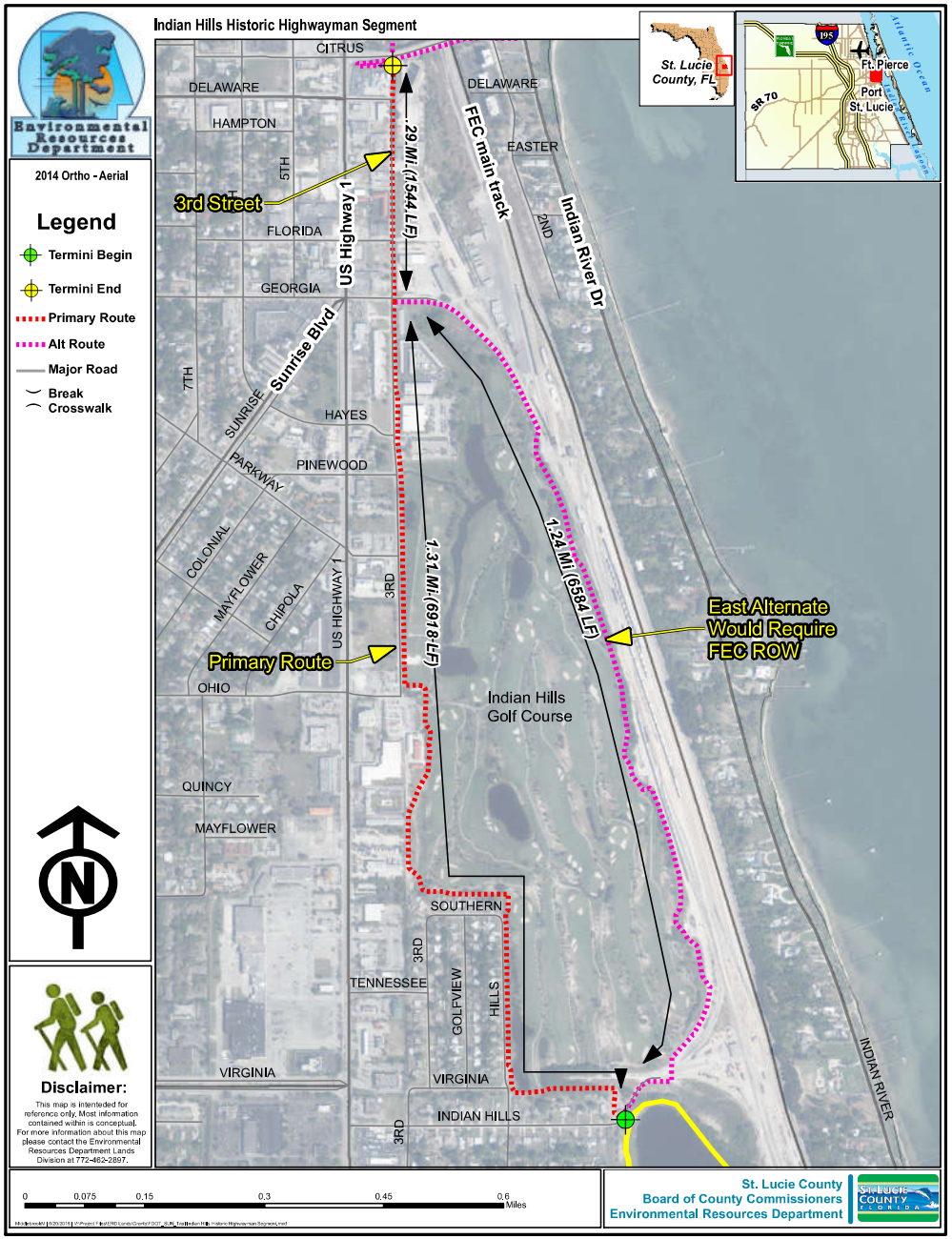


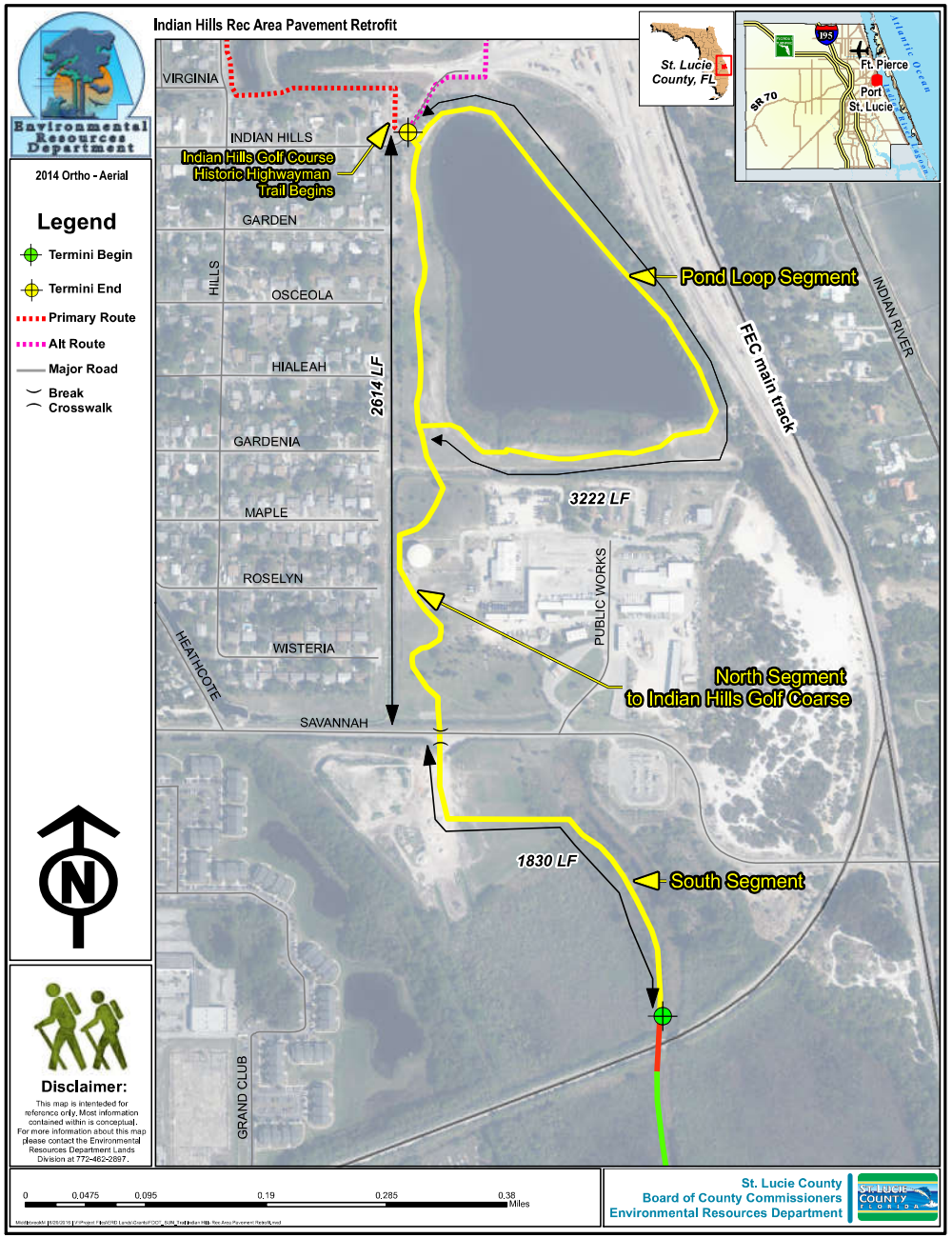





FEC Bridge - Savanna Rec Area to Indian Hills Rec Area
Environmental Resources Department
2014 Ortho - Aerial
Legend
Termini Begin
Termini End
Project
Complete Segment
80% Complete Segment
Railroad Spur
St. Lucie County, FL
Ft. Pierce
Port St. Lucie
SR 70
195
Atlantic Ocean
South Indian Hills Rec Area Segment
Railroad Trestle
240 LF
FEC Railroad Gap Aerial Bridge Needed
FEC Spur
Savannas Marsh
Savanna Rec Area Segment
N
Disclaimer:
This map is intended for reference only. Most information contained within is conceptual. For more information about this map please contact the Environmental Resources Department Lands Division at 772-462-2897.
0 62.5 125 250 375 500 Feet
St. Lucie County Board of County Commissioners Environmental Resources Department


Savannas State Park to Savanna Rec Area
Environmental Resources Department
2014 Ortho - Aerial
Legend
Termini Begin
Termini End
Primary Route
Alt Route
Major Road
St. Lucie County, FL
Ft. Pierce
Port St. Lucie
SR 70
195
Atlantic Ocean
1.25 Mi
Savanna Rec Area
Weatherbee
Midway Rd
Indian River Lagoon
S. Ocean Dr
Savannas Preserve State Park
2.90 Mi
Indian River Estates
North Alternate
FPL Easement
Indian River Dr
Kitterman
10.6 Mi
Primary
Savannas Preserve State Park
South Alternate
US Highway 1
1.93 Mi
Savanna Club
FEC main track
Walton Rd
Green River Parkway
N
Disclaimer:
This map is intended for reference only. Most information contained within is conceptual. For more information about this map please contact the Environmental Resources Department Lands Division at 772-462-2897.
0 0.375 0.75 1.5 2.25 3 Miles
St. Lucie County Board of County Commissioners Environmental Resources Department


Indian Hills Historic Highwayman Segment
Environmental Resources Department
2014 Ortho - Aerial
Legend
Termini Begin
Termini End
Primary Route
Alt Route
Major Road
Break
Crosswalk
St. Lucie County, FL
Ft. Pierce
Port St. Lucie
SR 70
195
Atlantic Ocean
Indian River Lagoon
3rd Street
.29 Mi (1544 LF)
US Highway 1
FEC main track
Indian River Dr
1.24 Mi (6584 LF)
1.31 Mi (6918 LF)
East Alternate Would Require FEC ROW
Primary Route
Indian Hills Golf Course
CITRUS
DELAWARE
HAMPTON
FLORIDA
GEORGIA
EASTER
HAYES
PINEWOOD
SUNRISE
Sunrise Blvd
PARKWAY
COLONIAL
MAYFLOWER
CHIPOLA
OHIO
QUINCY
SOUTHERN
TENNESSEE
GOLFVIEW
HILLS
VIRGINIA
INDIAN HILLS
INDIAN RIVER
1ST
2ND
3RD
5TH
7TH
Disclaimer:
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St. Lucie County
Board of County Commissioners
Environmental Resources Department


Indian Hills Rec Area Pavement Retrofit
Environmental Resources Department
2014 Ortho - Aerial
Legend
Termini Begin
Termini End
Primary Route
Alt Route
Major Road
Break
Crosswalk
St. Lucie County, FL
Ft. Pierce
Port St. Lucie
SR 70
195
Atlantic Ocean
Indian River Lagoon
Indian Hills Golf Course Historic Highwayman Trail Begins
Pond Loop Segment
FEC main track
INDIAN RIVER
2614 LF
3222 LF
1830 LF
South Segment
North Segment to Indian Hills Golf Coarse
PUBLIC WORKS
VIRGINIA
INDIAN HILLS
GARDEN
OSCEOLA
HIALEAH
GARDENIA
MAPLE
ROSELYN
WISTERIA
SAVANNAH
HEATHCOTE
GRAND CLUB
HILLS
Disclaimer:
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0 0.0475 0.095 0.19 0.285 0.38 Miles
St. Lucie County
Board of County Commissioners
Environmental Resources Department


Historic Downtown Segment - North Indian Hills to North Causeway
Environmental Resources Department
2014 Ortho - Aerial
Legend
Termini Begin
Termini End
Primary Route
Alt Route
Major Road
Disclaimer:
This map is intenteded for reference only. Most information contained within is conceptual. For more information about this map please contact the Environmental Resources Department Lands Division at 772-462-2897.
N Causeway Dr
Old Dixie Hwy
Primary
Harbour Pointe
North Alternate 1
North Alternate 2
Seaway Dr
Indian River Dr
Avenue D
Primary
South Alternate 1
Orange Ave
South Alternate 2
Delaware Ave
US Highway 1
FEC main track
Primary
St. Lucie County, FL
Ft. Pierce
Port St. Lucie
SR 70
I-95
Atlantic Ocean
Indian River Lagoon
0
650
1,300
2,600
3,900
5,200
Feet
St. Lucie County
Board of County Commissioners
Environmental Resources Department


Historic Downtown Segment - North Indian Hills to North Causeway
Environmental Resources Department
2014 Ortho - Aerial
Legend
Termini Begin
Termini End
Primary Route
Alt Route
Major Road
Old Dixie Hwy
N Causeway Dr
Primary
Harbour Pointe
North Alternate 1
North Alternate 2
Seaway Dr
Indian River Dr
Avenue D
Primary
South Alternate 1
Orange Ave
South Alternate 2
Delaware Ave
FEC main track
US Highway 1
Primary
Disclaimer:
St. Lucie County
Board of County Commissioners
Environmental Resources Department


Indian Hills Historic Highwayman Segment
Environmental Resources Department
2014 Ortho - Aerial
Legend
Termini Begin
Termini End
Primary Route
Alt Route
Major Road
Break
Crosswalk
3rd Street
DELAWARE
HAMPTON
FLORIDA
GEORGIA
US Highway 1
FEC main track
Sunrise Blvd
PINEWOOD
Primary Route
East Alternate
Would Require
FEC ROW
Indian Hills
Golf Course
QUINCY
MAYFLOWER
SOUTHERN
TENNESSEE
VIRGINIA
INDIAN HILLS
Disclaimer:
St. Lucie County
Board of County Commissioners
Environmental Resources Department

Local Agency Kick-Off Meeting

April 25, 2017

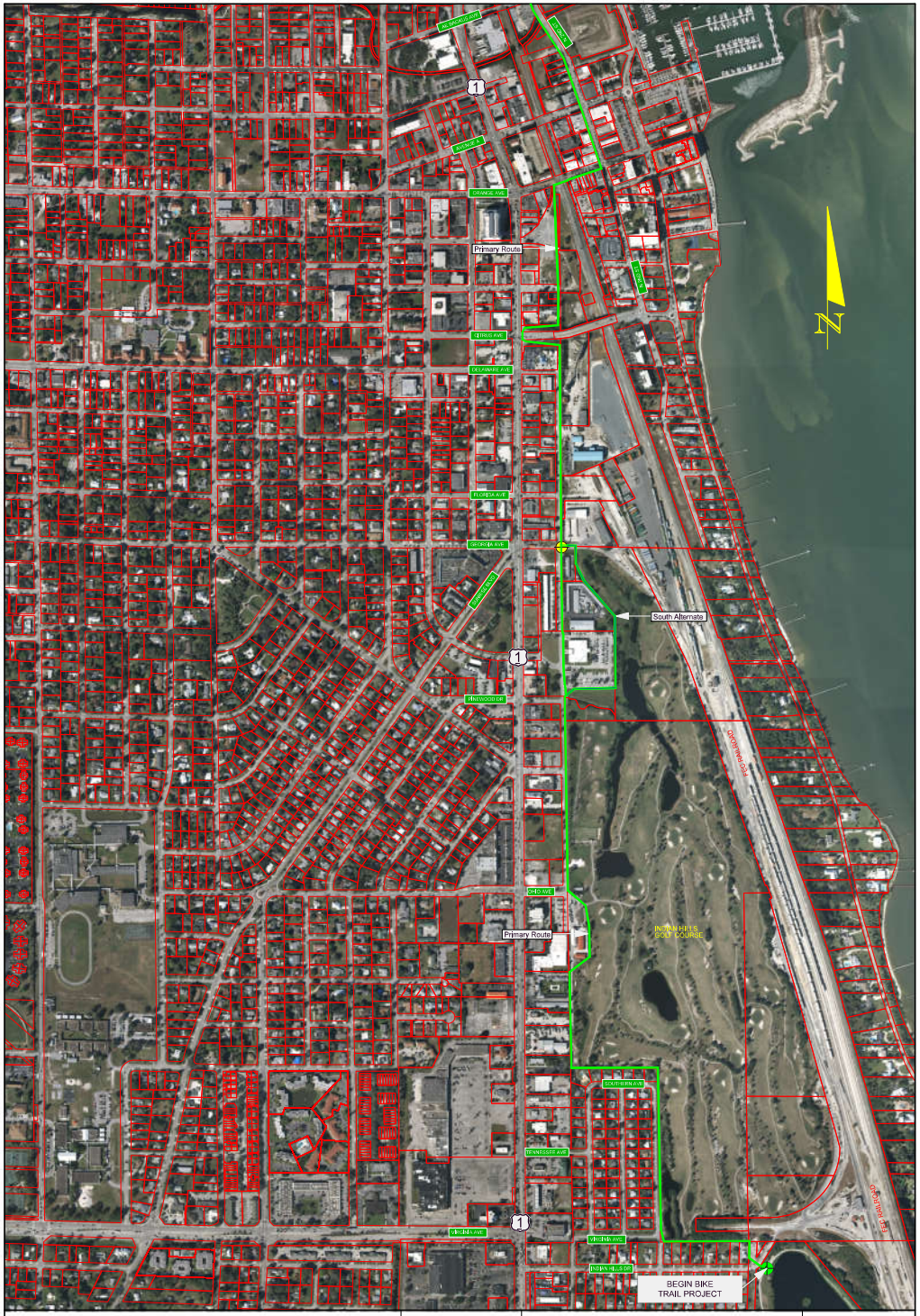
SUN Trail Feasibility Study
(Historic Highwayman and Historic Downtown)
Kickoff Meeting
Meeting Summary

Date/Time: April 25, 2017
1:30 PM
Location: City of Fort Pierce Town Hall
Engineering Conference Room
Subject: SUN Trail Feasibility Study Kickoff Meeting

- Introductions: Participants included:
  - FDOT: Lynn Kelley (FDOT PM), Lisa Maack
  - Saint Lucie County: Amy Griffin, Mike Middlebrook, Jennifer McGee
  - City of Fort Pierce: Jack Andrews, Kori Benton
  - Treasure Coast Regional Planning Council: Kim Delaney by phone
  - Consultants: Lance Decuir (Atkins), Rudy Westerman (Janus)
- Overview:
  - FDOT is conducting a feasibility study for the Historic Downtown Fort Pierce Retrofit (440033-1) from Georgia Avenue to North Causeway Drive and the Historic Highwayman Trail Gap (440034-1) from Indian Hills Drive to Georgia Avenue. These are both portions of the statewide SUN Trail system. This meeting was to discuss preliminary alignments that were developed by Fort Pierce, Saint Lucie County, Treasure Coast TPO, and the Treasure Coast Regional Planning Council. It was noted that the study was generally following the Type I environmental process so that federal funds would not be precluded in the future.
- Historic Highwayman Trail Gap
  - Eastern alternative of this portion along the golf course would use the FEC ROW and this is not ideal. It was noted that FEC is historically difficult to coordinate with.
  - The western route along the City owned Indian Hills Golf Course is ideal, but it was noted that special attention should be given to potential Section 4(f) impacts. Lynn mentioned that FDOT would write a letter for the City to sign, which states that the project would not impact the features or function of the golf course. The City stated that the trail would not modify the course and would be along the area that is generally out of bounds to the golf course play. This documentation is important in case federal funds become available.
  - Rudy mentioned that the golf course is over 50 years old, so it will need to be documented and evaluated for National Register of Historic Places (National Register) eligibility. Results of the evaluation will be coordinated with the Division of Historical Resources or State Historic Preservation Office (SHPO). The City mentioned that although the course dates to the 1930s, it has undergone major reconstruction.
- Historic Downtown – It was discussed that the Historic Downtown Retrofit portion of the SUN Trail has considerably more issues to incorporate a multi-use trail.
  - Starting from south to north, the first challenge will be to cross the FEC tracks near Citrus Avenue. There is currently a bridge at Citrus Avenue over the FEC tracks. The bridge has a sidewalk on the south side so this is one option for getting pedestrians/bicyclists over the bridge. Issues/challenges with this approach are that:
    - This would not be a 10' trail. Kim Delaney with TCRPC mentioned that it was ok if small sections of the trail were not 10' if they were considered necessary for connection and if substantial costs and impacts prohibited the 10' trail.
    - Another challenge with the Citrus Avenue is the Roundabout at S Indian River Drive. Later in the meeting, the group discussed that Indian River Drive would possibly be a good alternative for a trail. The trail would need to cross Citrus Avenue either at the signalized S 2nd street or at the roundabout at S Indian River Drive.

- Another option to cross the FEC tracks near Citrus Avenue would be to extend the trail north beyond Citrus Avenue and to cross the FEC at grade at Avenue A. This route will likely involve coordination with FEC.
- It was discussed that US 1 was previously the preferred alternative coming from the N Causeway (north side of Historic Downtown segment), but current preference is to bring the trail along Old Dixie Highway. This is a less traveled corridor and more desirable for a multi-use trail. Additionally, the North Causeway is currently in the final PD&E stage and accommodations have been made to bring the connecting sidewalk from the bridge to meet up with Old Dixie Highway.
- A challenge in the northern segment will be to get from N 2nd Street to Old Dixie Highway. There are currently two inactive rail spurs that are the preliminarily preferred areas for this crossing. Further exploration of the right-of-way in this area needs to be explored.
- It was also mentioned that the study team should coordinate with the Port and All Aboard Florida to determine how this might impact alignments.
- The group also discussed the potential of exploring an alternative along Indian River Drive since this a scenic route and is adjacent to the boat launch (potential weekday parking), the River Walk Center, and Veterans Memorial Park. Connecting roads to and from Indian River Drive could be Avenue H and Avenue D.
- Lynn mentioned that the downtown area is very historic and would potentially have many historic resources to assess for impacts depending on which route was determined. Old Dixie Highway is a historic roadway and the area of Old Dixie proposed for the primary alignment has been determined eligible for listing in the National Register. It is best for the alternatives to be preliminary developed before cultural resource assessments are conducted by Janus.

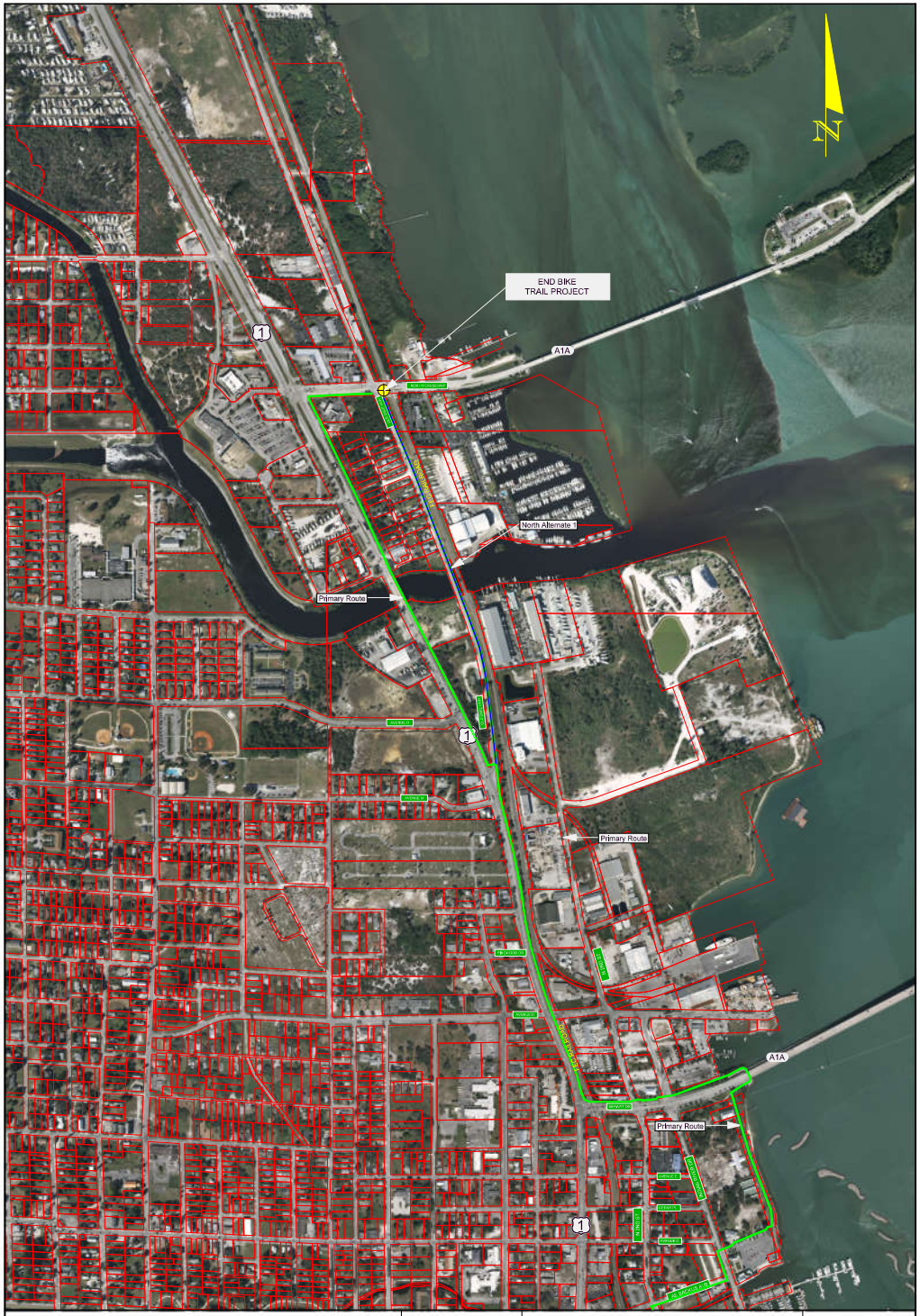
- Next Steps
  - Atkins will develop preliminary alternatives and assess based on engineering standards, right-of-way impacts, natural resources impacts and develop a matrix with these impacts as well as pros and cons of alternatives.
  - It was discussed at the meeting that a public kickoff meeting would be ideal to get feedback from stakeholders on the trail and the potential alignments. It would be best if this were held in early summer. ***(UPDATE: following the meeting, it was decided that additional stakeholder coordination and data collection should occur before the public kickoff meeting would be scheduled. The public kickoff meeting is now anticipated late summer/early fall.)***



ATKINS
482 S. Keller Road, Orlando, FL 32810

Indian Hills Historic
Highwayman Segment

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ATKINS
482 S. Keller Road, Orlando, FL 32810

Historic Downtown Segment
North Indian Hills to North Wauseway

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City of Fort Pierce Design Coordination Meeting

September 20, 2017

Florida Department of Transportation

RICK SCOTT
GOVERNOR

3400 West Commercial Boulevard
Fort Lauderdale, Florida 33309

MIKE DEW
SECRETARY

Meeting Minutes

Date and Time:	September 20, 2017 1:00 p.m.
Location:	City Hall Fort Pierce, Florida
Subject:	D4 SUN Trails Project Coordination Meeting
Attendees:	Jack Andrews (City of Fort Pierce) Kori Benton (City of Fort Pierce) Edward Defini (TPO) Peter Buchwald (TPO – phone) Mike Middlebrook (St. Lucie County) Lynn Kelley (FDOT – phone) Lisa Maack (FDOT – phone) Reshawn Fields (Atkins) Brooke Feagle (Atkins) Gary Giaotti (Atkins)
Copies to:	File

The meeting began with introductions of the City of Fort Pierce, St. Lucie County, St. Lucie County Transportation Planning Organization (TPO), FDOT, and Atkins staff. Reshawn Fields provided an overview of the project development to present date. Reshawn described the project overview and potential alternatives, and mentioned the projected Type 1 Categorical Exclusion (CE) environmental document for the project. Per the schedule, Reshawn advised there will be a Public Kick-Off Meeting on October 10, 2017, followed by an Alternatives Workshop in February of 2018; afterwards, the final alternative will be selected and the documents will be finished by summer of 2018. The project is currently in the scoping phase and the purpose of the coordination meeting was to further the design concepts, starting with the original alignments proposed.

Mike Middlebrook started with an explanation of the alternatives and alignments that St. Lucie County chose; first was the Indian Hills Highwayman Segment. Mike mentioned that the east route of the alignment, on the FEC property, was ruled out through previous meetings. Jack Andrews spoke up and mentioned that things may have changed. He stated that the City of Fort

Pierce had a meeting with FEC about a month ago and they had a discussion regarding the 90 acres of golf course that the City leases from FEC. He mentioned that FEC may sell the property to the City of Fort Pierce since FEC is considering moving their rail yard close to the Wal-Mart Distribution Center. Since the FEC property would become City property, it would make the east alignment preferable with less obstacles, however Jack stated he is unsure of anything regarding the transfer of the property at this point. Reshawn asked Lisa Maack and Lynn Kelley what their thoughts were regarding the potential of acquiring the property. Reshawn reminded everyone that the environmental document must be based on current conditions, not the assumption that the City will obtain the property. The general consensus was to move forward with the alternatives and keep collecting data. Lisa mentioned that the best plan would be see which alternatives move forward for development and when the funding will be available.

To return to the proposed alignments, Mike mentioned that the Indian Hills Highwayman Segment would definitely begin at the Indian Hills recreational area south of the golf course. He mentioned the best alternative was to keep the trail in the green spaces instead of a street route. Mike stressed keeping the trail close to the golf course and off of the nearby roads. At this point, Gary Giaotti mentioned the numerous obstacles that are present along the western alignment. Kori Benton provided an explanation of the golf course placement and where the City of Fort Pierce sees the trail being placed. Gary raised concerns about Hole #9 on the golf course and Kori replied that the City owns the golf course and had looked at changing the course to accommodate the trail. Reshawn brought up the fact that the golf course may be Section 4(f) eligible, to which Kori replied that it was, however there is a ten-foot wide drainage easement along Virginia Avenue. Mike summed up the placement of the Indian Hills Highwayman segment as to keep the trail off of US 1 and in the green spaces.

The next trail to be discussed was the Historic Downtown Retrofit Segment. Mike stated the main issue with the Downtown trail was getting the trail over FEC at either 2nd Street or Indian River Drive, and the numerous obstacles that are within the boundaries of the trail. Reshawn mentioned the big question is the design standards, since most of the Downtown segment would need variations or meet different design criteria to fit. Reshawn asked if the design standards set forth must be followed perfectly. Lisa stated that this trail segment is completely different from any others since it is in an urban setting. Lisa said she has an ongoing conversation with FDOT Central Office regarding the design standards, but no answer has been forthcoming.

Gary stated that he and another designer from Atkins rode bicycles along the proposed alternatives and they determined an alternative to the west would be the best route from a safety standpoint. There are numerous issues with downtown Fort Pierce and US 1, therefore 7th Street is a safer alternative. 7th Street is less crowded and has existing bike traffic. If the SUN Trails were to take the 7th Street alignment, the SUN Trail could connect to the existing park and trail system owned by the City of Fort Pierce. Gary gave an explanation of the alternative route along 7th Street

and advised against using 2nd Street or allowing bicycles on the sidewalks. Kori stated that Primary Option 2 may be feasible since the City may acquire ten feet of right-of-way along the football fields. Kori mentioned that 7th Street has a positive in that it could bring people into the corridor and breathe life into it. He stated there is a new art district that will be along 7th Street, so the City would want an agreement to put in routes to get people from the arts district to downtown. Mike stated that the County would like to keep the routes towards the east. Gary brought up the Share Ride program coming to Fort Pierce and asked where the stations would be so that the SUN Trail could tie into them; the response was downtown Fort Pierce.

According to Mike, the area around the port is redeveloping and may be on board with a multi-use path in the port area. The issue with that would be getting the trail over the FEC. Mike expressed concerns with using the 7th Street alignment since that area of town can be a bit rough. Kori stated that the alignment may want to start on 7th Street at 10th Street and north to get people off of the main corridor. If it can be assumed that the FEC would transfer their property to the City, then the trail would could come back to the west at either Georgia Avenue, Delaware Avenue, or Orange Avenue and continue north. Kori also mentioned there is a Police Memorial Park at 3rd Street that would be nice to tie into. Gary stated that if the golf course can be used, it would eliminate all southern alternatives and connect further north. Kori mentioned that there is a RFQ for a HD site downtown that would connect to Moor's Linear Creek Park. With that trail, the 7th Street alignment would connect to downtown at Avenue C. Mike asked if the FEC would move everything to the north, to which Jack replied yes; therefore, that opens up more area to get the trail to 2nd Street. Jack agreed that the trail could go from Georgia Avenue to 7th Street, to Backus Avenue, and then downtown to tie in since there is a bridge at Backus Avenue.

Peter Buchwald asked why the 7th Street alignment was developed. Gary provided the explanation of the development of that alternative and mentioned the safety aspect. Peter asked for the differences in volume between 2nd Street and 7th Street. Gary replied that no true numbers are known, however the 7th Street alignment felt safer from a bicyclist standpoint. Peter asked what would be shown at the Public Kick-Off Meeting, to which Reshawn replied the alternatives in the application. Peter stated the alignments in the application went through the public involvement phase and vetting. He mentioned that it was important to keep the trail on 2nd Street in order to get people into the shops and amenities downtown. According to Peter, 2nd Street is a relatively low-speed street; therefore, the trail would be safe. Since 7th Street is a new alternative, Peter questioned if the alignment would meet the goals of the project and that if it doesn't, it may have to be pulled from the TIP and may not proceed forward. Reshawn reminded that this phase of the project is simply a feasibility study to develop the alternatives. Peter mentioned that he would like more information behind developing new alternatives. Reshawn stated that it is still early in the project schedule and the public comments received at the Kick-Off Meeting will help with the design and preferred alternative, which is still months out.

Peter questioned the validity of having a Kick-Off Meeting if the alternatives will be changed since the information presented would no longer be valid. Lynn mentioned that the point of the Kick-Off Meeting is to give the public a heads up so that if consultants or anyone show up looking around, the public doesn't become concerned. Lynn stated that the alternatives presented in February of 2018 would be more precise and definite. Peter asked how the public would be notified and which alignments would be notified. According to Lynn, the target audience has been identified along the two previously approved alternatives. She assured that the 7th Street alignment will not be presented at the Kick-Off Meeting.

Jack stated that there is value to the 7th Street alignment; the trail could come back downtown at Backus Avenue to tie into the downtown area. Jack raised a question about taking 7th Street all the way to Avenue M, since that would completely miss the downtown area. He stated that Avenue O at US 1 should be signalized to get onto the bridge. Lisa stated her concerns about getting the trail to connect to the new bridge at the north end of the project. Reshawn mentioned she would follow up with Lisa and Lynn regarding the design around the bridges at the north end. Mike mentioned that there is talk of making Old Dixie Highway one-way, which would potentially give the SUN Trail a lane of the bridge. There are right-of-way issues, according to Peter, at the new bridge. He advised to go north and east to Old Dixie Highway and then connect to the new Sunny Lane to avoid the necessity of right-of-way, which may be the case with Avenue O. Kori stated that there will be a commercial plaza on Avenue O that would require the intersection to be signalized.

The SUN Trail system will be a game-changer for Fort Pierce and St. Lucie County, according to Peter. Lisa agreed that the trails are special since they are in urban areas. Mike asked if the grant process and application to receive SUN Trail funds would be covered at the Kick-Off Meeting. Reshawn stated the background would be pulled and added to the presentation. Lisa agreed it was a good idea to add the background and how the project has developed to this stage. Peter suggested that other resources such as parks and amenities should be added to the display maps. With no further questions or comments, the meeting was concluded.

<u>Action Items:</u>

1. Send a meeting invite for the Public Kick-Off Meeting to the team (Reshawn Fields). *Completed.*
2. Identify resources, such as parks, on the alignment maps (Atkins).



Indian Hills Historic Highwayman Segment



Historic Downtown Segment
North Indian Hills to North Wauseway

Design Coordination Meeting

March 30, 2018



SUNTRAIL

Indian Hills Historic Highwayman Segment

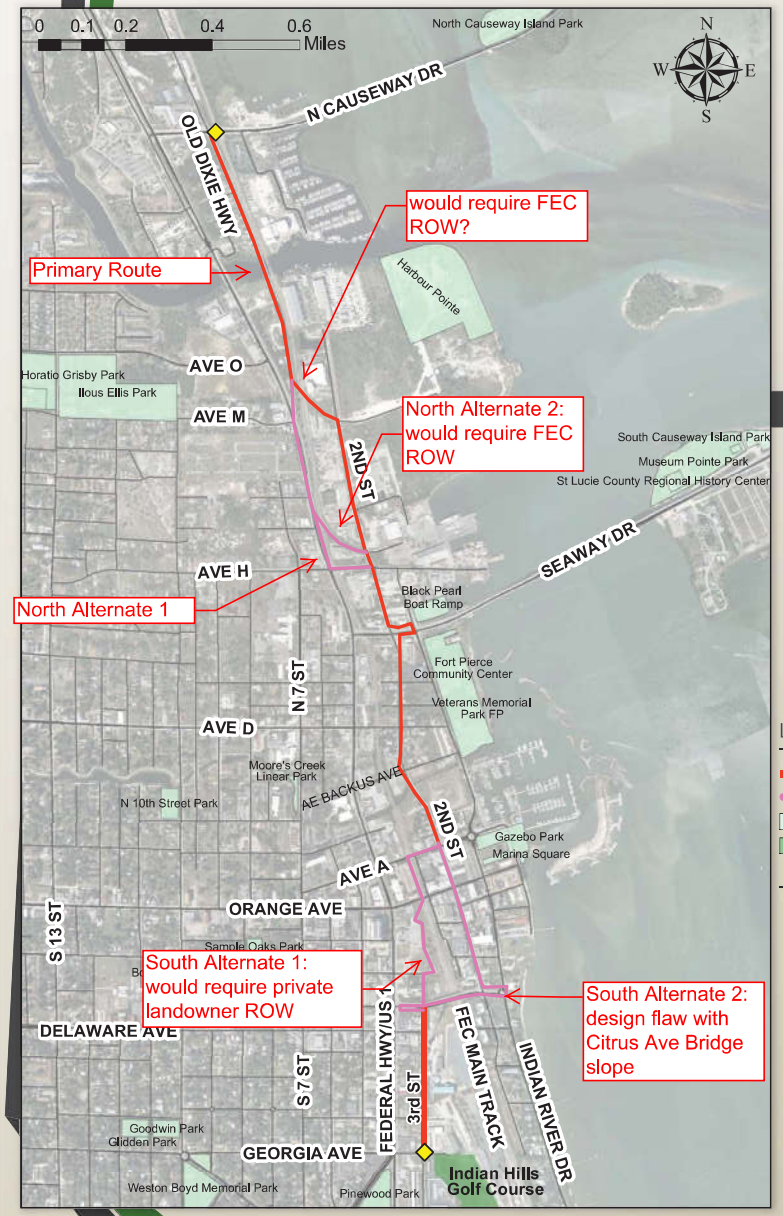
Location Map

Legend

- Primary Route
- Alternative Route
- St. Lucie County Parks
- Golf Course
- Segment Termini

Disclaimer:
This map is intended for reference only. Most information contained within is conceptual.

FDOT



SUNTRAIL

Historic Downtown Segment

Location Map



Legend

- Primary Route
- Alternative Route
- St. Lucie County Parks
- Golf Course
- Segment Termini

Disclaimer:
This map is intended for reference only. Most information contained within is conceptual.

FDOT

SUN Trail: Historic Downtown Fort Pierce Retrofit and Historic Highwayman Trail Gap Project Milestone Schedule	
DEADLINE	**TASK**
Alternatives Analysis	
04/27/18	Submit Draft Alternatives Analysis Comparison Matrix for D4 review
Week of 4/30	Design Coordination Meeting with City
Stakeholder Presentations	
05/08/18	City of Fort Pierce Planning Board Meeting
05/15/18	St. Lucie County TPO Meeting
05/18/18	Treasure Coast RPC Meeting
Alternatives Analysis Workshop	
04/27/18	Submit Draft PPT to D4 for review
05/18/18	(3 weeks) D4 Review and Provide Comments
06/01/18	Finalize Presentation/Meeting Materials (will also include City/County/RPC comments)
06/05/18	**Alternatives Analysis Workshop**
Draft Feasibility Report	
06/29/18	*Submit Draft Feasibility Report for D4 Review*
07/29/18	(30 days) D4 review and provide comments
Final Feasibility Report	
08/28/18	Revise Report to address D4 comments and submit Final to D4

Design Coordination Meeting

May 9, 2018

SUN Trail Feasibility Study
(Historic Highwayman Trail and Historic Downtown Ft. Pierce Retrofit Trail)
Design Coordination
Meeting Summary

Date/Time: May 9, 2018
10:30 a.m.

Location: St. Lucie County TPO

Subject: SUN Trail Feasibility Study Design Coordination Meeting

---

Introductions

- Florida Department of Transportation (FDOT): Lauren Rand (Project Manager)
- Saint Lucie County: Mike Middlebrook, Jennifer McGee, Kori Benton
- City of Fort Pierce: Jack Andrews
- St. Lucie County Transportation Planning Organization (TPO): Peter Buchwald, Ed Defini
- Atkins: Reshawn Fields, Brooke Feagle, Ryan Jensen

Overview

- FDOT is conducting a feasibility study for the Historic Downtown Fort Pierce Retrofit (440033-1) from Georgia Avenue to North Causeway Drive and the Historic Highwayman Trail Gap (440034-1) from Indian Hills Drive to Georgia Avenue. These are both portions of the statewide SUN Trail system. This meeting was to discuss alignments that were developed by the City of Fort Pierce, Saint Lucie County, and St. Lucie County TPO then reviewed by Atkins.

Historic Highwayman Trail Gap

- It was noted that the entire eastern trail alternative is located within FEC right-of-way. The beginning of the trail has a "Y" shape of available right-of-way, but the primary alternative will need a corner clip of right-of-way from either FEC or a homeowner. Concurrence with FEC would be necessary in order to gain an easement. Reshawn Fields mentioned that the report would have language regarding the corner clip options.
    - A FDOT drainage project (FPID: 441715-1) will run along Virginia Avenue and continue behind the homes. The project should have to acquire the necessary right-of-way for the corner clip that the SUN Trail could use. Jack Andrews mentioned that the project will be a canal but should have enough room to fit the trail. Lauren Rand said she would contact the FDOT drainage project manager.
- The issues with the second eastern alignment (at the northern end of the project) were discussed, including the need for a fence or wall by the lake and the lack of right-of-way at the northern end to connect to 3rd Street. The City of Fort Pierce has a drainage easement along Georgia Avenue that could be utilized, depending on the width of the trail. It was stated that the SUN Trail could be shrunk down to eight feet wide with an exception. It was decided that if a solution could not be found before construction, the trail would end at Georgia Avenue with signs on where to continue on the SUN Trail. It was agreed that the second eastern alignment was a good option for the trail.
- It was pointed out that right-of-way issues are a fatal flaw and that relocations should be avoided. The relocations were added by the environmental team as a "just in case" for the alternatives. The right-of-way and relocation sections will be revised to show no effects.
- The historic section was brought into question regarding the golf course and potentially historic residences. It was decided the historical section would not prove a fatal flaw because the residences would not be impacted, but did have to be noted in the report. The golf course was reconfigured in 2004-2005 and no archaeological or historical resources were uncovered; however, monitoring during construction may be necessary. It was mentioned that there has been coordination with the State Historic Preservation Officer (SHPO) regarding the golf course; projects weren't restricted, there was just added coordination.

Historic Downtown Ft. Pierce Retrofit Trail

- The northern terminus of the project was moved from Avenue H back to Causeway Drive; however, the area on US Highway 1 between Avenue H and Old Dixie Highway will be studied under another project as there is no right-of-way.
- A current study by St. Lucie County proposes that the Old Dixie Highway Bridge be changed to include one lane for traffic and one lane for the SUN Trail, along with two other options for the bridge. It was agreed upon that this segment can be labeled as "under study by St. Lucie County."

- Options regarding the gap on US Highway 1 were discussed, but no viable alternatives were decided upon. It was mentioned that FDOT has been trying to redesign the intersection of US Highway 1 and Avenue H, so the portion of the trail could be completed if the intersection is reconfigured at a later date.
- An issue with the Downtown segment of the trail is that large portions of the proposed trail cannot be funded under SUN Trails due to the need for privately owned right-of-way. It was discussed that some of the alternatives in right-of-way constricted areas can include sharrows and bike lanes; neither of which can be funded by the SUN Trail program.
- The bridge on Citrus Avenue would be a fatal flaw if that option were decided upon. The bridge does not meet Americans with Disabilities Act (ADA) criteria. It was discussed that a bike lane could be added to the bridge if no other options were available.
- The southern alternative 1 would be in City-owned right-of-way until just north of the bridge on Citrus Avenue, at which point the right-of-way becomes privately owned. Kori Benton also mentioned that the open area along that route is supposed to become a Brightline railroad station.
    - It was discussed on where this alternative would turn east and connect back to the primary alternative. It was decided upon that the alternative would turn right on Orange Avenue instead of Avenue A and continue east to 2nd Street.
- The northern section of the project was discussed, since there is no right-of-way to construct a full multiuse path. The segments on 2nd Street would have to be sharrows or bike lanes, not a SUN Trail. It was suggested that the City is looking to remove the on-street parking along 2nd Street and adding another parking garage. If this option occurs, then bike lanes could be added to 2nd Street.
- It was briefly discussed if the option exists with placing the trail next to the railroad; however, since the Brightline train will use the railroad, it was determined that would not be a safe option for pedestrians. The trail needs to be kept on 2nd Street.
- The Riverwalk alternative was discussed and determined to be a viable alternative. The issue with that alternative is how to get the pedestrians to the already constructed trail. The existing boat ramp is currently under reconstruction.
- It was determined that the trail will continue on the north side of Avenue H to the railroad tracks, where the SUN Trail segment will end until Old Dixie Highway.

Next Steps

- Atkins and Janus will revise the existing matrices, maps, and reports to reflect the decisions made.
- FDOT will provide information regarding the upcoming drainage project along Virginia Avenue and if it is possible to include the SUN Trail segment within this project area.

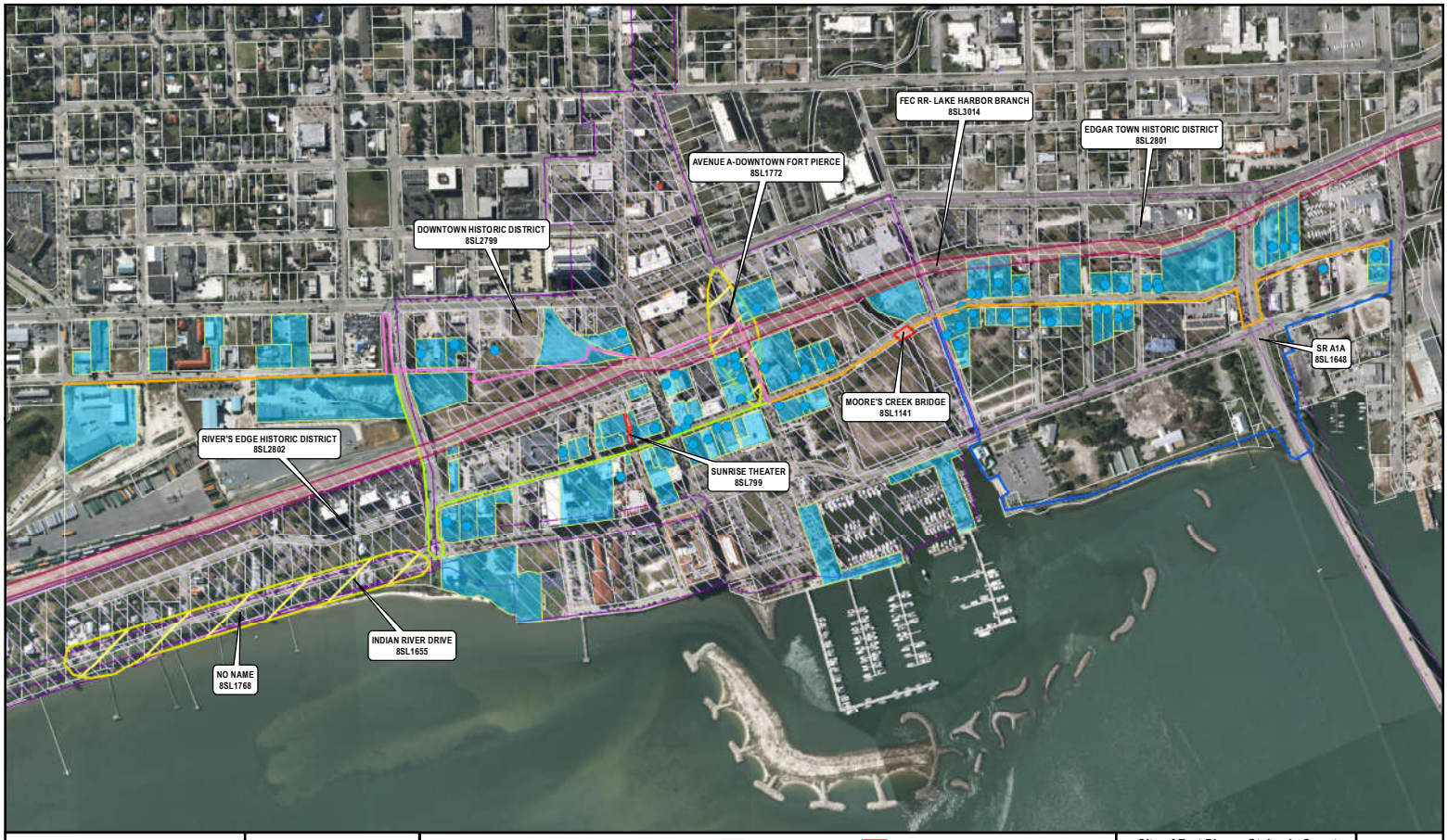

Will be evaluated under another project.
cannot be funded under SUN Trail program due to ROW limitations
Would require private ROW
Design flaw with Citrus Ave Bridge slope.
Cannot be funded under SUN Trail program due to ROW limitations
cannot be funded under SUN Trail program due to ROW limitations
Avenue Q
Avenue O
Avenue M
Avenue L
Avenue K
Avenue J
Avenue I
Avenue H
Avenue G
Avenue F
Avenue E
Avenue C
Avenue B
Avenue A
Orange Ave
Boston Ave
Citrus Ave
Delaware Ave
Florida Ave
Georgia Ave
Fisherman's Wharf
Seaway Dr
A1A
SR-5
SR-9
N 2nd St
N 3rd St
N 7th St
N 10th St
N 12th St
N 13th St
N 14th St
N 15th St
N 16th St
N 17th St
S 5th St
S 8th St
Melody Ln
Indian River Dr
Harbour
Imagery: NAIP 2013
St. Lucie County, Florida
St Lucie County Intl Airport
SUN Trail Historic Downtown Fort Pierce Retrofit Trail
Potential Routes
Ft. Pierce, St. Lucie County, Florida
Primary Route
South Alternate 1
South Alternate 2
River Walk Alternate
Project Map
1 in = 1,351 feet
Prepared By: Atkins N.A.
Date: May 02, 2018
ATKINS

Historic Downtown Fort Pierce Trail Alternates Matrix

for Trails Constructed under the SUN Trail Program

	No Build	Primary Route	South Alternate 1	South Alternate 2	River Walk Alternate
Social Features					
Existing Land Use	No adverse effects	No adverse effects	No adverse effects	No adverse effects	No adverse effects
Future Land Use	No adverse effects	No effect	No effect	No effect	No effect
Community Cohesion	No adverse effects; but does not enhance connectivity in the area and does not meet purpose and need	Enhanced connectivity. Trail traverses through one residential area along North 2nd Street between A E Backus Avenue and Avenue E.	Enhanced connectivity.	Enhanced connectivity.	Enhanced connectivity.
Relocations	None	Unless trail remains within existing ROW, six to seven buildings may require relocation. Five of which are identified as historic along N 2nd Street. One or two buildings located at 514 S 3rd Street at the mineral processing/cement plant may require relocation. Car dealership property just south of bridge uses side alley for parking. Could be avoided if the route was taken West on Delaware Ave.	Potential relocation of a multi-level parking facility located at the corner of US 1 and Orange Avenue unless trail remains within existing ROW	None	Two potential relocations include the Manatee Observation and Education Center (600 N Indian River Dr) and a building located near the boat ramp at Indian River Veterans Memorial Park.
ROW or Easements Required	None	Not enough ROW provided to accommodate multiuse paths of 8'-14' wide. Other options such as sharrows and bike lanes will have to be utilized or different routes selected.	ROW or easement agreement would be needed between Citrus Ave. and Orange Ave. Current route goes through various properties in this area. Bridge would need widening to safely accommodate bicyclists.	Not enough ROW provided to accommodate multiuse paths of 8'-14' wide. Other options such as sharrows and bike lanes will have to be utilized or different routes selected.	Not enough ROW provided to accommodate multiuse paths of 8'-14' wide in all areas. Other options such as sharrows and bike lanes will have to be utilized or different routes selected.
Construct Under the SUN Trail Program	N/A	No	Yes (require private ROW)	No	Yes (portions)
Community Services	No adverse effects	The proposed trail Alternate and/or associated construction would have the potential to impact six historic structures along N 2nd St (200, 518, 522, 524, 532 and 658 N 2nd St).	The proposed trail Alternate and/or associated construction would have the potential to impact three historic structures (301 and 311 Orange Avenue and 208 Avenue A).	No adverse effects. Enhancement to the community by providing increased connectivity and modal options.	No adverse effects. Enhancement to the community by providing increased connectivity and modal options.
Potential User Conflicts	None	Conflicts with heavy delivery trucks to warehouses. Minimize conflict with signage. Conflicts with on street parking could be handled with signage or different route selection.	Very steep and narrow bridge on Citrus Ave creates unsafe bicycle terrain. Minimize conflict by not using bridge. Conflicts with heavy delivery trucks to warehouses. Minimize conflict with signage. Conflicts with on street parking could be handled with signage or different route selection.	Very steep and narrow bridge on Citrus Ave creates unsafe bicycle terrain. Minimize conflict by not using bridge. Conflicts with on street parking could be handled with signage or different route selection. Traffic Circle conflicts and confusion for novice riders could be handled with signage.	Conflicts with boat ramp users. Minimize conflicts with signage. Conflicts with park users (fishing). Minimize with signage and specific fishing and resting spots. Conflicts with heavy delivery trucks to warehouses. Minimize conflict with signage.
Cultural					
Archaeological/ Historical Resources	None	1 National Register-Listed bridge, 1 historic district not evaluated by SHPO, 26 structures not evaluated by SHPO, 13 historic parcels	1 National Register-Eligible railroad, 3 historic structures not evaluated by SHPO, 3 historic parcels, 1 archaeological site not evaluated by SHPO	1 National Register-Listed structure, 1 National Register-Eligible railroad, 1 historic roadway not evaluated by SHPO, 13 historic structures not evaluated by SHPO, 15 historic parcels, 2 archaeological sites not evaluated by SHPO	1 historic district not evaluated by SHPO, 3 historic structures not evaluated by SHPO, 2 historic parcels
Section 4(f)	None	None	None	None	None
Natural					
Threatened and Endangered Species	No effect	No effects	No adverse effects	No effects	No effects
Wetlands/Surface Waters (acres)	None	None	None	None	None
Upland Habitat (acres)	None	None	None	None	None
Outstanding Florida Waters/Aquatic Preserves	None	None	None	None	None
Floodplains (acres)	No effect	None	None	None	None
Physical					
Noise	None	No effect	No effect	No effect	No effect
Air Quality	None	No effect	No effect	No effect	No effect
Contamination	None	See 'CONTAMINATION SUMMARY' table below for sites identified.	See 'CONTAMINATION SUMMARY' table below for sites identified.	See 'CONTAMINATION SUMMARY' table below for sites identified.	See 'CONTAMINATION SUMMARY' table below for sites identified.

Created 5/2/2018



Previously Recorded Cultural Resources and Historic Parcels

Sun Trail - Downtown Fort Pierce Segment

Primary Route
South Alternate 1
South Alternate 2
River Walk Alternative
Archaeological Site
Resource Group
Historic Bridge
Historic Structures
National Register-Listed or Eligible
Historic Parcels

City of Fort Pierce, St. Lucie County

0 250 500 Feet

0 50 100 Meters

Map 1



Imagery: NAIP 2013

Project Map

Prepared By: Atkins N.A.
Date: May 02, 2018

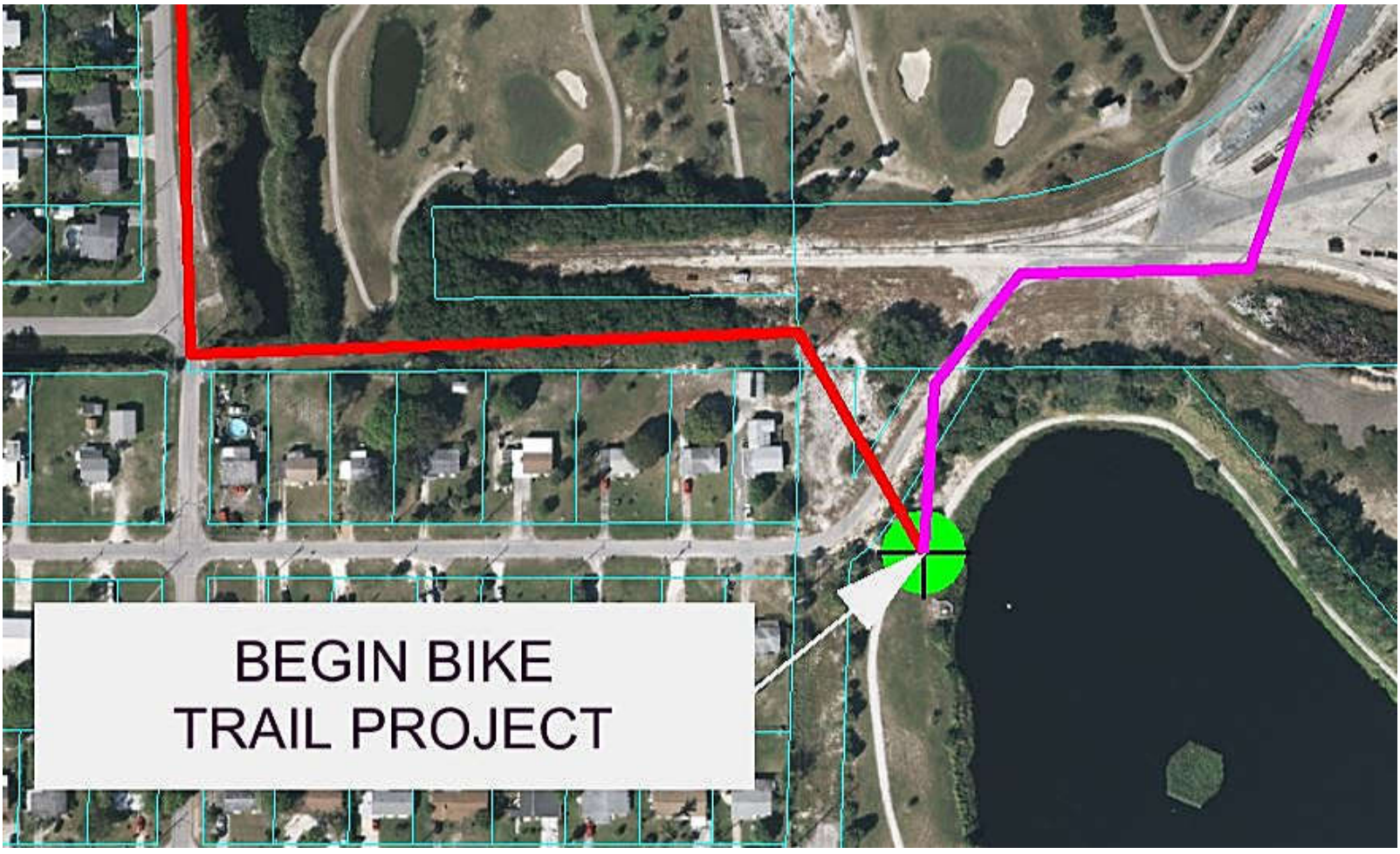
ATKINS

1 in = 673 feet

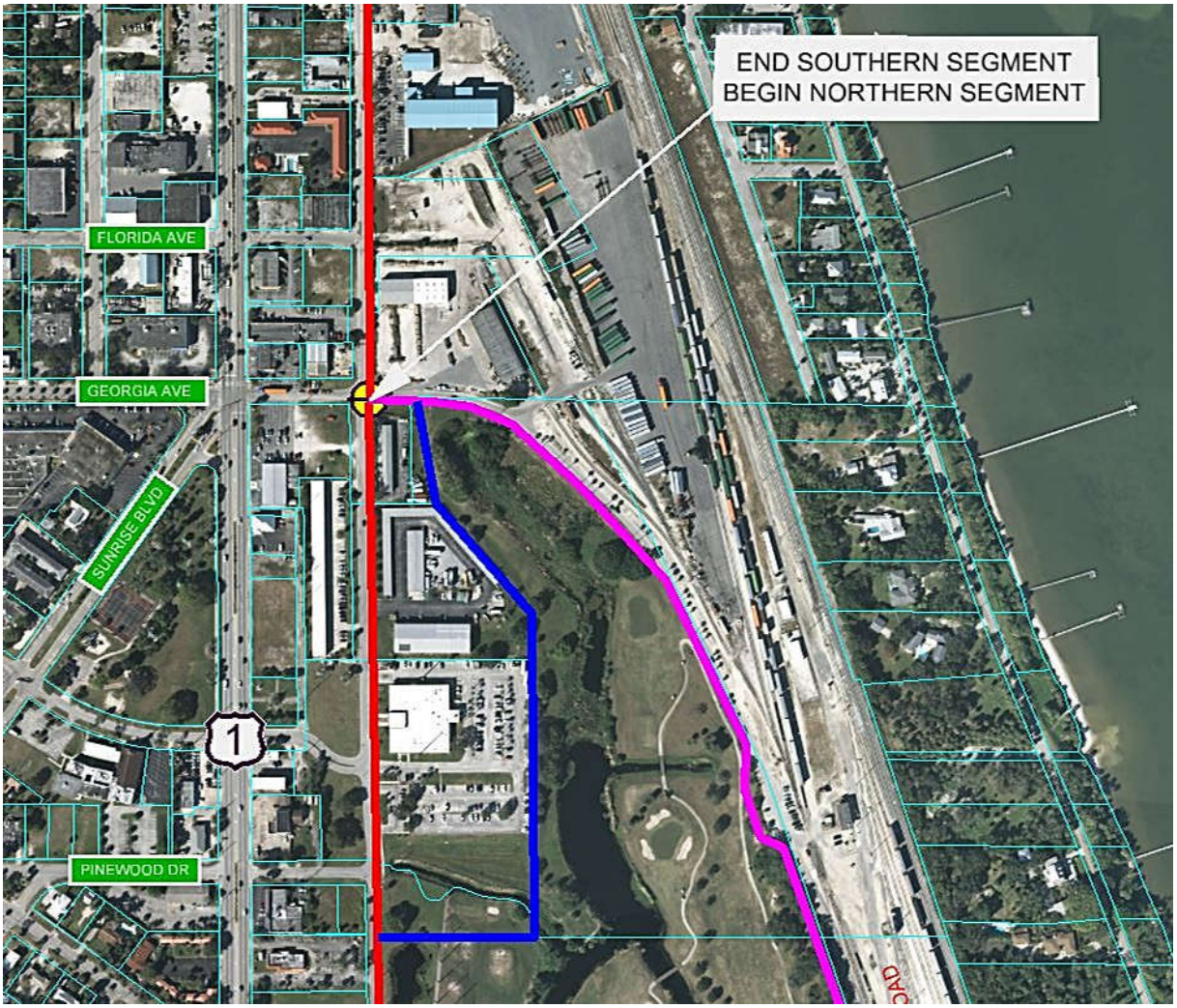
SUN Trail Highwayman Gap Trail
Potential Routes
Ft. Pierce, St. Lucie County, Florida

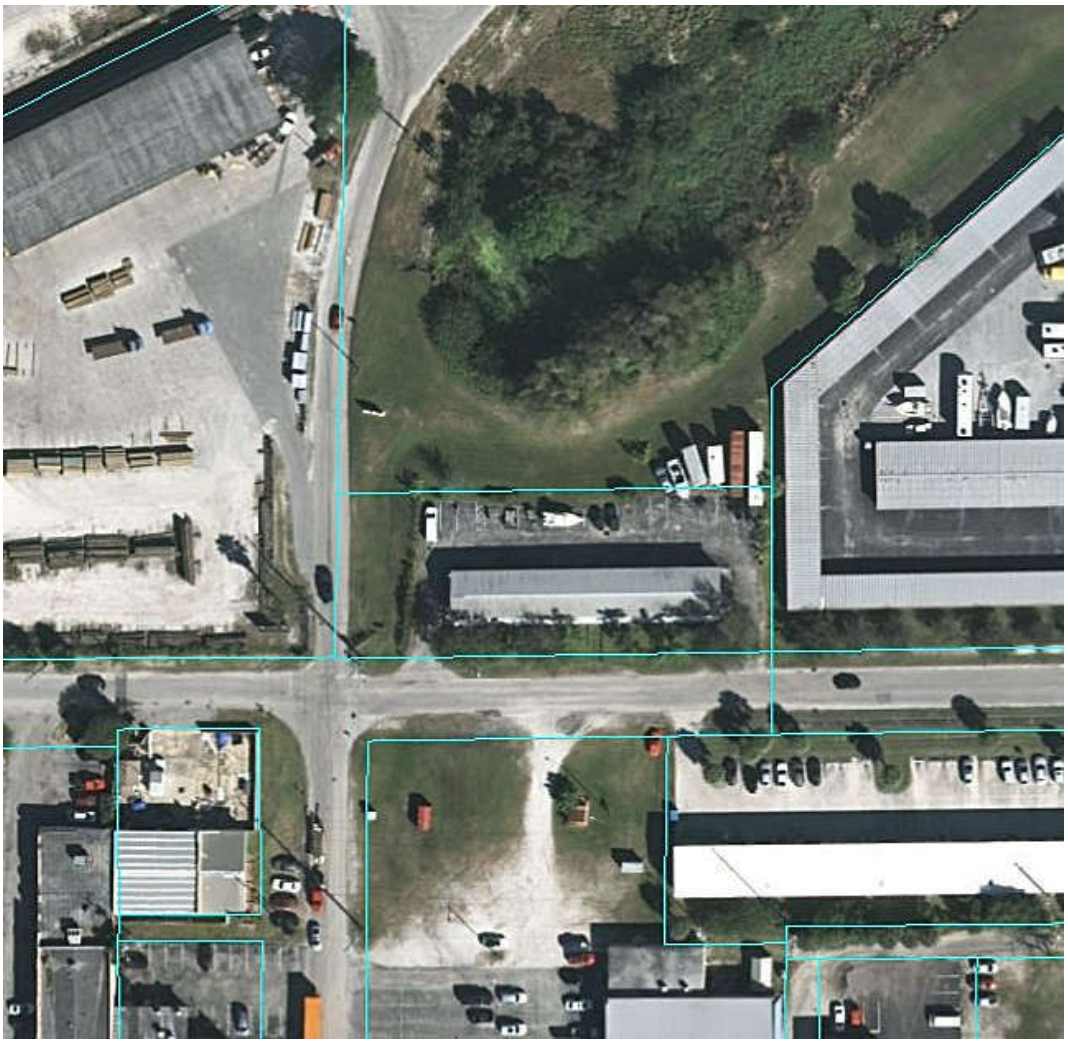
Primary Route
East Alternate 2
East Alternate 1




BEGIN BIKE
TRAIL PROJECT


EGIN BIKE
IL PROJECT


END SOUTHERN SEGMENT
BEGIN NORTHERN SEGMENT
FLORIDA AVE
GEORGIA AVE
SUNRISE BLVD
1
PINEWOOD DR



Historic Highwayman Gap Trail Alternates Matrix

for Trails Constructed under the SUN Trail Program

	No Build	Primary Route	East Alternate 1	East Alternate 2
Social Features				
Existing Land Use	No adverse effects	No adverse effects	No adverse effects	No adverse effects
Future Land Use	No effect	No effect	No effect	No effect
Community Cohesion	No adverse effects; but does not enhance connectivity in the area and does not meet purpose and need	Enhanced connectivity. Trail travels along *Pleasant View* and *Indian Hills Estates* and would enhance connectivity in the area.	Enhanced connectivity.	Enhanced connectivity.
Relocations	None	One potential relocation. Along S 3rd St, one outlying building (and two small covered pavilion structures) of the Indian Hills Golf Course may require relocation. The alignment will also need to be shifted around private properties along the south edge of the golf course.	None	One potential relocation. Warehouse/self-storage building(s) may require relocation if adjoining undeveloped land cannot be utilized for trail.
ROW or Easements Required	None	R/W agreement will be needed with Indian Hills Golf Course to add proposed multiuse path onto the Southern and Western edge of the property. An easement will also be needed from the railroad company to get the multiuse path from the Southern start point on to the golf course. NEED TO DETERMINE OWNERSHIP OF GOLF COURSE	R/W agreement will be needed with Indian Hills Golf Course to add proposed multiuse path onto the Southern and Eastern edge of the property. An easement will also be needed from the railroad company to get the multiuse path from the Southern start point on to the golf course.	R/W agreement will be needed with Indian Hills Golf Course to add proposed multiuse path behind the Police Station and businesses on South 3rd Street. An easement will also be needed from the railroad company to get the path from behind the Police Station and businesses back to South 3rd Street because Georgia Ave. is a private drive East of South 3rd Ave.
Construct under the SUN Trail Program	N/A	Yes	No	Yes
Community Services	No adverse effects	No adverse effects. Enhancement to the community by providing increased connectivity and modal options.	No adverse effects. Enhancement to the community by providing increased connectivity and modal options.	No adverse effects. Enhancement to the community by providing increased connectivity and modal options.
Potential User Conflicts	None	Golf ball and golf cart danger hazards. Minimize conflict with signage. Riders taking golf cart paths	Golf ball and golf cart hazards. Minimize conflict with signage. Riders taking golf cart paths	Golf ball hazards. Minimize conflict with signage. Proximity to golf course

		instead of the bike path. Minimize conflict with signage and paint markings. Conflicts with heavy delivery trucks to warehouses. Minimize conflict with signage.	instead of the bike path. Minimize conflict with signage and paint markings. Trains and path users in close quarters. Minimize conflicts with fencing.	lake. Minimize conflict with fencing and signage.
Cultural				
Archaeological/ Historical Resources	None	36 historic parcels	1 National Register eligible railroad; 2 archaeological sites not evaluated by SHPO, 3 historic parcels	1 archaeological site not evaluated by SHPO, 2 historic parcels
Section 4(f)	None	None	None	None
Natural				
Threatened and Endangered Species	No effect	No adverse effects	No adverse effects	No adverse effects
Wetlands/Surface Waters (acres)	None	0.02 acres wetlands 0.00 acres surface waters Impacts can be avoided/minimized by shifting the proposed trail route south adjacent to the existing freshwater wetland pond.	0.00 acres wetlands 0.00 acres surface waters	0.00 acres wetlands 0.01 acres surface waters
Upland Habitat (acres)	None	0.18 acres	0.25 acres	0.00 acres
Outstanding Florida Waters/Aquatic Preserves	None	None	None	None
Floodplains (acres)	No effect	1.32 acres	0.49 acres	0.73 acres
Physical				
Noise	None	No effect	No effect	No effect
Air Quality	None	No effect	No effect	No effect
Contamination	None	See 'CONTAMINATION SUMMARY' table below for sites identified. [Contamination Impacts TBD by FDOT District Contamination Impacts Coordinator (DCIC).]	See 'CONTAMINATION SUMMARY' table below for sites identified. [Contamination Impacts TBD by FDOT District Contamination Impacts Coordinator (DCIC).]	See 'CONTAMINATION SUMMARY' table below for sites identified. [Contamination Impacts TBD by FDOT District Contamination Impacts Coordinator (DCIC).]

Created 5/2/2018



Previously Recorded Cultural Resources and Historic Parcels

Sun Trail - Historic Highwayman Segment

Primary Route
East Alternate
East Alternate 2
Archaeological Site
Linear Resource
National Register-Eligible
Historic Parcel

City of Fort Pierce, St. Lucie County

0 250 500 Feet
0 50 100 Meters

Map 1

Public Kick-Off Meeting

October 10, 2017

FDOT

Florida Department of Transportation

RICK SCOTT
GOVERNOR

3400 West Commercial Boulevard
Fort Lauderdale, FL 33309

MIKE DEW
SECRETARY

September 29, 2017

Dear Property Owner or Other Interested Stakeholder:

RE: **Public Kick-Off Meeting**
Feasibility Study for Shared-Use Nonmotorized (SUN) Trails:
Historic Downtown Fort Pierce Retrofit Trail and Historic Highwayman Trail
St. Lucie County, Florida
Financial Management Numbers: 440033-1 and 440034-1

On behalf of the Florida Department of Transportation (FDOT) District Four, you are invited to a Public Kick-Off Meeting to learn about the Feasibility Study for the above referenced projects. The Study will evaluate alternatives for multi-use recreational pathways.

The Kick-Off Meeting is scheduled for Tuesday, October 10, 2017, with an open house at 5 p.m. and a presentation at 6 p.m. at the Old City Hall located at 315 Avenue A in Fort Pierce. A location map of the meeting site is enclosed.

The study limits for the Historic Downtown Fort Pierce Retrofit segment are from Georgia Avenue to North A1A, a distance of about 2.3 miles. The study limits for the Historic Highwayman Trail segment are from Indian Hills Drive to Georgia Avenue, a distance of about 1.3 mile.

This letter is being sent to all property owners and tenants within at least 300 feet of either side of the proposed project and to public officials, regulatory agencies, and individuals interested in the project. This meeting is being conducted to give interested persons an opportunity to review the project materials and become acquainted with the proposed SUN Trails.

Persons wishing to submit written statements may do so at the meeting or by sending them to Lisa Maack, Project Manager, 3400 W. Commercial Boulevard, Fort Lauderdale, Florida 33309 or by email to Lisa.Maack@dot.state.fl.us. Public participation is solicited without regard to race, color, national origin, age, sex, religion, disability, or family status. Persons who require accommodations under the Americans with Disabilities Act or persons who may require translation services (free of charge) should contact Lisa Maack at (954) 717-2253 at least seven (7) days prior to the meeting.

If you have questions about the project or scheduled public meeting, please contact the Project Manager, Lisa Maack, at the phone number or at the email address listed above. You may also visit the SUN Trails website at www.FloridaSUNTrail.com.

Sincerely,

Lisa Maack
District Four Project Manager

Attachment: Location Map

SUNTRAIL

SUN Trails Location Map

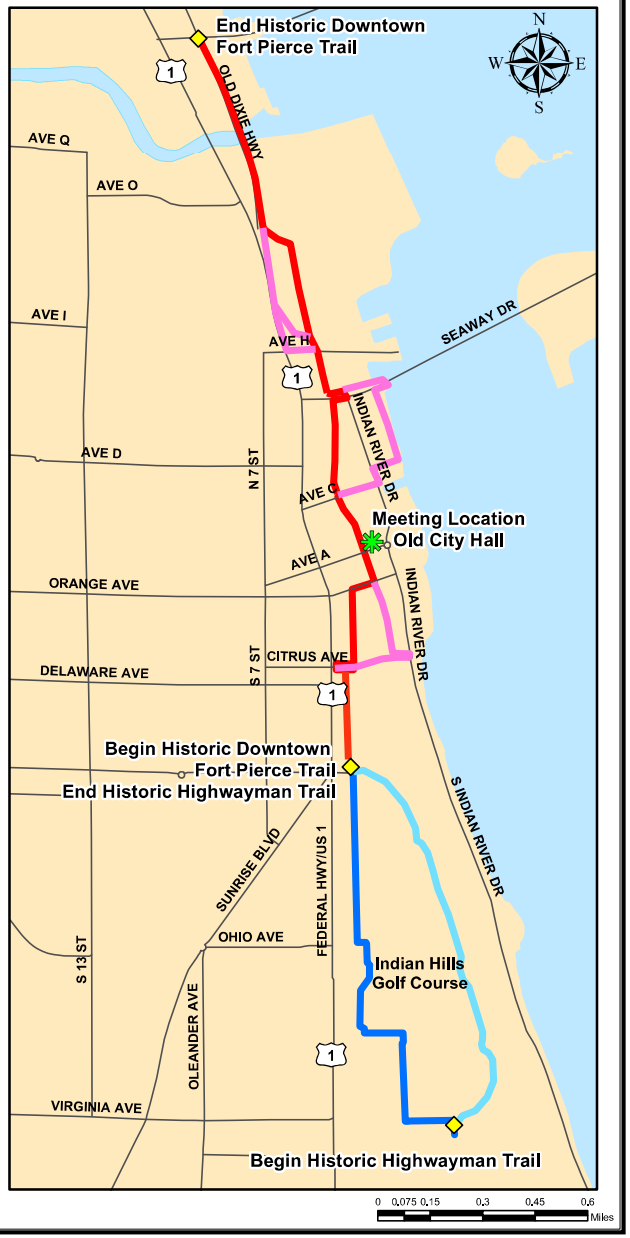
Legend

- Downtown Primary Route
- Downtown Alternative Route
- Historic Highwayman Primary Route
- Historic Highwayman Alternative



Disclaimer:
This map is intended for reference only. Most information contained within is conceptual.

FDOT



Feagle, Brooke

From: Cimini, Randy D
Sent: Wednesday, September 27, 2017 2:50 PM
To: Feagle, Brooke
Subject: FW: Submit Notice in FAR
Attachments: FL Admin Register notice_changes made.doc

Here you go. It will run on Monday, Oct. 2. Also, here is the file. I corrected the line spacing in the Public participation paragraph. It was wider than the other paragraphs.

Randy Cimini
Public Involvement Manager, FL Transportation Planning and PD&E

ATKINS
Find out more about what we do and how we do it - www.atkinsglobal.com

600 North Broadway Avenue, Suite 310, Bartow, Florida 33830 Main Office: +1 (863) 533-7000 | Direct: +1 (863) 800-9543 | Fax: +1 (863) 533-7888 | Cell: +1 (863) 512-2533
Email: randy.cimini@atkinsglobal.com | Web: www.atkinsglobal.com www.atkinsglobal.com/northamerica

-----Original Message-----
From: FL-Rules@dos.state.fl.us [mailto:FL-Rules@dos.state.fl.us]
Sent: Wednesday, September 27, 2017 2:47 PM
To: Cimini, Randy D <Randy.Cimini@atkinsglobal.com>
Subject: Submit Notice in FAR

You have successfully submitted a notice for publication in the Florida Administrative Register on 9/27/2017 2:47:05 PM.

Department: Other Agencies and Organizations

Organization: ATKINS - Bartow

Notice type: Notice of Meeting/Workshop Hearing

Issue: 43/190

Once this notice is published you will be able to view it by clicking the following link:

https://urldefense.proofpoint.com/v2/url?u=http-3A__www.FLRules.org_gateway_View-5FNotice.asp-3Fid-3D19464813&d=DwIFAg&c=cUkzcZGZt-E3UgRE832-4A&r=Jau9xTOVgJhpkpAByd9CJOcaYIHaUxaX59Yqa2woKRg&m=KUNTzKbU5rpdeyN1HZx2DzmMHkW6P14-U_BOsTsAQFc&s=_7g9GDlif9va9KlMceFLQAJpRqR82_GVfrcDR4pSn7M&e=

You may contact the Florida Administrative Register office at (850)245-6270 for additional information.

Notice of Meeting
DEPARTMENT OF TRANSPORTATION

The Florida Department of Transportation (FDOT), District Four, is hosting a Public Kick-off Meeting as part of the Feasibility Study for two segments of Shared-Use Nonmotorized (SUN) Trail Program, the Historic Downtown Fort Pierce Retrofit segment and Historic Highwayman Trail Gap segment in Fort Pierce, St. Lucie County. FDOT invites all members of the public to attend.

DATE AND TIME: Tuesday, October 10, 2017 from 5 p.m. to 7 p.m.
PLACE: Old City Hall, 315 Avenue A, Fort Pierce, FL 34950

GENERAL SUBJECT MATTER TO BE CONSIDERED: This public meeting offers the community the opportunity to express their views about the location, conceptual design, and social, economic, and environmental effects of constructing the trails on both proposed segments. The study limit for the Historic Downtown Fort Pierce Retrofit segment is from Georgia Avenue to North A1A; Financial Project ID 440033-1. The study limit for the Historic Highwayman Gap Trail segment is from Indian Hills Drive to Georgia Avenue; Financial Project ID 440034-1.

FDOT will provide an overview of both project segments, any potential issues of concern, and display information about the potential alternatives to be developed during the Feasibility Study. The meeting will be an open house format where people can ask questions and provide comments to FDOT representatives in a one-on-one setting. Written comments will be accepted.

Public participation is solicited without regard to race, color, national origin, age, sex, religion, disability, or family status. People requiring special accommodations under the Americans with Disabilities Act or who require translation services (free of charge) should contact Lisa Maack project manager, at (954) 717-2253 or toll free at 1 (866) 336-8435, or by email to lisa.maack@dot.state.fl.us at least seven (7) days prior to the meeting.

If you are hearing or speech impaired, please contact FDOT using the Florida Relay Service, 1 (800) 955-8771 (TDD) or 1 (800) 955-8770 (Voice).

For more information about the project or the Public Kick-off Meeting, please contact Lisa Maack or visit the SUN Trail website www.FloridaSUNTrail.com.

Treasure Coast Newspapers | TCPALM

Indian River Press Journal
1801 U.S. 1, Vero Beach, FL 32960

AFFIDAVIT OF PUBLICATION

STATE OF FLORIDA
COUNTY OF INDIAN RIVER

Before the undersigned authority personally appeared, Natalie Zollar, who on oath says that she is Classified Inside Sales Manager of the Indian River Press Journal, a daily newspaper published at Vero Beach in Indian River County, Florida: that the attached copy of advertisement was published in the Indian River Press Journal in the following issues below. Affiant further says that the said Indian River Press Journal is a newspaper published in Vero Beach in said Indian River County, Florida, and that said newspaper has heretofore been continuously published in said Indian River County, Florida, daily and distributed in Indian River County, Florida, for a period of one year next preceding the first publication of the attached copy of advertisement; and affiant further says that she has neither paid or promised any person, firm or corporation any discount, rebate, commission or refund for the purpose of securing this advertisement for publication in the said newspaper. The Indian River Press Journal has been entered as Periodical Matter at the Post Offices in Vero Beach, Indian River County, Florida and has been for a period of one year next preceding the first publication of the attached copy of advertisement.

Customer	Ad Number	Copyline	PO #
930054 - ATKINS NORTH AMERICA	1772025	SUN TRAIL FDOT	

Pub Dates
October 3, 2017
October 3, 2017
October 3, 2017

Sworn to and subscribed before me this day of, October 03, 2017, by

Natalie Zollar, who is
Natalie Zollar
(X) personally known to me or
( ) who has produced _____ as identification.

Karol E Kangas

Karol Kangas — Notary Public

KAROL E KANGAS
Notary Public - State of Florida
Commission # GG 126041
My Comm. Expires Jul 29, 2021
Bonded through National Notary Assn.

Medical pot producer: Regulate edibles

FRANK GLUCK
USA TODAY NETWORK - FLORIDA

Florida voters last year overwhelmingly backed broad medical marijuana legalization, but one popular means of ingesting the drug — eating cannabis-infused candies and baked goods — remains in a regulatory limbo.

Surterra Wellness, one of the first companies to win state approval to grow and dispense medical marijuana in the Sunshine State, is now urging the Florida Department of Health to move more quickly in drafting rules on such products.

"Many patients have been seeking edible products because it is the best format for them to find relief," said Wesley Reynolds, president of Surterra Florida, in a written statement. "The more available options for people, the more likely they will be able to use a cannabis product instead of highly addictive and easily abused opiates."

Florida law defines edibles as "commercially produced food items made with marijuana oil, but no other form of marijuana, that are produced and dispensed by a medical marijuana treatment center."

The law also requires that the state determine the "shapes, forms, and ingredients" of such products discourage use by children.

In states where marijuana is even more tolerated, such as Colorado, edibles closely resemble popular candies.

Mara Gambineri, the spokeswoman for the Department of Health's Office of Medical Marijuana Use, said the office is "working diligently" to implement Amendment 2. But she did not comment when asked when rules on edibles might be written.

Florida voters in November approved Amendment 2, which legalized medical marijuana use for patients with certain "debilitating" medical conditions.

The enabling law that put that measure into effect outlawed smoking marijuana for any purpose. So, for now, dispensaries largely sell cannabis-infused oils, lotions and vaporizer pens.



Edible marijuana products on display at a medical marijuana dispensary in Denver. ED ANDRIESKI, AP

Witness: Menendez 'hostile' on call on behalf of donor

DAVID PORTER
ASSOCIATED PRESS

NEWARK, N.J. - U.S. Sen. Bob Menendez reacted angrily and threatened to use his position on the Senate Finance Committee when his entreaties about changing Medicare reimbursement policy were rejected, a former Medicare official testified Monday at Menendez's bribery trial.

The New Jersey Democrat didn't mention co-defendant Salomon Melgen in either a 2009 phone call or a 2012 meeting about the dispute, former Centers for Medicare and Medicaid Services official Jonathan Blum testified. But Blum said it was clear the Florida eye doctor's billing dispute was the issue.

An indictment charges Menendez with accepting private jet flights and luxury hotel stays from Melgen in exchange for political influence. Both men have denied the charges and say the gifts stem from their longtime friendship.

While Menendez has claimed in court filings that he sought out then-Health and Human Services Secretary Kathleen Sebelius — who attended the 2012 meeting — because of inconsistencies in Medicare billing practices, prosecutors allege he was acting solely on Melgen's behalf.

According to Blum, the 2009 phone call started off cordially, but soon turned icy.

"As I did not yield on his statement that the agency wasn't being consistent, his tone became more hostile," Blum said. "It was definitely a call that stands out to me. The tone was very angry. I could tell he was not happy with my answers."

On cross-examination by Melgen's attorney, Blum added, "I think both of us were frustrated with the call."

After the 2012 meeting with Sebelius, Blum said, Menendez said he "was going to use the authority he had as a member of the Senate finance committee" to continue to press the issue.

Menendez didn't mention Melgen by name either time, Blum testified, though then-Senate Democratic Majority Leader Harry Reid mentioned at the 2012 meeting that he had become familiar with the billing issue after talking to Melgen. Blum added that unlike other queries from members of Congress, no other doctors or other potentially affected stakeholders were mentioned in the conversations.

Last week, former Democratic U.S. Sen. Tom Harkin of Iowa, who led a Senate health committee at the time, testified Menendez set up a meeting between him and Melgen about the Medicare billing issue in 2011 but that he didn't offer assistance.

Melgen paid back $8.9 million to Medicare in the dispute. In a separate case not involving Menendez, Melgen was convicted in Florida in April on multiple counts of health care fraud, submitting false claims and falsifying patients' records. Sentencing was postponed until after the current trial concludes.

RAPCO TRAILER CONNECTION
STIHL Elite Dealer
3025 SE Dixie Hwy., Stuart
Rapcotrailer.com
288-1808

Special Referendum Elections
SAMPLE BALLOTS
Tuesday · November 7, 2017
POLLS OPEN 7 am - 7 pm

City of Stuart Referendum Election

Sale of City-Owned Commercial Lot Fronting Tidally-Influenced Waters	Long-Term Lease of City-Owned Commercial Lot Fronting Tidally-Influenced Waters	Long-Term Lease of City-Owned Commercial Lot Fronting Tidally-Influenced Waters
Shall the City sell the 2.638 acre parcel of property known as the North Point Parcel for at least it's appraised value? This sale would meet the Community Redevelopment Plan and would provide tax relief to the tax payers.	Shall the City seek a long-term lease of the property known as Mulligan's Beach House located at 131 SW Flagler Avenue? This lease would provide that the property would be maintained at no cost to the City and would provide tax relief to the tax payers.	Shall the City seek a long-term lease of the property known as the Pelican Cafe? This lease would provide that the property would be maintained at no cost to the City and would provide tax relief to the tax payers.
○ Yes for approval ○ No for rejection	○ Yes for approval ○ No for rejection	○ Yes for approval ○ No for rejection

Proposed Village of Indiantown Election
Shall the Village of Indiantown be created and its charter adopted?
○ YES ○ NO

Early Voting October 30-November 3 • 8 am to 5 pm Daily
Elections Center: 135 SE Martin Luther King, Jr. Blvd., Stuart, FL 34994
Elisabeth Lahti Library: 15300 SW Adams Ave., Indiantown, FL 34956
For more information visit: MartinVotes.com or call 772.288.5637
October 3 & 17, 2017 ND-1767361

SUN Trail Feasibility Study
Historic Downtown Fort Pierce Retrofit
Historic Highwayman Trail Gap
FDOT
Financial Project Numbers: 440033-1 and 440034-1

PUBLIC KICK-OFF MEETING

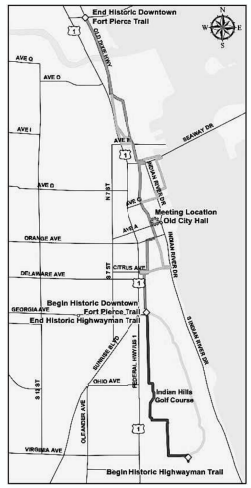
The Florida Department of Transportation (FDOT), District Four, is hosting a Public Kick-off Meeting as part of the Feasibility Study for two segments of Shared-Use Nonmotorized (SUN) Trail Program, the Historic Downtown Fort Pierce Retrofit segment and Historic Highwayman Trail Gap segment in Fort Pierce, St. Lucie County (see aerial photo). The public meeting is from 5 p.m. to 7 p.m., Tuesday, October 10, 2017, at the Old City Hall located at 315 Avenue A in Fort Pierce.

At this public meeting, FDOT will provide an overview of both project segments, any potential issues of concern, and potential trail alternatives. The study limits for the Historic Downtown Fort Pierce Retrofit study are from Georgia Avenue to North A1A. The study limits for the Historic Highwayman Trail Gap are from Indian Hills Drive to Georgia Avenue.

The meeting will be an open house format where people can ask questions and provide comments to FDOT representatives in a one-on-one setting. Written comments will be accepted. Your comments are an important part of this study.

Public participation is solicited without regard to race, color, national origin, age, sex, reli-gion, disability, or family status. People requiring special accommodations under the Americans with Disabilities Act or who require translation services (free of charge) should contact Lisa Maack project manager, at (954) 717-2253 or toll free at 1 (866) 336-8435, or by email to lisa.maack@dot.state.fl.us at least seven (7) days prior to the meeting.

For more information about the SUN Trail Feasibility Study, please contact Lisa Maack or visit the SUN Trail website www.FloridaSUNTrail.com.



October 3, 2017 ND-1772025

SUN Trail Feasibility Study

Historic Downtown Fort Pierce Retrofit — Financial Project Number: 440033-1
Historic Highwayman Trail — Financial Project Number: 440034-1

Public Kick-off Meeting
October 10, 2017

Lisa Maack, AICP
FDOT, District 4

Reshawn Fields, AICP
ATKINS North America



SUN Trail Feasibility Study

Historic Downtown Fort Pierce Retrofit — Financial Project Number: 440033-1
Historic Highwayman Trail — Financial Project Number: 440034-1

Agenda

- Overall SUN Trail Program
- Overview of Fort Pierce SUN Trail Projects:
  - Historic Downtown Fort Pierce Retrofit
  - Historic Highwayman Trail Gap
- Anticipated Feasibility Study Process and Schedule
- Public Comments and Next Steps

SUN Trail Feasibility Study

Historic Downtown Fort Pierce Retrofit — Financial Project Number: 440033-1
Historic Highwayman Trail — Financial Project Number: 440034-1

Title VI

The Florida Department of Transportation is required to comply with various non-discrimination laws and regulations, including Title VI of the Civil Rights Act of 1964.

Public participation is solicited without regard to race, color, national origin, age, sex, religion, disability, or family status.

Persons wishing to express their concerns about Title VI may do so at the table located at the entrance or by contacting either:

District Four
Florida Department of Transportation
District Four Title VI Coordinator
Shavon Nelson
3400 West Commercial Boulevard
Fort Lauderdale, Florida 33309-3421
(954) 777-4389 or
Toll free at (866) 336-8435 ext. 4190
Shavon.Nelson@dot.state.fl.us

Central Office
Florida Department of Transportation
State Title VI Coordinator
Jacqueline Paramore
605 Suwannee Street, MS 65
Tallahassee, Florida 32399-0450
(850) 414-4753
Jacqueline.Paramore@dot.state.fl.us

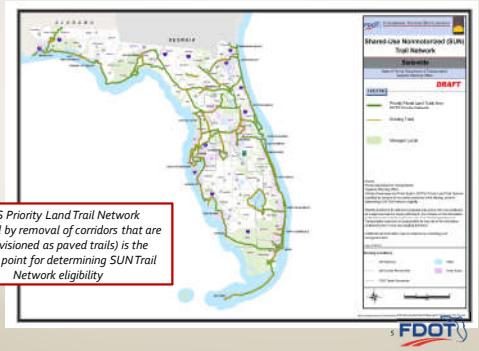
SUN Trail Feasibility Study

Historic Downtown Fort Pierce Retrofit — Financial Project Number: 440033-1
Historic Highwayman Trail — Financial Project Number: 440034-1

SUN Trail Program

- Created under Florida Statute 339.81
- To develop a statewide system of paved non-motorized trails as a component of the Florida Greenways and Trails System (FGTS)
- $25 million annually funded from new vehicle tag revenues

SUN Trail Network Map



FGTS Priority Land Trail Network (modified by removal of corridors that are not envisioned as paved trails) is the starting point for determining SUN Trail Network eligibility

SUN Trail Feasibility Study

Historic Downtown Fort Pierce Retrofit — Financial Project Number: 440033-1
Historic Highwayman Trail — Financial Project Number: 440034-1

Shared-Use Nonmotorized (SUN) Trail Network

FDOT

October 11, 2016

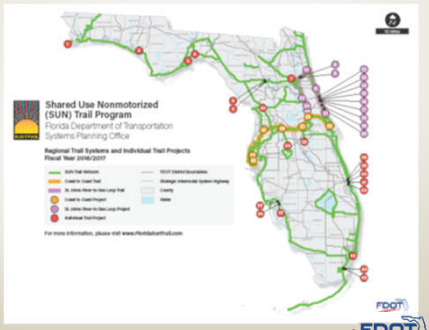
Dick Kane, (850) 414-4590
dick.kane@dot.state.fl.us

Florida Department of Transportation Awards $44.4 Million for Bicycle and Pedestrian Trail Expansion in Florida

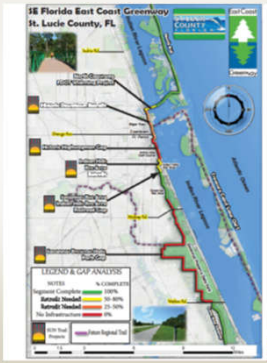
TALLAHASSEE – The Florida Department of Transportation (FDOT) announced today the selection of the first year of projects to receive funding under the Shared Use Nonmotorized (SUN) Trail program. A total of $44,434,543 million was awarded to 45 separate projects located across 21 counties throughout Florida. (See attached map and project list)

The projects include the construction of 11 separate trail segments, which will add or improve approximately 20 miles of trail to Florida's trail system. Another 34 projects will be in various pre-construction phases of work such as feasibility study, environmental review and design. The funds are for the current fiscal year (2016-17) and are immediately available to begin work.

Statewide SUN Trail Network Map with Projects Awarded funding



St. Lucie County East Coast Greenway Network Map



SUN Trail Feasibility Study

Historic Downtown Fort Pierce Retrofit Financial Project Number: 440033-1

Historic Highwayman Trail Financial Project Number: 440034-1

Project Purpose and Need

- A Feasibility Study is being conducted to evaluate two SUN Trail segments:
  - Historic Downtown Fort Pierce Retrofit
  - Historic Highwayman Trail Gap
- Study will evaluate the alternatives identified in the St. Lucie County May 2016 SUN Trail Application
- Trails will provide regional connectivity throughout St. Lucie County and Florida as part of the Greenways Trail System . Will connect to three trails:
  - FEC Overpass from Savanna's Recreation Area to South Savanna's Road
  - Indian Hills Recreation Area south of Savanna Road to Indian Hills Drive
  - Savanna's Preserve State Park from Walton Road to Savanna's Recreation Area

SUN Trail Feasibility Study

Historic Downtown Fort Pierce Retrofit Financial Project Number: 440033-1

Historic Highwayman Trail Financial Project Number: 440034-1

Benefits of the Trails

- They make communities more livable and connected
- Improve the economy through tourism and civic improvement
- Preserve and restore open space
- Provide opportunities for physical activity to improve fitness and mental health

Historic Downtown Fort Pierce Retrofit Segment

From Georgia Avenue to North Causeway



Historic Highwayman Trail Segment

From North Indian Hills to Georgia Avenue



SUN Trail Feasibility Study

Historic Downtown Fort Pierce Retrofit — Financial Project Number: 440033-1

Historic Highwayman Trail — Financial Project Number: 440034-1

Feasibility Study Process

- Goal is to develop basic information, including operational necessity, financial benefits and costs, and environmental impact
- Feasibility Study Stages:
  - Data Collection: We need your input!
  - Environmental Surveys and Studies
  - Evaluation of Alternatives
  - Selection of a Preferred Alternative
  - Environmental Report and Conceptual Design

SUN Trail Feasibility Study

Historic Downtown Fort Pierce Retrofit — Financial Project Number: 440033-1

Historic Highwayman Trail — Financial Project Number: 440034-1

Feasibility Study Schedule

Project Milestones	2017									2018					
	March	April	May	June	July	August	September	October	November	December	January	February	March	April	May	June	July
Begin Study	☆																
Public Involvement		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Data Collection		■	■	■	■	■	■	■	■	■	■	■	■	■	■		
Kick-off Meeting								☆									
Design and Environmental Analysis								■	■	■	■	■	■	■	■	■	
Alternatives Analysis Meeting													☆				
Study Completion																	☆

SUN Trail Feasibility Study

Historic Downtown Fort Pierce Retrofit — Financial Project Number: 440033-1

Historic Highwayman Trail — Financial Project Number: 440034-1

Alternative Analysis

- Identify potential alignments and facility types for each alternative.
- The alternatives will be analyzed on the following criteria:
  - System Connectivity – provides a safe, alternative mode of transportation for all users
  - Constructability – ease of implementation based on right-of-way, probable cost, and design constraints
  - Ownership/Agency Support – placed on accessible land and has the support of the agency responsible for its use and maintenance
  - Health/Environmental Benefits – provides conservation values and environmental protection; connects people to natural habitats as a 'green' open space recreational corridor
  - Regional Benefits – economic and tourism potential to link to a network that extends throughout the region
  - Environmental Impacts – historic/ archeological, natural, Section 4(f)

SUN Trail Feasibility Study

Historic Downtown Fort Pierce Retrofit — Financial Project Number: 440033-1

Historic Highwayman Trail — Financial Project Number: 440034-1

Next Steps

- Continue Data Collection and Stakeholder Meetings
- Environmental Surveys and Studies
- Alternative Analysis
- Alternatives Public Workshop – targeted Spring 2018
  - Alternative alignments will be presented for public opinion and feedback

SUN Trail Feasibility Study

Historic Downtown Fort Pierce Retrofit — Financial Project Number: 440033-1

Historic Highwayman Trail — Financial Project Number: 440034-1

SUN Trail Overall Project Schedule

Feasibility Study ★ → Preliminary Engineering (PE)/Design → Acquisition of Right of Way (If necessary) → Construction

We are here

Design for both segments will be funded in FY 2019. The goal is to construct the trail within City/County ROW and minimize having to purchase ROW.

SUN Trail Feasibility Study

Historic Downtown Fort Pierce Retrofit — Financial Project Number: 440033-1

Historic Highwayman Trail — Financial Project Number: 440034-1

Provide Comments!

- Append post-it notes to display boards
- Write comments on flip charts
- Comment forms: submit tonight or mail in later

SUN Trail Feasibility Study

Historic Downtown Fort Pierce Retrofit — Financial Project Number: 440033-1

Historic Highwayman Trail — Financial Project Number: 440034-1

For more information, please contact

Lisa Maack, District 4 SUNTrail Coordinator

Florida Department of Transportation

3400 West Commercial Boulevard

Fort Lauderdale, Florida 33309

(954) 717-2253

Lisa.Maack@dot.state.fl.us

For more information on the SUNTrail program:

www.FloridaSUNTrail.com

SUN Trail Feasibility Study

Historic Downtown Fort Pierce Retrofit — Financial Project Number: 440033-1

Historic Highwayman Trail — Financial Project Number: 440034-1

Thank You for Attending!!

Your input helps us build better trails!

SUN Trail Feasibility Study

Historic Downtown Fort Pierce Retrofit — Financial Project Number: 440033-1

Historic Highwayman Trail — Financial Project Number: 440034-1

Project Overview

The Historic Downtown Fort Pierce Retrofit and Historic Highwayman Trail SUN Trails Feasibility Study is being conducted to evaluate a multi-use trail that will provide regional connectivity throughout St. Lucie County and Florida (see location maps and pages 2 & 3).

- Historic Downtown Fort Pierce Retrofit Segment is from Georgia Avenue to North Causeway
- Historic Highwayman Trail Segment is from North Indian Hills Drive to Georgia Avenue

Feasibility Study Process

Goal is to develop basic information, including operational necessity, financial benefits and costs, and environmental impact

Feasibility study stages:

- Data Collection: We need your input!
- Environmental Surveys and Studies
- Evaluation of Alternatives
- Selection of a Preferred Alternative
- Environmental Report and Conceptual Design

Contact Us

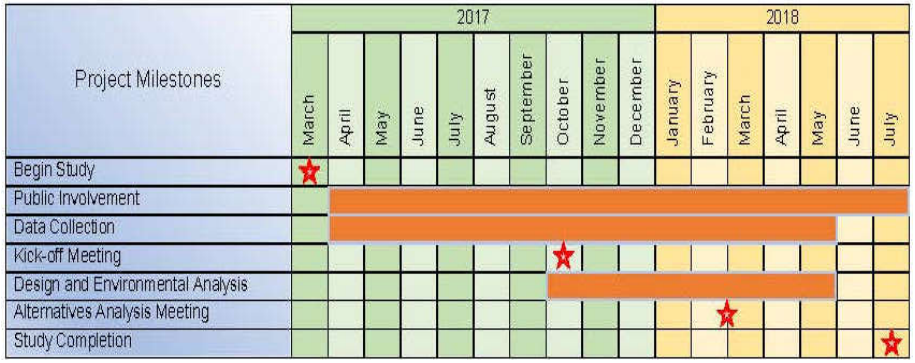
Lisa Maack, Project Manager

Florida Department of Transportation

(954) 717-2253 or Lisa.Maack@dot.state.fl.us

SUN Trails Website—www.FloridaSUNTrail.com

Feasibility Study Schedule



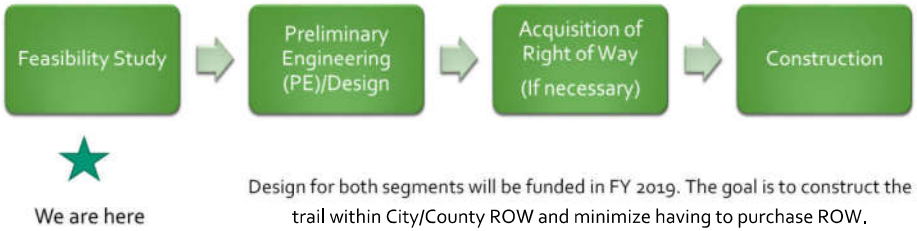




Next Steps

Next steps in the Feasibility Study Process will include additional stakeholder meetings, environmental field review and surveys, and an Alternatives Public Workshop is targeted for Spring 2018 where alternative alignments will be presented for public opinion and feedback.

Following the Feasibility Study, the Florida Department of Transportation will proceed with the project Design in 2019.



Design for both segments will be funded in FY 2019. The goal is to construct the trail within City/County ROW and minimize having to purchase ROW.

It is the policy of the Florida Department of Transportation that no person be denied the benefits of or be subjected to discrimination or retaliation under any program or activity administered by the Department or its sub-recipients on the basis of race, color, national origin, sex, age, disability/handicap, or income status.

SUN Trail Feasibility Study

Historic Downtown Fort Pierce Retrofit — Financial Project Number: 440033-1

Historic Highwayman Trail — Financial Project Number: 440034-1

Comment Sheet

Please provide any comments or drawings you may have regarding the Historic Downtown Fort Pierce Retrofit and Historic Highwayman Trail SUN Trails. The SUN Trails Feasibility Study is being conducted to evaluate a multi-use trail that will provide regional connectivity throughout St. Lucie County and Florida.

- Historic Downtown Fort Pierce Retrofit Segment is from Georgia Avenue to North Causeway
- Historic Highwayman Trail Segment is from North Indian Hills Drive to Georgia Avenue

Name: _____

Address: _____

_____

NOTE: Please complete and return to the "Comments" Box; mail to Lisa Maack at the address on the back of this sheet; or e-mail comments to Lisa.Maack@dot.state.fl.us by Tuesday, October 31, 2017. All comments are part of the project record and are available for viewing by the public and media.

☐ Please add me to the mailing list for the SUN Trails Feasibility Study.

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Fold

Postage Required Place Stamp Here

Lisa Maack
Project Manager
Florida Department of Transportation
3400 West Commercial Boulevard
Fort Lauderdale, Florida 33309

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SUN Trail Feasibility Study

Historic Downtown Fort Pierce Retro Fit FPID: 440033-1

Historic Highwayman Trail FPID: 440033-1

Project Overview

The Historic Downtown Fort Pierce Retrofit and Historic Highwayman Trail SUN Trails Feasibility Study is being conducted to evaluate a multi-use trail that will provide regional connectivity throughout St. Lucie County and Florida.

- Historic Downtown Fort Pierce Retrofit Segment is from Georgia Avenue to North Causeway
- Indian Hills Historic Highwayman Segment is from North Indian Hills Drive to Georgia Avenue

Feasibility Process

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Feasibility study stages:

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Contact us

Lisa Maack, Project Manager

Florida Department of Transportation

(954) 717-2253 or Lisa.Maack@dot.state.fl.us

SUN Trails Website—www.FloridaSUNTrail.com

Feasibility Study Schedule

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Design and Environmental Analysis								■	■	■	■	■	■	■	■		
Alternatives Analysis Meeting												☆					
Study Completion																	☆

Next Steps

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Following the Feasibility Study, the Florida Department of Transportation will proceed with the project Design in 2019.



We are here

Design for both segments will be funded in FY 2019. The goal is to construct the trail within City/County ROW and minimize having to purchase ROW.



SUNTRAIL

Indian Hills Historic Highwayman Segment

Location Map



Legend

- Primary Route
- Alternative Route
- St. Lucie County Parks
- Golf Course
- Segment Termini

Disclaimer:
This map is intended for reference only. Most information contained within is conceptual.

FDOT



SUNTRAIL

Historic Downtown Segment

Location Map



Legend

- Primary Route
- Alternative Route
- St. Lucie County Parks
- Golf Course
- Segment Termini

Disclaimer:
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FDOT

SUN Trail Feasibility Study

Historic Downtown Fort Pierce Retrofit — Financial Project Number: 440033-1

Historic Highwayman Trail — Financial Project Number: 440034-1

Public Kick-Off Meeting

Please Sign-In
(Sign-in sheets are subject to public record requests)

October 10, 2017

Name (Please Print)	Address	E-Mail	Telephone
CHARLES HAVEK	1111 FERNANDINA ST. F.P., FL 34949	CCHAWK77@AOL.COM	772 828 1080
MICHAEL MCLEOD	822 Atlantic Ave, FP, 34950	MCLEODSURVEYING@BELLSOUTH.NET	
Cathy Wassy Lenda	"	"	
PAUL HAYOT	11 WILMONT PLACE PALM COAST 32164	PAUL@GREENWAY.ORG	386-503-0284
KEN ROBERTS	1001 HARBOR ST. FORT PIERCE 34950		
DAVID ENGEL	ST. LUCIE COUNTY	engeld@stlucieco.org	772-462-5164
Wren Underwood	Jensen Bch, FL	underwoodwe stlucieco.org	772-785-5833
Kerri Jakubczak	2601 Palm Lakes Ave FP 34981	kerrijakubczak@gmail.com	704-718-0486
Peter Buchwald	St Lucie TPO		
Pamela Carithers	1234 Avenue D Fort Pierce 34950	pecarithers@aol.com	407-257-1678
Cynthia O'Connell	420 N 2nd St Ft Pierce	Cindi@oc RealtyTeam.com	772 924-2911
Holly Theuns	419 N 2nd St Ft Pierce 34950	hollytheuns@gmail.com	772-801-9505
DONALD E ROOT	4321 So. INDIAN RIVER Dr. 34982 Ft PIERCE		772-979-2987
Ed DeFini	ST. LUCIE TPO		772-462-1533
Lincoln Park Main Street		lincolnparkmainstreet@live.com	772-462-2481

(14)

SUN Trail Feasibility Study

Historic Downtown Fort Pierce Retrofit — Financial Project Number: 440033-1

Historic Highwayman Trail — Financial Project Number: 440034-1

Public Kick-Off Meeting

Please Sign-In
(Sign-in sheets are subject to public record requests)

October 10, 2017

Name (Please Print)	Address	E-Mail	Telephone
Charles Bourque Clough	702 SE P. Oak Terrace Stuart 34997	Cbourqueclough@comcast.net ✓	772 475 5346
Luke ANDERS	1945 N. Old Dixie Hwy FT. P	LEW9716@Gmail	772-453-3179
Diane Kimes - Heathcote Botanical Gardens	210 Savannah Rd, 34982	dkimes@heathcotebotanicalgardens.org	772-464-4672
PAUL SAKUBCZAK	2601 PALM LAKES AV	psakubczak69@gmail.com	772-618-3528
Ed Becht	219 N. 2nd Street FPFL	edbecht@comcast.Net	

(3)

SUN Trail Feasibility Study

Historic Downtown Fort Pierce Retrofit — Financial Project Number: 440033-1

Historic Highwayman Trail — Financial Project Number: 440034-1

Public Kick-Off Meeting | **Staff Sign-In** | **October 10, 2017**

Name (Please Print)	Representing	E-Mail	Telephone
Lynn Kelley	FDOT	lynn.Kelley@dot.state.fl.us	x43341
Lisa Maack	FDOT	Lisa.Maack@dot.state.fl.us	954-717-2253
Ryan Jensen	Atkins	Ryan.Jensen@AtkinsGlobal.com	305.989.5230
Mike Middlebrook	SLC ERD	middlebrookm@stlucieco.org	772-828-1661
Jeff Johnson	SLC PLANNING	johnsonja@stlucieco.org	772-462-1580
Amanda Thompson	SLC ERD	Thompsonam@stlucieco.org	772.462.2528
Jack Andrews	City of Ft. Pierce	JAndrews@city-FtPierce.com	772-467-3773
RESHAW FIELDS			

SUN Trail Feasibility Study

Historic Downtown Fort Pierce Retrofit — Financial Project Number: 440033-1

Historic Highwayman Trail — Financial Project Number: 440034-1

Comment Sheet

Please provide any comments or drawings you may have regarding the Historic Downtown Fort Pierce Retrofit and Historic Highwayman Trail SUN Trails. The SUN Trails Feasibility Study is being conducted to evaluate a multi-use trail that will provide regional connectivity throughout St. Lucie County and Florida.

- Historic Downtown Fort Pierce Retrofit Segment is from Georgia Avenue to North Causeway
- Historic Highwayman Trail Segment is from North Indian Hills Drive to Georgia Avenue

PLEASE USE BITUMINUS RATHER THAN CONCRETE TO PROVIDE A BETTER EXPERIENCE FOR JOGGERS & WALKERS.

Name: DAVID LENGER

Address: ST. LUCIE CO. BOCC

NOTE: Please complete and return to the "Comments" Box; mail to Lisa Maack at the address on the back of this sheet; or e-mail comments to Lisa.Maack@dot.state.fl.us by Tuesday, October 31, 2017. All comments are part of the project record and are available for viewing by the public and media.

☐ Please add me to the mailing list for the SUN Trails Feasibility Study.

It is the policy of the Florida Department of Transportation that no person be denied the benefits of or be subjected to discrimination or retaliation under any program or activity administered by the Department or its sub-recipients on the basis of race, color, national origin, sex, age, disability/handicap, or income status.

SUN Trail Feasibility Study

Historic Downtown Fort Pierce Retrofit — Financial Project Number: 440033-1

Historic Highwayman Trail — Financial Project Number: 440034-1

Comment Sheet

Please provide any comments or drawings you may have regarding the Historic Downtown Fort Pierce Retrofit and Historic Highwayman Trail SUN Trails. The SUN Trails Feasibility Study is being conducted to evaluate a multi-use trail that will provide regional connectivity throughout St. Lucie County and Florida.

- Historic Downtown Fort Pierce Retrofit Segment is from Georgia Avenue to North Causeway
- Historic Highwayman Trail Segment is from North Indian Hills Drive to Georgia Avenue

DOWNTOWN SEGMENT - SHOULD NOT GO UP 2ND ST. UNTIL AVE A TOO CONJESTED BEFORE THEN

INDIAN HILLS SEGMENT - PREFER EAST SIDE ALONG TRACKS MORE SPACE TO WORK WITH

Name: CHARLES HAYEK

Address: 1111 FERNANDINA ST
FORT PIERCE, FL 34949
CCHAWK77@AOL.COM

NOTE: Please complete and return to the "Comments" Box; mail to Lisa Maack at the address on the back of this sheet; or e-mail comments to Lisa.Maack@dot.state.fl.us by Tuesday, October 31, 2017. All comments are part of the project record and are available for viewing by the public and media.

☑ Please add me to the mailing list for the SUN Trails Feasibility Study.

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Honorable Governor Rick Scott
Mr. Mike Dew, Secretary, Florida Department of Transportation
Lisa Maack, FDOT District Four Project Manager
3400 West Commercial Boulevard, Ft. Lauderdale, Fl 33309

October 10, 2017

Ref: Historic Downtown Fort Pierce Retrofit Trail and Historic Highwayman Trail
FDOT: Financial Management Numbers 44033-1 and 440034-1

Honorable Governor Rick Scott and Secretary Mike Dew:

Enclosed is a copy of a letter which we received regarding the above listed projects being proposed by FDOT over properties within the Port of Ft. Pierce and FECI railroad switching yard area which are in most cases private in ownership. Almost all of these properties are currently zoned Marine Industrial or Commercial/Industrial and are used for a variety of commerce related activities. The Port of Ft. Pierce properties have been in use since the early 1920s and the Florida Ports Council has recently funded infrastructure and road improvements within the Port area for the purpose of furthering commerce. The FECI (Flagler) railroad, was built in the late 1800s, and both areas have been the commercial life blood of Ft. Pierce for over 100 years. We support the continued usage of these properties as they are currently used and zoned in the 2015-16 Ft. Pierce, St Lucie County Comprehensive Master Plan and do not believe they should be included in the areas being considered for inclusion in another layer of quasi-government regulations.

There is no overriding public benefit or need for these properties, many privately owned, to be included in the Historic Downtown Retrofit Trail designation and Historic Highwayman Trail. In fact enhanced pedestrian traffic may prove detrimental to continued commercial / industrial uses and future job creation. We believe the citizens tax dollars could be much better utilized in improving the viability of the properties as currently zoned. Your prompt attention to this matter would be appreciated.

Sincerely yours,

Hans Van Zonneveld, Managing Partner
Mollywog, LLC, 1302 North 2nd Street, FT. Pierce, Florida
281 Sabal Palm Lane, Indian River Shores, Florida 32963,
Ph: 772-231-4000, email sunfieldgroup@yahoo.com

SUN Trail Feasibility Study

Historic Downtown Fort Pierce Retrofit — Financial Project Number: 440033-1
Historic Highwayman Trail — Financial Project Number: 440034-1

Comment Sheet

Please provide any comments or drawings you may have regarding the Historic Downtown Fort Pierce Retrofit and Historic Highwayman Trail SUN Trails. The SUN Trails Feasibility Study is being conducted to evaluate a multi-use trail that will provide regional connectivity throughout St. Lucie County and Florida.

- Historic Downtown Fort Pierce Retrofit Segment is from Georgia Avenue to North Causeway
- Historic Highwayman Trail Segment is from North Indian Hills Drive to Georgia Avenue

Historic Markers for trail segments that chronicles The history along Indian River Drive (i.e, Grover Mc Carthy's Home site: The Original Hall of Fame Highwaymen Artist that sold their paintings along Indian River Drive). Also the significance of the people that lived there and Once Judge Alto Adams (Federal Courthouse on US Hwy 1) and other prominent families. Downtown Fort Pierce and it's Fishing Tournaments and other notable history facts.

* Also, Florida Humanities Council Story telling smart phone app could be used ~~to~~ tell the stories along ~~the~~ both segments of the Sun Trail, complete with pictures and music.

Name: Pamela Carithers
Address: 1934 Avenue D
Fort Pierce, FL 34950

NOTE: Please complete and return to the "Comments" Box; mail to Lisa Maack at the address on the back of this sheet; or e-mail comments to Lisa.Maack@dot.state.fl.us by Tuesday, October 31, 2017. All comments are part of the project record and are available for viewing by the public and media.

☐ Please add me to the mailing list for the SUN Trails Feasibility Study.

It is the policy of the Florida Department of Transportation that no person be denied the benefits of or be subjected to discrimination or retaliation under any program or activity administered by the Department or its sub-recipients on the basis of race, color, national origin, sex, age, disability/handicap, or income status.

Honorable Governor Rick Scott
Mr. Mike Dew, Secretary, Florida Department of Transportation
Lisa Maack, FDOT District Four Project Manager
3400 West Commercial Boulevard, Ft. Lauderdale, Fl 33309 & Lisa.Maack@dot.state.fl.us

October 10, 2017

Ref: Historic Downtown Fort Pierce Retrofit Trail and Historic Highwayman Trail
FDOT: Financial Management Numbers 44033-1 and 440034-1

Honorable Governor Rick Scott and Secretary Mike Dew:

We are in receipt of the notice sent on behalf of the FDOT District Four, inviting surrounding property owners to a public kick-off meeting to learn about the feasibility study for the above referenced projects.

It was disturbing to view the Location Map which reflects the projects proposed location of SUN trails north of Seaway Dr. We strongly oppose the proposed trails specifically north of Seaway drive which run thru the port operations area, most of which are privately owned properties and designated for commercial/industrial use. It strikes us that shared-use nonmotorized (SUN) trails to increase pedestrian traffic thru commercial/industrial properties arguably would do more harm than good, is not in the best interest of the state and would be a grave error.

We believe you already know that Florida Department of Transportation (FDOT) engaged in a multiphase endeavor to update the 2002 Port Master Plan for the Port of Fort Pierce, an irreplaceable asset. As a result in September 2015, St. Lucie County Ordinance amended the Comprehensive Port Master Plan. I'd direct your attention to attached Figures 2A-1 and 2A-2 of this St. Lucie County Ordinance. Please note the "port operations area" north of seaway drive along with the future land use of Industrial, both General Industrial and Marine Industrial on the surrounding properties of the proposed Historic Downtown Fort Pierce Trail location. Therefore, the Historic Downtown Trails proposed location conflicts with this ordinance.

Additional factors from the reports prepared for FDOT to consider:

1) It's consensus plan unified market demand and public desires to more clearly define the communities vision to capitalize the port's potential.
2) It identified opportunities of a more streamlined organizational structure and intergovernmental collaboration to allow for active marketing of the port to its highest and best use.
3) It recommended the County and City compose and adopt consistent land use and zoning plans to promote and support the economic development while providing flexibility to meet market demand and desired mixed uses.
4) The Florida Ports Council along with St. Lucie County recently funded $7.4 million in infrastructure improvements including rebuilding 2nd street from Fisherman's Warf north to where the road dead ends: upgrading gas, electric and sewer lines; and storm water retention ponds to promote and encourage economic development.
5) Florida ports have consistently proven to be significant economic drivers, the reason smart urban areas covet seaports which provide industrial, non-local economic base.
6) Ports fit in the footprint of Governor Scotts dream to attract more growth and create jobs.
7) Ports are economic engines that bring better paying sustained jobs and further support strong indirect and induced jobs in the community and region, something other sectors simply do not do.
8) The study reviewed the potential of the Port of Ft. Pierce to be designated a Strategic Intermodal System Facility, which could mean additional economic cargo opportunities available as Florida attracts an expected increase in maritime traffic from the widening of the Panama Canal. The port growth potential in its future is as a niche port serving nearby markets and for feeder services to and from large global vessels docking after or before transitioning the expanded Panama Canal.
9) Fort Pierces intermodal connection possibilities including air, Interstate 95 and the Fl. Turnpike, all within minutes of the port, and FEC rail on port property which offer potential that is much easier to accomplish than is the case at other nearby Fl. Ports.

For these reasons we do not believe the port operations area, north of seaway drive, should be considered as an area to locate the proposed Historic Downtown Ft. Pierce Trail. Instead we support positioning the Port of Fort Pierce for development to its highest and best use as a new economic engine to grow and improve the city.

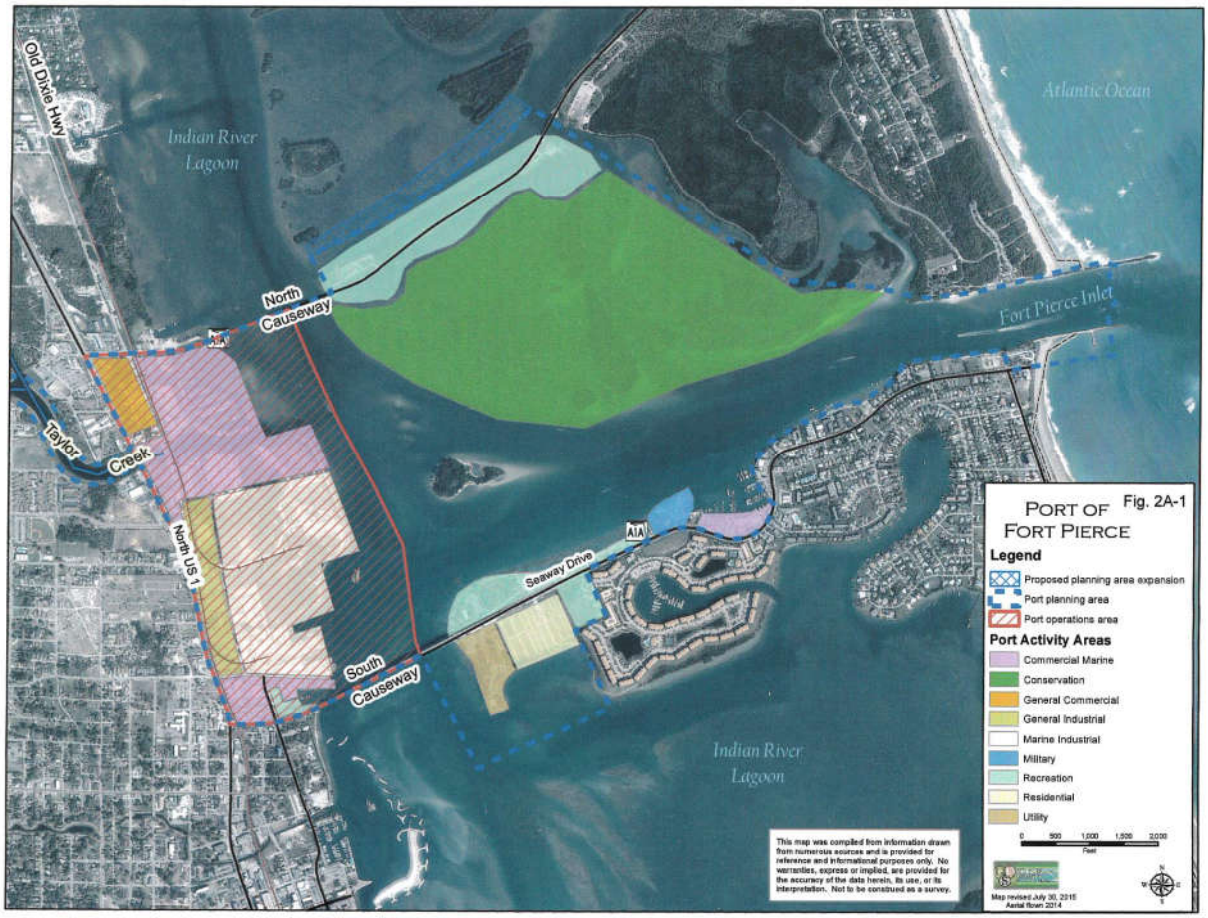
We urge you to consider these factors and appreciate your continued commitment to improving Florida.

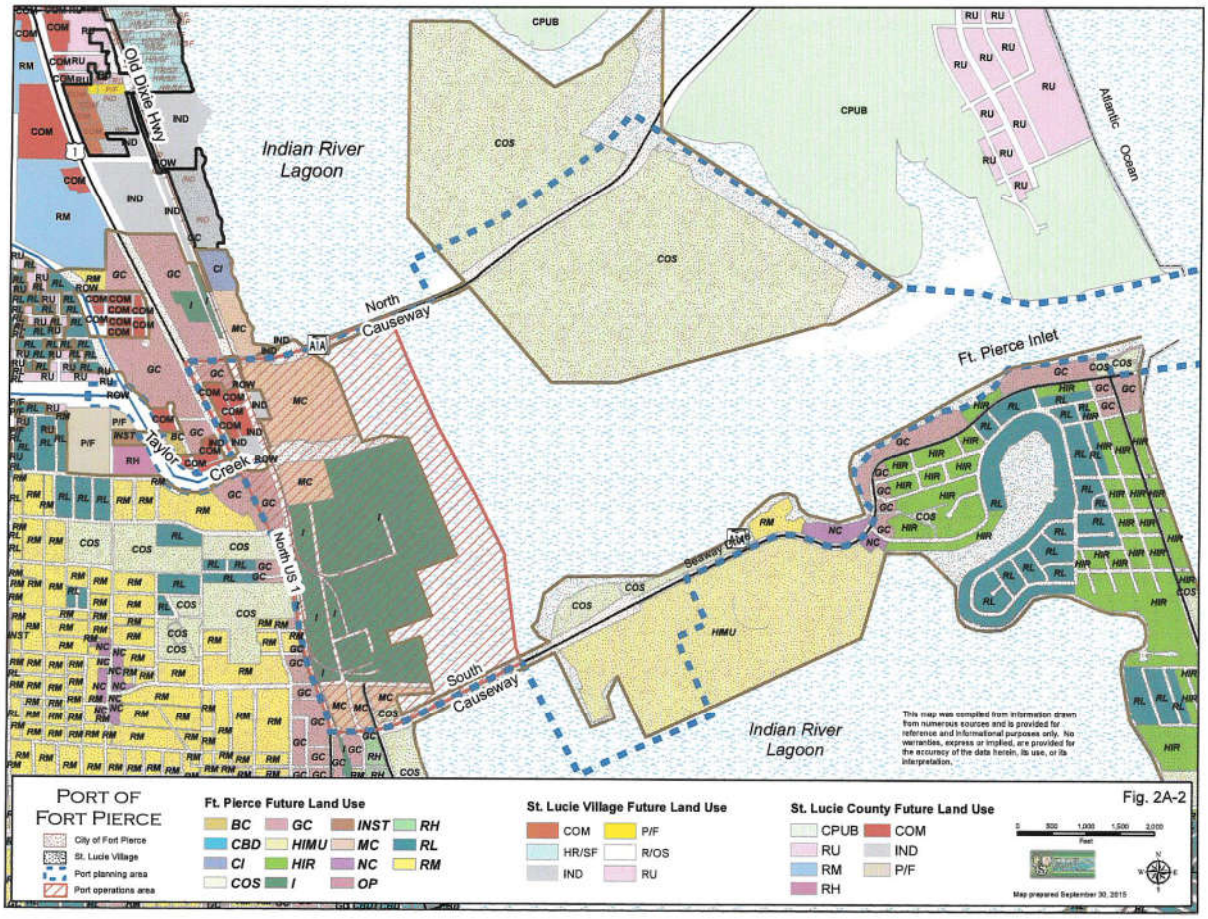
Sincerely,

Carmela Bell Christina R. Bell

Carmela Bell and Christina Bell
Destin Beach Inc., President and Vice President
Property owner of 67 acres - Port of Ft. Pierce
1008 Hwy 98 East Box B, Destin, Fl. 32541
Ph: 850-830-8030, email: cbell712@gmail.com Carmela Bell or Christina Bell crbell0660@gmail.com

Attachment: Figures 2A-1 and 2A-2 to St. Lucie County Ordinance


Old Dixie Hwy
Indian River Lagoon
Atlantic Ocean
North Causeway
Fort Pierce Inlet
Taylor Creek
North US 1
A1A
Seaway Drive
South Causeway
Indian River Lagoon
PORT OF FORT PIERCE
Fig. 2A-1
Legend
Proposed planning area expansion
Port planning area
Port operations area
Port Activity Areas
Commercial Marine
Conservation
General Commercial
General Industrial
Marine Industrial
Military
Recreation
Residential
Utility
This map was compiled from information drawn from numerous sources and is provided for reference and informational purposes only. No warranties, express or implied, are provided for the accuracy of the data herein, its use, or its interpretation. Not to be construed as a survey.
Map revised July 30, 2015
Aerial flown 2014


Old Dixie Hwy
Indian River Lagoon
Atlantic Ocean
North Causeway
Ft. Pierce Inlet
Taylor Creek
North US 1
A1A
Seaway Drive
South Causeway
Indian River Lagoon
PORT OF FORT PIERCE
Fig. 2A-2
City of Fort Pierce
St. Lucie Village
Port planning area
Port operations area
Ft. Pierce Future Land Use
BC GC INST RH
CBD HIMU MC RL
CI HIR NC RM
COS I OP
St. Lucie Village Future Land Use
COM P/F
HR/SF R/OS
IND RU
St. Lucie County Future Land Use
CPUB COM
RU IND
RM P/F
RH
This map was compiled from information drawn from numerous sources and is provided for reference and informational purposes only. No warranties, express or implied, are provided for the accuracy of the data herein, its use, or its interpretation.
Map prepared September 30, 2015

Feagle, Brooke

From: Jensen, Ryan M
Sent: Thursday, October 12, 2017 10:45 AM
To: Fields, Reshawn; Gaiotti, Gary E
Cc: Feagle, Brooke
Subject: RE: Historic Downtown Trail
Attachments: Downtown Comments.pdf

Does the primary route go through the port or is it adjacent to the west side of the port?
The Primary route (currently) is shown along 2nd Street on the Historic Downtown Section which is West of what I believe is the Port.

Also, are all the possible routes on public roadway right-of-ways?
No the routes are sometimes on FEC R/W for example the 2 short curved sections at the North end of the Historic Downtown section. There are also areas where the route goes thru property that is currently undeveloped and we are not sure if that is City, County, FEC or privately owned. Attached image for reference.

Ryan Jensen, E.I.
Engineer II, Transportation Design

ATKINS
800 Waterford Way (NW 62nd Ave), 7th floor, Miami, FL 33126

Tel: +(954) 903-3614 | Fax: 1 (954) 733-1101 | Mob: +(305) 989-5230
Email: Ryan.Jensen@atkinsglobal.com | Web: www.atkinsglobal.com | Careers: www.atkinsglobal.com/careers

From: Fields, Reshawn
Sent: Thursday, October 12, 2017 10:30 AM
To: Gaiotti, Gary E <Gary.Gaiotti@atkinsglobal.com>; Jensen, Ryan M <Ryan.Jensen@atkinsglobal.com>
Cc: Feagle, Brooke <brooke.feagle@atkinsglobal.com>
Subject: FW: Historic Downtown Trail

Ryan/Gary,

Please provide a response to this question, and I'll respond to Lisa.

Reshawn

From: Maack, Lisa [mailto:Lisa.Maack@dot.state.fl.us]
Sent: Thursday, October 12, 2017 10:15 AM
To: Fields, Reshawn <Reshawn.Fields@atkinsglobal.com>
Subject: FW: Historic Downtown Trail

Reshawn,

Could you assist me in responding to this question? See below.

Thanks,
Lisa

Lisa W. Maack, AICP
Multimodal Coordinator
FDOT D4
954-717-2253

From: Merritt, Larry
Sent: Wednesday, October 11, 2017 4:13 PM
To: Maack, Lisa
Cc: Padron, Gaspar; Rand, Lauren; Goddeau, Amie
Subject: RE: Historic Downtown Trail

Lisa,

Does the primary route go through the port or is it adjacent to the west side of the port? Also, are all the possible routes on public roadway right-of-ways?

Thanks.

Larry Merritt |
Passenger Operations Manager
District 4 Modal Development
Florida Department of Transportation
FDOT Only: 884-4683 | Direct: 954-777-4683

From: Maack, Lisa
Sent: Wednesday, October 11, 2017 2:49 PM
To: Goddeau, Amie; Merritt, Larry
Cc: Padron, Gaspar; Rand, Lauren
Subject: FW: Historic Downtown Trail

Amie/Larry,

I received the attached letter to the Governor, Secretary Dew and myself in opposition to the SUN Trail project alignments that are adjacent to the Port of Fort Pierce.

Lisa

Lisa W. Maack, AICP
Multimodal Coordinator
FDOT D4
954-717-2253

From: Bell, Carmela [mailto:Carmela.Bell@resortquest.com]
Sent: Tuesday, October 10, 2017 11:20 AM
To: Maack, Lisa
Cc: crbell0660@gmail.com
Subject: Historic Downtown Trail

We submit the attached. Please confirm your receipt by a return email.

Sincerely,

Carmela Bell
Broker
ResortQuest Real Estate
35000 Emerald Coast Pkwy.
Destin, FL 32541
O: 850-337-5000
C: 850-830-8030
E: cbell@resortquest.com

A Wyndham Worldwide Company, NYSE: WYN
Search Real Estate: www.DestinFLProperties.com

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Public Alternatives Analysis Meeting

June 5, 2018

FDOT

Florida Department of Transportation

RICK SCOTT
GOVERNOR

3400 W. Commercial Boulevard
Fort Lauderdale, FL 33309

MIKE DEW
SECRETARY

May 24, 2018

Dear Agency Official:

RE: **Alternatives Analysis Meeting Announcement**
Feasibility Study of Two Shared-Use Nonmotorized (SUN) Trails:
Historic Downtown Fort Pierce Retrofit Trail and
Historic Highwayman Trail
Limits: Indian Hills Drive to North Causeway Drive in Fort Pierce
St. Lucie County, Florida
Financial Project ID Numbers: 440033-1 and 440034-1

On behalf of the Florida Department of Transportation (FDOT), District Four, you and your staff are invited to an Alternatives Analysis Public Meeting for the Feasibility Study for the above referenced project. A Feasibility Study is FDOT's process to evaluate the social, economic and environmental impacts associated with a proposed transportation project. This Alternatives Analysis Meeting will provide an overview of both project segments, any potential issues of concern, and display information about the alternatives that were developed during the Feasibility Study.

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

The Alternatives Analysis Public Meeting is scheduled for **Tuesday, June 5, 2018, from 5:00 p.m. to 7:00 p.m. at the Old City Hall located at 315 Avenue A in Fort Pierce, Florida 34950**. The meeting will begin as an open house at 5:00 p.m. with a short presentation at 5:30 p.m., followed by a comment period. Notices are being sent to all property owners and tenants located within at least 300 feet on either side of the proposed alignment and to other public officials, regulatory agencies, organizations, and individuals interested in the project. Attached is a copy of the Public Notice for the Meeting.

If you require further information, please do not hesitate to contact the Project Manager, Ms. Lauren Rand at (954) 777-4499 or toll free at (866) 336-8435, via email at lauren.rand@dot.state.fl.us or visit the project website at www.FloridaSUNTrail.com.

Sincerely,

Lauren Rand

Lauren Rand, MPE, CPM
District Four Multimodal Coordinator

LR:rf

Attachment: Public Notice

ALTERNATIVES ANALYSIS PUBLIC MEETING

Historic Downtown Fort Pierce Retrofit Trail and Historic Highwayman Trail Shared-Use Nonmotorized (SUN) Trails
From Indian Hills Drive to North Causeway Drive in Fort Pierce
Feasibility Study
St. Lucie County, Florida
Financial Project ID Numbers: 440033-1 and 440034-1

The Florida Department of Transportation (FDOT), District Four, will hold an Alternatives Analysis Public Meeting for the Feasibility Study for the above referenced projects. The meeting will be held as an informal open house from **5:00 p.m. to 7:00 p.m. with a short presentation at 5:30 p.m. on Tuesday, June 5, 2018 at the Old City Hall located at 315 Avenue A in Fort Pierce, Florida 34950.**

The purpose of the Alternatives Analysis Meeting is to provide an overview of both project segments, any potential issues of concern, and display information about the alternatives that were developed during the Feasibility Study. Project representatives will be available during the meeting to discuss the projects, answer questions, and receive comments.

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

Public participation is solicited without regard to race, color, national origin, age, sex, religion, disability, or family status. Persons who require special accommodations under the Americans with Disabilities Act (ADA) or persons who require translation services (free of charge) should contact Ms. Lauren Rand, Project Manager, at least seven (7) days prior to the meeting.

Contact Information:
Ms. Lauren Rand, Project Manager
3400 W. Commercial Boulevard, Fort Lauderdale, FL 33309
Telephone: (954) 777-4499 or toll free at (866) 336-8435
Email: lauren.rand@dot.state.fl.us,

You may also visit the project website at
www.FloridaSUNTrail.com.



ALTERNATIVES ANALYSIS PUBLIC

FDOT

DATE: Tuesday, June 5, 2018
TIME: 5:00 p.m. – 7:00 p.m.
PLACE: Old City Hall
315 Avenue A
Fort Pierce, Florida 34950

FLORIDA DEPARTMENT OF TRANSPORTATION

Florida Department of Transportation

RICK SCOTT
GOVERNOR

3400 W. Commercial Boulevard
Fort Lauderdale, FL 33309

MIKE DEW
SECRETARY

May 23, 2018

SUBJECT: Alternatives Analysis Meeting Announcement
Feasibility Study of Two Shared-Use Nonmotorized (SUN) Trails:
Historic Downtown Fort Pierce Retrofit Trail and
Historic Highwayman Trail
Limits: Indian Hills Drive to North Causeway Drive in Fort Pierce
St. Lucie County, Florida
Financial Project ID Numbers: 440033-1 and 440034-1

Dear Property Owner or Current Resident:

The Florida Department of Transportation (FDOT), District Four, will hold a public Alternatives Analysis Meeting for the two above referenced projects. The Alternatives Analysis Meeting will be held on Tuesday, June 5, 2018 with an open house from 5 p.m. to 7 p.m. at the Old City Hall located at 315 Avenue A in Fort Pierce. A brief presentation will be provided at 5:30 p.m. A location map with the meeting site is provided with this letter.

The study limits for the Historic Downtown Fort Pierce Retrofit study are from Georgia Avenue to North Causeway Drive (with an exception along US Highway 1 from Avenue H to Avenue M), for an overall distance of about 2.5 miles. The study limits for the Historic Highwayman Trail are from Indian Hills Drive to Georgia Avenue, a distance of about 2 miles. The project consists of building multi-use recreational pathways and includes the conceptual development of necessary trail heads, site furnishing details, rest stops and interpretive display recommendations. The trails will be developed to accommodate a range of appropriate non-motorized uses.

This letter is being sent to all property owners and tenants within at least 300 feet of either side of the proposed project and to public officials, regulatory agencies, organizations, and individuals interested in the project. This Alternatives Analysis Meeting will provide an overview of both project segments, any potential issues of concern, and display information about the alternatives that were developed during the Feasibility Study. Your attendance is encouraged and your participation and comments are appreciated. Persons wishing to submit written statements may do so at the meeting or by sending them to Lauren Rand, project manager, 3400 W. Commercial Boulevard, Fort Lauderdale, Florida 33309 or by email to Lauren.Rand@dot.state.fl.us.

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

Public participation is solicited without regard to race, color, national origin, age, sex, religion, disability, or family status. Persons who require accommodations under the Americans with Disabilities Act or persons who may require translation services (free of charge) should contact Lauren Rand at (954) 777-4499 at least seven (7) days prior to the meeting.

If you have questions about the project or scheduled Alternatives Analysis Meeting, please contact Project Manager Lauren Rand at the phone number or email address listed above. You may also visit the SUN Trails website at www.FloridaSUNTrail.com.

Sincerely,

Lauren Rand, MPE, CPM
District Four Multimodal Coordinator

LR:rf

Attachment: Location Map

Feagle, Brooke

From: FL-Rules@dos.state.fl.us
Sent: Tuesday, May 29, 2018 2:48 PM
To: Cimini, Randy D
Subject: Submit Notice in FAR

You have successfully submitted a notice for publication in the Florida Administrative Register on 5/29/2018 2:47:09 PM.

Department: Other Agencies and Organizations
Organization: ATKINS - Bartow
Notice type: Notice of Meeting/Workshop Hearing
Issue: 44/105

Once this notice is published you will be able to view it by clicking the following link:
https://urldefense.proofpoint.com/v2/url?u=http-3A__www.FLRules.org_gateway_View-5FNotice.asp-3Fid-3D20472061&d=DwIFAg&c=cUkzcZGZt-E3UgRE832-4A&r=Jau9xTOVgJhpkpAByd9CJOcaYIHaUxaX59Yqa2woKRg&m=GwHIMW0AnRzGwJak-0EzxR2_NgVPAwlSBJABSKrL6xc&s=-csuoQPcbobK0MY79j4KDnyxXkj7VCp5OdO7fhWc39g&e=

You may contact the Florida Administrative Register office at (850)245-6270 for additional information.

Notice of Meeting
DEPARTMENT OF TRANSPORTATION

The Florida Department of Transportation (FDOT), District Four, is hosting an Alternatives Analysis Meeting as part of the Feasibility Study for two segments of the Shared-Use Nonmotorized (SUN) Trail Program, the Historic Downtown Fort Pierce Retrofit segment and Historic Highwayman Trail Gap segment in Fort Pierce, St. Lucie County. FDOT invites all members of the public to attend.

DATE AND TIME: Tuesday, June 5, 2018 from 5 p.m. to 7 p.m.
PLACE: Old City Hall, 315 Avenue A, Fort Pierce, FL 34950

GENERAL SUBJECT MATTER TO BE CONSIDERED: This public meeting offers the community the opportunity to express their views about the location, conceptual design, and social, economic, and environmental effects of constructing the trails on both proposed segments. The study limits for the Historic Downtown Fort Pierce Retrofit segment are from Georgia Avenue to North Causeway Drive, with an exception along US Highway 1 from Avenue H to Avenue M; Financial Project ID 440033-1. The study limits for the Historic Highwayman Gap Trail segment are from Indian Hills Drive to Georgia Avenue; Financial Project ID 440034-1.

FDOT will provide an overview of both project segments, any potential issues of concern, and display information about the alternatives that were developed during the Feasibility Study. The meeting will include a brief presentation at 5:30 p.m. followed by an open house where people can ask questions and provide comments to FDOT representatives in a one-on-one setting. Written comments will be accepted.

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

Public participation is solicited without regard to race, color, national origin, age, sex, religion, disability, or family status. People requiring special accommodations under the Americans with Disabilities Act or who require translation services (free of charge) should contact Lauren Rand, project manager, at (954) 777-4499 or toll free at 1 (866) 336-8435, or by email to Lauren.Rand@dot.state.fl.us at least seven (7) days prior to the meeting.

If you are hearing or speech impaired, please contact FDOT using the Florida Relay Service, 1 (800) 955-8771 (TDD) or 1 (800) 955-8770 (Voice).

For more information about the project or the Alternatives Analysis Meeting, please contact Lauren Rand or visit the SUN Trail website www.FloridaSUNTrail.com.

Hawaii volcano leaves few escape routes

Denise Laitinen
Special to USA TODAY

KEAAU, Hawaii – As the Kilauea volcano spews lava and toxic gas, weary residents are facing the threat of fewer routes to escape – and the possibility of finding themselves stranded.

Three rural highways serve as evacuation routes for roughly 5,000 residents living near the erupting lava fissures. One is completely blocked and another remains open only to local residents – for now.

The biggest concern is the third exit route: Highway 130, a main connector road that runs from north to south through the region.

Several large cracks have formed in the road due to magma disrupting earth as it travels downslope underground. Nine metal plates have been installed over the cracks to maintain access.

But if those fail and the highway becomes impassable, residents in numerous neighborhoods will be stranded.

"We're doing everything humanly possible to keep Highway 130 open," says Don Smith, an engineering program manager for the Hawaii Department of Transportation.

To keep the road passable, transportation officials will reinforce the metal plates, fill in the cracks with aggregate material and use heat-resistant steel reinforced plates if needed.

"We have multiple contingencies in place and we'll go down the list depending on the circumstances," said Tim Sakahara, public information officer for the Hawaii transportation department.

One backup plan includes shoring up a road that runs through the closed Volcanoes National Park for use as a one-way emergency evacuation route.

But that also presents several challenges. While only a small portion of Chain of Craters Road has to be fixed, the route passes close to the Halema'uma'u crater, near the volcano summit, which continues to sporadically spew ash thousands of feet into the air.

Despite the uncertainty, Jean Howell, a Seaview Estates resident who lives a few miles downwind from where the lava is entering the ocean, is staying put.

"My knowing is that I am right here, right now, because this is where I am supposed to be," Howell said. "If I was supposed somewhere else I'd be guided by a higher knowing within me to go somewhere else."



Will Devine takes snapshots Thursday of lava flowing in Leilani Estates. Devine says he lost his home to the Kilauea volcano eruption. ROBERT HANASHIRO/USA TODAY NETWORK

If authorities order an evacuation for her area, Howell said she hasn't decided whether she would leave. "There really aren't a whole lot of places to go," she said.

Fellow Seaview resident Mark Wyatt is in a similar boat. He retired to the Big Island 12 years ago and manages three rental properties in the coastal neighborhood.

While his tenants and about 60 percent of the neighborhood have evacuated, Wyatt is staying as long as possible to watch over the homes.

"Even if they do mandatory evacuations they're going to have to drag me out of here," he said. "I'm going to have to see the lava before I decide to leave. I don't know where else I would go, because I love it here."

Prince Kelī'iho'omalu's family has lived in Kalapana for nearly a century and his father, Robert Kelī'iho'omalu, is the namesake of the internationally known Uncle Robert's Kava Bar and weekly farmers market.

As a member of a road maintenance crew with Hawaii County Department of Public Works, Kelī'iho'omalu relocated out of Kalapana due to his job. He said many of his relatives in Kalapana plan to stay.

"Their view is that they're not going to move unless they really have to," says Kelī'iho'omalu. "The majority of them are retired" and grow their own vegetables and raise pigs and chickens.

"They know they can survive off the land, that's why they feel comfortable staying. Part of it's cultural and part of it is they have nowhere else to go."

He adds younger relatives who have jobs requiring daily travel on Highway 130 will soon face tough choices. "They're going to have to make a decision (to stay or evacuate) sooner or later."

Depending on which way the lava travels and where new fissures erupt, the only way out may be by helicopter.

Officials are formulating plans to conduct mass air evacuations should the region's main roads be compromised.

According to a report in the Honolulu Star Advertiser, Hawaii Army National Guard commander Brig. Gen. Kenneth Hara told county, state and federal officials that two Sikorsky CH-53 Sea Stallion helicopters are available for evacuation purposes.

Hara was recently tasked to spearhead Joint Task Force 5-0, a dual command team comprised of National Guard and active military personnel based in the town of Hilo, roughly 15 miles north of the eruptions on the lower East Rift Zone. According to a Hawaii County spokesperson, the units can evacuate upwards of 500 people within two hours.

Great American Gun Shows
Big Weekend Event, Buy-Sell-Trade



STUART, FL
Martin County Fairgrounds
2616 SE Dixie Highway, Stuart
June 2-3, 2018
Saturday 9-5 - Sunday 10-4
$1.00 OFF Admission 12 and under Free with adult admission
Vendors please call 865-453-0074 or visit www. greatamericanpromotionsllc.com
For info on Concealed Carry Class Please call 561.214.5115

CITY OF PORT ST. LUCIE FLORIDA
PORT ST. LUCIE PARKS & RECREATION

CHANGE OF LOCATION FOR THE
2018 MEMORIAL DAY SERVICE
IN PORT ST. LUCIE

The United Veterans of Port St. Lucie and the City of Port St. Lucie Parks & Recreation's 2018 Memorial Day Service, scheduled for Monday, May 28, 2018, at 10 a.m., at Veteran's Memorial Park, has now been moved and will take place at the PSL Community Center, located at 2195 SE Airoso Blvd in the main ballroom. Weather permitting, the rifle salute will be in the outside plaza of the Community Center. Due to the recent heavy rain, conditions at the park are unconducive for this service.

FOR MORE INFORMATION, PLEASE CONTACT (772) 878-2277

SUNTRAIL
SUN Trail Feasibility Study
Historic Downtown Fort Pierce Retrofit
Historic Highwayman Trail Gap
FDOT
Financial Project Numbers: 440033-1 and 440034-1

ALTERNATIVES ANALYSIS MEETING

The Florida Department of Transportation (FDOT) District Four, is hosting an Alternatives Analysis Meeting as part of the Feasibility Study for two segments of the Shared-Use Non-motorized (SUN) Trail Program, the Historic Down-town Fort Pierce Retrofit segment and Historic Highwayman Trail Gap segment in Fort Pierce, St. Lucie County (see location map). The public meeting is from 5 p.m. to 7 p.m., Tuesday, June 5, 2018 at the Old City Hall located at 315 Avenue in Fort Pierce.



At this public meeting, FDOT will provide an overview of both project segments, any potential issues of concern, and the trail alternatives. The study limits for the Historic Downtown Fort Pierce Retrofit study are from Georgia Avenue to North Causeway Drive, with an exception along US Highway 1 from Avenue H to Avenue M. The study limits for the Historic Highwayman Trail Gap are from Indian Hills Drive to Georgia Avenue.

The meeting will include a brief presentation at 5:30 p.m. followed by an open house where people can ask questions and provide comments to FDOT representatives in a one-on-one setting. Written comments will be accepted. Your comments are an important part of this study.

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

Public participation is solicited without regard to race, color, national origin, age, sex, religion, disability, or family status. People requiring special accommodations under the Americans with Disabilities Act can contact Lauren Rand, project manager, at (954) 777-4499 or toll free at 1 (866) 336-8435, or by email to Lauren.Rand@dot.state.fl.us at least seven (7) days prior to the meeting.

For more information about the SUN Trail Feasibility Study, please contact Lauren Rand or visit the SUN Trail website at www.FloridaSUNTrail.com.

May 27, 2018 TCN-2026275

Treasure Coast Newspapers | **TCPALM**

St. Lucie News-Tribune
1939 SE Federal Highway, Stuart, FL 34994

AFFIDAVIT OF PUBLICATION

STATE OF FLORIDA
COUNTY OF ST. LUCIE

Before the undersigned authority personally appeared, Natalie Zollar, who on oath says that she is Classified Inside Sales Manager of the St. Lucie News-Tribune, a daily newspaper published at Fort Pierce in St. Lucie County, Florida: that the attached copy of advertisement was published in the St. Lucie News-Tribune in the following issues below. Affiant further says that the said St Lucie News-Tribune is a newspaper published in Fort Pierce, in said St. Lucie County, Florida, and that said newspaper has heretofore been continuously published in said St. Lucie County, Florida, daily and distributed in St. Lucie County, Florida, for a period of one year next preceding the first publication of the attached copy of advertisement; and affiant further says that she has neither paid or promised any person, firm or corporation any discount, rebate, commission or refund for the purpose of securing this advertisement for publication in the said newspaper. The St. Lucie News-Tribune has been entered as Periodical Matter at the Post Offices in Fort Pierce, St. Lucie County, Florida and has been for a period of one year next preceding the first publication of the attached copy of advertisement.

Customer	Ad Number	Copyline	PO #
930054 - ATKINS NORTH AMERICA	2026275	SUN TRAILS NEWS AD	

Pub Dates
May 27, 2018

Sworn to and subscribed before me this day of, May 29, 2018, by

Natalie Zollar, who is

(X) personally known to me or

( ) who has produced _____ as identification.

Karol E Kangas
Karol Kangas **Notary Public**

KAROL E KANGAS
Notary Public - State of Florida
Commission # GG 126041
My Comm. Expires Jul 29, 2021
Bonded through National Notary Assn.

SUN Trail Feasibility Study

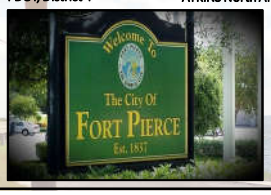
Historic Downtown Fort Pierce Retrofit
Financial Project Number: 440033-1

Historic Highwayman Trail
Financial Project Number: 440034-1

Alternatives Analysis Meeting
June 5, 2018

Lauren Rand, MPE, CPM
FDOT, District 4

Reshawn Fields, AICP
ATKINS North America



1

SUN Trail Feasibility Study

Historic Downtown Fort Pierce Retrofit
Financial Project Number: 440033-1

Historic Highwayman Trail
Financial Project Number: 440034-1

- Presentation and Q&A – 5:30pm
  - Overview of Fort Pierce SUN Trail Projects:
    - Historic Downtown Fort Pierce Retrofit
    - Historic Highwayman Trail Gap
  - Feasibility Study Process and Schedule
  - Alternatives and Evaluation
  - Public Comments and Next Steps
- Open House 6:00 pm to 7:00 pm





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SUN Trail Feasibility Study

Historic Downtown Fort Pierce Retrofit
Financial Project Number: 440033-1

Historic Highwayman Trail
Financial Project Number: 440034-1

Title VI of the Civil Rights Act of 1964

Public participation is solicited without regard to race, color, national origin, age, sex, religion, disability, or family status.

Persons wishing to express their concerns about Title VI may do so at the table located at the entrance or by contacting either:

District Four
Florida Department of Transportation
District Four Title VI Coordinator
Shavon Nelson
3400 West Commercial Boulevard
Fort Lauderdale, Florida 33309-3421
(954) 777-4389 or
Toll free at (866) 336-8435 ext. 4190
Shavon.Nelson@dot.state.fl.us

Central Office
Florida Department of Transportation
State Title VI Coordinator
Jacqueline Paramore
605 Suwannee Street, MS 65
Tallahassee, Florida 32399-0450
(850) 414-4753
Jacqueline.Paramore@dot.state.fl.us

3

SUN Trail Feasibility Study

Historic Downtown Fort Pierce Retrofit
Financial Project Number: 440033-1

Historic Highwayman Trail
Financial Project Number: 440034-1

Study Partners

The Historic Downtown Fort Pierce Retrofit and Historic Highwayman Trail SUN trail studies are being conducted by:

The Florida Department of Transportation in association with -

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SUN Trail Feasibility Study

Historic Downtown Fort Pierce Retrofit
Financial Project Number: 440033-1

Historic Highwayman Trail
Financial Project Number: 440034-1

Studies conducted to evaluate two proposed SUN trail segments

These Alternatives were identified in the St. Lucie County May 2016 SUN Trail Application





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SUN Trail Feasibility Study

Historic Downtown Fort Pierce Retrofit
Financial Project Number: 440033-1

Historic Highwayman Trail
Financial Project Number: 440034-1

Purpose of Study

- Trails will provide regional connectivity throughout St. Lucie County and Florida as part of the Greenways Trail System. Will connect:
  - FEC Overpass
  - Indian Hills Recreation Area
  - Savanna's Preserve State Park
- Trails benefits include:
  - Ability to make a community more livable and cohesive
  - Connect the community to other communities and amenities
  - Improve the economy through tourism and civic improvement
  - Preserve and restore open space
  - Provide opportunities for physical activities that can promote and improve fitness and mental health.

6

SUN Trail Feasibility Study
Historic Downtown Fort Pierce Retrofit — Financial Project Number: 440033-1
Historic Highwayman Trail — Financial Project Number: 440034-1

Purpose of Study

- The feasibility study conducted for both segments is a planning process that will assess:
  - Engineering requirements
  - Impacts and enhancements to the natural, physical, and social environments
  - Costs
  - Public input
- Study will vet options and provide a basis for future phases:
  - Preliminary Engineering Studies
  - Project Development and Environment (PD&E) Studies
  - Final Design
  - Right-of-Way Acquisition (if necessary)
  - Construction

7

SUN Trail Feasibility Study
Historic Downtown Fort Pierce Retrofit — Financial Project Number: 440033-1
Historic Highwayman Trail — Financial Project Number: 440034-1

Feasibility Study Process

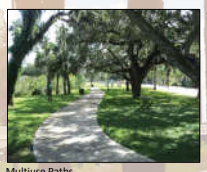
Project Milestones	2017									2018							
	March	April	May	June	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September
Begin Study	☆																		
Public Involvement		■	■	■	■	■	■	■	■	■	■	■	■	■	■				
Data Collection		■	■	■	■	■	■	■	■	■	■	■	■	■	■				
Kick-off Meeting								☆											
Design and Environmental Analysis								■	■	■	■	■	■	■	■	■			
Alternatives Analysis Meeting																☆			
Draft and Final Feasibility Reports														■	■	■	■	■	■
Study Completion																			☆

8

SUN Trail Feasibility Study
Historic Downtown Fort Pierce Retrofit — Financial Project Number: 440033-1
Historic Highwayman Trail — Financial Project Number: 440034-1

Where we are currently – Alternatives Analysis

- Alternatives developed through stakeholder coordination, design, and environmental analysis are presented tonight for public input
- Identify potential alignments and facility types for each Alternative.


Multiuse Paths




Sharrows


Bike Lanes

9

Historic Downtown Fort Pierce Retrofit

- Limits: From Georgia Avenue north through downtown area close to waterfront, ending at North Causeway Drive.
- NOTE: The "gap" in the trail will not be studied under this Feasibility Study due to future work on Federal Highway/US1 at Avenue H.
- Alternatives:
  - Primary Alternative: Red line indicates proposed trail SUN Trail application
  - River Walk Alternative: Blue line *NEW Alternative*
  - South Alternative 1: Green Line
  - South Alternative 2: Yellow Line

Visit the workshop stations during the meeting tonight for more details!



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Historic Highwayman Trail Gap

- Limits: From North Indian Hills around the Indian Hills Golf Course, ending at Georgia Avenue. Would connect with the Historic Downtown segment to the north.
- Alternatives:
  - Primary Alternative: Red line indicates proposed trail SUN Trail application
  - East Alternative 1: Pink Line
  - East Alternative 2: Blue Line *NEW Alternative*

Visit the workshop stations during the meeting tonight for more details!



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SUN Trail Feasibility Study
Historic Downtown Fort Pierce Retrofit — Financial Project Number: 440033-1
Historic Highwayman Trail — Financial Project Number: 440034-1

Alternatives Comparison Matrix

- The alternatives will be evaluated on the following criteria:
  - Design: Does or does not meet SUN Trail Program criteria
  - Social Features: Land Use, Community Cohesion, *Relocations, ROW or Easements Required*, Potential User Conflicts
  - Cultural: Archaeological/ Historical Resource, Section 4(f)
  - Natural: Threatened and Endangered Species, Wetlands/Surface Waters Upland Habitat, Outstanding Florida Waters/Aquatic Preserves, Floodplains
  - Physical: Noise, Air Quality, Contamination

Visit the workshop stations during the meeting tonight for more details!

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SUN Trail Feasibility Study

Historic Downtown Fort Pierce Retrofit — Financial Project Number: 440033-1
Historic Highwayman Trail — Financial Project Number: 440034-1

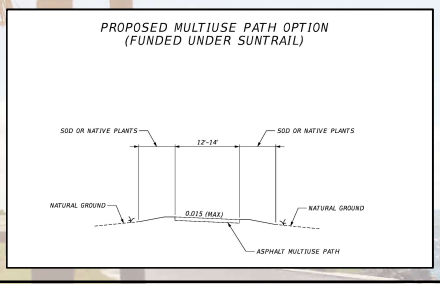
Alternatives Comparison Matrix

- KEY Criteria:
  - Meets SUN Trail Program Design Criteria - path must be:
    - 10-14 ft (8ft in rare cases)
    - Multiuse (bicyclists, pedestrians, runners, skaters)
    - Paved
    - Separated from roadway (at least 5 ft or physical barrier/railing)
  - ROW or Easements Required (no FEC or other private property)

Please visit the workshop stations during the meeting tonight for more details!

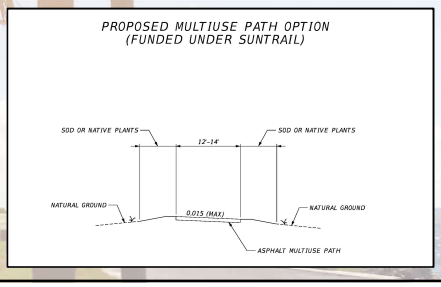
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Historic Highwayman Trail Gap – Typical Sections



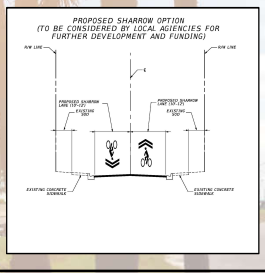
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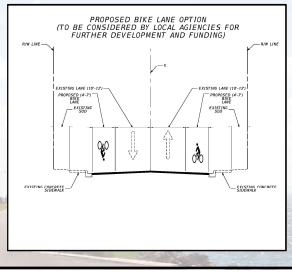
Historic Downtown Fort Pierce Retrofit – Typical Sections



15

Historic Downtown Fort Pierce Retrofit – Typical Sections





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SUN Trail Feasibility Study

Historic Downtown Fort Pierce Retrofit — Financial Project Number: 440033-1
Historic Highwayman Trail — Financial Project Number: 440034-1

Next Steps

- Following this Alternatives Analysis Public Meeting, Draft and Final Feasibility Reports will be prepared to include a recommended Alternative for each segment.
- Feasibility Study completion anticipated September 2018

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SUN Trail Feasibility Study

Historic Downtown Fort Pierce Retrofit — Financial Project Number: 440033-1
Historic Highwayman Trail — Financial Project Number: 440034-1

Project Schedule

Feasibility Study → Preliminary Engineering (PE)/Design → Acquisition of Right of Way (If necessary) → Construction

We are here

Design for both segments will be funded in FY 2019. The goal is to construct the trail within City/County ROW and minimize having to purchase ROW.

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SUN Trail Feasibility Study
Historic Downtown Fort Pierce Retrofit
Financial Project Number: 440033-1
Historic Highwayman Trail
Financial Project Number: 440034-1
FDOT
SUNTRAIL
Your Comments
❖ Fill out and submit a comment sheet tonight (comment box)
❖ Mail in comment sheet later. NOTE: all comments must be postmarked by Tuesday, June 19, 2018 so that we may complete our study.
Mail comments to:
Lauren Rand
3400 West Commercial Boulevard,
Fort Lauderdale, Florida 33309
❖ Email comments or questions:
Lauren.Rand@dot.state.fl.us
Stay involved with project updates, please visit project website:
www.FloridaSUNTrail.com
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SUN Trail Feasibility Study
Historic Downtown Fort Pierce Retrofit
Financial Project Number: 440033-1
Historic Highwayman Trail
Financial Project Number: 440034-1
FDOT
SUNTRAIL
Questions?
Thank you for your interest!
Please visit the workshop stations during the meeting tonight for more details!
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SUN Trail Feasibility Study

Historic Downtown Fort Pierce Retrofit — Financial Project Number: 440033-1

Historic Highwayman Trail — Financial Project Number: 440034-1

Project Overview

The Historic Downtown Fort Pierce Retrofit and Historic Highwayman Trail SUN Trails Feasibility Study is being conducted to evaluate a multi-use trail that will provide regional connectivity throughout St. Lucie County and Florida (see location maps and pages 2 & 3).

- Historic Downtown Fort Pierce Retrofit Segment is from Georgia Avenue to North Causeway (with an exception along US Highway 1 from Avenue H to Avenue M)
- Historic Highwayman Trail Segment is from North Indian Hills Drive to Georgia Avenue

Feasibility Study Process

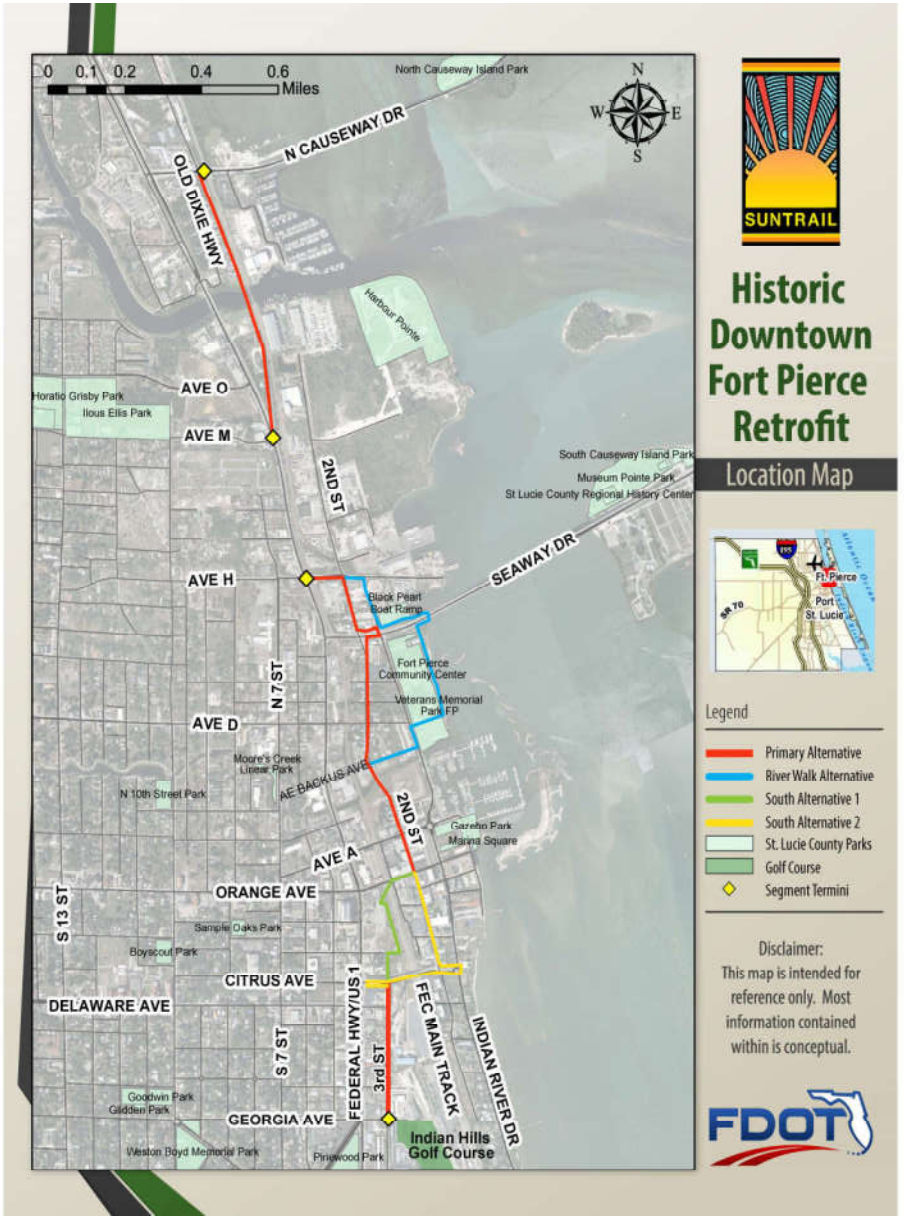
The goal is to develop basic information, including operational necessity, financial benefits and costs, and environmental impact.

Feasibility study stages:

- Data Collection
- Environmental Surveys and Studies
- Evaluation of Alternatives
- Recommended Alternatives
- Feasibility Report

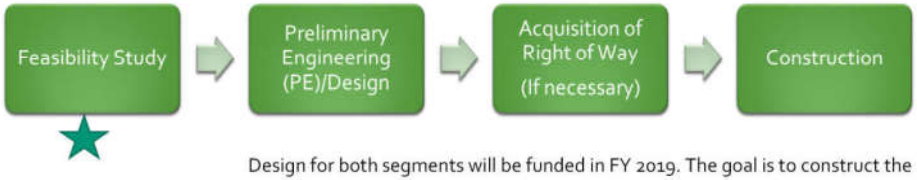
Feasibility Study Schedule

Project Milestones	2017									2018								
	March	April	May	June	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September
Begin Study	★																		
Public Involvement		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Data Collection		■	■	■	■	■	■	■	■	■	■	■	■	■	■				
Kick-off Meeting								★											
Design and Environmental Analysis								■	■	■	■	■	■	■	■	■			
Alternatives Analysis Meeting																★			
Draft and Final Feasibility Reports														■	■	■	■	■	■
Study Completion																			★





Overall Project Schedule



Design for both segments will be funded in FY 2019. The goal is to construct the trail within City/County ROW and minimize having to purchase ROW.

Next Steps

Following the Alternatives Analysis Public Meeting, Draft and Final Feasibility Studies will be prepared to include a recommended Alternative for each segment.

Following the completion of this Feasibility Study, the Florida Department of Transportation will proceed with the project Design in 2019.

Contact Us

Lauren Rand, Project Manager
Florida Department of Transportation
(954) 777-4499 or Lauren.Rand@dot.state.fl.us
SUN Trails Website—www.FloridaSUNTrail.com

It is the policy of the Florida Department of Transportation that no person be denied the benefits of or be subjected to discrimination or retaliation under any program or activity administered by the Department or its sub-recipients on the basis of race, color, national origin, sex, age, disability/handicap, or income status.

SUN Trail Feasibility Study

Historic Downtown Fort Pierce Retrofit — Financial Project Number: 440033-1

Historic Highwayman Trail — Financial Project Number: 440034-1

Comment Sheet

Please provide any comments or drawings you may have regarding the Historic Downtown Fort Pierce Retrofit and Historic Highwayman Trail Gap SUN Trails. The SUN Trails Feasibility Study is being conducted to evaluate a multi-use trail that will provide regional connectivity throughout St. Lucie County and Florida.

- Historic Downtown Fort Pierce Retrofit Segment is from Georgia Avenue to North Causeway
- Historic Highwayman Trail Gap Segment is from North Indian Hills Drive to Georgia Avenue

Name: _____

Address: _____

_____

NOTE: Please complete and return to the "Comments" Box; mail to Lauren Rand at the address on the back of this sheet; or e-mail comments to Lauren.Rand@dot.state.fl.us by Tuesday, June 19, 2018. All comments are part of the project record and are available for viewing by the public and media.

☐ Please add me to the mailing list for the SUN Trails Feasibility Study.

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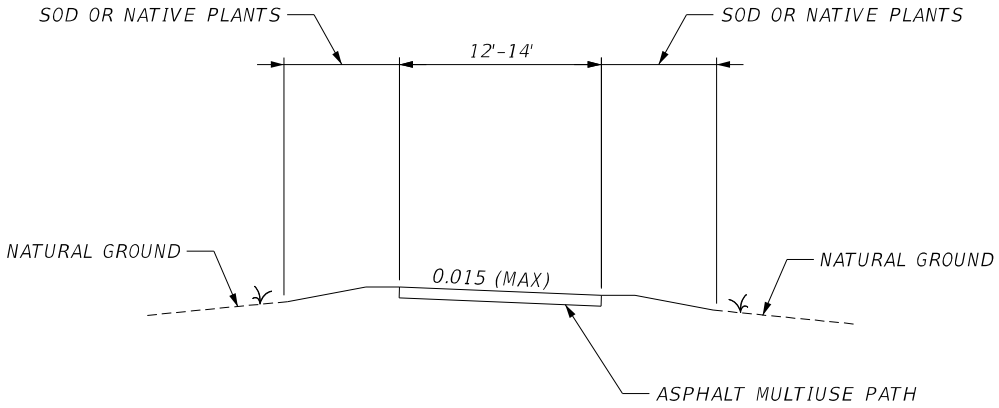
Lauren Rand
Project Manager
Florida Department of Transportation
3400 West Commercial Boulevard
Fort Lauderdale, Florida 33309

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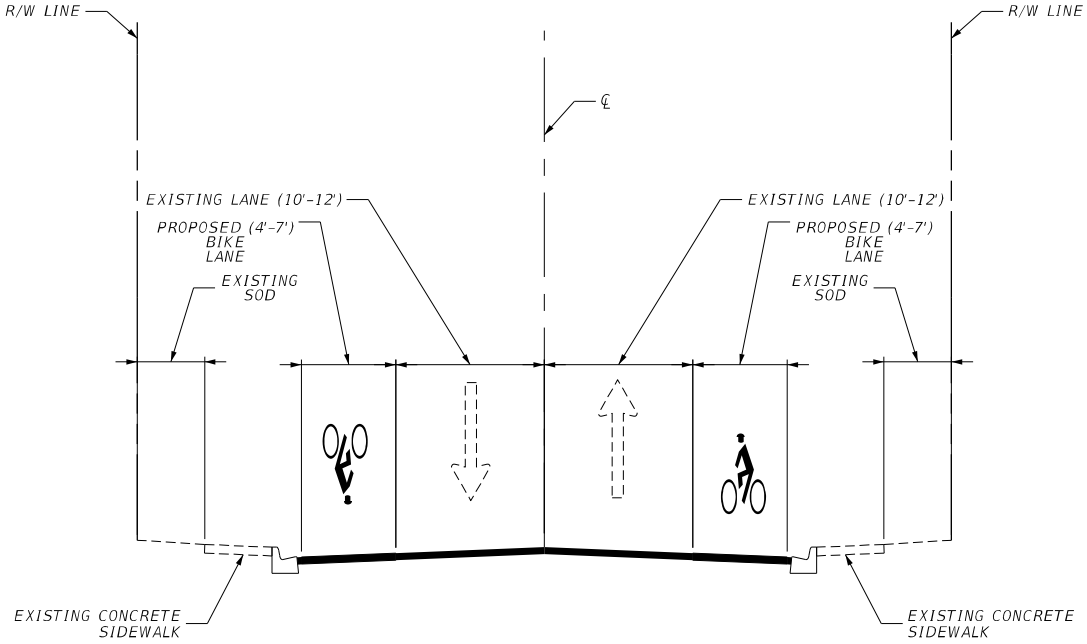

Legend
East Alternative 1
East Alternative 2
Primary Alternative
NR - Eligible Bridges
NR - Eligible Resource Groups
NR - Listed Resources
Locally Designated Districts
ROW
N
0 0,05 0,1 0,2 Miles
Private ROW
Both Alternatives meet SUN Trail Program criteria. A SUN Trail multi-use path is recommended.
River's Edge Historic District
8SL2602
FEC RR - Lake Harbor Branch
8SL3014
Alternative would require FEC ROW.
Scrub Habitat
FEC ROW


Legend
Primary Alternative
South Alternative 1
South Alternative 2
River Walk Alternative
NR - Eligible Bridges
NR - Eligible Resource Groups
NR - Listed Resources
Locally Designated Districts
N
0 0,1 0,2 0,4 Miles
Alternative does not meet the SUN Trail Program criteria, so will be explored by local agencies for further development and funding.
Flaws: There is no room for a separated multiuse path. Would require widening the Old Dixie Highway bridge.
Bike lanes/sharrows are recommended.
Dixie Highway
8SL1056
Fixed Bridge over Taylor Creek
8SL3181
Will not be covered under this feasibility study due to future work on Federal Highway/US1 at Avenue H.
FEC RR - Lake Harbor Branch
8SL3014
Alternative does not meet the SUN Trail Program criteria, so will be explored by local agencies for further development and funding.
Flaws: There is no room for a separated multiuse path. Would require building, sidewalk, street lamp relocations.
Bike lanes/sharrows are recommended.
Alternative does meet the SUN Trail Program criteria, so SUN Trail multi-use path would be recommended.
Edge Town Historic District
8SL2601
Moores Creek Bridge
8SL1141
Downtown Historic District
8SL2790
Sunrise Theatre
8SL799
Alternative does not meet the SUN Trail Program criteria, so will be explored by local agencies for further development and funding.
Flaws: There is no room for a separated multiuse path. Would require widening Citrus Ave Bridge, and sidewalk and building relocations.
Citrus Ave bridge slope more than 5%.
Flaws: Alternative would require the private and FEC ROW, so will be explored by local agencies for further development and funding.
Alternative does not meet the SUN Trail Program criteria, so will be explored by local agencies for further development and funding.
Flaws: There is no room for a separated multiuse path. Would require onstreet parking relocation.
Bike lanes/sharrows are recommended.

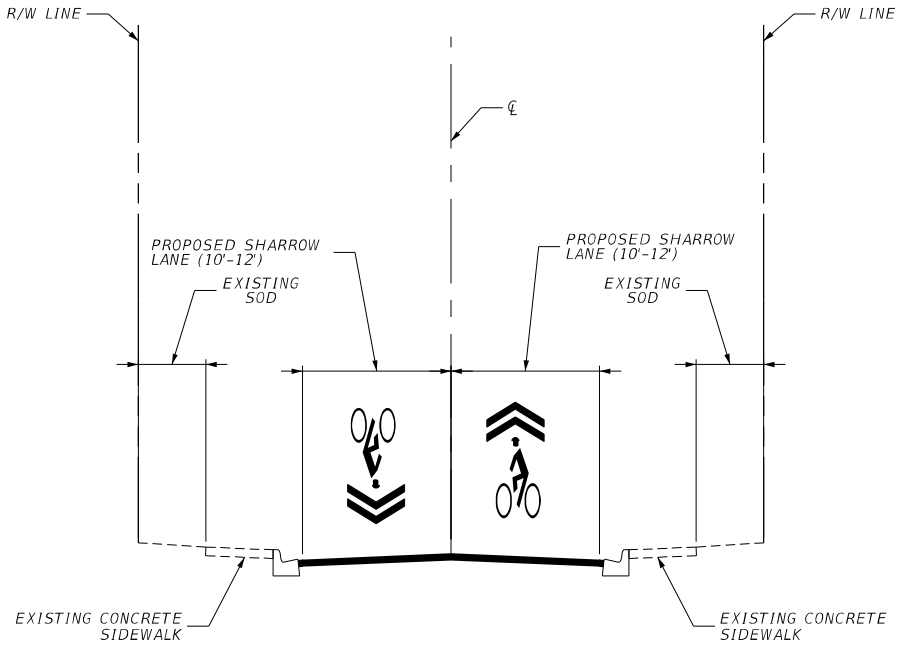
PROPOSED MULTIUSE PATH OPTION
(FUNDED UNDER SUNTRAIL)



PROPOSED BIKE LANE OPTION
(TO BE CONSIDERED BY LOCAL AGIENCIES FOR FURTHER DEVELOPMENT AND FUNDING)



PROPOSED SHARROW OPTION
(TO BE CONSIDERED BY LOCAL AGIENCIES FOR FURTHER DEVELOPMENT AND FUNDING)



SUN Trail Feasibility Study

Historic Downtown Fort Pierce Retrofit — Financial Project Number: 440033-1

Historic Highwayman Trail — Financial Project Number: 440034-1

Alternatives Analysis Meeting

Please Sign-In
(Sign-in sheets are subject to public record requests)

June 5, 2018

Name (Please Print)	Address	E-Mail	Telephone
JOSEPH G. MILLER	5500 ORANGE AVE 34947	JGM01@COMCAST.NET	772-475-6066
Ryan Jensen		Ryan.Jensen@AtkinsGlobal.com	305 984-5280
Lauren Rand		Lauren.Rand@Dot.State.fl.us	954-777-4499
Lynn Kelley	FDOT D4	lynn.kelley@dot...	V43354
Jenn McGee	SLC ERD	mcgeej@stlucieco.org	772 462 3862
ALBERT SORREL	116 INDIAN HILL DR		
DAVID H. KAPLAN	4105E Harbor La PSL	DKAPLAN73@HOTMAIL.COM	
LAURA A. KAPLAN	"	LAURASTLUCIEREALTOR@GMAIL.COM	772-342-7736
Jim Bounds	206 Southern Av. Ft. Pierce	Jbounds133@gmail.com	772-359-4852
DOUGLAS DAVIS	2201 ATLANTIC BEACH BLVD FP 34949	ddavis@rkdavis.com	772 461 8335
STAN & JEAN SYNKOSKI	2005 COCONUT DR. FORT PIERCE FL 34949	INSYNKINC@GMAIL.COM	301 232-5692
Buck Bryan			
CHARLIE BECK	2001 SURFSIDE DR.		
Toni Monokian	6010 Myrtle Dr. Ft Pierce 34982	tonif6@cs.com	
Jim KAUFFMANN	2919 S. INDIAN RIVER DR	JIM KAUFFMANN@ICLOUD.COM	772-370-5621
Greg Griffett		GGRIFFETT@STLUCIECO.COM	
MURRSAH DEKLE	437 N 7TH STREET FORT PIERCE	DEKLEM@STLUCIECO.ORG	772-462-3065
Peter Buchwald	St. Lucie TPO		

(9)

SUN Trail Feasibility Study

Historic Downtown Fort Pierce Retrofit — Financial Project Number: 440033-1

Historic Highwayman Trail — Financial Project Number: 440034-1

Alternatives Analysis Meeting

Please Sign-In
(Sign-in sheets are subject to public record requests)

June 5, 2018

Name (Please Print)	Address	E-Mail	Telephone
GARY GAROTTI		gary.garotti@atkinsglobal.com	407-206-4184
Bassel Kassem	633 Dartmouth St Orlando FL	bKassem@flbridge.com	407 492-1744
PAUL HAYDT	11 WILMONT PL PALM COAST 32164	PAUL@GRASSWAY.ORG	386 503-0294
KEN SCOTT	453 MILTON RD. FT. PIERCE		
TERRY WALTERS	900 S. 3RD ST. FT. PIERCE		
LUIS ORTIZ	601 S Indian River Dr. FP	Fpielort1481@Gmail.Com	772 971 7115
Jack Andrews	City of Ft. Pierce	JAndrews@City-FTPierce.com	772-467-3773
SELENA GRIFFETT	SLC PW ENG	griffetts@stlucieco.org	772-462-2153

SUN Trail Feasibility Study

Historic Downtown Fort Pierce Retrofit — Financial Project Number: 440033-1

Historic Highwayman Trail — Financial Project Number: 440034-1

Alternatives Analysis Meeting

Please Sign-In

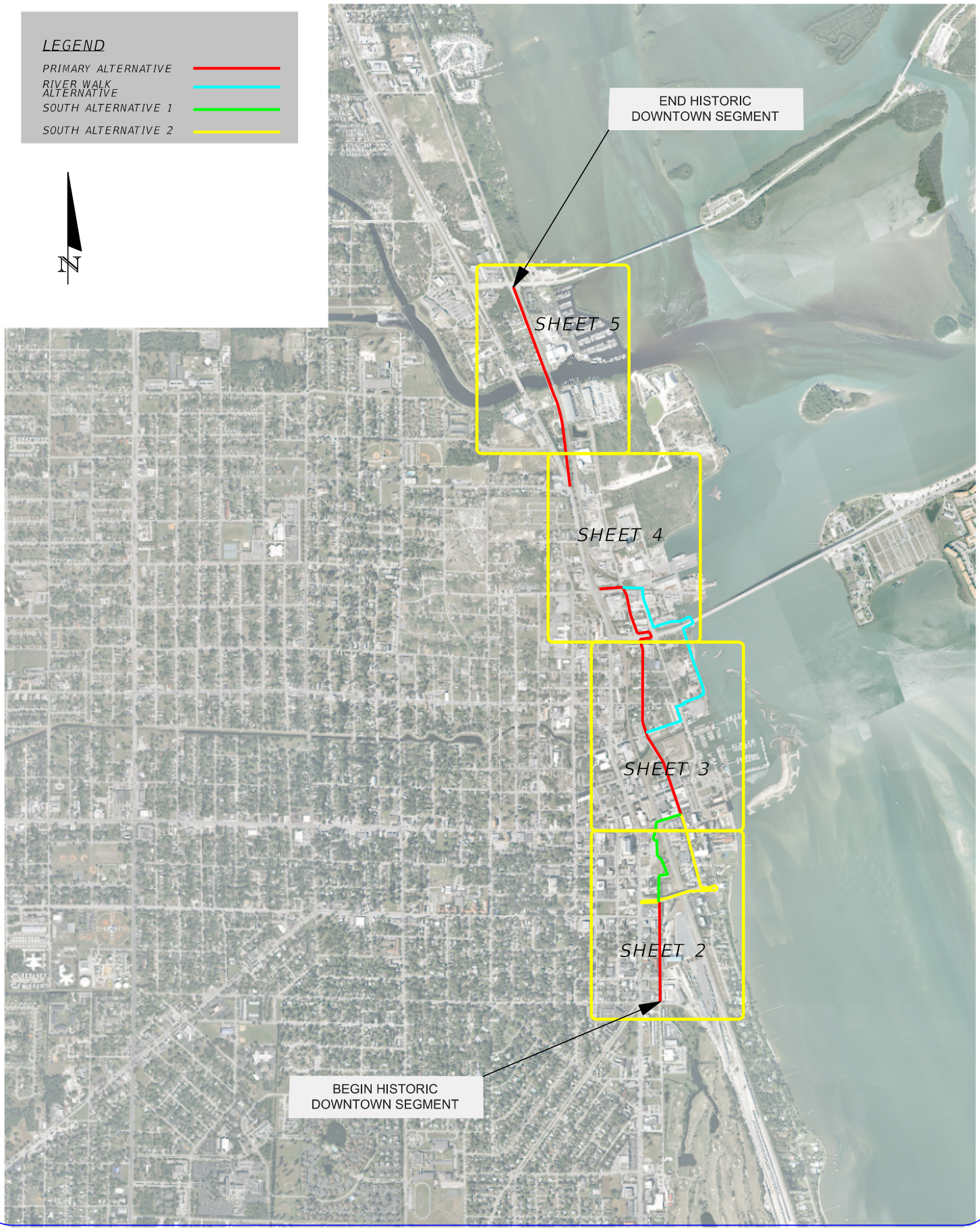
(Sign-in sheets are subject to public record requests)

June 5, 2018

Name (Please Print)	Address	E-Mail	Telephone
REP. LARRY LEE, JR.	7936 SADDLEBROOK DR. PSL, FL	LARRY.LEE.JR55@GMAIL	772-528-4167

Appendix C

Environmental Opportunities and Right-of-Way Constraint Maps



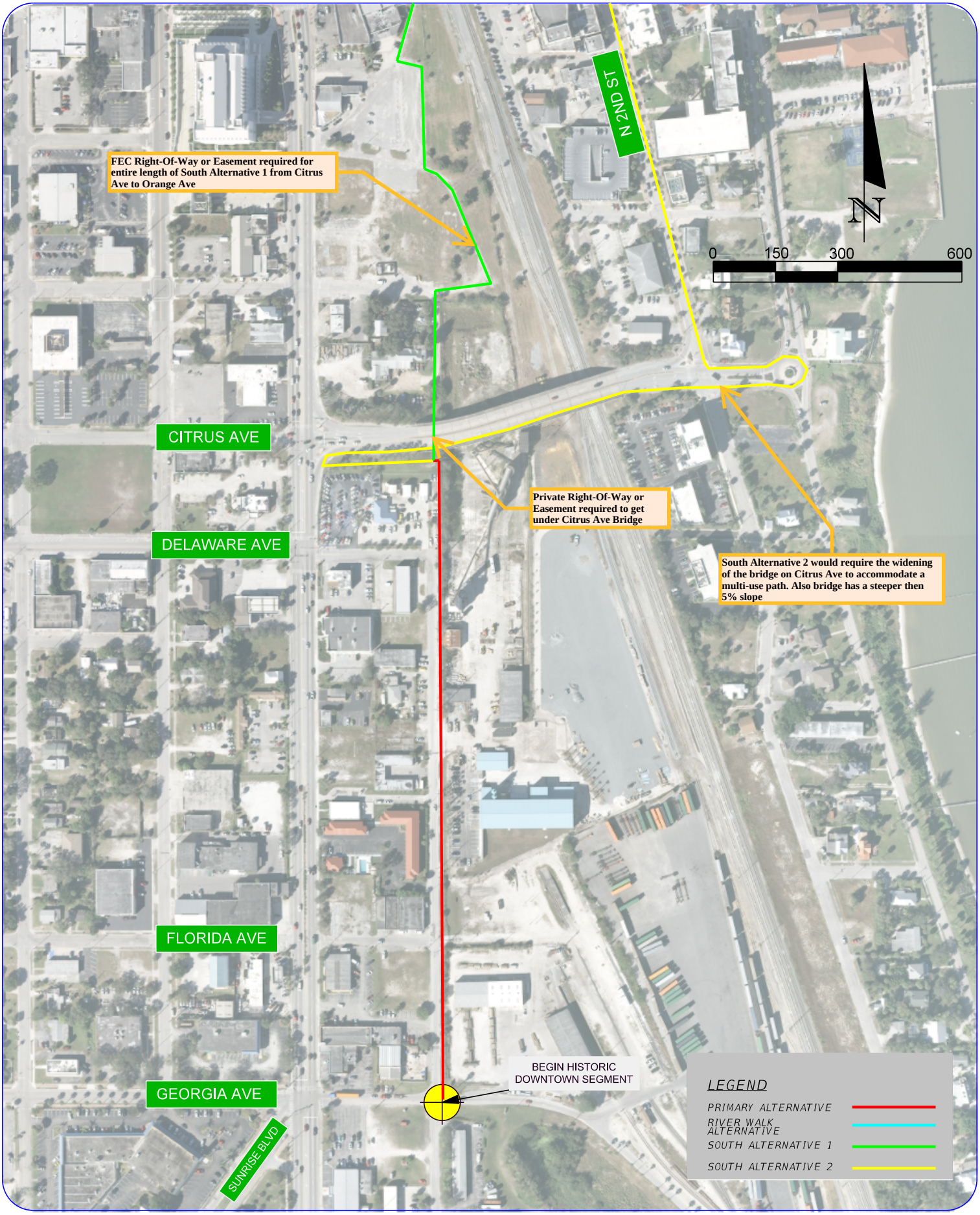
ENVIRONMENTAL OPPORTUNITIES AND RIGHT-OF-WAY CONSTRAINTS MAP

SUN TRAIL HISTORIC DOWNTOWN SEGMENT
FEASIBILITY STUDY
FORT PIERCE, FL

SHEET 1 OF 5	FPID: 440033-1-52-01	JULY 2018	SCALE:1" = 2000'

ATKINS
CORPORATE OFFICE:
4030 W. BOY SCOUT BOULEVARD
TAMPA, FLORIDA 33607
FBPR CERTIFICATE OF AUTHORIZATION NO.24
www.atkinsglobal.com

jens6760
7/6/2018
7:55:48 AM
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jens6760

7/6/2018

7:59:50 AM

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ENVIRONMENTAL OPPORTUNITIES AND RIGHT-OF-WAY CONSTRAINTS MAP

SUN TRAIL HISTORIC DOWNTOWN SEGMENT
FEASIBILITY STUDY
FORT PIERCE, FL

SHEET 2 OF 5	FPID: 440033-1-52-01	JULY 2018	SCALE: 1" = 300'

ATKINS
CORPORATE OFFICE:
4030 W. BOY SCOUT BOULEVARD
TAMPA, FLORIDA 33607
FBPR CERTIFICATE OF AUTHORIZATION NO.24
www.atkinsglobal.com



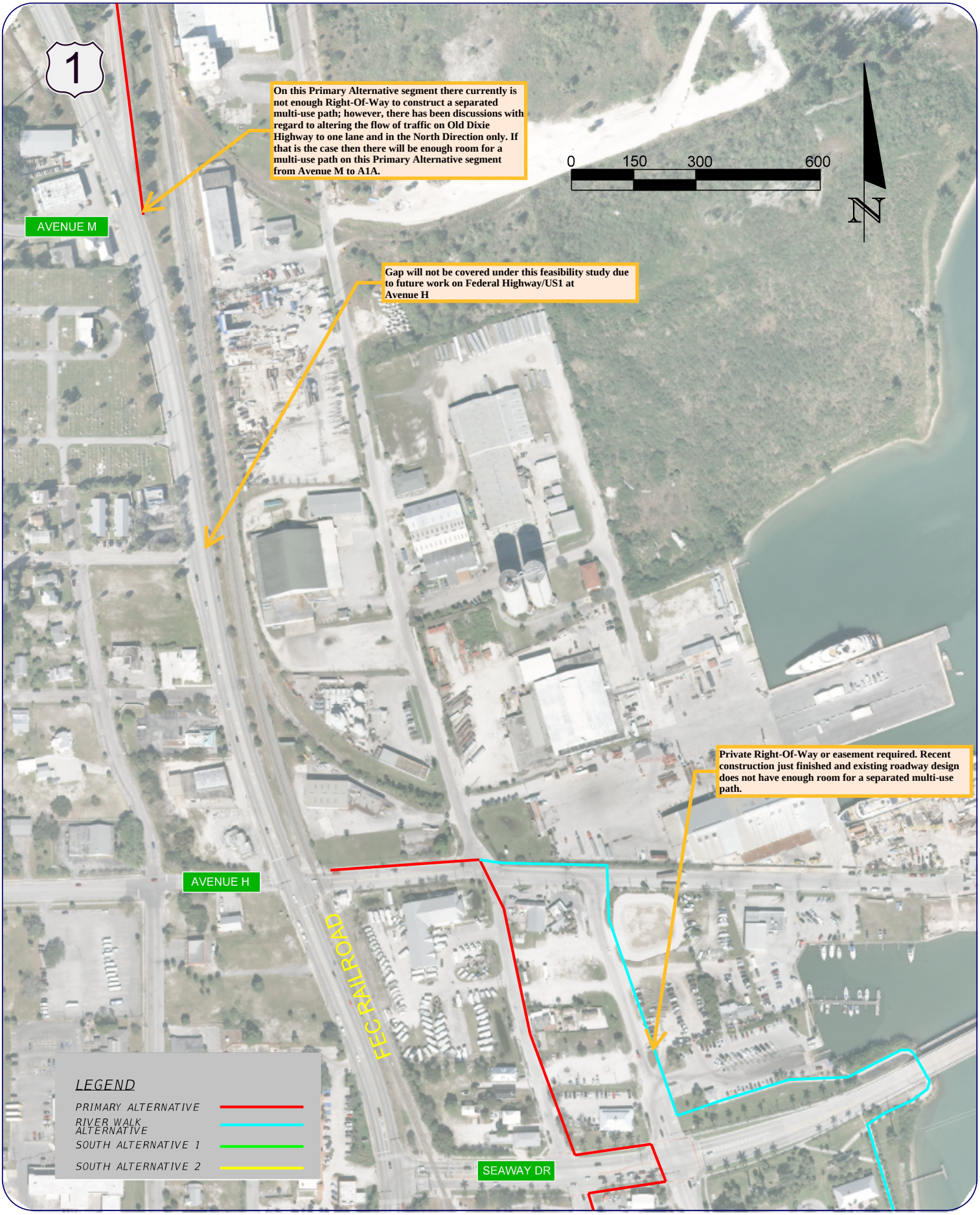
jens6760 7/6/2018 8:00:01 AM O:\Projects\Sun_Trail\Cadd\Roadway\PLANRD01.DGN

ENVIRONMENTAL OPPORTUNITIES AND RIGHT-OF-WAY CONSTRAINTS MAP

SUN TRAIL HISTORIC DOWNTOWN SEGMENT
FEASIBILITY STUDY
FORT PIERCE, FL

SHEET 3 OF 5	FPID: 440033-1-52-01	JULY 2018	SCALE: 1" = 300'

ATKINS
CORPORATE OFFICE:
4030 W. BOY SCOUT BOULEVARD
TAMPA, FLORIDA 33607
FBPR CERTIFICATE OF AUTHORIZATION NO.24
www.atkinsglobal.com



jens6760

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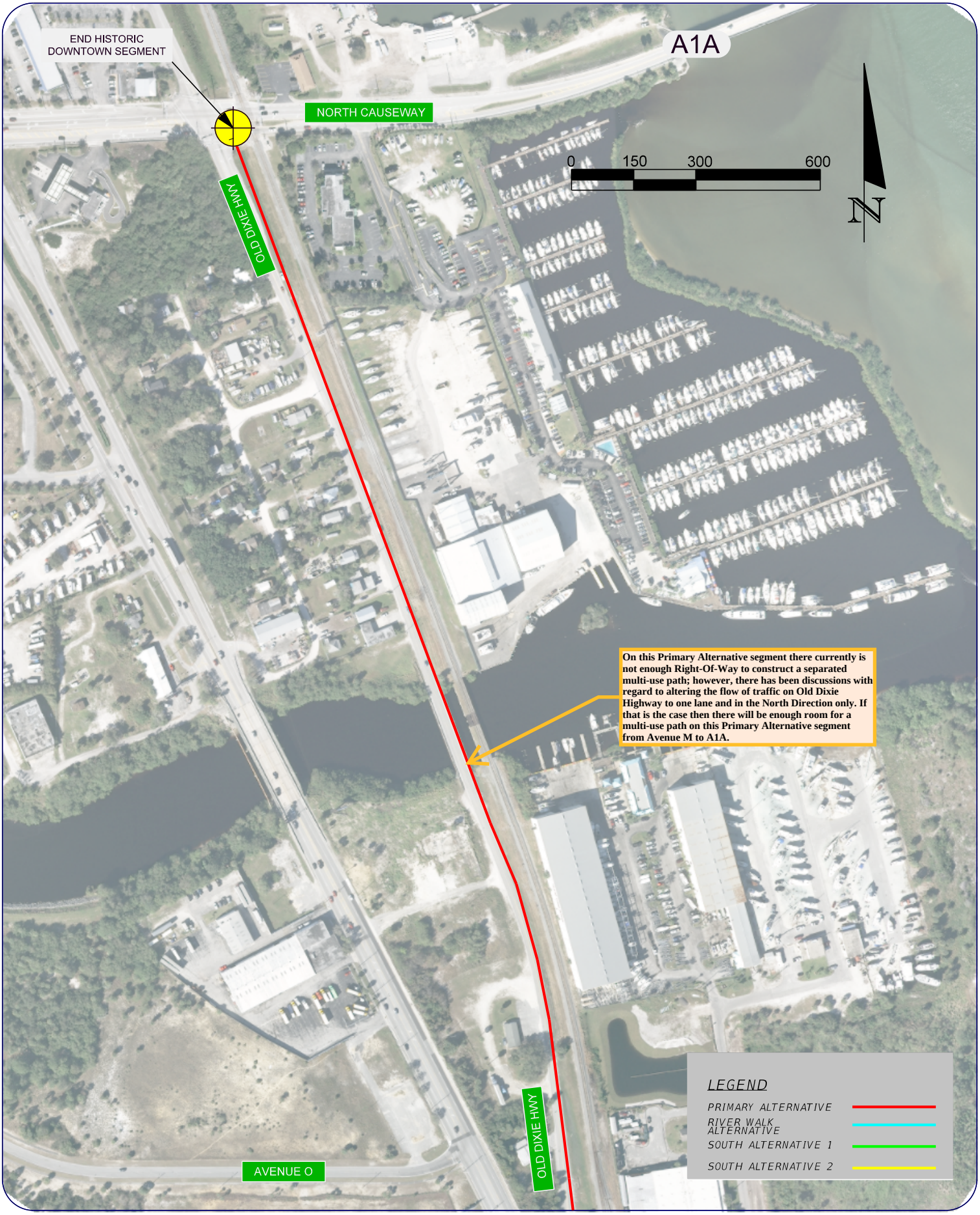
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ENVIRONMENTAL OPPORTUNITIES AND RIGHT-OF-WAY CONSTRAINTS MAP

SUN TRAIL HISTORIC DOWNTOWN SEGMENT
FEASIBILITY STUDY
FORT PIERCE, FL

SHEET 4 OF 5	FPID: 440033-1-52-01	JULY 2018	SCALE: 1" = 300'

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4030 W. BOY SCOUT BOULEVARD
TAMPA, FLORIDA 33607
FBPR CERTIFICATE OF AUTHORIZATION NO.24
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jens6760

7/6/2018

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ENVIRONMENTAL OPPORTUNITIES AND RIGHT-OF-WAY CONSTRAINTS MAP

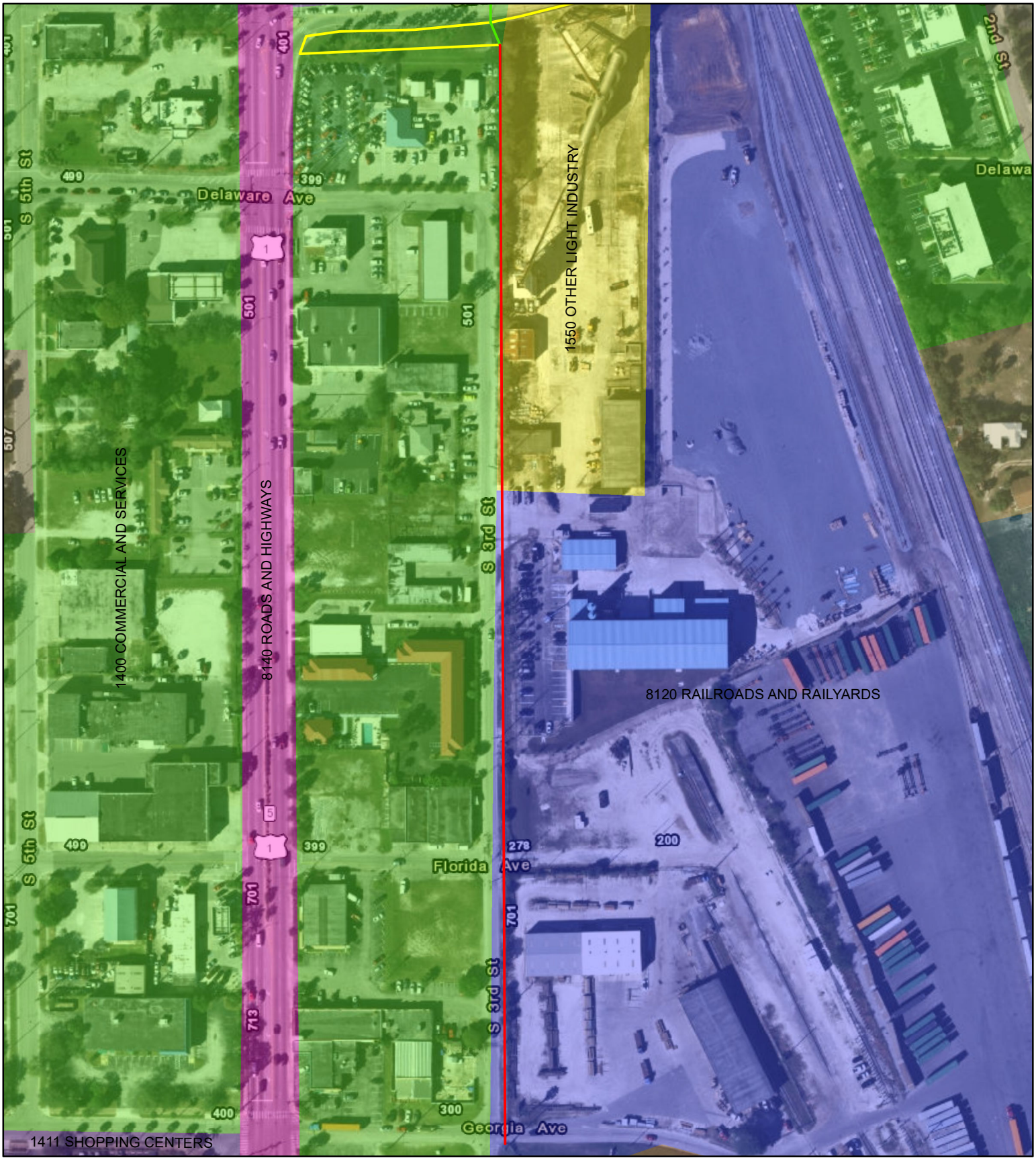
SUN TRAIL HISTORIC DOWNTOWN SEGMENT
FEASIBILITY STUDY
FORT PIERCE, FL

SHEET 5 OF 5	FPID: 440033-1-52-01	JULY 2018	SCALE: 1" = 300'

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CORPORATE OFFICE:
4030 W. BOY SCOUT BOULEVARD
TAMPA, FLORIDA 33607
FBPR CERTIFICATE OF
AUTHORIZATION NO.24
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Appendix D

Existing Land Use Maps and Fort Pierce Future Land Use Map



FLUCFCS Data: SFWMD 2009

Imagery: NAIP 2013



SUN Trail Historic Downtown Fort Pierce Trail
Ft. Pierce, St. Lucie County, Florida

- 1110 FIXED SINGLE FAMILY UNITS
- 1210 FIXED SINGLE FAMILY UNITS
- 1400 COMMERCIAL AND SERVICES
- 1411 SHOPPING CENTERS
- 1550 OTHER LIGHT INDUSTRY
- 1620 SAND AND GRAVEL PITS
- 1820 GOLF COURSE
- 8120 RAILROADS AND RAILYARDS
- 8140 ROADS AND HIGHWAYS

D-1: Existing Land Use

1 in = 182 feet

Prepared By: Atkins N.A.
Date: July 06, 2018

ATKINS



FLUCFCS Data: SFWMD 2009

Imagery: NAIP 2013



SUN Trail Historic Downtown Fort Pierce Trail
Ft. Pierce, St. Lucie County, Florida

- 1210 FIXED SINGLE FAMILY UNITS
- 1400 COMMERCIAL AND SERVICES
- 1550 OTHER LIGHT INDUSTRY
- 1620 SAND AND GRAVEL PITS
- 1700 INSTITUTIONAL
- 8120 RAILROADS AND RAILYARDS

D-2: Existing Land Use

1 in = 158 feet

Prepared By: Atkins N.A.
Date: July 06, 2018

ATKINS



FLUCFCS Data: SFWMD 2009

Imagery: NAIP 2013



SUN Trail Historic Downtown Fort Pierce Trail

Ft. Pierce, St. Lucie County, Florida

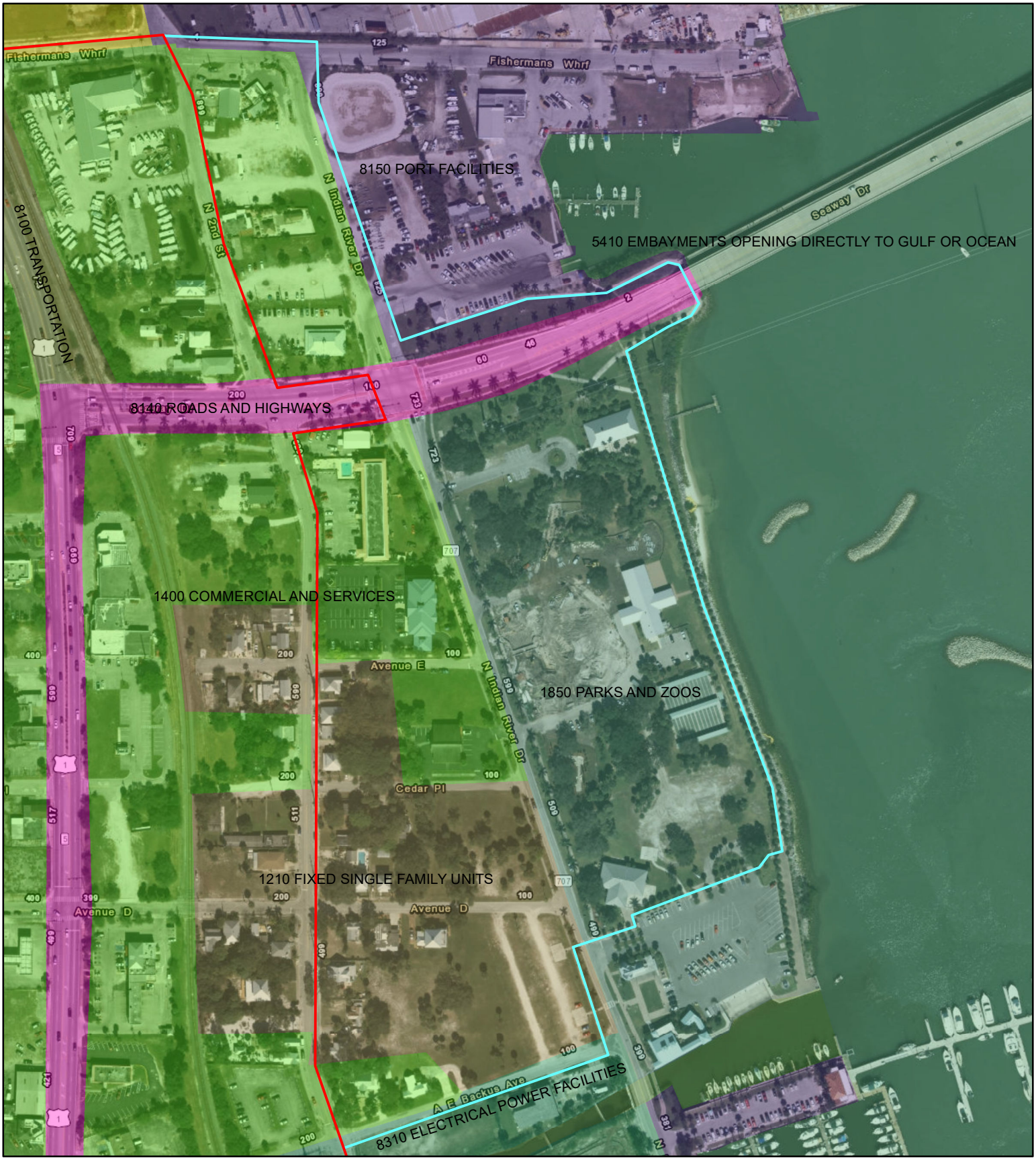
- 1400 COMMERCIAL AND SERVICES
- 1840 MARINAS AND FISH CAMPS
- 5120 CHANNELIZED WATERWAYS - CANALS
- 5410 EMBAYMENTS OPENING DIRECTLY TO GULF OR OCEAN
- 8120 RAILROADS AND RAILYARDS
- 8310 ELECTRICAL POWER FACILITIES

D-3: Existing Land Use

1 in = 153 feet

Prepared By: Atkins N.A.
Date: July 06, 2018

ATKINS



FLUCFCS Data: SFWMD 2009

Imagery: NAIP 2013



SUN Trail Historic Downtown Fort Pierce Trail
Ft. Pierce, St. Lucie County, Florida

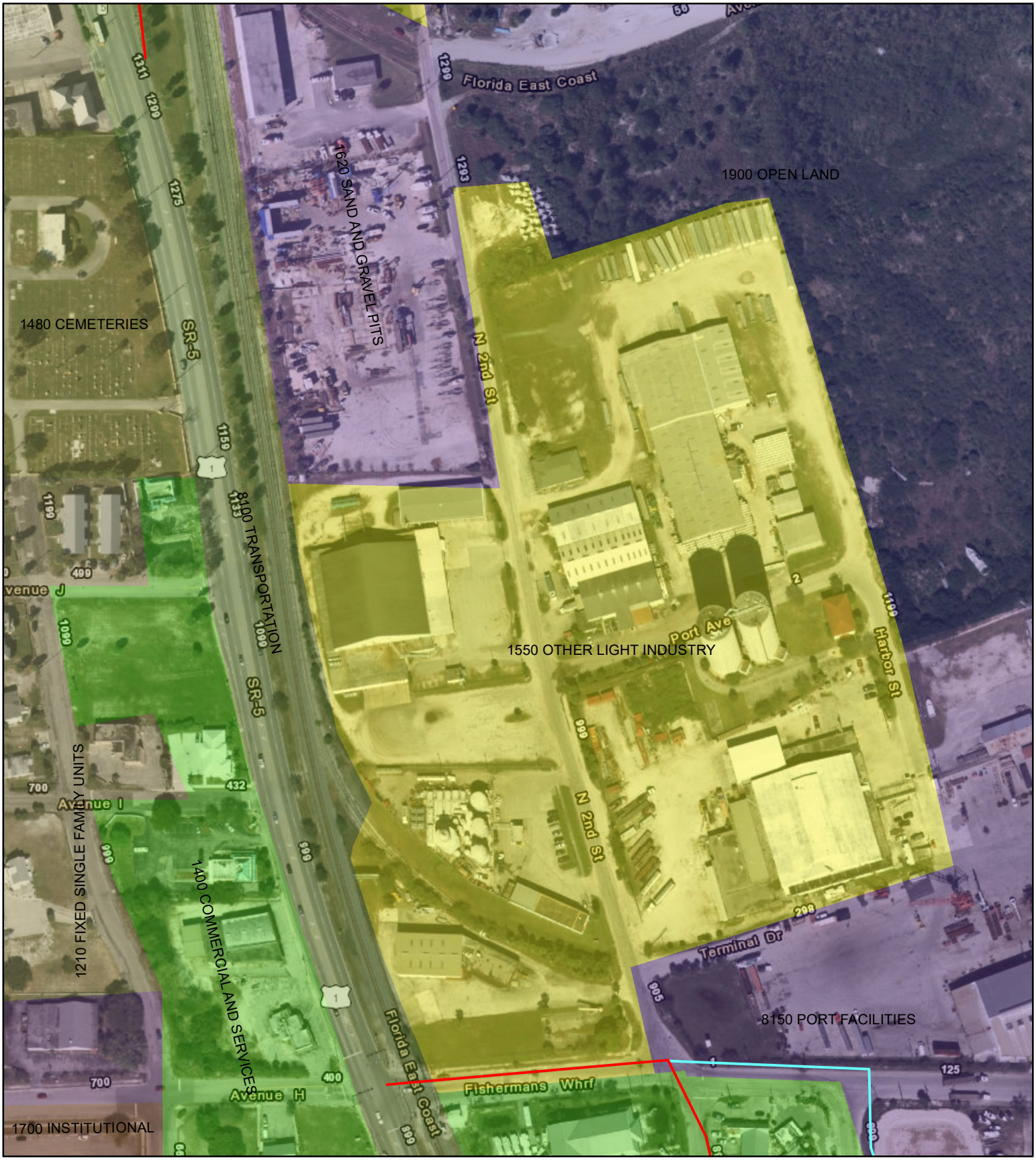
- 1210 FIXED SINGLE FAMILY UNITS
- 1400 COMMERCIAL AND SERVICES
- 1550 OTHER LIGHT INDUSTRY
- 1840 MARINAS AND FISH CAMPS
- 1850 PARKS AND ZOOS
- 5120 CHANNELIZED WATERWAYS - CANALS
- 5410 EMBAYMENTS OPENING DIRECTLY TO GULF OR OCEAN
- 8100 TRANSPORTATION
- 8140 ROADS AND HIGHWAYS
- 8150 PORT FACILITIES
- 8310 ELECTRICAL POWER FACILITIES

D-4: Existing Land Use

1 in = 261 feet

Prepared By: Atkins N.A.
Date: July 06, 2018

ATKINS



FLUCFCS Data: SFWMD 2009

Imagery: NAIP 2013



SUN Trail Historic Downtown Fort Pierce Trail
Ft. Pierce, St. Lucie County, Florida

- 1210 FIXED SINGLE FAMILY UNITS
- 1330 MULTIPLE DWELLING UNITS - LOW RISE
- 1400 COMMERCIAL AND SERVICES
- 1480 CEMETERIES
- 1550 OTHER LIGHT INDUSTRY
- 1620 SAND AND GRAVEL PITS
- 1700 INSTITUTIONAL
- 1900 OPEN LAND
- 8100 TRANSPORTATION
- 8150 PORT FACILITIES

D-5: Existing Land Use

1 in = 200 feet

Prepared By: Atkins N.A.
Date: July 06, 2018

ATKINS



FLUCFCS Data: SFWMD 2009

Imagery: NAIP 2013



SUN Trail Historic Downtown Fort Pierce Trail
Ft. Pierce, St. Lucie County, Florida

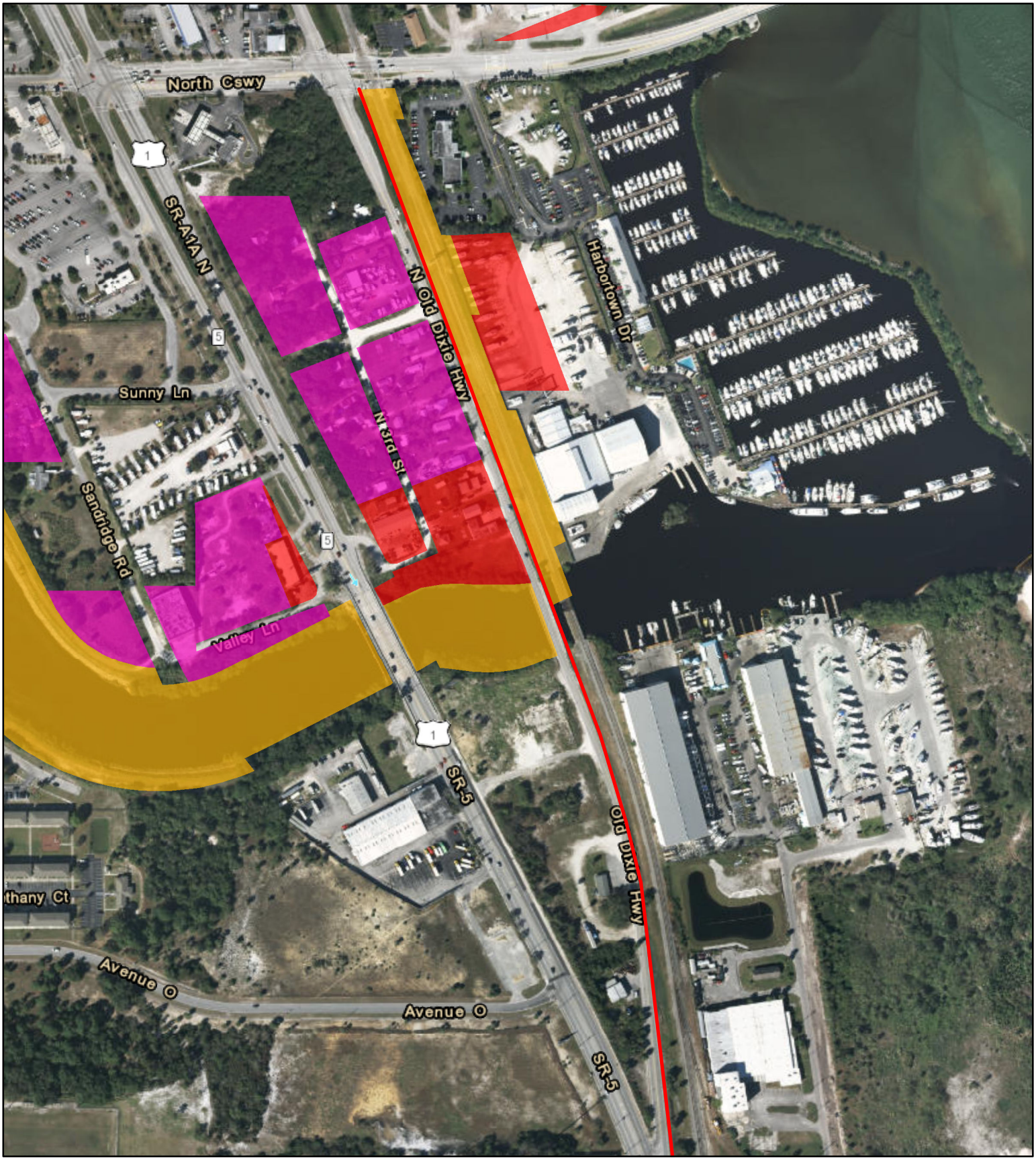
- 1110 FIXED SINGLE FAMILY UNITS
- 1210 FIXED SINGLE FAMILY UNITS
- 1320 MOBILE HOME UNITS
- 1330 MULTIPLE DWELLING UNITS - LOW RISE
- 1400 COMMERCIAL AND SERVICES
- 1411 SHOPPING CENTERS
- 1550 OTHER LIGHT INDUSTRY
- 1620 SAND AND GRAVEL PITS
- 1840 MARINAS AND FISH CAMPS
- 1850 PARKS AND ZOOS
- 1900 OPEN LAND
- 4130 SAND PINE
- 4220 BRAZILIAN PEPPER
- 5120 CHANNELIZED WATERWAYS - CANALS
- 5410 EMBAYMENTS OPENING DIRECTLY TO GULF OR OCEAN
- 8100 TRANSPORTATION
- 8140 ROADS AND HIGHWAYS

D-6: Existing Land Use

1 in = 358 feet

Prepared By: Atkins N.A.
Date: July 06, 2018

ATKINS



Future Land Use Data: St. Lucie County

Imagery: NAIP 2013



SUN Trail Historic Downtown Fort Pierce Trail
Ft. Pierce, St. Lucie County, Florida

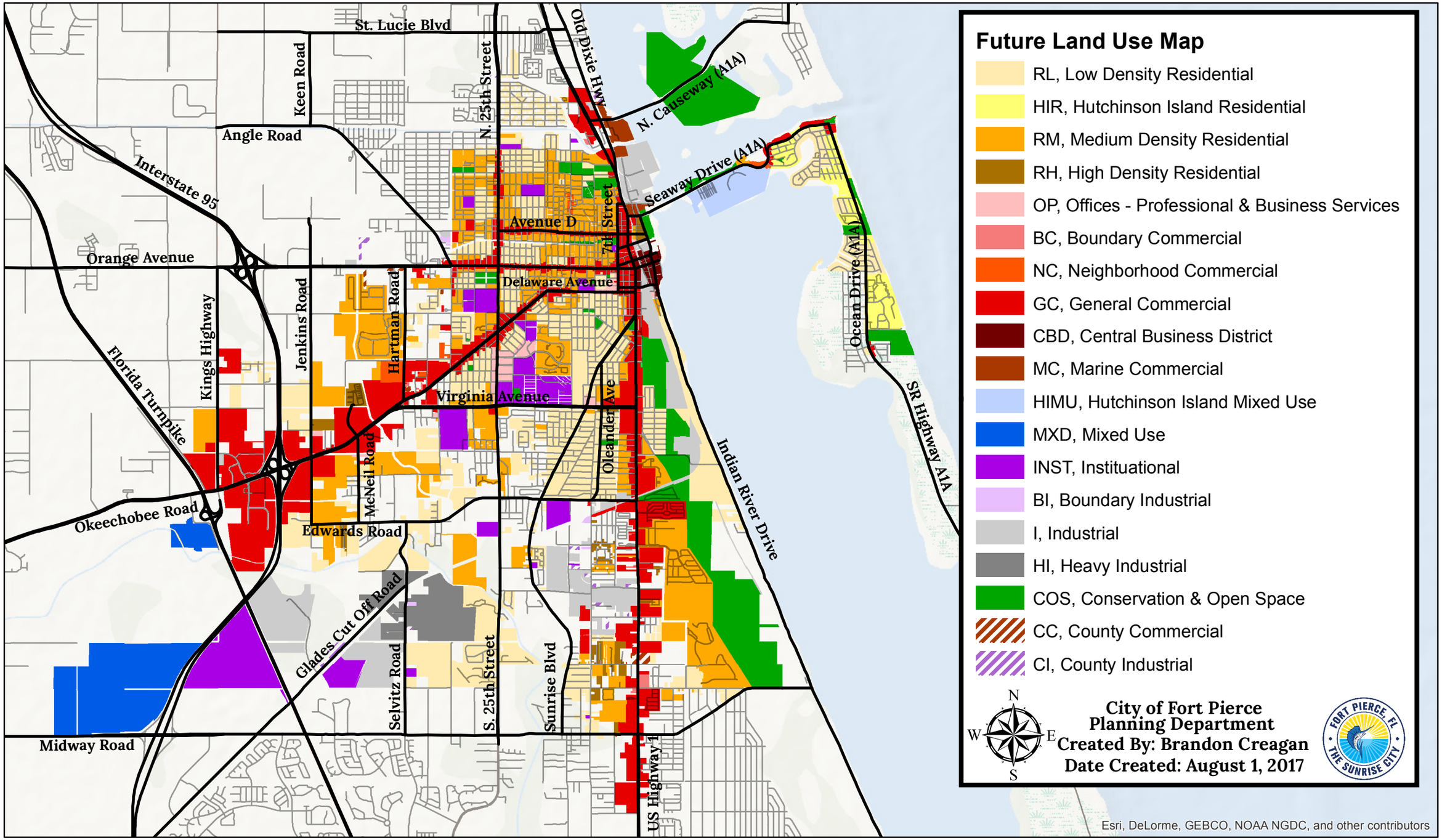
COM
IND
ROW

Future Land Use

1 in = 350 feet

Prepared By: Atkins N.A.
Date: July 05, 2018

ATKINS


Future Land Use Map
RL, Low Density Residential
HIR, Hutchinson Island Residential
RM, Medium Density Residential
RH, High Density Residential
OP, Offices - Professional & Business Services
BC, Boundary Commercial
NC, Neighborhood Commercial
GC, General Commercial
CBD, Central Business District
MC, Marine Commercial
HIMU, Hutchinson Island Mixed Use
MXD, Mixed Use
INST, Instituational
BI, Boundary Industrial
I, Industrial
HI, Heavy Industrial
COS, Conservation & Open Space
CC, County Commercial
CI, County Industrial
N
W
E
S
City of Fort Pierce
Planning Department
Created By: Brandon Creagan
Date Created: August 1, 2017
FORT PIERCE, FL
THE SUNRISE CITY
St. Lucie Blvd
Keen Road
Angle Road
Interstate 95
Orange Avenue
Kings Highway
Florida Turnpike
Okeechobee Road
Midway Road
Jenkins Road
Hartman Road
McNeil Road
Edwards Road
Glades Cut Off Road
Selvitz Road
S. 25th Street
N. 25th Street
Old Dixie Hwy
Avenue D
Delaware Avenue
Virginia Avenue
7th Street
Olender Ave
Sunrise Blvd
US Highway 1
N. Causeway (A1A)
Seaway Drive (A1A)
Ocean Drive (A1A)
SR Highway A1A
Indian River Drive
Esri, DeLorme, GEBCO, NOAA NGDC, and other contributors

Appendix E

Previously Recorded Significant Resources and Locally-Designated Historic Districts

Table 1: Previously Recorded Significant Resources, and Previously Recorded and Locally-Designated Historic Districts Within and Adjacent to the Downtown Fort Pierce Trail

FMSF No.	Site Name/Address	Year Built	Resource Type/Style	SHPO Evaluation
8SL799	Sunrise Theater / 117 S 2nd Street	1923	Building	National Register–Listed
8SL1141	Moore's Creek Bridge	1925	Roadway Bridge	National Register–Listed
8SL1666	Dixie Highway	1914 or earlier	Road	National Register–Eligible
8SL2799	Downtown Historic District	c. 1882	Historic District	National Register–Ineligible
8SL3014	FEC Railroad-Lake Harbor Branch	1892	Railroad	National Register–Eligible
8SL3191	Bridge at Mile Post 240.1	c. 1961	Railway Bridge	National Register–Eligible
8SL2801	Edgar Town Historic District	c. 1870s	Historic District	Not Evaluated
8SL2802	River's Edge Historic District	c. 1900	Historic District	National Register–Ineligible

Table 2: Previously Recorded Significant Resources, and Previously Recorded and Locally-Designated Historic Districts Within and Adjacent to the Highwayman Gap Trail Alternatives

FMSF No.	Site Name/Address	Year Built	Resource Type/Style	SHPO Evaluation
8SL3014	FEC Railroad-Lake Harbor Branch	1892	Railroad	National Register–Eligible



Previously Recorded Significant Resources and Previously Recorded and Locally-Designated Historic Districts

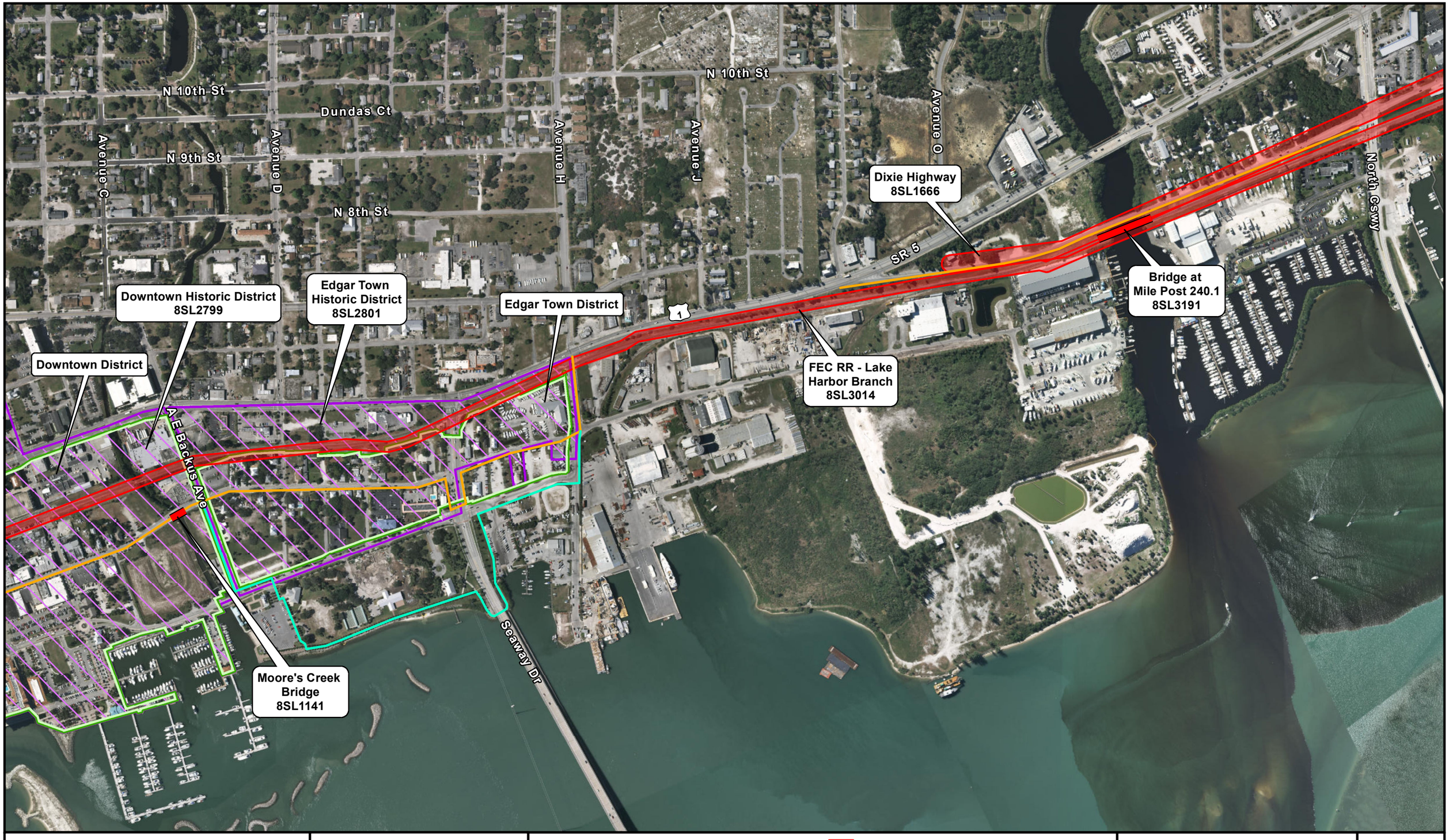
Sun Trail - Historic Downtown Fort Pierce Retrofit and Historic Highwayman Trail Gap

- Primary Route
- East Alternate 1
- East Alternate 2
- River Walk Alternative
- South Alternate 1
- South Alternate 2
- National Register-Listed or Eligible
- Historic District (FMSF Boundaries)
- Historic District (Local Boundaries)

City of Fort Pierce, St. Lucie County

0 100 200 Meters

Map 1



Previously Recorded Significant Resources and Previously Recorded and Locally-Designated Historic Districts

Sun Trail - Historic Downtown Fort Pierce Retrofit and Historic Highwayman Trail Gap

- Primary Route
- East Alternate 1
- East Alternate 2
- River Walk Alternative
- South Alternate 1
- South Alternate 2
- National Register-Listed or Eligible
- Historic District (FMSF Boundaries)
- Historic District (Local Boundaries)

City of Fort Pierce, St. Lucie County

0 100 200 Meters

Map 2

Appendix F

Florida Natural Areas Inventory Standard Data Report

FLORIDA
Natural Areas
INVENTORY

1018 Thomasville Road
Suite 200-C
Tallahassee, FL 32303
850-224-8207
fax 850-681-9364
www.fnai.org

April 12, 2018

Beth Zimmer
ATKINS
800 Waterford way, Suite 700
Miami, FL 33126

Dear Ms. Zimmer,

Thank you for requesting information from the Florida Natural Areas Inventory (FNAI). We have compiled the following information for your project area.

Project: SUN Trail Historic Downtown Trail Gap

Date Received: 04/10/18

Location: St. Lucie County

Element Occurrences

A search of our maps and database indicates that we currently have several element occurrences mapped in the vicinity of the study area (see enclosed map and element occurrence table). Please be advised that a lack of element occurrences in the FNAI database is not a sufficient indication of the absence of rare or endangered species on a site.

The element occurrences data layer includes occurrences of rare species and natural communities. The map legend indicates that some element occurrences occur in the general vicinity of the label point. This may be due to lack of precision of the source data, or an element that occurs over an extended area (such as a wide ranging species or large natural community). For animals and plants, element occurrences generally refer to more than a casual sighting; they usually indicate a viable population of the species. Note that some element occurrences represent historically documented observations which may no longer be extant. Extirpated element occurrences will be marked with an 'X' following the occurrence label on the enclosed map.

Likely and Potential Rare Species

In addition to documented occurrences, other rare species and natural communities may be identified on or near the site based on habitat models and species range models (see enclosed Biodiversity Matrix Report). These species should be taken into consideration in field surveys, land management, and impact avoidance and mitigation.

FNAI habitat models indicate areas, which based on land cover type, offer suitable habitat for one or more rare species that is known to occur in the vicinity. Habitat models have been developed for approximately 300 of the rarest species tracked by the Inventory, including all federally listed species.

FNAI species range models indicate areas that are within the known or predicted range of a species, based on climate variables, soils, vegetation, and/or slope. Species range models have been developed for approximately 340 species, including all federally listed species.

The FNAI Biodiversity Matrix Geodatabase compiles Documented, Likely, and Potential species and natural communities for each square mile Matrix Unit statewide.

Florida Resources
and Environmental
Analysis Center

Institute of Science
and Public Affairs

The Florida State University

Florida Scrub-jay Survey – U.S. Fish and Wildlife Service
This survey was conducted by staff and associates of the Archbold Biological Station from 1992 to 1996. An attempt was made to record all scrub-jay (*Aphelocoma coerulescens*) groups, although most federal lands were not officially surveyed. Each map point represents one or more groups.

This data layer indicates that there are potential scrub-jay populations on or very near your site. For additional information:

Fitzpatrick, J.W., B. Pranty, and B. Stith, 1994, Florida scrub jay statewide map, 1992-1993. U. S. Fish and Wildlife Service Report, Cooperative Agreement no. 14-16-004-91-950.

The Inventory always recommends that professionals familiar with Florida's flora and fauna conduct a site-specific survey to determine the current presence or absence of rare, threatened, or endangered species.

Please visit www.fnai.org/trackinglist.cfm for county or statewide element occurrence distributions and links to more element information.

The database maintained by the Florida Natural Areas Inventory is the single most comprehensive source of information available on the locations of rare species and other significant ecological resources. However, the data are not always based on comprehensive or site-specific field surveys. Therefore this information should not be regarded as a final statement on the biological resources of the site being considered, nor should it be substituted for on-site surveys. Inventory data are designed for the purposes of conservation planning and scientific research, and are not intended for use as the primary criteria for regulatory decisions.

Information provided by this database may not be published without prior written notification to the Florida Natural Areas Inventory, and the Inventory must be credited as an information source in these publications. FNAI data may not be resold for profit.

Thank you for your use of FNAI services. An invoice will be mailed separately. If I can be of further assistance, please contact me at (850) 224-8207 or at kbrinegar@fnai.fsu.edu.

Sincerely,

Kerri Brinegar

Kerri Brinegar
GIS / Data Services

Encl

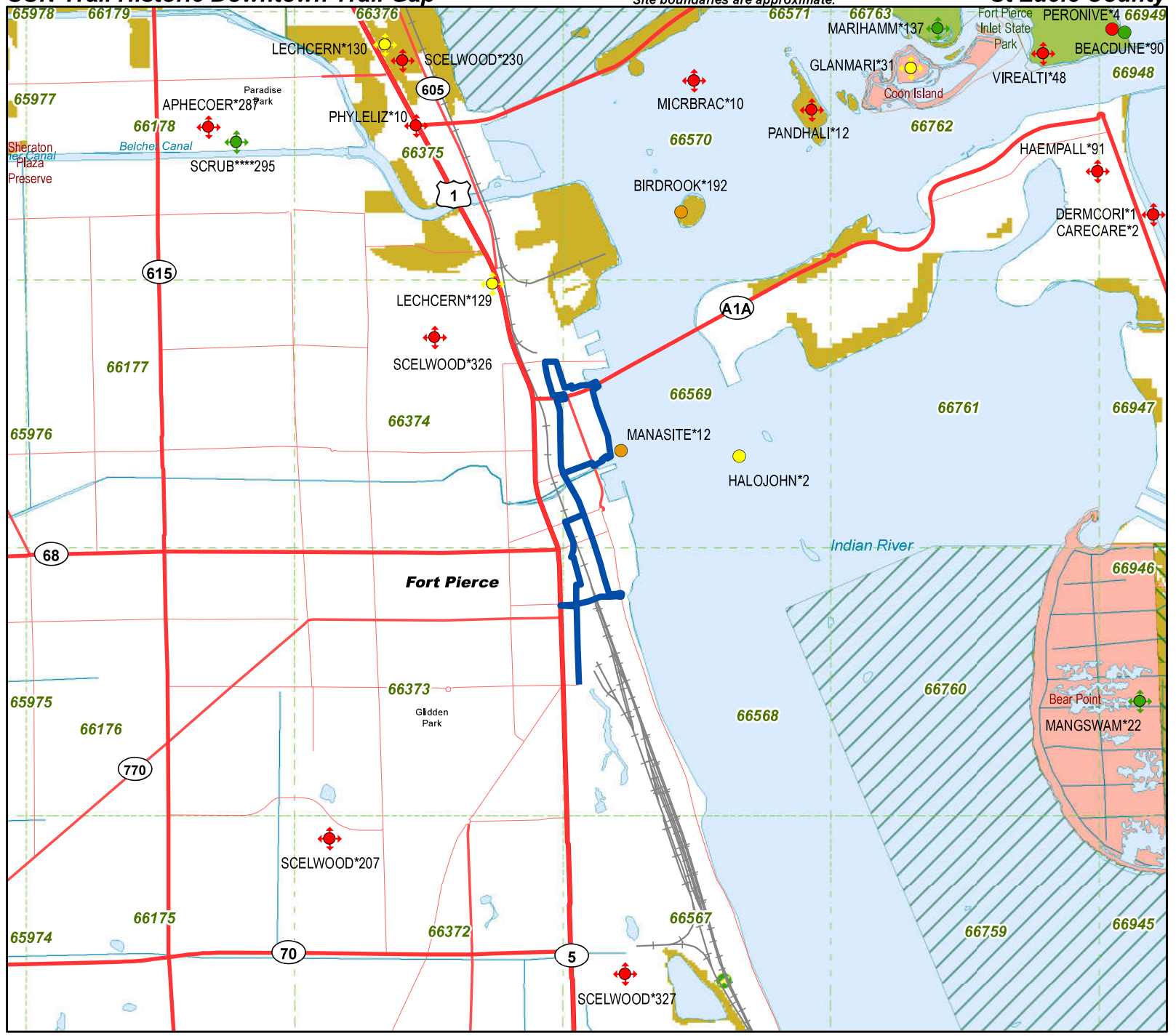
SUN Trail Historic Downtown Trail Gap

St Lucie County

Site boundaries are approximate.

1018 Thomasville Road
Suite 200-C
Tallahassee, FL 32303
(850) 224-8207
(850) 681-9364 Fax
www.fnai.org

FLORIDA Natural Areas INVENTORY



Element Occurrences

- Animals
- Plants
- Communities
- Other
- Data Sensitive

Point Indicates General Vicinity of Element

U.S. Fish & Wildlife Service Scrub Jay Survey 1992-96

Conservation Lands

- Federal
- State
- Local
- Private
- State Aquatic Preserves

Land Acquisition Projects

- Florida Forever Board of Trustees Projects

- FNAI Rare Species Habitat
- FNAI Biodiversity Matrix Square Mile Units

- County Boundary
- Interstate
- Turnpike
- Major Highway
- Local Road
- Railroad [Inactive railroads shown in Gray]
- Water

NOTE
Map should not be interpreted without accompanying documents.

Map produced by KAB
4/11/2018

1018 Thomasville Road
Suite 200-C
Tallahassee, FL 32303
(850) 224-8207
(850) 681-9364 Fax
www.fnai.org

FNAI ELEMENT OCCURRENCE REPORT on or near

SUN Trail Historic Downtown Trail Gap

Map Label	Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Listing	Observation Date	Description	EO Comments
APHECOER*287	*Aphelocoma coerulescens*	Florida Scrub-Jay	G2	S2	T	FT	1981-05-11	REMNANT OAK SCRUB BETWEEN HOUSES.	1981-05-11: 2 SCRUB JAYS.
BIRDROOK*192	Bird Rookery		G5	SNR	N	N	1988-10-16	SPOIL ISLAND. CENTER OF ISLAND HAS NATIVE HAMMOCK HARDWOODS. AUSTRALIAN PINE AND BRAZILIAN PEPPER DOMINANT ON REST OF ISLAND. ISLAND SURROUNDED BY PRODUCTIVE GRASSBEDS.	40 NESTS GREAT BLUE HERONS AND DOUBLE CRESTED CORMORANTS. IMPORTANT NESTING ISLAND.
HALOJOHN*2	*Halophila johnsonii*	Johnson's seagrass	G2	S2	T	E	1988-10-17	SANDY SHOAL IN INDIAN RIVER LAGOON.	PLANTS FORM SPARSE LOW MATS FEW INCHES HIGH IN WATER 1.1' DEEP ON INCOMING TIDE (11:30 AM EDT); INTERSPERSED WITH HALODULE WRIGHTII.
LECHCERN*129	*Lechea cernua*	nodding pinweed	G3	S3	N	T	1987-07-26	1987-07-26: TALL, LEAFY SAND PINE, ARISTIDA, QUERCUS MYRTIFOLIA, ASCLEPIAS CURTISSII, POLYGONELLA, Q. INOPINA, HELIANTHENUM, VITRIS, OPUNTIA, SILKGRASS, SELAGINELLA, PALAFOX, RHYCHOSPORA MEGACARPA, Q. GEMINATA, SMILAX, Q. CHAPMANII, SERENOA, ROSEMARY, CL	1987-07-26: ON SITE(U92MIN01FLUS).
LECHCERN*130	*Lechea cernua*	nodding pinweed	G3	S3	N	T	1987-07-26	1987-07-26: tall sand pines; white sand; flora includes Quercus myrtifolia, Palafox, Polygonella, Q. chapmanii, Smilax, Aristida, Carya, Vitris, Sabal palmetto, Q. inopina, Opuntia, silgrass, Persea, Schinus, Q. geminata, tree cactus, hog plum, Lechea ce	1987-07-26: on site (U92MIN01FLUS).
MANASITE*12	Manatee Aggregation Site		GNR	SNR	N	N	1988	WARM-WATER EFFLUENT FROM POWER PLANT AT THE MOUTH OF MOORE CREEK WHERE IT ENTERS A LARGE COASTAL RIVER.	UP TO 44 MANATEES USE THIS SITE DURING THE WINTER.

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FNAI ELEMENT OCCURRENCE REPORT on or near

SUN Trail Historic Downtown Trail Gap

Map Label	Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Listing	Observation Date	Description	EO Comments
MANGSWAM*22	Mangrove swamp		G5	S4	N	N	1999	No general description given	2010: Prior to the 2010 natural community reclassification effort this EO had been known as Estuarine tidal swamp EO number 22 (see U10FNA01FLUS for updated community descriptions). 1999: Update to last obs date was based on interpretation of aerial phot
MICRBRAC*10	*Microphis brachyurus*	Opossum Pipefish	G4G5	S2	SC	N	1981	No general description given	Specimens collected.
PANDHALI*12	*Pandion haliaetus*	Osprey	G5	S3S4	N	SSC*	1984	THROUGHOUT AREA.	SIGNIFICANT MIGRATORY AREA, UP TO 80 INDIVIDUALS CAN BE FOUND DAILY IN GENERAL AREA.
PHYLELIZ*10	*Phyllophaga elizoria*	Elizoria June Beetle	G2	S2	N	N	2002-03-14	2002-03-14: No description given (N05LAM01FLUS).	2002-03-14: One specimen was collected (N05LAM01FLUS).
SCELWOOD*207	*Sceloporus woodi*	Florida Scrub Lizard	G2G3	S2S3	N	N	1930-08-13	No general description given	8 SPEC. COLL. 13 AUG. 1930 BY O.C. VAN HYNING (AMNH-58573-80).
SCELWOOD*230	*Sceloporus woodi*	Florida Scrub Lizard	G2G3	S2S3	N	N	1987-07-26	1987-07-26: tall sand pines, white sand, flora includes: Quercus myrtifolia, Palafox, Polygonella, Q. chapmanii, Smilax, Aristida, Carya, Vitris, Sabal palmetto, Q.inopina, Opuntia, silkgrass, Persea, Schinus, Q. geminata, tree cactus, hog plum, Lechea c	1987-07-26: scrub lizards abundant on site (U92MIN01FLUS).
SCELWOOD*326	*Sceloporus woodi*	Florida Scrub Lizard	G2G3	S2S3	N	N	1986-05-12	Coastal scrub	1986-05-12: K.E. Enge, GFC, observation. See Enge et al (1986; Coop Unit Tech Rep No 26).
SCELWOOD*327	*Sceloporus woodi*	Florida Scrub Lizard	G2G3	S2S3	N	N	1986-05-12	Coastal scrub	1986-05-12: K.E. Enge, GFC, observation. See Enge et al (1986; Coop Unit Tech Rep No 26).
SCRUB****295	Scrub		G2	S2	N	N	1981-05-11	REMNANT OAK SCRUB BETWEEN HOUSES.	No EO data given

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Florida Natural Areas Inventory

Biodiversity Matrix Report

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Listing
Matrix Unit ID: 66373					
Potential					
Athene cunicularia floridana	Florida Burrowing Owl	G4T3	S3	N	ST
Coelorachis tuberculosa	Piedmont Jointgrass	G3	S3	N	T
Conradina grandiflora	Large-flowered Rosemary	G3	S3	N	T
Drymarchon couperi	Eastern Indigo Snake	G3Q	S3	LT	FT
Glandularia maritima	Coastal Vervain	G3	S3	N	E
Gopherus polyphemus	Gopher Tortoise	G3	S3	C	ST
Lechea cernua	Nodding Pinweed	G3	S3	N	T
Linum carteri var. smallii	Small's Flax	G2T2	S2	N	E
Nemastylis floridana	Celestial Lily	G2	S2	N	E
Polygala smallii	Tiny Polygala	G1	S1	LE	E
Pteroglossaspis ecristata	Giant Orchid	G2G3	S2	N	T
Rostrhamus sociabilis	Snail Kite	G4G5	S2	LE	N
Sceloporus woodi	Florida Scrub Lizard	G2G3	S2S3	N	N
Sciurus niger shermani	Sherman's Fox Squirrel	G5T3	S3	N	SSC
Matrix Unit ID: 66374					
Likely					
Scrub		G2	S2	N	N
Trichechus manatus	West Indian Manatee	G2	S2	LE, PT	FE
Potential					
Acipenser oxyrinchus oxyrinchus	Atlantic Sturgeon	G3T3	S1	LE	FE
Aphelocoma coerulescens	Florida Scrub-Jay	G2	S2	LT	FT
Athene cunicularia floridana	Florida Burrowing Owl	G4T3	S3	N	ST
Coelorachis tuberculosa	Piedmont Jointgrass	G3	S3	N	T
Conradina grandiflora	Large-flowered Rosemary	G3	S3	N	T
Ctenogobius stigmaturus	Spottail Goby	G2	S2	N	N
Drymarchon couperi	Eastern Indigo Snake	G3Q	S3	LT	FT
Glandularia maritima	Coastal Vervain	G3	S3	N	E
Gopherus polyphemus	Gopher Tortoise	G3	S3	C	ST
Halophila johnsonii	Johnson's Seagrass	G2	S2	LT	E
Heterodon simus	Southern Hognose Snake	G2	S2	N	N
Lechea cernua	Nodding Pinweed	G3	S3	N	T
Linum carteri var. smallii	Small's Flax	G2T2	S2	N	E
Microphis brachyurus	Opossum Pipefish	G4G5	S2	SC	N
Pandion haliaetus	Osprey	G5	S3S4	N	SSC*
Polygala smallii	Tiny Polygala	G1	S1	LE	E
Pteroglossaspis ecristata	Giant Orchid	G2G3	S2	N	T
Rostrhamus sociabilis	Snail Kite	G4G5	S2	LE	N
Sceloporus woodi	Florida Scrub Lizard	G2G3	S2S3	N	N
Sciurus niger shermani	Sherman's Fox Squirrel	G5T3	S3	N	SSC
Setophaga discolor paludicola	Florida Prairie Warbler	G5T3	S3	N	N
Matrix Unit ID: 66568					
Likely					

Definitions: *Documented - Rare species and natural communities documented on or near this site.*
Documented-Historic - Rare species and natural communities documented, but not observed/reported within the last twenty years.
Likely - Rare species and natural communities likely to occur on this site based on suitable habitat and/or known occurrences in the vicinity.
Potential - This site lies within the known or predicted range of the species listed.

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Florida Natural Areas Inventory

Biodiversity Matrix Report

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Listing
Scrub		G2	S2	N	N
Trichechus manatus	West Indian Manatee	G2	S2	LE, PT	FE
Potential					
Acipenser oxyrinchus oxyrinchus	Atlantic Sturgeon	G3T3	S1	LE	FE
Athene cunicularia floridana	Florida Burrowing Owl	G4T3	S3	N	ST
Coelorachis tuberculosa	Piedmont Jointgrass	G3	S3	N	T
Conradina grandiflora	Large-flowered Rosemary	G3	S3	N	T
Ctenogobius stigmaturus	Spottail Goby	G2	S2	N	N
Drymarchon couperi	Eastern Indigo Snake	G3Q	S3	LT	FT
Eretmochelys imbricata	Hawksbill Sea Turtle	G3	S1	LE	FE
Forestiera segregata var. pinetorum	Florida Pinewood Privet	G4T2	S2	N	N
Glandularia maritima	Coastal Vervain	G3	S3	N	E
Gopherus polyphemus	Gopher Tortoise	G3	S3	C	ST
Halophila johnsonii	Johnson's Seagrass	G2	S2	LT	E
Lechea cernua	Nodding Pinweed	G3	S3	N	T
Linum carteri var. smallii	Small's Flax	G2T2	S2	N	E
Pteroglossaspis ecristata	Giant Orchid	G2G3	S2	N	T
Rivulus marmoratus	Mangrove Rivulus	G4G5	S3	SC	N
Rostrhamus sociabilis	Snail Kite	G4G5	S2	LE	N
Sceloporus woodi	Florida Scrub Lizard	G2G3	S2S3	N	N
Sciurus niger shermani	Sherman's Fox Squirrel	G5T3	S3	N	SSC
Setophaga discolor paludicola	Florida Prairie Warbler	G5T3	S3	N	N
Matrix Unit ID: 66569					
Documented-Historic					
Halophila johnsonii	Johnson's Seagrass	G2	S2	LT	E
Manatee Aggregation Site		GNR	SNR	N	N
Likely					
Mycteria americana	Wood Stork	G4	S2	LT	FT
Trichechus manatus	West Indian Manatee	G2	S2	LE, PT	FE
Potential					
Acipenser oxyrinchus oxyrinchus	Atlantic Sturgeon	G3T3	S1	LE	FE
Coelorachis tuberculosa	Piedmont Jointgrass	G3	S3	N	T
Conradina grandiflora	Large-flowered Rosemary	G3	S3	N	T
Ctenogobius stigmaturus	Spottail Goby	G2	S2	N	N
Drymarchon couperi	Eastern Indigo Snake	G3Q	S3	LT	FT
Eretmochelys imbricata	Hawksbill Sea Turtle	G3	S1	LE	FE
Forestiera segregata var. pinetorum	Florida Pinewood Privet	G4T2	S2	N	N
Glandularia maritima	Coastal Vervain	G3	S3	N	E
Gopherus polyphemus	Gopher Tortoise	G3	S3	C	ST
Heterodon simus	Southern Hognose Snake	G2	S2	N	N
Lechea cernua	Nodding Pinweed	G3	S3	N	T
Linum carteri var. smallii	Small's Flax	G2T2	S2	N	E
Microphis brachyurus	Opossum Pipefish	G4G5	S2	SC	N
Pandion haliaetus	Osprey	G5	S3S4	N	SSC*
Peromyscus polionotus niveiventris	Southeastern Beach Mouse	G5T1	S1	LT	FT

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Florida Natural Areas Inventory

Biodiversity Matrix Report

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Listing
Rivulus marmoratus	Mangrove Rivulus	G4G5	S3	SC	N
Rostrhamus sociabilis	Snail Kite	G4G5	S2	LE	N
Sceloporus woodi	Florida Scrub Lizard	G2G3	S2S3	N	N
Sciurus niger shermani	Sherman's Fox Squirrel	G5T3	S3	N	SSC
Setophaga discolor paludicola	Florida Prairie Warbler	G5T3	S3	N	N
Tephrosia angustissima var. curtissii	Coastal Hoary-pea	G1T1	S1	N	E

Definitions: *Documented - Rare species and natural communities documented on or near this site.*
Documented-Historic - Rare species and natural communities documented, but not observed/reported within the last twenty years.
Likely - Rare species and natural communities likely to occur on this site based on suitable habitat and/or known occurrences in the vicinity.
Potential - This site lies within the known or predicted range of the species listed.

Elements and Element Occurrences

An **element** is any exemplary or rare component of the natural environment, such as a species, natural community, bird rookery, spring, sinkhole, cave, or other ecological feature.

An **element occurrence (EO)** is an area of land and/or water in which a species or natural community is, or was, present. An EO should have practical conservation value for the Element as evidenced by potential continued (or historical) presence and/or regular recurrence at a given location.

Element Ranking and Legal Status

Using a ranking system developed by NatureServe and the Natural Heritage Program Network, the Florida Natural Areas Inventory assigns two ranks for each element. The global rank is based on an element's worldwide status; the state rank is based on the status of the element in Florida. Element ranks are based on many factors, the most important ones being estimated number of Element Occurrences (EOs), estimated abundance (number of individuals for species; area for natural communities), geographic range, estimated number of adequately protected EOs, relative threat of destruction, and ecological fragility.

FNAI GLOBAL ELEMENT RANK

G1 = Critically imperiled globally because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or man-made factor.
G2 = Imperiled globally because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.
G3 = Either very rare and local throughout its range (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction from other factors.
G4 = Apparently secure globally (may be rare in parts of range).
G5 = Demonstrably secure globally.
GH = Of historical occurrence throughout its range, may be rediscovered (e.g., ivory-billed woodpecker).
GX = Believed to be extinct throughout range.
GXC = Extirpated from the wild but still known from captivity or cultivation.
G#? = Tentative rank (e.g., G2?).
G#G# = Range of rank; insufficient data to assign specific global rank (e.g., G2G3).
G#T# = Rank of a taxonomic subgroup such as a subspecies or variety; the G portion of the rank refers to the entire species and the T portion refers to the specific subgroup; numbers have same definition as above (e.g., G3T1).
G#Q = Rank of questionable species - ranked as species but questionable whether it is species or subspecies; numbers have same definition as above (e.g., G2Q).
G#T#Q = Same as above, but validity as subspecies or variety is questioned.
GU = Unrankable; due to a lack of information no rank or range can be assigned (e.g., GUT2).
GNA = Ranking is not applicable because the element is not a suitable target for conservation (e.g. a hybrid species).
GNR = Element not yet ranked (temporary).
GNRTNR = Neither the element nor the taxonomic subgroup has yet been ranked.

FNAI STATE ELEMENT RANK

S1 = Critically imperiled in Florida because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or man-made factor.
S2 = Imperiled in Florida because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.
S3 = Either very rare and local in Florida (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction from other factors.
S4 = Apparently secure in Florida (may be rare in parts of range).
S5 = Demonstrably secure in Florida.
SH = Of historical occurrence in Florida, possibly extirpated, but may be rediscovered (e.g., ivory-billed woodpecker).
SX = Believed to be extirpated throughout Florida.
SU = Unrankable; due to a lack of information no rank or range can be assigned.
SNA = State ranking is not applicable because the element is not a suitable target for conservation (e.g. a hybrid species).
SNR = Element not yet ranked (temporary).

FEDERAL LEGAL STATUS

Legal status information provided by FNAI for information only. For official definitions and lists of protected species, consult the relevant federal agency.

Definitions derived from U.S. Endangered Species Act of 1973, Sec. 3. Note that the federal status given by FNAI refers only to Florida populations and that federal status may differ elsewhere.

C = Candidate species for which federal listing agencies have sufficient information on biological vulnerability and threats to support proposing to list the species as Endangered or Threatened.
E = Endangered: species in danger of extinction throughout all or a significant portion of its range.
E, T = Species currently listed endangered in a portion of its range but only listed as threatened in other areas
E, PDL = Species currently listed endangered but has been proposed for delisting.
E, PT = Species currently listed endangered but has been proposed for listing as threatened.
E, XN = Species currently listed endangered but tracked population is a non-essential experimental population.
T = Threatened: species likely to become Endangered within the foreseeable future throughout all or a significant portion of its range.
PE = Species proposed for listing as endangered
PS = Partial status: some but not all of the species' infraspecific taxa have federal
PT = Species proposed for listing as threatened
SAT = Treated as threatened due to similarity of appearance to a species which is federally listed such that enforcement personnel have difficulty in attempting to differentiate between the listed and unlisted species.
SC = Not currently listed, but considered a "species of concern" to USFWS.

STATE LEGAL STATUS

Provided by FNAI for information only. For official definitions and lists of protected species, consult the relevant state agency.

Animals: Definitions derived from "Florida's Endangered Species and Species of Special Concern, Official Lists" published by Florida Fish and Wildlife Conservation Commission, 1 August 1997, and subsequent updates.

C = Candidate for listing at the Federal level by the U. S. Fish and Wildlife Service
FE = Listed as Endangered Species at the Federal level by the U. S. Fish and Wildlife Service
FT = Listed as Threatened Species at the Federal level by the U. S. Fish and Wildlife Service
FXN = Federal listed as an experimental population in Florida
FT(S/A) = Federal Threatened due to similarity of appearance
ST = State population listed as Threatened by the FFWCC. Defined as a species, subspecies, or isolated population which is acutely vulnerable to environmental alteration, declining in number at a rapid rate, or whose range or habitat is decreasing in area at a rapid rate and as a consequence is destined or very likely to become an endangered species within the foreseeable future.
SSC = Listed as Species of Special Concern by the FFWCC. Defined as a population which warrants special protection, recognition, or consideration because it has an inherent significant vulnerability to habitat modification, environmental alteration, human disturbance, or substantial human exploitation which, in the foreseeable future, may result in its becoming a threatened species. (SSC* for Pandion haliaetus (Osprey) indicates that this status applies in Monroe county only.)
N = Not currently listed, nor currently being considered for listing.

Plants: Definitions derived from Sections 581.011 and 581.185(2), Florida Statutes, and the Preservation of Native Flora of Florida Act, 5B-40.001. FNAI does not track all state-regulated plant species; for a complete list of state-regulated plant species, call Florida Division of Plant Industry, 352-372-3505 or see: http://www.doacs.state.fl.us/pi/.

E = Endangered: species of plants native to Florida that are in imminent danger of extinction within the state, the survival of which is unlikely if the causes of a decline in the number of plants continue; includes all species determined to be endangered or threatened pursuant to the U.S. Endangered Species Act.
T = Threatened: species native to the state that are in rapid decline in the number of plants within the state, but which have not so decreased in number as to cause them to be Endangered.
N = Not currently listed, nor currently being considered for listing.

Element Occurrence Ranking

FNAI ranks of quality of the element occurrence in terms of its viability (EORANK). Viability is estimated using a combination of factors that contribute to continued survival of the element at the location. Among these are the size of the EO, general condition of the EO at the site, and the conditions of the landscape surrounding the EO (e.g. an immediate threat to an EO by local development pressure could lower an EO rank).

A = Excellent estimated viability
A? = Possibly excellent estimated viability
AB = Excellent or good estimated viability
AC = Excellent, good, or fair estimated viability
B = Good estimated viability
B? = Possibly good estimated viability
BC = Good or fair estimated viability
BD = Good, fair, or poor estimated viability
C = Fair estimated viability
C? = Possibly fair estimated viability
CD = Fair or poor estimated viability
D = Poor estimated viability
D? = Possibly poor estimated viability
E = Verified extant (viability not assessed)
F = Failed to find
H = Historical
NR = Not ranked, a placeholder when an EO is not (yet) ranked.
U = Unrankable
X = Extirpated

*For additional detail on the above ranks see: http://www.natureserve.org/explorer/eorankguide.htm

FNAI also uses the following EO ranks:

H? = Possibly historical
F? = Possibly failed to find
X? = Possibly extirpated

The following offers further explanation of the H and X ranks as they are used by FNAI:

The rank of H is used when there is a lack of recent field information verifying the continued existence of an EO, such as (a) when an EO is based only on historical collections data; or (b) when an EO was ranked A, B, C, D, or E at one time and is later, without field survey work, considered to be possibly extirpated due to general habitat loss or degradation of the environment in the area. This definition of the H rank is dependent on an interpretation of what constitutes "recent" field information. Generally, if there is no known survey of an EO within the last 20 to 40 years, it should be assigned an H rank. While these time frames represent suggested maximum limits, the actual time period for historical EOs may vary according to the biology of the element and the specific landscape context of each occurrence (including anthropogenic alteration of the environment). Thus, an H rank may be assigned to an EO before the maximum time frames have lapsed. Occurrences that have not been surveyed for periods exceeding these time frames should not be ranked A, B, C, or D. The higher maximum limit for plants and communities (i.e., ranging from 20 to 40 years) is based upon the assumption that occurrences of these elements generally have the potential to persist at a given location for longer periods of time. This greater potential is a reflection of plant biology and community dynamics. However, landscape factors must also be considered. Thus, areas with more anthropogenic impacts on the environment (e.g., development) will be at the lower end of the range, and less-impacted areas will be at the higher end.

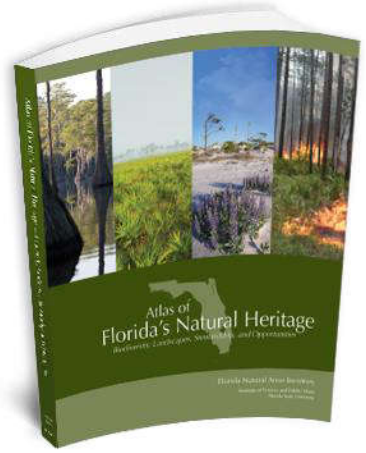
The rank of X is assigned to EOs for which there is documented destruction of habitat or environment, or persuasive evidence of eradication based on adequate survey (i.e., thorough or repeated survey efforts by one or more experienced observers at times and under conditions appropriate for the Element at that location).

ON SALE NOW

Atlas of Florida's Natural Heritage

Biodiversity, Landscapes, Stewardship, and Opportunities

The Florida Natural Areas Inventory is pleased to announce the publication of the ***Atlas of Florida's Natural Heritage: Biodiversity, Landscapes, Stewardship, and Opportunities***. This high-quality, full-color *Atlas* is sure to become a standard reference for anyone involved in the conservation, management, study, or enjoyment of Florida's rich natural resources. We hope the *Atlas* will inspire, educate, and raise awareness of and interest in biodiversity and conservation issues.



Learn more about the Atlas, view sample pages and order your copy today at:
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ECOLOGY AND DEVELOPMENT-RELATED HABITAT REQUIREMENTS OF THE FLORIDA SCRUB JAY (*APHELOCOMA COERULESCENS COERULESCENS*)

NONGAME WILDLIFE PROGRAM
TECHNICAL REPORT NO. 8



JOHN W. FITZPATRICK, Ph.D
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MARK T. KOPENY, Ph.D

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APRIL 1991

ECOLOGY AND DEVELOPMENT-RELATED HABITAT REQUIREMENTS OF THE FLORIDA SCRUB JAY (*APHELOCOMA COERULESCENS COERULESCENS*)

NONGAME WILDLIFE PROGRAM TECHNICAL REPORT NO. 8

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APRIL 1991

Suggested reference:

J.W. Fitzpatrick, 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 No. 8. Tallahassee, FL. 49 pp.

This publication provides guidelines to both developers and regulators where habitat protection for Florida scrub jays is desired. The recommendations in this publication reflect the development-related actions considered necessary by the authors and by staff of the Commission if the scrub jay is to survive outside existing protected lands. These do not, however, constitute rules or formal policies of the Florida Game and Fresh Water Fish Commission and are not legally binding on developers or on regulators that make decisions affecting scrub jays and scrub jay habitat.

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SECTION 1

RECOMMENDATIONS: DEVELOPMENT-RELATED HABITAT PRESERVATION FOR THE THREATENED FLORIDA SCRUB JAY

PREFACE

The recommendations presented in this section were developed by Mark Kopeny, nongame biologist with Florida Game and Freshwater Fish Commission, Office of Environmental Services, in consultation with biologists at Archbold Biological Station, the Commission, and other institutions. Many of the recommendations presented here are based on the research results that comprise Section 2 of this report, "Ecology and Habitat Requirements of the Threatened Florida Scrub Jay," prepared by John Fitzpatrick and Glen Woolfenden. These recommendations are applicable to Developments of Regional Impact and to any other land conversion activities within the range of the Florida scrub jay, and are intended for use by regulatory and review agencies.

ACKNOWLEDGMENTS

The preparation of this section involved the help of many individuals, each of whom gladly contributed their time and energy. Dave Breininger, Ray Fernald, Grace Iverson, Peter Merritt, Dick Roberts, and Brian Toland, all currently or recently involved in research on the Florida scrub jay, contributed significantly in the development of these recommendations by sharing unpublished information and reviewing earlier drafts. Mike Allen and Randy Kautz also were closely involved in developing these recommendations throughout the process. Many others, in academia, private enterprise, and state and federal agencies, were asked to comment on various parts of this section at one time or another and their assistance was always forthcoming. David Cook edited the final draft. Sharon Hunter and Traci Wallace provided indispensible secretarial support. We gratefully acknowledge everyone that contributed to this conservation effort for the Florida scrub jay.

DEFINITIONS

The following terms are used throughout this section.

COMPENSATE OFF-SITE, OFF-SITE COMPENSATION. To contribute land or money for the purchase of land in lieu of on-site protection of habitat for jays. Off-site compensation may be accomplished through participation in a mitigation park program, or by conveyance of property or property rights to an appropriate private conservation organization or state agency.

JAY, SCRUB JAY. Synonyms for Florida scrub jay.

JAY GROUP. One or more jays occupying a territory. A jay group may be composed of a breeding pair of adults, with or without helpers and young of the year, or may consist of a single, unpaired, territorial individual that is not a member of other jay groups on-site.

OFF-SITE. Outside the boundaries of a proposed development site.

ON-SITE. Within the boundaries of a proposed development site.

PRESERVE, PRESERVATION. To contribute habitat for the Florida scrub jay, either on-site (i.e., protection) or off-site (i.e., compensation).

PROTECT ON-SITE, ON-SITE PROTECTION. To establish one or more refuges for the Florida scrub jay on a proposed development site.

SATELLITE REFUGE. A protected area established on-site in Type I habitat. Satellite refuges are established when there is a large amount of Type I habitat on-site compared to the number of jay groups on-site. Satellite refuges are established 1) *in addition to territory refuges* when jays are on-site or 2) *in the absence of territory refuges* when jays are not onsite, but occur within normal dispersal distance of Type I habitat. The primary purpose of establishing satellite refuges is to secure a portion of the unoccupied scrub that is potential scrub jay habitat and is of critical importance in maintaining local jay populations.

SCRUB OAK SPECIES. Any of the following stunted, low-growing species of oak that occur on sandy soils within the range of the Florida scrub jay; *Quercus geminata*, *Q. chapmanii*, *Q. inopina*, *Q. myrtifolia*, *Q. minima*. Taxonomically confusing scrub oaks related to *Q. geminata* are sometimes lumped under the name *Q. virginiana*.

TERRITORY REFUGE. A protected area established on-site in Type I, Type II, and/or Type III habitat. Territory refuges are established on-site when one or more jays occur on-site. The primary purpose of territory refuges is to provide permanent habitat and other resources for each jay group onsite.

TYPE I HABITAT. Upland plant communities, assessed in one-acre plots, with greater than or equal to 15% cover of scrub oak species.

TYPE II HABITAT. Plant communities, assessed in one-acre plots, with percent cover of scrub oak species greater than zero but less than 15%.

TYPE III HABITAT. Native and improved uplands and seasonally dry wetlands within 1/4 mile of Type I or Type II habitat.

DICHOTOMOUS KEY

The following dichotomous key describes the intended step-by-step application of this section. The purpose of the key is to initiate the reader and to provide an overview. Recommendations per se are not presented in the key. It is necessary to read both sections of the report in order to understand and implement the recommendations contained in it.

1a. PROPOSED DEVELOPMENT IS WITHIN THE CURRENT RANGE OF SCRUB JAYS. Inventory habitat on-site (p. 13). Go to couplet 2.

1b. PROPOSED DEVELOPMENT IS *NOT* WITHIN THE CURRENT RANGE OF SCRUB JAYS. No habitat preservation measures for scrub jays are recommended.

2a. TYPE I, II, OR III HABITAT EXISTS ON-SITE. Survey all Type I, II, and III habitat for scrub jays (pp. 13-15). Go to couplet 3.

2b. *NO* TYPE I, II, or III HABITAT EXISTS ON-SITE. No habitat preservation measures for scrub jays are recommended.

3a. SCRUB JAYS OCCUR ON-SITE. Establish one or more territory refuges in Type I, II and/or III habitat. The total number of acres of habitat to be protected in territory refuge(s) equals 25 times the number of scrub jay groups on-site (p. 16). Off-site compensation may be an option in certain circumstances (p. 16). Go to couplet 4.

3b. *NO* SCRUB JAYS OCCUR ON-SITE. Search records for recent documentation of scrub jays within 5 miles of Type I habitat on the proposed development site (p. 15). Go to couplet 5.

4a. THE TOTAL NUMBER OF ACRES OF TYPE I HABITAT ON-SITE IS GREATER THAN THE TOTAL NUMBER OF ACRES DESIGNATED FOR TERRITORY REFUGE(S) IN 3a, ABOVE. Establish one or more satellite refuges in Type I habitat. The total number of acres to be protected equals: [(total number of acres of Type I habitat on-site) – (total number of acres preserved as territory refuges in 3a, above)] X 0.25 (p. 16). Off-site compensation may be an alternative to on-site protection in certain circumstances (p. 16). No further habitat preservation measures for scrub jays are recommended.

4b. THE TOTAL NUMBER OF ACRES OF TYPE I HABITAT ON-SITE IS LESS THAN THE TOTAL NUMBER OF ACRES DESIGNATED FOR TERRITORY REFUGE(S) IN 3a, ABOVE. No further habitat preservation measures for scrub jays are recommended.

5a. POST-1974 RECORDS EXIST OF SCRUB JAYS WITHIN 5 MILES OF TYPE I HABITAT ON THE PROPOSED DEVELOPMENT SITE. Establish one or more satellite refuges in Type I habitat (p. 16) or demonstrate that the jays in question have since been extirpated (p. 15). The total number of acres to be preserved equals 25% of all Type I habitat on-site. Off-site compensation may be an alternative to on-site protection in certain circumstances (p. 16). No further habitat preservation measures for scrub jays are recommended.

5b. *NO* POST-1974 RECORDS EXIST OF SCRUB JAYS WITHIN 5 MILES OF TYPE I HABITAT ON THE PROPOSED DEVELOPMENT SITE. No further habitat preservation measures for scrub jays are recommended.

SUBSECTION 1.1
INTRODUCTION

STATUS OF THE FLORIDA SCRUB JAY

The statewide population of the Florida scrub jay (*Aphelocoma coerulescens coerulescens*) was recently estimated at about 7,000 to 11,000 birds (Breininger 1989). Over half of the remaining jays in the state occur on and around two large, federally owned tracts of land: Ocala National Forest and Merritt Island National Wildlife Refuge. Breininger (1989) estimated the Merritt Island population to be about 1,400-3,600 birds. Cox (1987) estimated the Ocala National Forest population to be 2,600-3,400 birds. Based on current management practices in these two tracts and their effects on Florida scrub jays, it is doubtful that the number of jays on these two federal properties will remain stable or increase; declines are likely. Extant but fragmented habitat on the Lake Wales Ridge in Highlands and Polk counties supports the third large concentration of jays. Beyond these three population centers, the Florida scrub jay occurs in widely scattered populations inhabiting patches of scrub along the interior and coastal sand ridges of the Florida peninsula.

Cox (1987) estimated that the number of jays statewide probably has declined by 50% or more over the last 100 years. More recent information indicates that 50% is almost certainly an underestimate of the statewide decline. The estimated population loss along the Lake Wales Ridge, considered to have been at the heart of the species' range prior to human settlement, is 80% or more. This estimate is based on the amount of scrub habitat that has been destroyed or otherwise rendered unsuitable for jays.

The decline of the Florida scrub jay throughout its present and former range is attributed almost entirely to the loss of Florida's scrub communities to agriculture, silviculture, and commercial and residential development. The Florida scrub jay has been classified as Threatened by the Florida Game and Fresh Water Fish Commission since 1975 and by the U.S. Fish and Wildlife Service since 1987.

PATTERNS OF HABITAT USE BY THE FLORIDA SCRUB JAY

The Florida scrub jay is strongly associated with several Florida scrub communities, and also will use *adjacent* non-scrub habitats of certain types. However, Florida scrub jays persist only in areas where one or more species of scrub oaks (*Quercus* spp.) occur, even if only vestigially represented. Prior to human settlement, virtually all these natural scrub communities were maintained by frequent natural fires.

Florida scrub jays are most abundant in open, oak-dominated scrub communities of the interior and Atlantic coast sand ridges of the Peninsula. Examples of optimal habitat include xeric oak scrub (Figures 1.1-1.2), open sand pine scrub (Figure 1.3), open scrubby flatwoods with slash pines (Figure 1.4), and rosemary scrub (Figure 1.5).

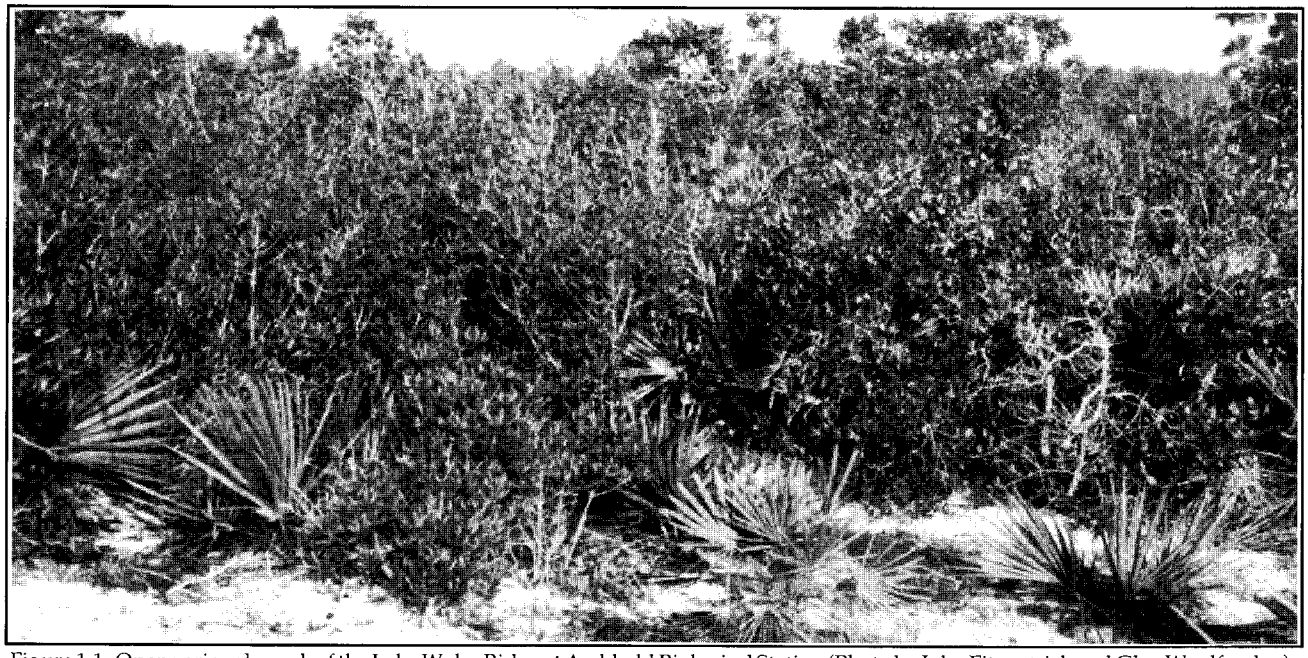


Figure 1.1. Open xeric oak scrub of the Lake Wales Ridge at Archbold Biological Station (Photo by John Fitzpatrick and Glen Woolfenden).

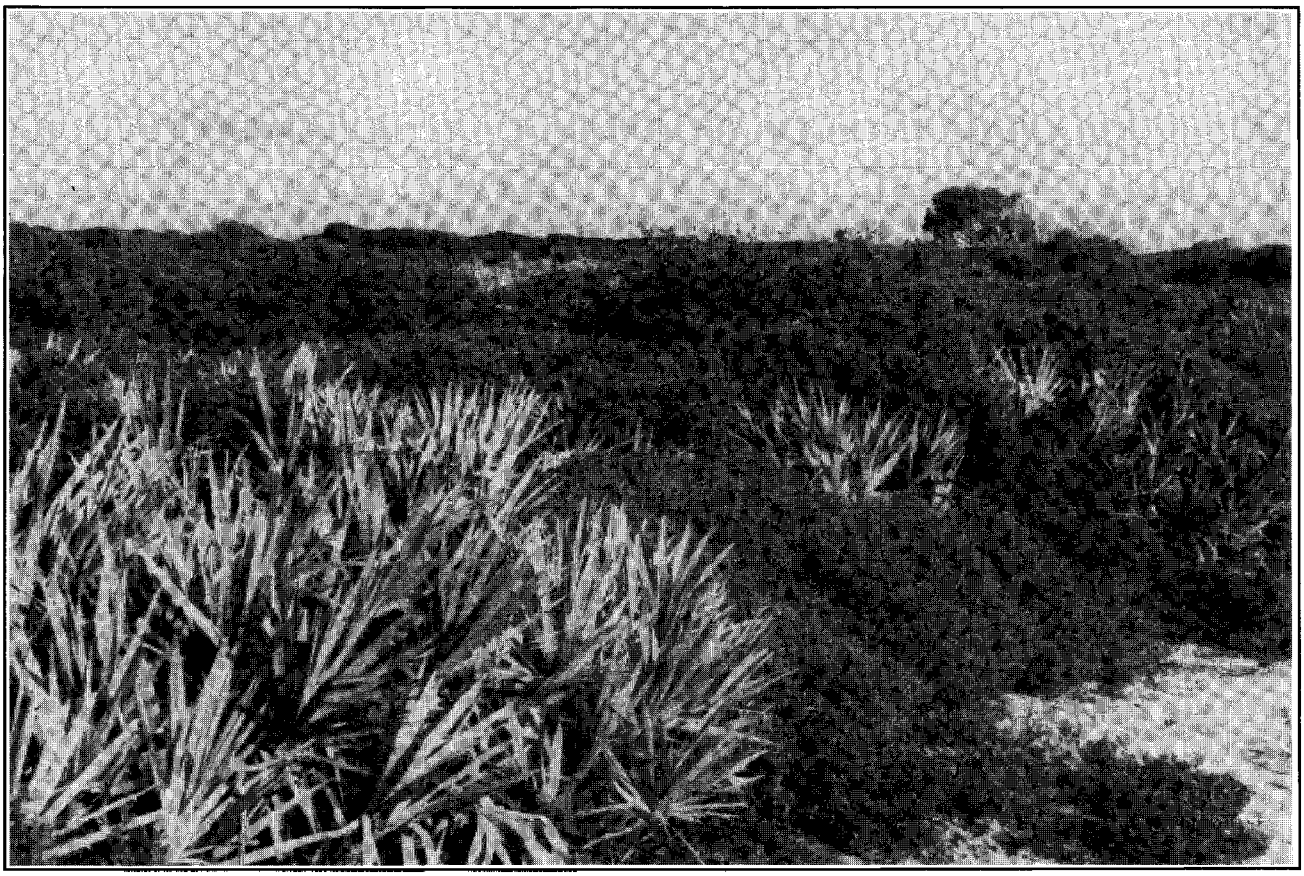


Figure 1.2. Oak-palmetto scrub of the Atlantic coast in Brevard County (Photo by Dave Breininger).

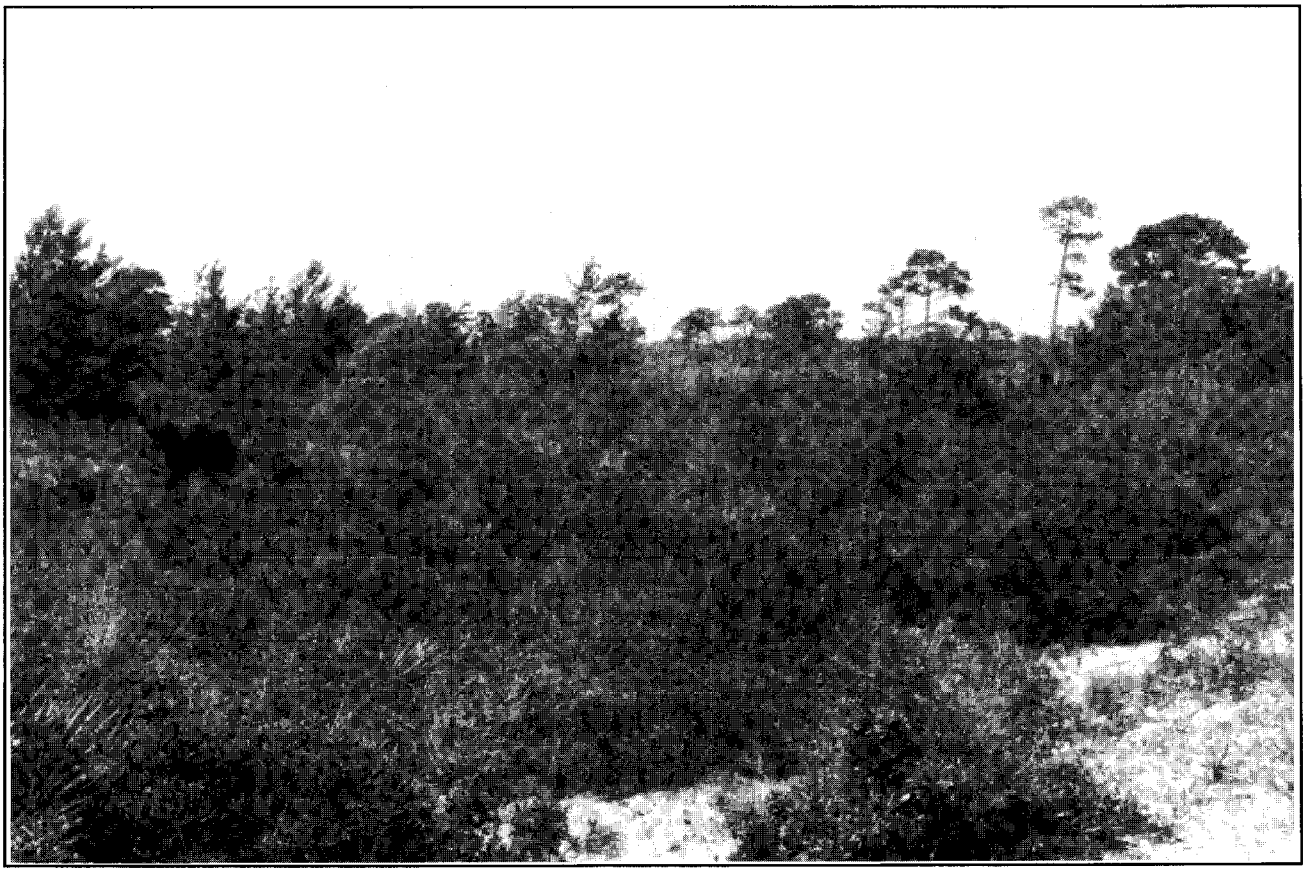


Figure 1.3. Early successional sand pine scrub of the Southern Atlantic Coast, at Jonathan Dickinson State Park, Martin County (Photo by Judith C. Norton).

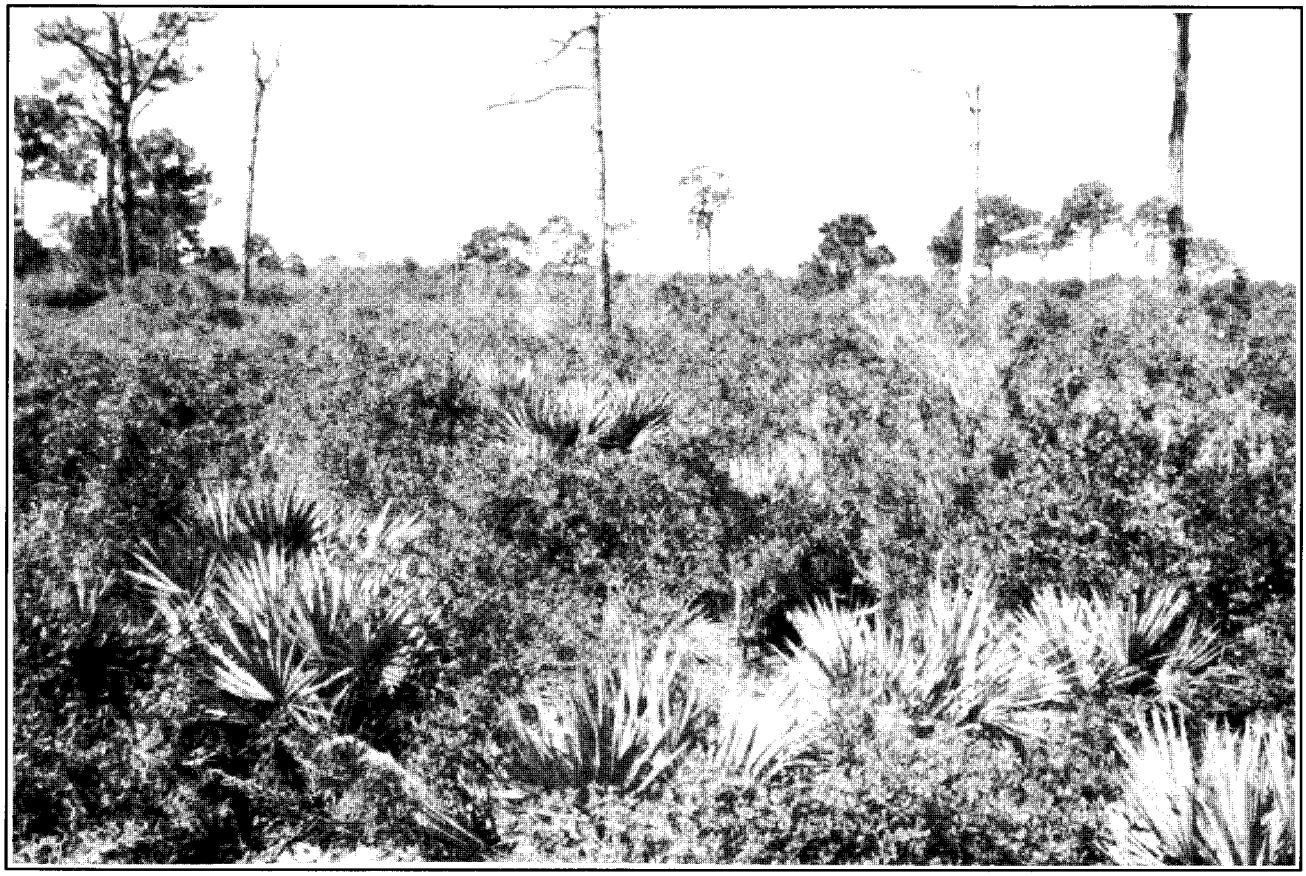


Figure 1.4. Scrubby slash pine flatwoods near the Atlantic Coast in Brevard County (Photo by Dave Breininger).

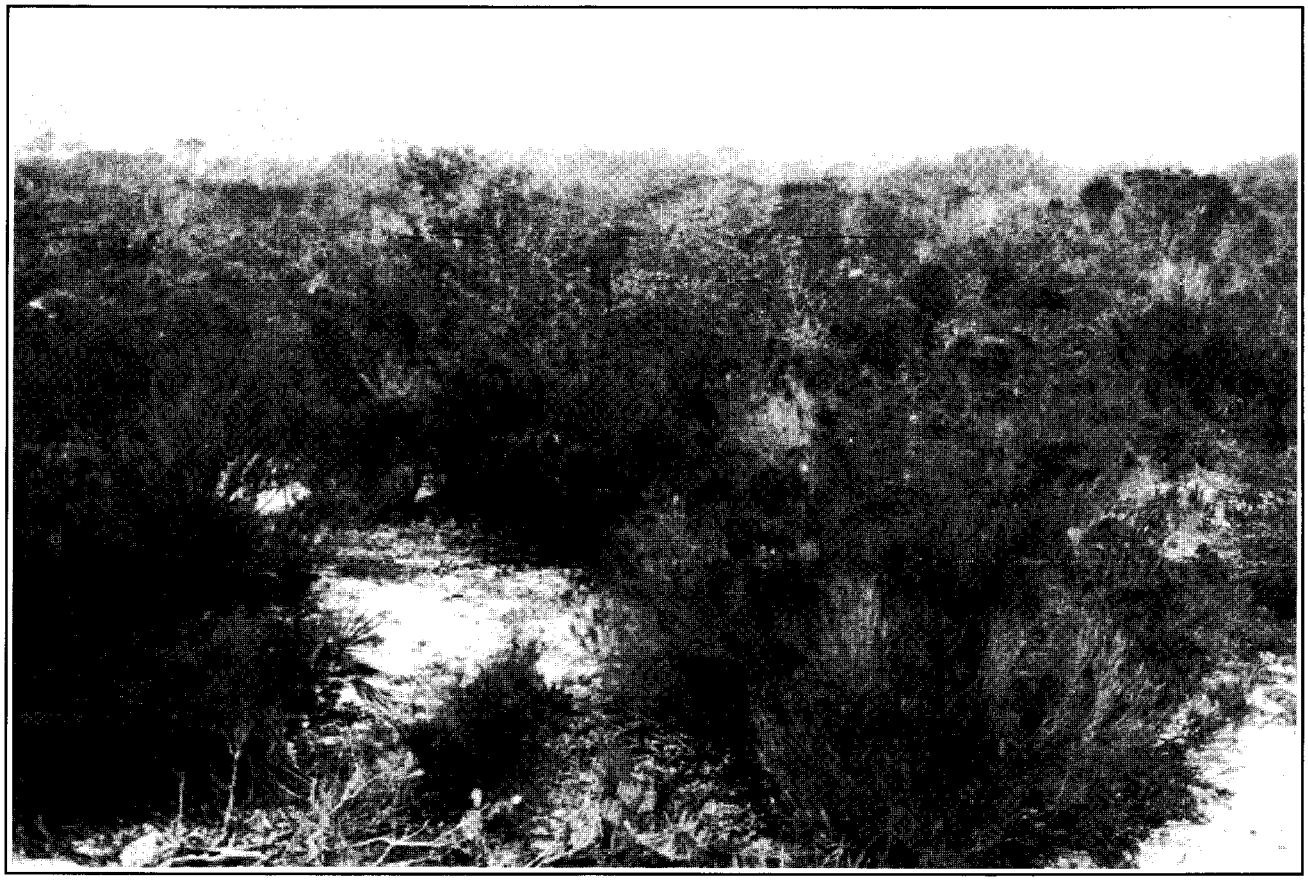


Figure 1.5. Rosemary scrub of the Lake Wales Ridge at Archbold Biological Station (Photo by John Fitzpatrick and Glen Woolfenden).

Land conversion in Florida has resulted in extensive reduction, fragmentation and insularization of Florida's fire-maintained scrub communities. Consequently, natural fires burn fewer acres, and only a fraction of Florida's remaining oak-dominated scrub communities is in a condition that can support a stable (i.e., not declining) population of the jays. Fire-suppressed scrub, with a dense, tall understory and/or an encroaching canopy of pines, is low quality habitat for Florida scrub jays. Examples depicted here are unburned interior and coastal xeric oak scrub (Figures 1.6-1.7) and mature sand pine scrub (Figure 1.8).

Many scrub areas are subjected to direct human disturbance (mechanical and chemical treatment of vegetation, altered hydrology, etc.), *often in addition to* fire-suppression. Certain of these habitats are used by scrub jays in low, and usually decreasing, densities (Figures 1.9-1.12). Cox (1987) depicts various successional stages of sand pine scrub after clear-cutting and sand pine seeding in the Ocala National Forest. Shortly after seeding (Cox's figures 29 and 30) the habitat lacks scrub jays. During the intervening few years the jays are present (Cox's figures 28 and 4). Fernald (1989) depicts several examples of degraded coastal scrub (Fernald's figure 14) and overgrown scrub (Fernald's figure 13), as well as scrub acceptable to the jays (Fernald's figures 8 and 9).

Fragmentation itself promotes changes in structure and species composition in the scrub community because of changed species-area relationships and edge effects. Scrub areas subjected to severe or multiple forms of degradation may show only remnants of the original community composition, and are difficult to categorize according to most existing schemes for classifying native vegetation. Fernald's (1989) treatment of the remaining scrub in the Treasure Coast region is the most useful classification scheme available in this respect.

Florida scrub jays use human-altered scrub-like landscapes in some parts of the state. Individual territories may be dissected by residential dwellings, roads, recreational areas, etc. In these situations, jays often use non-scrub habitat in conjunction with remnant patches of scrub, deviating somewhat from ecology and behavior seen in less disturbed areas. Few data exist to indicate whether Florida scrub jays in these situations maintain stable populations in the absence of immigration from source populations in nearby native scrub.

Given the severity of the problems confronting the Florida scrub jay, *all* areas occupied by jays are significant. Long-term population persistence is most likely under optimal habitat conditions (Figures 1.1-1.3) across expansive (several square miles) tracts of protected xeric oak scrub. Areas that are in less suitable condition may in fact represent habitat sinks that siphon dispersers from nearby jay source pools. These areas nevertheless may be indispensable in maintaining the abundance and distribution of jays in Florida because they provide corridors for dispersal and allow overall populations to be larger in areas that otherwise would support smaller populations.



Figure 1.6. Xeric oak scrub of the Lake Wales Ridge, unburned for 60 years, at the Archbold Biological Station. Scrub jays no longer exist here (Photo by John Fitzpatrick).

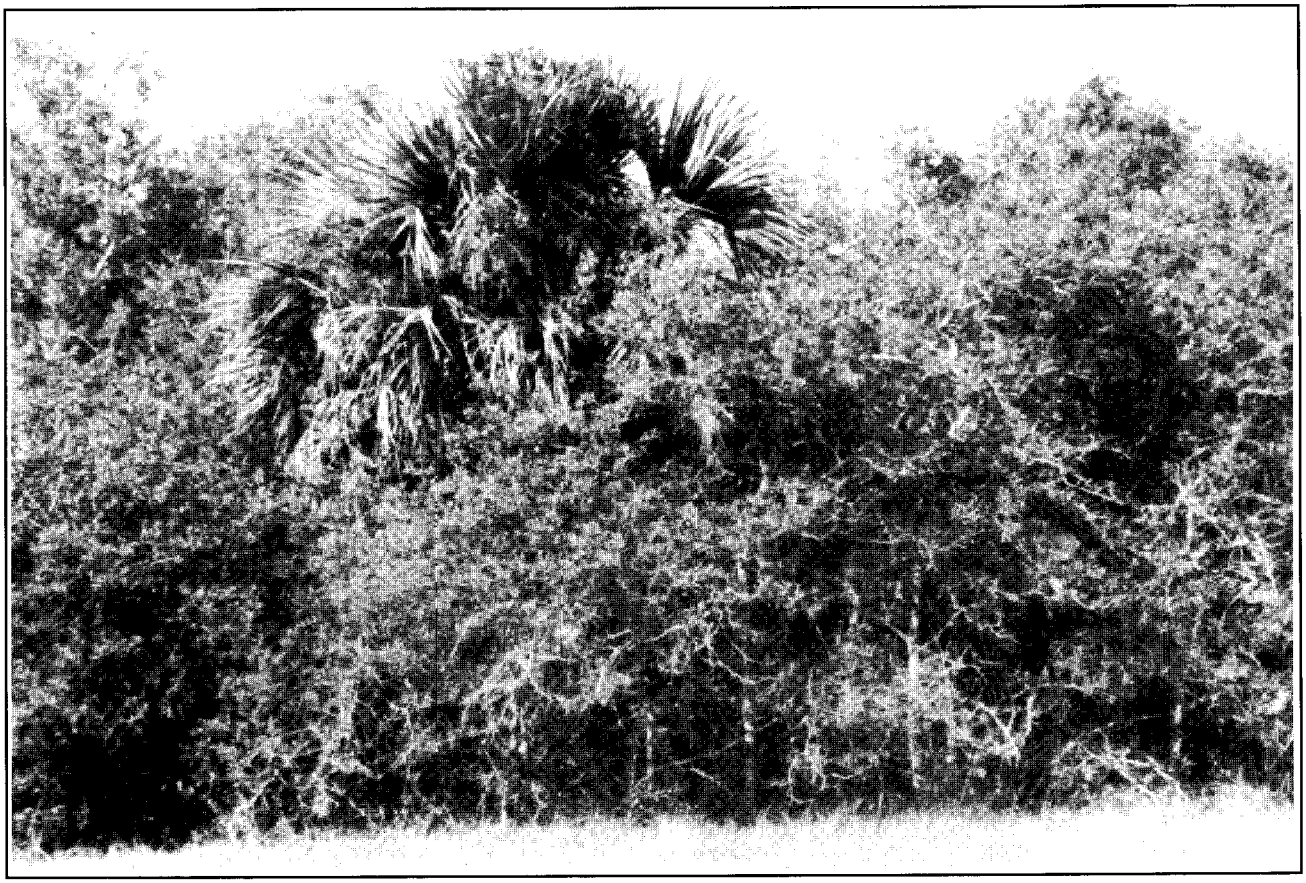


Figure 1.7. Unburned oak-palmetto coastal scrub in Brevard County. Scrub jays live along the edge of this overgrown, dense habitat (Photo by Dave Breininger).



Figure 1.8. Remnant coastal sand pine scrub in Indian River County. Scrub jays occupy the edges of this habitat (Photo from Fernald 1989, figure 4).



Figure 1.9. Cattle pasture with palmetto and scrub oaks on the Lake Wales Ridge in Highlands County. Scrub jays occur here in low densities. Note resident jay atop tall oak (Photo by John Fitzpatrick and Glen Woolfendenden).

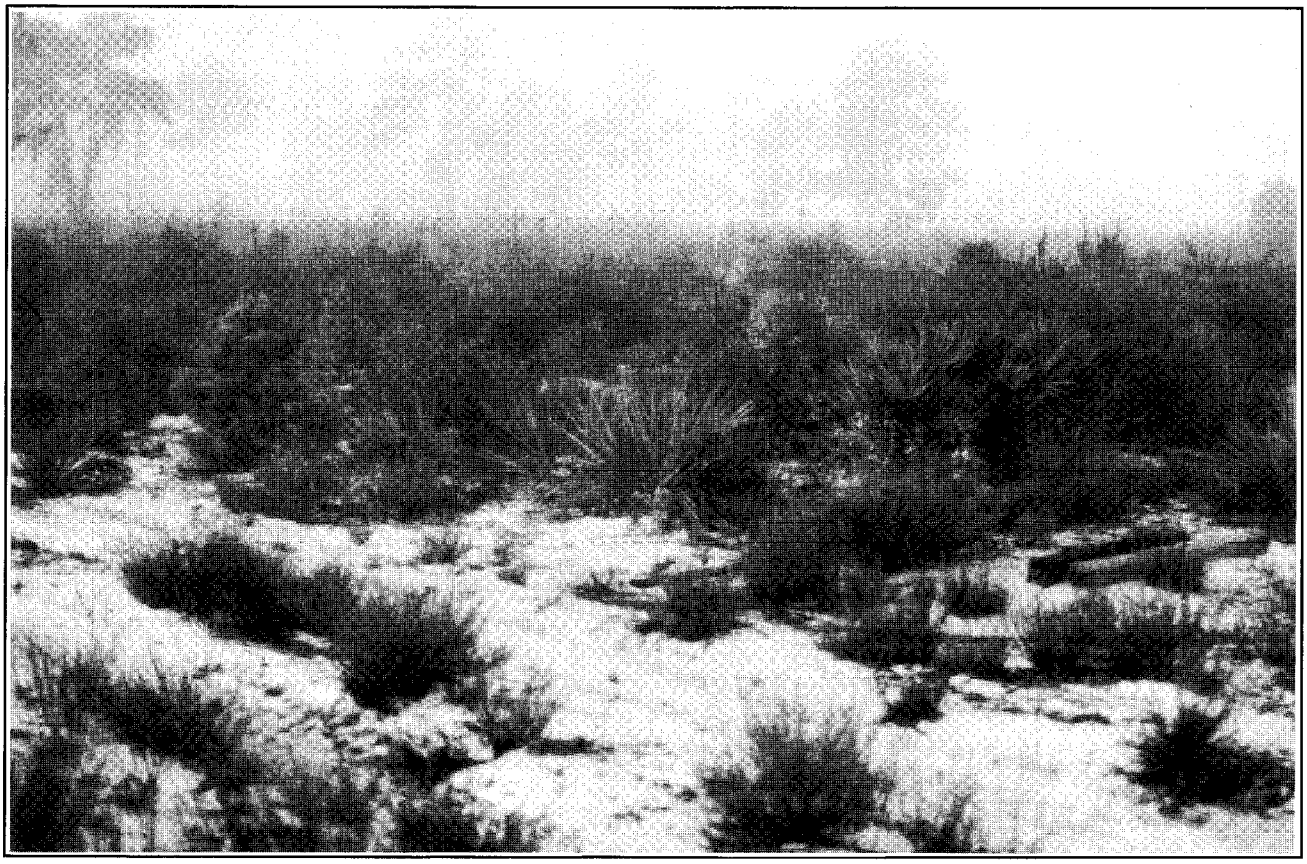


Figure 1.10. Recently-chopped xeric oak scrub on the Lake Wales Ridge in Highlands County. Scrub jays occur here in low densities (photo by John Fitzpatrick and Glen Woolfenden).



Figure 1.11. Partially disturbed, remant coastal scrub community in Jupiter, Palm Beach County (Radnor Tract). Jays nested at this site in 1989 and 1990 (Photo by Grace Iverson).

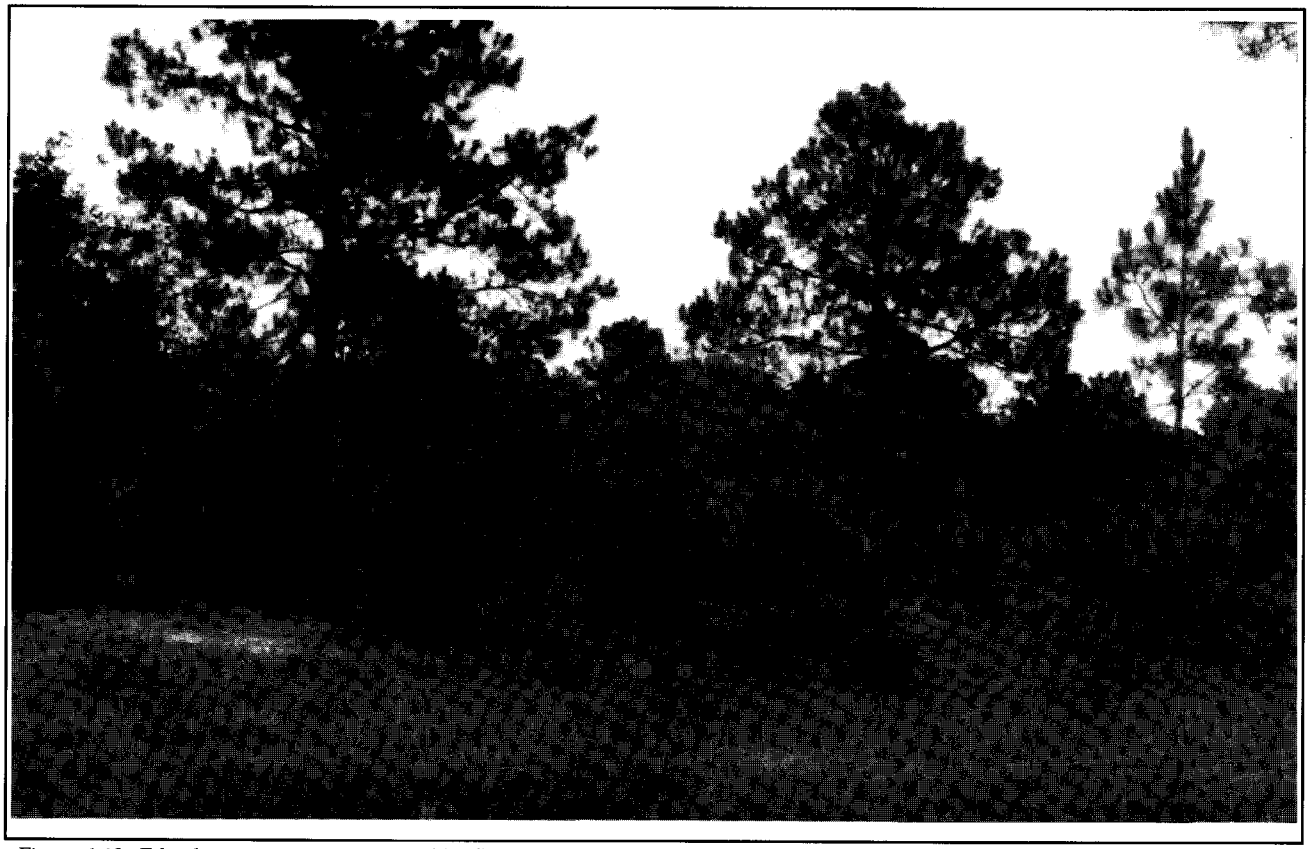


Figure 1.12. Edge between overgrown scrubby flatwoods and disturbed open area in Charlotte County. This site is occupied by scrub jays (Photo by Rick Gooch).

CONSERVATION GOALS AND APPROACH TO THE PROBLEM

The primary conservation goal of these recommendations is to minimize further decline of the remaining Florida scrub jay population resulting from habitat conversion. This is a difficult goal because of human demands on the species' fundamental resource, Florida oak scrub communities.

If wild populations of Florida scrub jays are to persist, they will reside in a mosaic of protected and unprotected oak scrub islands. Most islands will be small relative to scrub jay population dynamics, but will be supported by a network of large preserves with enduring populations. Small oak scrub islands periodically may lose their jays through random extirpation events. Islands that remain suitable or are restored to that condition may be recolonized. Long distances between vacated habitat islands and resident populations of jays impede recolonization, and seemingly suitable habitat patches may remain unoccupied for long periods. Relocation experiments currently in progress may provide a management tool to reduce recolonization time.

To reduce further loss of scrub jay habitat we recommend development-related habitat preservation and management on two levels: 1) protection of an adequate amount of habitat for every jay group occurring on a proposed development site (i.e., territory refuges), and 2) protection of a portion of suitable or recoverable habitat on-site additional to that recommended in level 1 (i.e., satellite refuges) when there is a great deal of such habitat on-site relative to the number of jay groups present. We recommend implementing these measures whenever: 1) jays are on-site, or 2) jays are not on-site, but important habitat exists on-site, any portion of which is within normal dispersal distance (5 miles) of jays off-site.

Our recommendations emphasize on-site protection. Off-site compensation is a preservation measure that we anticipate being implemented only infrequently. When off-site compensation is implemented in conjunction with on-site protection, decisions on which tracts of habitat to eliminate and which to protect must be based on optimizing the quality of protected habitat on-site.

HOW TO USE THE INFORMATION PRESENTED IN THIS SECTION

Areas of Florida Where These Recommendations are Applicable.

The current geographic range of the Florida scrub jay extends south to Lee, Hendry, Collier, and Palm Beach counties. To the north, the range extends to Levy, Alachua, Bradford, Clay, and St Johns counties. These recommendations apply to any proposed conversion of uplands within this range.

Organization of Information in this Section.

These recommendations are organized in three parts. Subsection 1.2 describes procedures for determining if a proposed development will negatively affect jays. This determination is based on the number of jay groups on-site as well as the amount of habitat important to jays. Subsection 1.3 describes the number of acres and, to some extent, the types of habitat that should be preserved in cases where development activities will negatively affect jays. Subsection 1.4 describes procedures for implementing the preservation measures: how to design refuges, which habitat parcels to incorporate in refuges, and how to manage refuges.

SUBSECTION 1.2
PROCEDURES FOR DETERMINING IF PROPOSED DEVELOPMENT WILL NEGATIVELY AFFECT SCRUB JAYS

HABITAT INVENTORY AND MAPPING

The primary objective of these procedures is to develop a vegetation map that depicts all plant communities on-site that are used by the Florida scrub jay or have the potential to be used by jays. Map plant communities either on a 7.5' USGS topographic map or on an aerial photograph at a scale of no more than 400 feet per inch. The vegetation map must show all forms of existing development (e.g., roads, buildings). The vegetation map 1) provides information needed to survey the site for jays, and, 2) provides information needed for planning refuges, if any are to be established on-site.

Use the Florida Land Use Cover and Forms Classification System (Florida Department of Transportation 1985) to map the entire proposed development site. The following classes are especially important in identifying potential habitat of the Florida scrub jay (number in parentheses represents hierarchical designation in the classification system): Improved, unimproved and woodland pastures (211, 212, 213), citrus groves (221), rangeland (310-330), pine flatwoods (411), long-leaf pine-xeric oak (412), sand pine (413), sand-pine plantations (4411), forest regeneration areas (443), sand other than beaches (720), disturbed rural land in transition without positive indicators of intended activity (741), disturbed burned areas (745).

Add a second level of information to the vegetation map. For purposes at hand, consider three types of habitat for jays. Two of these habitat types, collectively, include any and all areas where one or more species of scrub oak are present, even if only vestigially represented:

TYPE I HABITAT. Any upland plant community in which percent cover of the substrate by scrub oak species is 15% or more.

TYPE II HABITAT. Any plant community, not meeting the definition of Type I habitat, in which one or more scrub oak species is represented.

In most instances, Type I habitat is easily recognized as xeric oak scrub, scrubby pine flatwoods, scrubby coastal strand, or sand pine scrub. Conventional classification schemes are of less value in identifying or predicting the presence of Type II habitat; the presence of scrub oaks is the key indicator.

The third habitat type includes a variety of plant communities where scrub oak species are *not* represented, but that are nearby or adjacent to Type I or Type II habitat:

TYPE III HABITAT. Any upland or seasonally dry wetland within 1/4 mile of any area designated as Type I or Type II habitat.

Grid the vegetation map in 1-acre units. Label each acre that, upon field inspection, is identified as Type I, Type II, or Type III habitat. Qualitative field inspection normally will be adequate for distinguishing Type I from Type II habitat. If a quantitative approach is desired, we recommend that Breininger's (1981, 1989) modification of Canfield's (1941) line transect method be used. Because of the difficulties involved in successfully designing and executing a quantitative habitat analysis in scrub vegetation, we strongly recommend that sampling design, data collection, and data analysis be developed with the assistance of a plant ecologist experienced in quantitative techniques.

SURVEYING FOR SCRUB JAYS

Searching for Scrub Jays On-site.

The primary objective of these procedures is to obtain an accurate count of the number of jay groups on-site. Secondary objectives include mapping the location of each jay group and estimating the size and age constituency of each group.

The most effective method for surveying a site for jays is to traverse the area systematically, using a high quality tape recording of Florida scrub jay territorial scolding in an attempt to attract the jays. The recording should include clear examples of all typical territorial scolds, including the female "hiccup" call. Copies of taped vocalications may be obtained from Archbold Biological Station, P.O. Box 2057, Lake Placid, FL 33852.

Survey Design. Establish parallel line transects, and playback stations along each transect, on the vegetation map developed earlier. Space the transects and playback stations so that all Type I, II, and III habitat onsite will be sampled for jays (i.e., so that the taped calls unquestionably will be effectively broadcast across areas of concern). Distances between transects, and between stations along transects, depend on many factors, including the power of the speaker used for broadcasting the calls, topography, and the density of the surrounding vegetation. Adequate spacing between transects can be estimated roughly as the distance at which a person listening to the tape directly in front of the speaker perceives the "bird" to be no more than about 100 meters away. A distance of 100 to 200 meters between transects and between stations is generally adequate when using a good-quality, hand-held cassette player broadcasting at full volume.

Surveys should be carried out on calm, clear days about one hour after sunrise, and should terminate before midday

heat or wind. Surveys should not be conducted in winds stronger than a moderate breeze (5-8 mph), in mist or fog, or in precipitation exceeding a light, intermittent drizzle. Heat and especially wind lowers the tendency for jays to respond to distant territorial scolds, and wind reduces the distance over which recordings can be heard. Furthermore, jays are reluctant to fly on windy days regardless of hour or season.

Surveys should be conducted during: 1) spring (especially March), 2) fall (September and October), when territorial displays are most frequent and vigorous, and 3) mid-summer (July) when young of the year are independent but still distinguishable by plumage. The poorest times of year to survey are late winter, when jays are most likely to fly far for food, and late spring when the young are quiet and the adults are occupied with molt and feeding fledglings.

Survey Protocol. Transects may be driven or walked. If driven, step out of or stand atop the vehicle at each playback station. Broadcast the calls at each station for at least 1 minute in all four directions around the playback station, emphasizing any direction in which low-growing oak scrub is the predominant vegetation. On the vegetation map, plot the locations and indicate group sizes of all Florida scrub jays where they are first seen or heard. Distinguish adult-plumaged jays from juvenal-plumaged jays whenever possible.

At localities with car trails, large areas of scrub can be surveyed with a vehicle in one day. On foot, the process is more laborious because of the relatively large size of territories (often 10 to 40 acres). Once a group is located, stop broadcasting at that station. Remaining at this station briefly should result in the assembly of the entire group. This allows one to estimate group size and, if done during mid-summer, to distinguish young of the year from adults.

Sometimes two or more groups will be attracted to one station, usually from different directions. Observers should be careful, therefore, to plot each group where it was first spotted or heard, not at the site to which the jays were attracted. In rare circumstances, especially at sites where numerous groups congregate at artificial food or water sources, it may be difficult to differentiate groups. This is especially true where the jays have become habituated and tame to human approach. Again, in such cases careful observation is extremely important. Studies of such congregations using color-marked jays have confirmed that *almost always* they consist of members of different family groups. Often they may have crossed several territory boundaries to reach the neutral feeding or drinking area. The result gives a false impression of extremely high jay density.

It is essential that the subject area be visited *as often as necessary* to establish an accurate count of jay groups. If more than 8 to 10 jays are encountered at a single playback station during a fall or spring survey period, the jays at this site should be monitored carefully over several visits and different times of day. Numbers will shift as groups arrive and depart. Often it is possible to watch where the jays come from or return to as a means of determining how many groups are represented. If a question exists as to how many groups of scrub jays are on-site, we strongly recommend that the review agency involved request permission from the land owner to conduct an independent survey on-site.

The key products of this procedure are 1) a complete count of all jay groups on-site, and 2) an approximate territory map or home range center for each group. The map shown in Figure 1.13 took only a few full mornings of work to complete using a 4-wheel drive vehicle. Such a map allows developers and land-use planners to identify accurately the localities where preserving a given acreage will result in saving the largest possible population of jays.

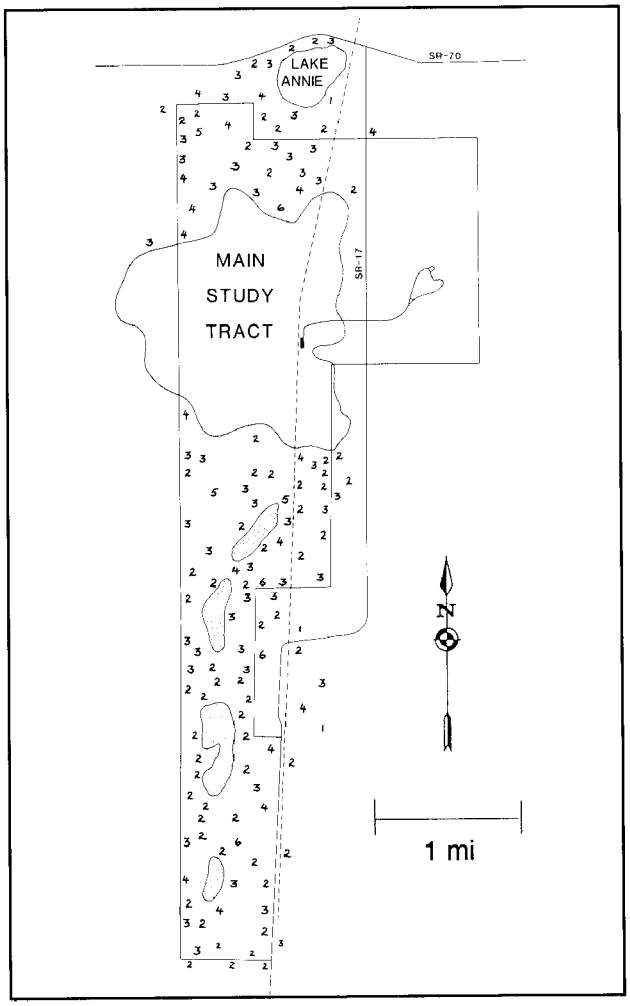


Figure 1.13. Example of a census map obtained by systematic traversing of patchy oak scrub habitat in southern Highlands County over several clear spring mornings in 1979. Detailed study of this area beginning in 1986 proved that this map was extremely accurate for estimating territory density. See text for methods. Each number designates the location of a jay group and estimates group size.

Survey Report. Provide the appropriate review or regulatory agencies with a final report that includes the following, as applicable:

A. An information sheet including:
   1. Dates and starting and ending times of all survey conducted.
   2. Weather conditions during all surveys, including average temperature, wind speed and direction, visibility, and precipitation.
   3. Total number of jay groups found, number of jays in each group and number of juvenal-plumaged jays in each of these groups .

B. An aerial photograph or vegetation map depicting:
   1. The entire area of interest, including all Type I, II, and III habitat.
   2. Transect lines and playback stations.
   3. Locations of all jays seen or heard while conducting the survey or at any other time.
   4. Approximate suspected territory boundaries between jay groups or suspected home range centers for each group.

Consulting Sources for Documentation of Scrub Jays within Dispersal Distance of Important Habitat On-site.

Habitat preservation for the Florida scrub jay is recommended if jays are not on-site, but are within normal dispersal distance (5 miles) of Type I habitat on-site. The following sources on Florida scrub jay records of occurrence (confirmed observations or museum specimens) should be consulted in order to determine if jays have been documented within 5 miles of Type I habitat on-site.

1) Florida Natural Areas Inventory. 1018 Thomasville Rd., Suite 200-C, Tallahassee, FL 32303.
2) Florida Breeding Bird Atlas. Florida Audubon Society, 1101 Audubon Way, Maitland, FL 32751.
3) Cox, J.A. 1987. Status and distribution of the Florida scrub jay. Fla. Ornithol. Soc. Spec. Publ. No. 3, Florida Ornithological Society, Gainesville, 110 pp.
4) Regional Planning Councils whose jurisdiction either includes all or part of the proposed development or is within five miles of the proposed development.
5) County environmental agencies whose jurisdiction either includes all or part of the proposed development or is within 5 miles of the proposed developments.
6) Regional Offices of Environmental Services, Florida Game and Fresh Water Fish Commission, whose jurisdiction either includes all or part of the proposed development or is within five miles of the proposed development.

Presume that any areas in which jays were documented within 5 miles of Type I habitat on-site *since 1975* are currently inhabited by jays. The developer may want to investigate for present occurrence of jays if it seems likely that the local jays in question have been extirpated since that time. Submit a report of the entire investigation to the reviewing agency, which may want to conduct an independent investigation of the records as well as field surveys for jays in the 5-mile area surrounding Type I habitat on-site.

SUBSECTION 1.3
PRESERVATION MEASURES TO BE IMPLEMENTED IF SCRUB JAYS WILL BE NEGATIVELY AFFECTED BY DEVELOPMENT

Preservation refers to both *on-site protection* of habitat and *off-site compensation* for any habitat of critical importance to the Florida scrub jay that is eradicated on-site. In this subsection we discuss the acreage that should be preserved in order to mitigate adequately the impact of development on jays, and whether protection or compensation is the appropriate means of habitat preservation.

DETERMINING ADEQUATE LEVEL OF HABITAT PRESERVATION

Habitat preservation for the Florida scrub jay is recommended whenever 1) jays exist on-site, or 2) jays do not exist on-site, but are off-site within five miles of Type I habitat on-site. *In either case*, the total number of acres to be designated for preservation on behalf of the Florida scrub jay is determined by performing the calculations in parts 1A and 1B, below, and *summing* the answers to both parts.

1A. Number of Acres to be Preserved for Territory Refuges.

The number of acres to be preserved as territory refuges, based on the number of jay groups on-site, equals:

$$\text{Preserved acres} = \left[\text{Number of scrub jay groups on-site}\right] \times 25$$

or the total number of acres of developable uplands, whichever is less

This acreage is designated for the establishment of one or more territory refuges on-site, or, when appropriate, for the provision of an equal amount of habitat off-site. This acreage is arrived at completely independent of habitat type or types on-site. When on-site protection is appropriate, as opposed to off-site compensation, the habitat types (i.e., the particular parcels of land) that should comprise this acreage must be determined based on optimal location, shape, and habitat composition of territory refuges. These are the subjects of the recommendations in Subsection 1.4.

1B. Number of Acres to be Preserved for Satellite Refuges.

The number of acres to be preserved as satellite refuges, based on the amount of Type I habitat on-site compared to the number of jay groups on-site, equals:

$$\text{Preserved acres} = \left[\text{Total no. acres Type I habitat on-site}\right] - \left[\text{No. acres designated for preservation in 1A}\right] \times 0.25$$

or 0, whichever is greater

This acreage is designated for the establishment of one or more satellite refuges on-site, or, when appropriate, for the provision of an equal amount of habitat off-site. When on-site protection is appropriate, the acreage entering into satellite refuges for jays must be exclusively Type I habitat. Determining *which* parcels of Type I habitat should comprise this acreage must be based on optimal location, shape, and habitat composition of satellite refuges. These are the subject of the recommendations in Subsection 1.4

DETERMINING THE APPROPRIATE MEANS OF HABITAT PRESERVATION

In most instances we recommend on-site protection of habitat, as opposed to off-site compensation for destruction of jay habitat. The only circumstances in which we recommend off-site compensation are: 1) when the acreage designated for preservation is extremely small and therefore of greater conservation value in a mitigation park or elsewhere off-site, or 2) when the acreage designated for preservation is a large proportion of all developable uplands on-site. Determine the appropriate means of preservation as follows.

Exclusive On-site Protection.

Provide exclusive on-site protection whenever the total amount of land designated for preservation, as calculated by summing parts 1A and 1B, is greater than 10 acres and less than 25% of all developable uplands on-site.

Either Exclusive On-site Protection, or On-site Protection in Conjunction with Off-site Compensation.

Consider either alternative when the amount of land designated for preservation, as calculated by summing parts 1A and 1B, is greater than 25% of all developable uplands. For either alternative, provide on-site protection of at least 25% of all developable uplands; provide off-site compensation for any remaining acreage designated for jays but not protected on-site.

Either Exclusive On-site Protection, or Exclusive Off-site Compensation.

Consider either alternative whenever fewer than 10 acres have been designated for preservation as calculated by summing parts 1A and 1B.

SUBSECTION 1.4
PROCEDURES FOR IMPLEMENTING PRESERVATION MEASURES

All decisions made in designing territory and satellite refuges should be based on maximizing their conservation value. In the simplest, ideal situation the total acreage designated for the Florida scrub jay in Subsection 1.3 can be protected as a single, uninterrupted parcel of high quality oak scrub habitat (Figure 1.14). Unfortunately, circumstances commonly depart from the ideal. In order to maximize the conservation value of a refuge, it is necessary to consider four features: habitat composition, size, shape, and location. In many instances, one or more factors must be compromised in order to achieve another.

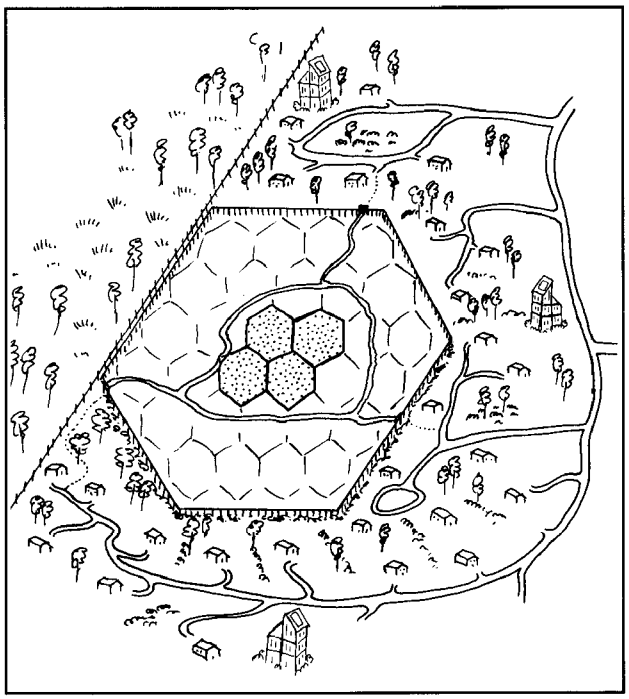


Figure 1.14. Configuration of a model habitat preserve containing about 30 Florida Scrub Jay territories. Approximate hexagonal packing of jay territories emphasizes that even in a 750 acre preserve of roughly circular dimensions, only about four jay territories are buffered from the edge by more than a single territory-width (stippled territories at center). Placement of preserve adjacent to undeveloped land (left of fence) helps buffer additional territories. Arterial roadways are separated from preserve by housing developments, reducing mortality from vehicular traffic. Fire breaks also serve as nature trails. Fence limits entry by domestic animals. Natural vegetation planted around the outside of the fence increases effective area of preserve and adds to its visual appeal.

PRIMARY CONSIDERATIONS FOR ESTABLISHING TERRITORY REFUGES

The following recommendations apply to all developments regardless of the number of jay groups on-site. When more than one jay group exists on-site, establish the smallest number of disjunct territory refuges possible within the constraints discussed below, by maximizing the number of adjoining territories within refuges.

When planning either territory or satellite refuges on-site, first rank all parcels of Type I and Type II habitat from highest to lowest quality. In ranking scrub parcels consider the *potential* quality of the scrub, based on anticipated management, in addition to present condition. Scrub that is optimal for jays (Figures 1.1-1.3) has a well-developed shrub layer, approximately one to two meters tall, that covers 50% - 75% of the substrate. The shrub layer is dominated by scrub oaks which cover at least 30% of the substrate. The scrub oaks must be mature enough to produce a mast crop (i.e., three or more years since a fire or mechanical clearing). At least 25% of the substrate is exposed or only sparsely vegetated, usually with low-growing annuals. These openings are well-distributed throughout the vegetation. Canopy cover is less than 20%; overstory trees, if present at all, usually are sand pine (*Pinus clausa*), slash pine (*P. elliottii*), or longleaf pine (*P. palustris*). Scrub habitat that is in or near optimal condition for jays is characteristic of well-managed xeric oak scrub, but may also occur in other community types, including scrubby flatwoods, scrubby coastal strand, and early successional sand pine scrub.

Usually, areas on-site that offer the most potential as territory refuges will be those already occupied by jays. Consequently, part or all of the actual jay territories on-site should be incorporated into the territory refuge. Exceptions are likely to be sites with dense, overgrown scrub where jays have been displaced to the margins. Such areas sometimes can offer the most potential after being properly managed. Only when the best on-site location for a territory refuge clearly is in an area beyond the actual jay territory, do we recommend that such action be taken.

Configuration of Territory Refuges

Wherever possible, protect the total number of acres of habitat designated for territory refuges in a single tract of land uninterrupted by any form of development. The only circumstance under which a single jay group should be provided habitat on two or more disjunct parcels of land is where existing development precludes establishing a single refuge.

Establish territory refuges that are approximately square or circular in order to minimize the edge-to-area ratio. Deviate from this design only to maximize the area containing high quality habitat. At some point the benefits of

maximizing overall habitat quality are offset by the costs of a high edge-to-area ratio.

Habitat Composition of Territory Refuges

Identify the largest, highest quality tract of scrub habitat on-site and build the territory refuge to incorporate this tract. If the largest scrub tract is not the highest quality tract on-site, then sacrifice quality for size, and build the territory refuge to incorporate the largest tract of Type I or Type II habitat on-site. Obvious exceptions will favor quality over quantity (e.g., little difference in size and great difference in quality.) If the size of a tract of scrub is less than the total acreage designated for the territory refuge, add other contiguous parcels of habitat to the core until the total designated acreage is reached. If choices exist as to what types of habitat to include in the territory refuge, follow the priorities below:

TYPE I OR TYPE II HABITAT

1. Oak scrub or sand pine scrub communities judged capable of supporting the highest density of jays when properly managed.
2. Other oak scrub communities.

TYPE III HABITAT

3. Managed grasslands, dry prairie.
4. Other open or semi-open uplands.
5. Seasonally dry, open and semi-open wetlands.
6. Wooded uplands.

PRIMARY CONSIDERATIONS FOR ESTABLISHING SATELLITE REFUGES

Satellite refuges may be established whether or not jays exist on-site. They serve as outlying foraging areas, buffer zones near territory refuges, and dispersal islands or corridors. Large satellite refuges may attract and support breeding jays. Satellite refuges preserve a portion of the Type I habitat onsite, and are composed exclusively of Type I habitat. When deciding which parcel or parcels of Type I habitat on-site to protect as satellite refuges, use the following recommendations.

Configuration and Location of Satellite Refuges

The shape of satellite refuges depends mostly on the distribution of Type I habitat. Protect the recommended number of acres of Type I habitat in as few satellite refuges as habitat permits. If two or more parcels of Type I habitat are of equal acreage and habitat quality, protect the one that has the lowest edge-to-area ratio.

Locate satellite refuges close to territory refuges on-site or off-site. If possible, adjoin satellite refuges to territory refuges, creating, in effect, an expanded territory refuge.

Quality of Type I Habitat for Satellite Refuges

In designing satellite refuges, select Type I habitat that most closely approximates optimal conditions for jays, or has the greatest potential for recovery to optimal conditions with appropriate management. A point will exist at which the benefits of maximizing habitat quality are offset by the costs of sacrificing aspects of refuge configuration. Biological judgment appropriate to the individual case must prevail.

SECONDARY CONSIDERATIONS FOR ESTABLISHING BOTH TYPES OF REFUGES

If alternatives are available for meeting the constraints discussed above for territory or satellite refuges, follow these priorities:

1. Place refuges as close as possible to protected natural habitat, especially oak scrub, and as close as possible to protected or unprotected jay territories.
2. Place refuges as far as possible from roads with posted speed limit $\geq$ 30 mph, especially major highways.
3. Select habitat known to contain other elements of the endangered scrub biota.
4. Place refuges as close as possible to off-site undeveloped lands that are expected to remain undeveloped.
5. Place refuges as far as possible from off-site undeveloped lands that are expected to be developed.

MANAGING REFUGES

The major goal in managing scrub jay refuges is to maintain optimal habitat for jays. Where and when feasible, prescribed burning should be used as a primary management tool.

Where prescribed burning is feasible, create fire lanes through the refuge, dissecting it into manageable units. For territory refuges, design units so that each jay group retains an adequate amount of mature oak scrub while recently-burned scrub regenerates. No more than 25% of a refuge occupied by jays should be burned at any one time. When laying out firebreaks, one also may want to consider their later use as nature trails.

Oak scrub should be burned every 5 to 20 years in order to maintain suitable jay habitat. Oak scrub burned more frequently than every 5 years produces mast below the level needed to support jays, and experiences proliferation of palmetto (*Sabal etonia, Serenoa repens*). Oak scrub burned less than every 20 years frequently grows too tall and dense to support jays, accommodates undesirable competitors, undergoes unnatural successional changes in species composition of the vegetation, and develops an unnaturally high canopy cover.

Prescribed burning is the preferred method of scrub habitat management. Above-ground mechanical treatments, such as roller chopping, are short-term alternatives, but may be less effective long-term. The long-term effects of mechanical treatment on composition and diversity of scrub are unknown. Mechanical treatments do provide important practical means for managing prescribed burns.

In designing territory or satellite refuges, develop a proposed management plan. A management plan should be submitted to the reviewing agency prior to establishing refuges. We recommend that this plan include the following:

1) A map of the proposed refuges depicting management units, fire lanes and other openings, buffer zones, habitat islands and corridors, and the surrounding commercial and residential area that may be affected by prescribed burning.

2) A schedule of the burning regime and the type and frequency of mechanical treatment planned for each management unit.

3) Identification of the party or parties responsible for the management of the refuges, including specific provision for any legal transfer of this authority.

INTEGRATING REFUGES INTO THE DEVELOPMENT COMMUNITY

Buffer Zones

Provide buffer zones around the perimeter of territory refuges to insulate jays and facilitate burning. Satellite refuges may be used to buffer territory refuges from impacts of development. Position recreational areas (e.g., golf courses, parks) as boundaries to refuges. Plan cul-de-sacs, driveways, dwellings and backyards in fire-safe areas along the perimeter of refuges.

Habitat Islands and Corridors

Certain habitats outside of territory and satellite refuges can enhance the scrub jay by serving as islands or corridors for dispersal. Habitat islands and corridors are especially important when they lie between two or more refuges separated by about five miles or more. Such habitats also are important in connecting unprotected areas that are occupied by jays and are separated by about five miles or more.

Ideally, such islands and corridors contain scrub. Other natural areas and land uses that may contain no scrub also serve in this capacity. Examples are parks, golf courses, rights-of-way along low-speed roads and transmission lines, and other quasi-natural open habitats.

Public Education

Implement a program to educate residents as to the threatened nature of the oak scrub habitat including the Florida scrub jay. Effective means of accomplishing this include providing self-guided nature trails and educational signage through the refuges, and providing informative pamphlets to local residents. Emphasize the importance of fire in maintaining the natural scrub community. Post nature trails with rules discouraging destruction of oak scrub habitat, while encouraging enjoyment and study of it. Prohibit house pets and unauthorized motor vehicles in refuges. Encourage the use of native plants, especially oaks, for xeriscaping roadsides and yards. Discourage the use of ornamental shade trees and rapidly-spreading introduced species, especially Brazilian pepper (*Schinus terebinthifolius*).

SECTION 2

ECOLOGY AND HABITAT REQUIREMENTS OF THE THREATENED FLORIDA SCRUB JAY

PREFACE

In 1988, the Florida Game and Fresh Water Fish Commission solicited a report on ecology and management of the Florida scrub jay from John Fitzpatrick and Glen Woolfenden. That report was reviewed and edited and is presented here as Section 2 of this publication. The recommendations contained in Section 1 of this publication are based largely on the information presented here.

ACKNOWLEDGMENTS

Archbold Biological Station continues to provide extensive support for our long-term study of Florida scrub jay ecology. During the preparation of this report we were provided office space, field and office equipment, secretarial help, and library resources. We are extremely grateful for the assistance. In addition we thank Debra K. Moskovits who contributed to the preparation of the three-dimensional diagrams (Fig. 2.16), Emily K. McGowan who prepared many figures, Anita DelGenio and Nancy Stotz who typed text, and Jan Woolfenden who typed text and prepared the bibliography. Special thanks go to Ron Mumme who provided data and many useful comments.

The National Science Foundation (BSR-8705443), the Conover Fund of the Field Museum of Natural History (Fitzpatrick), and the University of South Florida (Woolfenden) provided support for the field work for which we are extremely grateful.

SUBSECTION 2.1
INTRODUCTION

Many thousands of years ago, arid scrublands of western North America were distributed eastward to the Atlantic Ocean across what is now northern Mexico and southern United States. Climatic changes associated with glacial fluctuations severed this habitat connection between east and west, and the eastern forests adapted to wetter conditions. The once widespread scrub all but disappeared from eastern North America, clinging to a last stronghold on ancient sand dunes scattered through the Florida peninsula. Because these pure sand soils were porous to water, they produced growing conditions similar to those in arid environments supporting scrub habitats elsewhere around the continent. Long isolated from its western counterparts, and constantly adapting to the seasonally wet subtropical environment of the peninsula, the Florida scrub evolved into one of the rarest and most distinctive vegetation formations in all of North America. It is a habitat utterly unique to Florida, harboring scores of plant and animal species found nowhere else in the world. The fates of all those species now hang in the balance, as the Florida scrubs disappear at the hands of man.

The Florida scrub jay (*Aphelocoma c. coerulescens*) is the most conspicuous animal in the scrub. Some taxonomists (e.g., Phillips 1986) consider it a full biological species. If indeed it is, then it is the only bird species whose distribution is entirely confined to the state of Florida. Once scattered widely throughout the peninsula, it is now extirpated from vast areas within its former range. It is endangered or severely threatened essentially wherever it still persists, a fact that seems incongruous to countless human inhabitants of the peninsula who know these jays as tame, easily watched, and conspicuous backyard neighbors.

Like many species currently threatened with extinction, the Florida scrub jay is a victim of an unkind ecological accident. Its requisite habitat is a leftover from ancient times, an anomaly among the swamplands, prairies and flatwoods that dominate the Florida landscape. The scrubby oaks and bare sand patches absolutely essential for the survival of Florida scrub jays are present only in scattered, isolated patches surrounded by habitats almost as inhospitable to the jays as ocean. With essentially no hope of survival or reproduction outside these sharply bounded habitat patches, the Florida scrub jay evolved into one of the most ecologically restricted birds in North America. Its social system arose out of the ecological constraints thus imposed: permanent monogamy, year-round territoriality, delayed dispersal, and cooperative breeding as the most successful route to territory acquisition in a permanently overcrowded environment.

The accident of having severely restricted habitat requirements became unkind when humans discovered the importance to their own species of a well-drained sandy soil substrate. For human agriculture, residence, and recreation, the ancient dunes that support scrub are of superior quality, especially in a state with thousands of square miles only a few meters above sea level. As the human population expands in Florida, economic pressures seem to dictate an accelerating effort to clear what final vestiges of oak scrub remain intact. As a result, by the early 1980's the Florida scrub jay was extirpated from eight counties, and nearly so in as many more. In 1975 the Florida scrub jay was formally listed as "Threatened" by the Florida Game and Fresh Water Fish Commission. In 1987 the jay became listed as "Threatened" within the Endangered Species classifications of the United States Fish and Wildlife Service (*Federal Register* vol. 52, no. 106, pp. 20715-20719, 3 June 1987).

Florida scrub jays reside and breed only on periodically-burned, low-growing oak scrub, with abundant bare sand and only scattered tall pines. For the species to persist in Florida, these very specific kinds of places must remain protected and managed. Such places must exist in sufficient number and size to protect against accidental annihilation by random demographic fluctuations, epidemics, skilled domestic predators, and human interference. Land developers bear both a responsibility and an opportunity to contribute to the mounting effort to preserve this beautiful Florida specialty. This section of the report is a compilation of available information on how to protect the Florida scrub jay by protecting its unique habitat.

Because the Florida scrub jay is easy to detect, sedentary, and extremely habitat specific, this bird is an excellent indicator species for good quality oak scrub habitat. Moreover, because the jay requires modest to large-sized patches of scrub in order to persist, preserving this species entails preservation of endangered oak scrub habitat. Many of the endangered scrub organisms, plant and animal, will thrive in viable populations within the space needed to maintain safely a population of Florida scrub jays. For example, the gopher tortoise (*Gopherus polyphemus*), classified as a "Species of Special Concern" by the Florida Game and Fresh Water Fish Commission (Wood 1986), can maintain excellent population sizes within a scrub habitat minimally acceptable for scrub jay preservation (Cox et al. 1987). Thus, the Florida scrub jay can be considered a vanguard for oak scrub habitat as well as its most distinctive indicator species.

Subsection 2.2 describes those life history characteristics most important from a management point of view, especially for persons not already familiar with the species. Characteristics of the oak scrub habitat are summarized, including the overwhelming importance of fire in maintaining the scrub ecosystem. The excellent management potential for the species also is described.

Subsection 2.3 discusses numbers of jays per unit area in some different scrub habitats, and summarizes the natality and mortality factors in these habitats. It is strongly recommended that densities be calculated as territories per unit area. Evidence on the nature and frequency of catastrophic epidemics is presented, and their effects on population models are highlighted. The importance of limited dispersal distances is discussed.

Subsection 2.4 discusses factors affecting the coexistence of Florida scrub jays with human settlements. The principal causes of local extirpations are outlined, along with recommended means to prevent them. Prescribed burning is emphasized as a means to prevent degradation of oak scrub habitat.

Subsection 2.5 draws upon the data presented in previous subsections for development of a model simulating the population fluctuations in a natural population of limited size. Replicate simulations, under different demographic conditions and population sizes, provide the first detailed estimation of the relationships between Florida scrub jay population size and probabilities of extinction through time. Interpretation of these models provides a basis for determining the sizes and configurations of habitat preserves that will permit long-term persistence of Florida scrub jays in the presence of commercial and residential development.

SUBSECTION 2.2
LIFE HISTORY, MANAGEMENT POTENTIAL, AND HABITAT REQUIREMENTS

LIFE HISTORY

The Florida scrub jay has been the subject of an intensive demographic and behavioral study at the Archbold Biological Station in Highlands County for 20 years. One result is that considerable published information pertinent to developing habitat protection guidelines already is available. This fortunate situation stands in contrast to that of many other threatened or endangered species, in which primary biological data remain scanty.

In this section we summarize briefly those factors considered most pertinent to a general understanding of Florida scrub jay biology and life history from a management point of view. This information is drawn principally from our book, *The Florida Scrub Jay: Demography of a Cooperative Breeding Bird* (Woolfenden and Fitzpatrick 1984) and a recent summary chapter we have written for another book (Woolfenden and Fitzpatrick 1990). Additional information appears in numerous other publications (e.g., Bancroft and Woolfenden 1982; DeGange et al. 1989; Fitzpatrick and Woolfenden 1986, 1988; Fitzpatrick et al. 1988; McGowan and Woolfenden 1989; Woolfenden 1974, 1975, 1978a, 1978b; Woolfenden and Fitzpatrick 1977, 1978, 1986).

Description

The Florida scrub jay is similar in size (about 12 inches total length) and shape to its close relative the blue jay (*Cyanocitta cristata*). Although the predominant color of both these species is blue, they differ strikingly in color pattern. Blue jays are boldly marked with many white-tipped, black-barred feathers and with a black bridle pattern about the head and neck. They also have an ample crest. Scrub jays are far more subtly marked. They lack the white tips, black barring, bridle, and crest. The blue of the head, nape, wings and tail grades into pale gray on the back and belly. They have a white eyeline that blends with a frosted white forehead (forehead is blue in subspecies of western North America). Scrub jays possess an indistinctly striped throat and upper breast, bordered by blue to form a dickey.

In contrast to blue jays, scrub jays have longer, stronger feet, a longer tail and shorter wings. All these features reflect their more terrestrial existence. Scrub jays rarely fly long distances, while the forest-inhabiting blue jays are much more capable in the air.

The sexes of scrub jays are indistinguishable by plumage. Males average only slightly larger than females (Woolfenden 1978a). Young scrub jays during their first four months of life are distinguished easily from adults. As characterizes jaybirds, the nestlings hatch naked. They are well feathered before they leave the nest at about 15-20 days after hatching. The juvenal plumage, fuzzy in texture, is smoky gray on the head and back, entirely lacking the blue crown and nape.

An incomplete postjuvenal molt during their first summer (Bancroft and Woolfenden 1982) makes the juveniles nearly indistinguishable from adults by about September. In the hand, most first-year birds can be distinguished through the following spring by their worn primary coverts, which appear grayish instead of bluish at the tips.

Range And Habitat

Scrub jays occur throughout the brushlands, scrub lands, semideserts, chaparral, open woodlands, and pinyon-juniper hillsides of southwestern North America and in scattered populations south to southern Mexico. Florida scrub jays are isolated from the closest of these western relatives (*Aphelocoma coerulescens texana*, in west-central Texas) by about 1000 miles.

Florida scrub jays occur only in central peninsular Florida, where they are restricted to one habitat type, the low-growing oak scrub that occurs on well-drained sandy ridges. This distinctive habitat is endemic to Florida, and contains numerous species of animals and plants found nowhere else. The scrub jay is the only bird whose distribution depends on patches of this rare habitat. It is essential to any conservation effort that the critical importance of the oak scrub be understood. In contrast to blue jays, which are broadly tolerant of a variety of habitats, Florida scrub jays are exceedingly habitat-restricted. As habitat preservation and management is the only solution to Florida scrub jay protection, we discuss the scrub habitat extensively in later sections.

Food And Predators

Florida scrub jays have a very broad diet. Insects and other arthropods plucked from the leaves or leaf litter in the shrubby vegetation form the bulk of their diet. The jays do not dig extensively, and rarely sally for aerial insects. A wide variety of small vertebrates also is taken, especially tree frogs (*Hyla* spp.), *Anolis* lizards, and small snakes.

Scrub jays do not eat large fruits such as citrus. Although they eat small quantities of berries and seeds (e.g. slash pine, *Pinus elliottii*, and sand pine, *P. clausa*), only one plant food is crucial to their existence. Annually each jay harvests and buries for later use about 6,000 to 8,000 acorns, taken from all the principal scrubby oak species in the territory (DeGange et al. 1989). It is estimated that about a third of these acorns are later recovered and eaten. Caching behavior allows jays to eat acorns during every month of the year. This reliance upon acorns and caching may constitute a major reason for the Florida scrub jay's restriction to the oak scrub and the sandy ridges within Florida.

Various snakes, mammals, and birds feed on scrub jay eggs, small young, or adults. Both the eastern coachwhip (*Masticophis flagellum*) and indigo snake (*Drymarchon corias*) are known to eat adults and fledglings, and the coachwhip also is known to eat nestlings. Known natural mammalian predators include bobcat (*Lynx rufus*) and raccoon (*Procyon lotor*). Cotton rats (*Sigmodon hispidus*) sometimes take eggs. Domestic cats (*Felis cattus*) also prey on adults. We suspect that a population of domestic cats supported by human food offerings could eliminate a small, local population of Florida scrub jays. Avian predators of small young include the great horned owl (*Bubo virginianus*), eastern screech-owl (*Otus asio*), red-tailed hawk (*Buteo jamaicensis*), and northern harrier (*Circus cyaneus*). The American crow (*Corvus brachyrhynchos*), fish crow (*C. ossifragus*) and blue jay no doubt take eggs and nestlings. Indeed, we suspect that nest predation by blue jays may be one factor limiting the numbers of scrub jays in dense scrub or wooded habitats. The most frequent avian predators on adult jays are the sharp-shinned hawk (*Accipiter striatus*), Cooper's hawk (*A. cooperii*), merlin (*Falco columbarius*), and northern harrier.

Social Organization

Florida scrub jays live in groups, varying in size from a simple mated pair (group size of 2) up to large, extended-family groups of 8 adults and 1 to 4 juveniles. Large groups are rare; average group size is 3.

Four activities account for almost all daily actions performed by the jays: foraging, predator surveillance and defense, territory defense, and body maintenance. Jays execute all these activities in close proximity to one another within the group. They forage independently, but usually near each other among the shrubs or on the ground. When a large food item is obtained the possessor usually moves some distance away in order to consume it unharassed. One jay usually sits on an exposed perch as a sentinel while most other group members forage. If an aerial predator is spotted, distinctive warning calls are given and all jays dash for dense cover. If a ground predator is seen, alarm scolds are given and the group converges to mob the predator with noisy scolds and even furtive pecks. In fall and winter when bird-eating hawks (mostly *Accipiter* spp.) are most abundant, we suspect that the groups average at least one encounter with a hawk per day.

Florida scrub jays live in large all-purpose territories throughout their lives (e.g., Fig. 2.1). Exceptions occur during dispersal, when prebreeders are searching for breeding space. Territory defense is a group activity spearheaded by the breeders, especially the male, and sometimes the oldest male offspring. Territorial squabbles peak in fall and again in early spring before nesting. Many of the daylight hours are spent resting, especially during hot midday periods in the summer. However, when resting perched atop a low shrub in open habitat, Florida scrub jays probably are nearly immune to predation, and at the same time can scan for intruders into their territory. The advantages conferred by this behavior may help explain their obvious preference for low-growing vegetation unobstructed by large trees.

Well-defined division of labor exists between males and females, especially during the breeding season. Only females incubate eggs and brood young in the nest. Males lead in providing food for young nestlings and their mates. Males also are more often the leaders in territorial defense

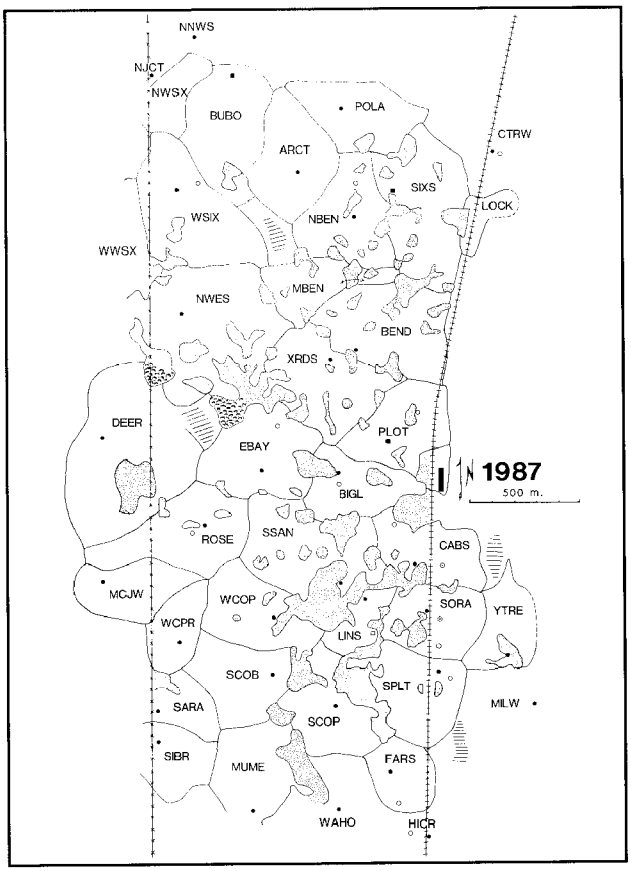


Figure 2.1. A representative map of Florida scrub jay territories (April 1987) occupying about 400 ha. of open, periodically burned oak scrub at Archbold Biological Station. Strippled areas are seasonally inundated grassy depressions rarely used by the jays. Four-letter codes refer to standard names for each territory in the study population. Main building of the Station is shown at center right adjacent to a north-south railroad track.

and predator mobbing, although both sexes participate actively in these activities.

Young jays remain in their natal territory for at least one year before beginning to attempt dispersal. Some, especially males, may remain non-breeders for several years. These "helpers" assist the breeders in most activities, including caring for dependent young. Although they do not build nests, incubate, or brood, they do feed nestlings and fledglings. They also help mob predators, perform sentinel duties, and defend the territory. Breeders assisted by helpers produce more independent young than pairs without helpers. Perhaps of equal importance, breeders show increased annual survival when helpers are present. Helpers also experience lower mortality while remaining within the group. Clearly all group members benefit in various ways from being a part of a group.

Reproduction

Florida scrub jays build their nests low to mid-height in dense shrubs (mean nest height is 1.0 m. at Archbold Biological Station). Often the nest is placed in a dense shrub at the edge of a thicket, bordering an open space or even bare ground. The nest is a bulky basket of twigs, usually taken from oak shrubs. Nests are lined with a tightly woven cup consisting entirely of fibers from *Sabal* palmettos or palms. The jays never reuse the nest or any of the materials from which it was constructed. Even if the nest is removed after use, the probability of their nesting in the exact same location is nil.

The nesting season extends from March through June (Fig. 2.2). True second broods, defined as a nest with eggs layed concurrent with living offspring from a previous brood of the same season, are extremely rare. At Archbold Biological Station we have documented 23 double broods in 524 pair-years (4.4%), and most of these occurred during a few exceptionally productive years. However, renesting after a nest fails is a regular event, especially early in the nesting season. The probability of a pair attempting a replacement clutch following nest failure declines rapidly after late April. Average number of attempts per pair per breeding season is 1.4, and typically the maximum number for any one pair is 3 attempts (one pair attempted 4 nests in 1972).

Clutch size typically is either 3 or 4 eggs (mean = 3.33, range - 1 to 5). Age and experience of the breeders, time in the nesting season, annual food supply, and heredity all influence clutch size to some extent.

Nest failure almost always occurs through predation. Inclement weather, desertion, fire, and starvation account for fewer than 2% of all losses. Overall nest success (probability of fledging at least one young) is about 50%, but this varies substantially with time in nesting season, with presence or absence of helpers, and among years. Nest success decreases steadily through the season. We suspect that this rapid decline, combined with greater risk of adult

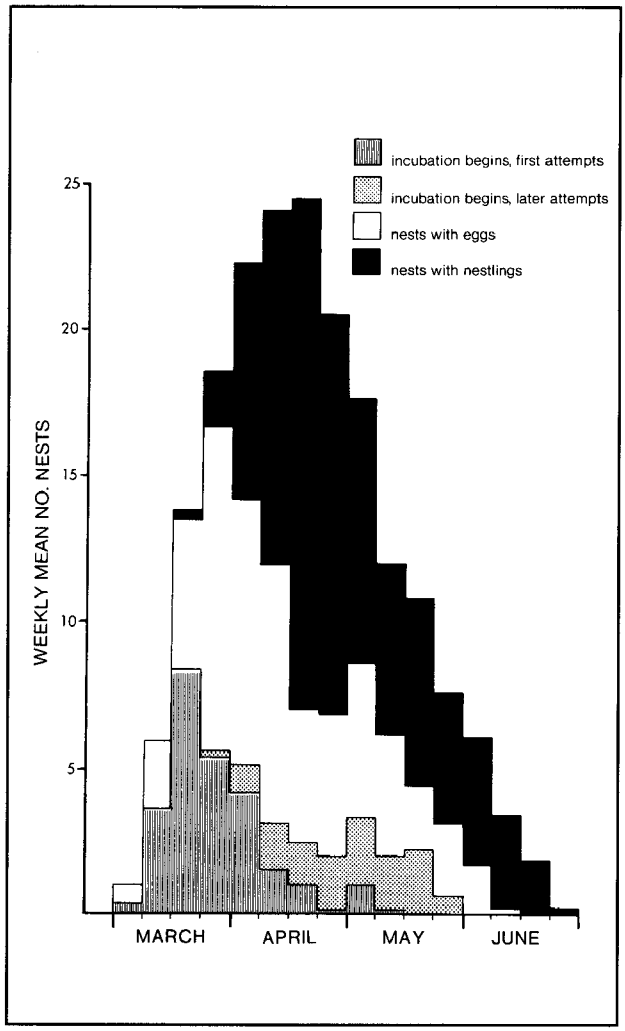


Figure 2.2. Nesting chronology of Florida scrub jays, based on nests found in the study tract at Archbold Biological Station, 1970-1979. The outer line shows the total number of nests with eggs or young each week. Black and shaded portions separate nests and renests into different stages. From Woolfenden and Fitzpatrick (1984).

mortality during nesting, contributes to the relatively brief nesting season of the Florida scrub jay compared to those of other songbirds in the region.

Average production of young is about 2 fledglings per pair per year. Fledgling brood sizes vary from 1 to 5, with 3 being by far the most common number for successful nests. Mortality of fledglings within the first few weeks post-fledging is extremely high. On average only about 35% of the fledglings survive to their first birthday, when they normally serve as helpers in the home territory.

Helpers

About 30-40% of the jays alive at the onset of a nesting season are not breeders. Predominantly yearlings, these jays are adult-plumaged prebreeders, mostly living in their natal territory where they assist the breeders, usually their parents, with all daily activities mentioned above. In performing these acts, nonbreeding helpers may further their own genetic representation in future generations.

This is because on average helpers help the breeders produce larger numbers of young, and these extra young usually are genetic sibs or half-sibs of the helpers. Helpers also behave in ways to maximize their own opportunities to become breeders. The probability that siblings will actively compete for breeding vacancies is reduced through an intrafamilial dominance hierarchy in which males dominate females, breeders dominate helpers, and older helpers dominate younger ones.

Space is at a premium in the world of Florida scrub jays. Potential breeders always outnumber breeding vacancies. Helper males may remain nonbreeders for up to five years, while helper females generally disperse after one or two years of helping. Both sexes follow the general strategy of waiting at home while monitoring the neighborhood for breeding vacancies, which mainly arise through the death of an established breeder. New territories arise at about the same rate as established ones disappear from deaths or family breakups.

New territories are established through a process we have termed *territorial budding* (Woolfenden and Fitzpatrick 1978). Helpers generally increase reproductive success and survival within the group, which naturally causes family size to increase. As family size grows, territory size also is expanded. Expansion occurs at the expense of neighboring breeders whose family size is decreasing. Frequently, following such a build-up, the dominant nonbreeding male takes over a segment of the now larger family territory as his own. Obtaining a mate from outside his functional family, he becomes a paired breeder on a new, "budded" territory. Female helpers become heirs to territory in this fashion only rarely. Budding is almost exclusively a male-inheritance system.

Female non-breeders also help at the nest, although they deliver less food than males of equal age. In addition to gaining experience at nesting, and minimizing risk of early mortality by spending most of their time in the safety of the home territory, females also are constantly monitoring the greater neighborhood for breeding vacancies or males that are budding a territory. As their territory grows, in part through their own efforts, the number of neighboring territories that can be monitored without leaving home increases. Thus, the helping system benefits females even though they rarely inherit space directly.

New territories cannot be established in habitat previously unoccupied, because essentially no such land exists (see Fig. 2.1). This fact presents the most fundamental ecological constraint facing Florida scrub jay populations. *It also presents the fundamental conservation problem.* The extremely intense competition for breeding vacancies has caused a social system to evolve in which prebreeders queue for breeding space within the existing territories. This insures that densities of breeders virtually always are at their maximum. The process of working to become breeders involves a system of cooperation within the family group. The cooperative-breeding system of the Florida scrub jay thus appears to be a natural evolutionary consequence of their restriction to a severely limited and sharply defined habitat.

Scrub jays have helpers only in Florida. In western North America where habitat suitable for these jays occurs in a variety of forms, over vast areas, and in a broad range of climates, the young leave home soon after they are nutritionally independent (Carmen in press). The profound differences between these closely related forms in Florida and western North America therefore provide unparallelled insight into forces shaping animal behavior and the evolution of cooperation. Because Florida scrub jays can be tamed so easily and live in a low-growing, easily observed habitat, they have considerable appeal and importance to the layman and scientist alike. Protected populations of this jay not only provide enjoyment to countless human neighbors, but also a natural outdoor laboratory (of increasing world-wide recognition) for the study of animal behavior.

MANAGEMENT POTENTIAL

Although genuinely threatened throughout the state, Florida scrub jays are by no means a hopeless case for preservation, even in the context of land development by humans. Many attributes of the species make it relatively easy to preserve, as long as some suitable habitat can be left intact at a site:

1) We know a great deal about the biology of the species already, which allows biologists and regulatory agencies to make accurate predictions as to the effects of certain activities upon the populations.

2) The species depends entirely upon one very specific and easily identified habitat.

3) The requisite habitat naturally occurs in patches or ecological "islands," many of them small and isolated from one another. Therefore, both the habitat and the bird have proven through geologic time that they can withstand fragmentation.

4) The Florida scrub jay is not migratory, but instead defends year-round territories that are passed on to succeeding generations indefinitely. Therefore, if the quality of the habitat remains suitable, no jay population will "voluntarily" leave the patch in search of new places to live.

5) Maintaining the habitat in its native condition is relatively easy if it can be burned. None of its component species is highly sensitive to environmental perturbations, as long as the soil is left more or less intact.

6) The Florida scrub jay is an attractive and endearing "flagship" species within a rare and vanishing habitat. Local residents routinely grow quite fond of "their" local groups of jays, which often become exceptionally tame. This attribute provides an *opportunity* for local developers to foster a special relationship between the residents, their environment, and a highly visible and

beautiful Florida specialty.

All these features make the Florida scrub jay a bird that can thrive around people. The jay can benefit enormously from the local protection of moderately sized habitat preserves. Moreover, each such preserve has a compound effect upon the fate of the species as a whole. Clusters of small, isolated preserves provide one another with occasional colonists that maintain genetic variability and provide some measure of insurance against local extinctions that normally occur through random population fluctuations.

HABITAT REQUIREMENTS

The essential habitat is oak-dominated scrub, a peculiar vegetation formation found only on extremely well-drained, sandy soil formed by old coastal dunes or paleodunes (Laessle 1958, 1968). The most characteristic and essential species in the habitat are four species of stunted, low-growing oaks. At different sites around the Florida peninsula these species occur in varying percentages, and one or two may even be lacking, but as a group they always dominate the habitat: scrub oak (*Quercus inopina*), sand live oak (*Q. geminata*), Chapman's oak (*Q. chapmanii*), and myrtle oak (*Q. myrtifolia*). Certain scrub habitats contain taxonomically confusing oaks closely related to *Q. geminata*, all of which are sometimes lumped under the name live oak (*Q. virginiana*).

In optimal jay habitat most of the oak shrubs are between 1 and 3 m. tall. Apparently critical to Florida scrub jays, the oak cover must be interspersed with numerous patches of exposed sand. Percent of total surface area represented by exposed sand can vary down to 10 to 15%; habitat with less open sand usually is overgrown and unsuitable. We suspect that various factors cause this peculiar ecological requirement, including the need for sufficient sandy substrate to bury and recover thousands of acorns each year. Florida scrub jays spend considerable portions of their foraging time on the ground, and while foraging they avoid areas of heavy leaf litter or herbaceous cover. As discussed below, natural fires were frequent in native oak scrub. Florida scrub jays will not persist in scrub that is prohibited from burning regularly. One possible reason for this is the steady loss of bare sand as leaf litter, herbaceous growth, and new oak shoots build up.

Trees and dense herbaceous vegetation are rare in naturally occurring habitats preferred by Florida scrub jays. Among the common plant associates in typical oak scrub habitat are scrub palmetto (*Sabal etonia*), saw palmetto (*Serenoa repens*) crooked wood (*Lyonia ferruginea*), fetterbush (*Lyonia lucida*), tar flower (*Befaria racemosa*), dwarf blueberry (*Vaccinium myrsinites*), scrub hickory (*Carya floridana*), and rosemary (*Ceratiola ericoides*), Trees, when they do occur, are widely scattered pines, usually slash pine (*Pinus elliottii*) or sand pine (*Pinus clausa*). Various grasses (e.g., *Aristida stricta, Panicum abscissum, Andropogon brachystachys*) grow in depressions between the sandy ridges. Where these depressions are wet or seasonally inundated, gallberry (*Ilex glabra*) or St. John's wort (*Hypericum* spp.) often occur.

A considerable body of literature exists on the oak scrub in Florida. Austin (1976) provides a general overview. Early references (e.g. Harper 1913, 1915, 1921; Howell 1932; Laessle 1958, 1968; Davis 1967) provide good descriptions including mention of the variable nature of scrubs around the Florida peninsula. Woolfenden and Fitzpatrick (1984, 1986), Cox (1984, 1987), and Breininger (1981) discuss the relationships between scrub habitats and aspects of Florida scrub jay population biology. Recent technical literature includes studies of natural succession (e.g. Abrahamson et al. 1984; Cooper et al. 1959; Veno 1976), effects of fire suppression (Givens et al. 1984), and the effects of prescribed burning (Doren et al. 1987).

Fire

Fire is a natural and frequent event in scrub habitats throughout Florida. The frequency and effects of natural fires in scrub habitats before the influence of man are still unclear, and presumably vary from site to site (Myers 1985, Myers and White 1987). No debate exists, however, that lightning strikes are frequent in summer months in peninsular Florida, and that they often ignite local brush fires in scrub habitats (e.g., Archbold Biological Station unpublished records). Local sites probably burned at intervals much shorter than the experimental 50-year spans studied by Myers (1985) and Myers and White (1987).

For Florida scrub jay habitat, a fire frequency averaging about once every 10 to 20 years is probably optimal. Much greater frequency (e.g., every 2-3 years) consistently maintains the principal oak species below acorn-bearing height, and may slowly favor the spread of palmettos at the expense of oaks. Lower frequency produces pine forests and tall, dense oak understories. These habitats (referred to below as "overgrown scrub") are of limited value, if not entirely unsuitable, to Florida scrub jays, and often are occupied by a competitor-predator, the blue jay.

At the Archbold Biological Station, fire suppression in a tract formerly supporting low, open oak scrub has provided an excellent experimental opportunity to document the response of Florida scrub jays to advanced habitat succession. The 400 ha property originally acquired by Richard Archbold in 1941 had last burned extensively about 1927 (Myers and White 1987). Extensive portions of this tract were occupied by Florida scrub jays through the 1940's (Amadon 1944), 1950's, and 1960's (Woolfenden 1974). By the onset of our long-term study in 1969 the habitat already had become tall and dense, with numerous sapling slash pines; density of territories in this tract was about 3.8 per 40 ha. During the 1970's we witnessed the gradual decline of jays in this tract, and since 1980 the area has been colonized only sporadically by

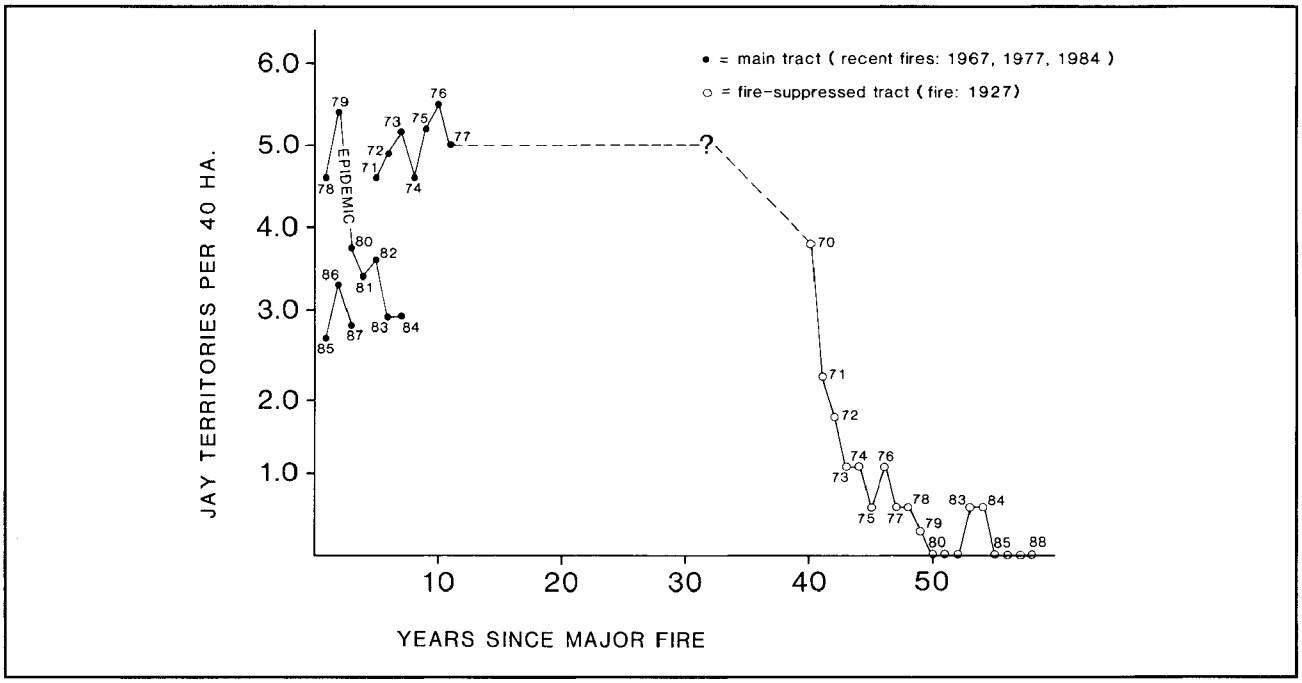


Figure 2.3. Density of Florida scrub jay territories in several tracts of scrubby flatwoods at Archbold Biological Station, in relation to time since most recent major fire in the respective habitat patch. Precipitous decline after 40 years post-fire reflects the point at which reproduction no longer kept pace with average mortality of adults and young in tall, overgrown scrub.

dispersing jays, then abandoned. Fifty years post-fire in this case was the final point, but reproduction and survival had dipped below replacement levels even by 1969 (about 42 years post-fire). Density in the fire-suppressed tract already had been reduced below the density in periodically-burned oak scrub just a few hundred meters away.

Fig. 2.3 summarizes our density measurements in relation to the most recent major fires at the Archbold Biological Station. We conclude that, for interior scrub, a fire frequency of 10 to 20 years is optimal for maintaining a healthy population of Florida scrub jays.

DISTRIBUTION AND POPULATIONS

The distribution of the Florida scrub jay throughout the state, both historically and in the early 1980's, was carefully documented and mapped by J.A. Cox (1984, 1987). Because the species is confined to a naturally patchy habitat (primarily old sand dunes or shorelines) its distribution is characterized by numerous small, isolated patches (Fig. 2.4). This is true even in the five counties in which the species is most abundant, Brevard (includes Merritt Is. National Wildlife Refuge, Kennedy Space Center, and Cape Canaveral Air Force Station), Highlands (includes Archbold Biological Station), and Marion, Lake, and Putnam counties (collectively include Ocala National Forest). The largest presently-existing contiguous populations of Florida scrub jays occur at and around the localities listed above in parentheses.

Historically the Florida scrub jay occurred on the peninsula in 39 of the 40 counties south of, and including, Levy, Gilchrist, Alachua, Clay, and Duval. Only the

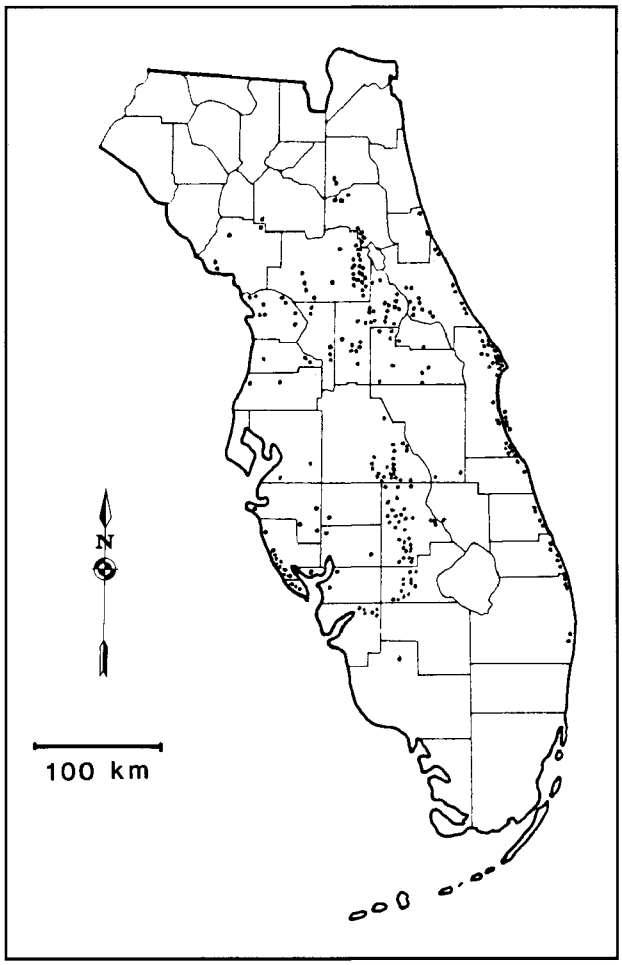


Figure 2.4. Approximate locations of all remaining populations of Florida scrub jays as of early in the 1980's. Modified from Cox (1984).

southernmost peninsular county, Monroe, lacked jays. The jay is now extirpated from 7 of these (Broward, Dade, Duval, Gilchrist, Hendry, Pinellas, and St. John's) and is nearing extirpation in several others. The distribution of the Florida scrub jay as of the early 1980's shown in Fig. 2.4 is drawn from Cox's report and amended slightly based on our own findings in certain areas.

Cox (1987) estimated the total population of Florida scrub jays in 1984 to be 15,600 to 22,800, and suggested that this represented a decrease of about 50% during historical times. By his own account, Cox's census methods were crude and often hasty. In our opinion they were susceptible to error and overestimate (see below). Regardless, the total number of individuals remaining in the state is not large, and has decreased rapidly in recent years, even since Cox conducted his counts.

Cox made judgements on the probability of survival of many of the isolated populations he located, and whose sizes he estimated. However, these judgements constituted necessarily subjective guesses as to whether the habitat patch would remain intact and suppositions as to whether the jays would survive in it. Furthermore, he mostly ignored the statewide problem of fire suppression rendering small habitat patches unsuitable. Unfortunately, based upon our demographic data and our models of population survival using real-world values, we consider most of Cox's judgements to be overly optimistic.

With due respect for Cox's valuable efforts, we provide one example from his report that illustrates the need for more realistic projections as to survival of Florida scrub jay populations. Cox (1987, p. 35) commented that "as many as 10 jays" were seen near the west side of the Immokalee Airport (Collier County), and stated that "the population could survive indefinitely." Estimates such as these contribute to his conclusion (p. 101) that "a total of 11,900 to 18,900 Florida scrub jays . . . may survive indefinitely into the future." However, our population models based on demography alone demand far more conservative estimates. Local sites with 10 jays (2 - 4 territories) bear about a 50% chance of going extinct within 30 years even in the absence of habitat degradation, unless they are located near a source population that could supply colonists as the population dwindles. The Florida peninsula contains scores, perhaps hundreds, of small populations such as those at Immokalee. The long-term future of the Florida scrub jay depends upon recognizing the fragile nature of such a population structure.

SUBSECTION 2.3
POPULATION DENSITY AND DEMOGRAPHY

POPULATION DENSITIES AND TERRITORY SIZE

Preservation of Florida scrub jays in the context of land development requires strict attention to two facts: all individuals reside within territories, and each territory must contain sufficient habitat to sustain a family of jays throughout the year. Therefore, the importance of a given parcel of scrub for preserving a *population* of scrub jays depends upon three particulars: 1) the total *area* of habitat; 2) the density of territories supported by that patch of habitat; 3) the *long-term management* of the habitat to maintain its suitability for scrub jays. The first and third of these issues, in large part, are subject to control by humans. The second issue, territory density, largely is determined by the natural quality of the local habitat and by the evolutionary and ecological history of the scrub jay in Florida. In a natural scrub not already perturbed by man, Florida scrub jay territory densities probably cannot be significantly increased by management.

Density

The most biologically sound measure of Florida scrub jay density is the number of jay territories defended within a unit area of scrub. Use of this measure over other density estimates (e.g., jays per ha) is dictated by several aspects of Florida scrub jay behavior and ecology. Most important, jays are easily attracted to human census-takers, especially along artificial openings such as trails or roads. Calculating densities based upon numbers thus obtained can result in substantial overestimates. Secondly, our long-term data show that densities of territories fluctuate little from year to year, even during periods when total jay density varies widely. Therefore, counting the number of territories within a given area of native scrub provides a reliable measure of the long-term carrying capacity of the local habitat patch. Thirdly, the number of territories provides the only meaningful measure of the number of breeding jays, because each territory contains one and only one monogamous pair of jays. Additional jays (juveniles and older "helpers") can obscure the biologically important density, namely the density of reproductive individuals. Finally, measuring or estimating the density of territories is easily accomplished using tape-recorded jay vocalizations to attract each territorial group and plotting them on aerial photographs. This method is elaborated in Subsection 1.2.

Figure 2.5 shows densities of Florida scrub jay territories in three habitats at the Archbold Biological Station from 1971 through 1987. We have observed natural

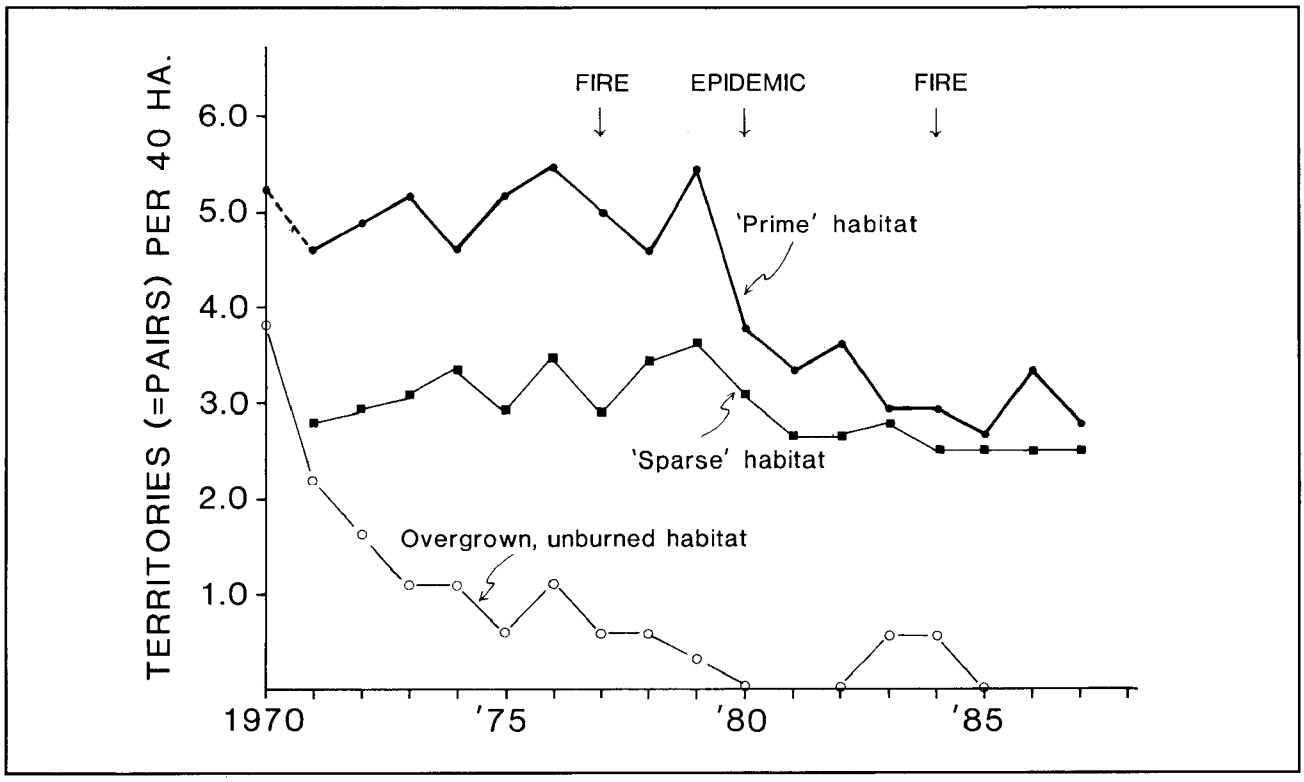


Figure 2.5. Densities of Florida scrub jay territories in three scrubby flatwoods habitats at Archbold Biological Station. Higher density occurs in periodically-burned oak scrub atop well drained sand ridges, while adjacent lower-lying habitat of sparser oak density and abundant palmetto-wiregrass areas supports larger territories, hence lower density. Overgrown scrubby flatwoods supports declining population 40 years after the most recent fire.

variation from about 2 to about 6 territories per 40 ha. of scrub. Mean density in the apparently prime habitat was about 5 territories per 40 ha. before an epidemic in 1979. That habitat patch now varies between 3 and 4 territories per 40 ha, perhaps reflecting lower carrying capacity owing to more extensive burning after the epidemic, perhaps reflecting a regional aftereffect from the epidemic itself (see below).

Territory sizes are larger in scrub habitats that are poorer in quality. At Archbold Biological Station, jay density along the western edge of our study tract ("sparse" habitat) varied between 2.5 and 3.5 territories per 40 ha, 1971-1987 (mean = 2.9; Fig. 2.5). This area is characterized by widely scattered oak patches interspersed with extensive areas of low palmetto and sparse oaks. Scrub jay density declines at the other extreme of oak density as well. In scrubby flatwoods (sensu Abrahamson 1984) that had not burned since the 1930's, density of Florida scrub jays declined in the 1970's from about 3.0 territories per 40 ha to nearly zero. This area has been occupied only sporadically since 1980 (Fig. 2.5). The management implications of this experimental result are discussed carefully elsewhere. Its importance here is the indication that jay densities even in excellent scrubby flatwoods habitat probably *rarely exceed* 5 to 6 territories per 40 ha, and often are considerably lower.

Densities of Florida scrub jays at Archbold Biological Station appear to be similar to those elsewhere around Florida (contra Westcott 1970), although comparably detailed data from other study sites are not available. Cox (1984, 1987) found that "densities of 10-20 birds/40 ha seem to be typical" (Cox 1987, p. 3). Considering average group sizes to be about 3 jays (Woolfenden and Fitzpatrick 1984), these figures correspond to densities of 3.3 to 6.7 territories per 40 ha. Certain areas may occasionally harbor considerably higher densities (e.g., Breininger 1981), but all such estimates known to us are made in disturbed areas where temporary jay concentrations probably do not reflect true local densities (Breininger pers. comm.). Until any study using mapped territories reveals a genuinely higher density, we consider 6.5 territories per 40 ha (ca. 0.5 jays per ha) to be the maximum sustainable density of Florida scrub jays within optimal habitat for the species. Densities of about 2.0 territories per 40 ha should be considered the minimum for stable populations.

Determining a course of action at a site containing Florida scrub jays requires knowledge of population density and local distribution. These data are necessary to assess the population size, and must be used in planning which areas to commit toward scrub jay habitat preservation. The best survey method is to plot the locations of jay families on an aerial photograph or detailed vegetation map of the site. The entire area should be censused carefully enough to insure that most or all groups of jays are noted.

Detailed methods for surveying for Florida scrub jays are presented in Section 1; Figure 1.13 shows a map of a three square-mile tract in Highlands County that was mapped over several days using these methods.

Territory Size

Average territory sizes in continuous oak scrub habitat sometimes can be calculated directly from density estimates. However, most scrub is patchy and characterized by sandy ridges with shrubby oaks interspersed by low areas supporting other plant formations (e.g., flatwoods, palmetto, grassy ponds). Density estimates in highly patchy scrub do not provide direct estimates of territory size, because the jays avoid some of the non-oak habitats.

At Archbold Biological Station, Florida scrub jay territories have been mapped precisely from 1971 to the present. Our maps permit us to delete unused habitats from the measurements of territory size for certain analyses. Overall average territory size in good jay habitat is 9.0 ha (about 23 acres; Woolfenden and Fitzpatrick 1984). Stable territories have ranged in size from 4 to 18 ha (10 to 45 acres). From a conservation perspective, this should be considered the *average amount of usable oak habitat* required to support a single breeding group of Florida scrub jays. Because most scrub habitats contain patches of unused habitat, the total area effectively occupied by jay territories is larger than 23 acres on average. *We recommend considering the average space requirement of the Florida scrub jay to be 25 acres per territory.*

Considerable variation in territory size exists among groups, among habitats, and among years (Fig. 2.3). The most important variables affecting territory size are habitat quality and group size (Woolfenden and Fitzpatrick 1978, 1984). Fig. 2.6 shows two important samples of territories that were substantially smaller than the average for the study population. The lower contains the smallest territories maintained by a single breeding pair for three or more consecutive years. The average size of 5.4 ha (13.5 acres) among this sample provides the best available estimate for the *minimum sustainable territory size* for the Florida scrub jay within contiguous, optimal habitat. The upper includes all smaller-than-average territories that *disappeared* after only one or two years. Many of these persisted for only a few months, as the breeders unsuccessfully attempted to expand their boundaries. Average size among this sample of failures was 3.3 ha (8.3 acres). This result corroborates our suspicion that territories containing less than about 5.4 ha (13.5 acres) of oak scrub cannot be considered adequate to support a family of jays.

Figure 2.7 shows sizes of 33 jay territories in unburned, overgrown oak scrub prior to their disappearance from this unsuitable habitat. The average size of 6.9 ha (17.3 acres) in the unsuitable habitat is significantly smaller than the average size in optimal scrub ($t = 11.3$, $p < .0001$), yet larger than the minimum-sustained territories in optimal scrub. This indicates that territory size problems per se were not a primary cause of disappearances within the unburned habitat.

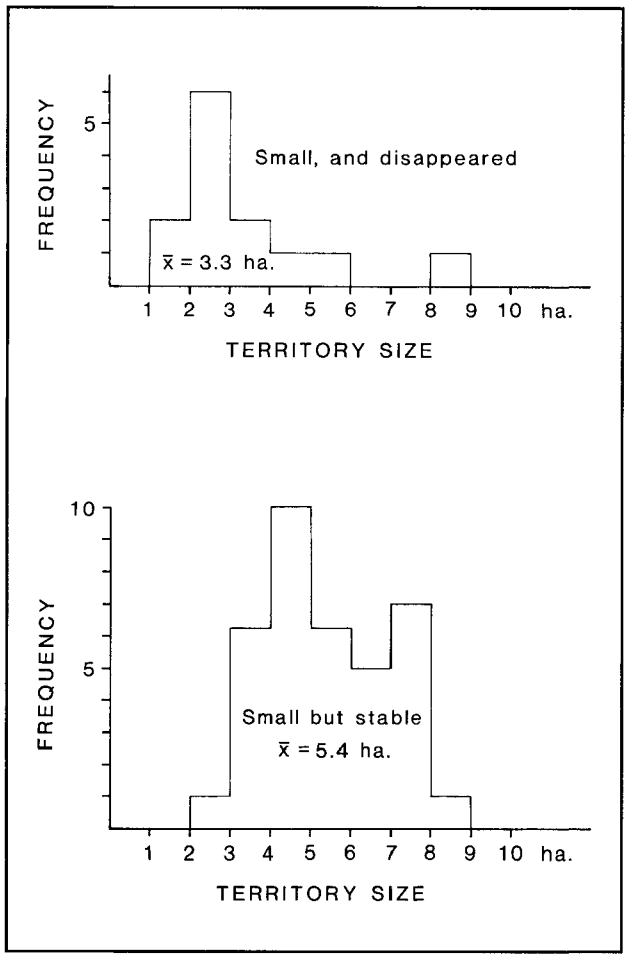


Figure 2.6. Two samples of the smallest territory sizes at Archbold Biological Station, 1970-1979. Upper sample contains territories that disappeared after one year, often through abandonment by the unsuccessful breeders. In lower sample territories persisted for three to four years before either disappearing or expanding. The lower sample probably reflects the smallest sustainable territory size for Florida scrub jays in open scrubby flatwoods habitat.

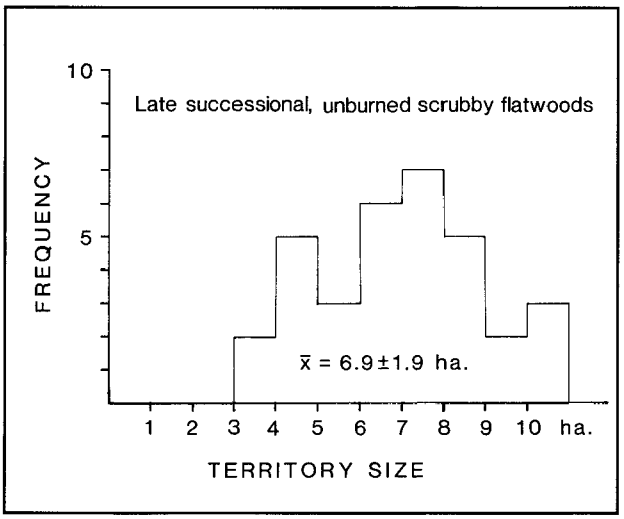


Figure 2.7. Territory sizes of all groups living in late successional, unburned scrubby flatwoods at Archbold Biological Station, 1970-1986. Mean size is slightly smaller than average throughout the main study area, and larger than the apparent minimum sustainable size shown in Fig. 2.6.

REPRODUCTION AND MORTALITY IN SEVERAL HABITATS

Long-term survival of any population depends upon adequate recruitment of new breeders to replace those that die. The balance between birth rates and death rates depends upon a host of variables, and can vary substantially from year to year. However, fundamental to the long-term survival of any Florida scrub jay population is the necessity to maintain this average balance. A large part of the management scheme to protect Florida scrub jays must include efforts to reduce or avoid perturbations that reduce average reproductive success or increase average mortality beyond equilibrium values.

Average Values

Table 2.1 summarizes reproduction and survival in the Florida scrub jay at Archbold Biological Station from 1969 through 1986. The results are separated into four habitat categories pertinent to management concerns: periodically-burned, open oak scrub; unburned and overgrown scrubby flatwoods; unburned Southern Ridge Sandhill (Slash Pine/Turkey Oak formation); mature citrus groves bordering scrub. To our knowledge these represent the only data of their kind for any population of Florida scrub jays. Data on other populations, in other scrub habitats within Florida, would be extremely useful for testing the generality of the following conclusions.

Long-term survival of a population of Florida scrub jays is impossible in all habitats we monitored except for periodically-burned oak scrub. In this habitat: average annual reproductive success was 2.0 fledglings per pair; average survival of fledglings to age one year ("yearlings") was .31; average annual survival of breeding adults was .79. These values translate to an average lifetime production of about 1.3 jays of potential breeding age (yearling) per individual. (The surplus of potential breeders represents the source of the "helper" population—non-breeders working their way into the breeding ranks.)

In each of the remaining habitats monitored, annual reproductive success or survivorship, or both, were substantially lower than in open scrub habitat. The worst of all habitats was overgrown, unburned scrubby flatwoods. Reproductive success was 1.6 fledglings per pair, first year survival was .23, and annual breeder survival was only .72. Under these demographic conditions the average individual breeder does not replace itself, instead producing only 0.6 potentially breeding offspring. This explains why the local populations inhabiting these unburned, late successional habitats became extirpated (Figure 2.5). In the remaining two habitats, where our samples are smaller, reduced reproductive success and greatly increased breeder mortality produced demographic conditions only slightly better than in unburned scrub. Average breeders produced only 0.8 potential breeding offspring, again causing the populations to go locally extinct.

Table 2.1. Mean surviviorships and reproduction of Florida scrub jays in several habitats, 1969-1986

	HABITAT							
	Periodically burned, open-oak scrub		Unburned, overgrown scrubby flatwoods		Unburned Southern Ridge Sandhill (Slash Pine-Turkey Oak)		Mature Citrus bordering unburned scrub	
N (pair-years)	429		74		8		21	
Seasonal nest attempts	1.38	(593/429)	1.49	(110/74)	1.50	(12/8)	1.11	(20/18)
Fledgl./pr.	1.97	(843/429)	1.58	(117/74)	1.38	(11/8)	2.00	(38/18)
Indep. Yg./pr.	1.17	(500/429)	0.80	(59/74)	1.13	(9/8)	1.56	(28/18)
Yearl./pr.	0.60	(259/429)	0.36	(27/74)	0.50	(4/8)	0.61	(11/18)
First-yr. survival	0.307	(259/843)	0.231	(27/117)	0.364	(4/11)	0.289	(11/38)
Breeder survival	0.789	(697/883)†	0.723	(107/148)	0.688	(11/16)	0.619	(26/42)
	EXPECTED LIFETIME SUCCESS/INDIVIDUAL							
Breeding seasons	4.4		3.5		3.2		2.6	
Fledglings	4.3		2.8		2.2		2.6	
Indep. Young	2.6		1.4		1.8		2.0	
Yearlings	1.3		0.6		0.8		0.8	

†N = 883 breeder-years for calculating breeder survival

Annual Variation

Average values for reproduction and survival form a general picture of the health and long-term prospects of a population. However, no single year in the life of a jay or a population is an "average" year. Natural environmental variability plays an exceedingly important role in governing the probability that a given population can survive (MacArthur and Wilson 1967, Soule 1987). For Florida scrub jays, this aspect of population biology is especially crucial because of their naturally patchy, "island-like" distribution. Populations being protected for long-term conservation must be large enough to withstand, or recover from, random fluctuations in birth rate or death rate.

Our long-term data on Florida scrub jay demography provide an opportunity to assign values to the variation surrounding the mean birth rates and death rates. Figures 2.8, 2.9, and 2.10 clearly illustrate the difference between healthy, periodically-burned scrub and overgrown, unburned scrub. Three conclusions are paramount from these graphs and the data in Table 2.1:

1) The average annual values for reproduction and survival are consistently higher in the periodically-burned scrub compared to the overgrown habitat (Table 2.1). In only 4 of 18 years was average fledgling production slightly higher in the tall, unburned habitat. All were during relatively productive years, when both habitats did well. Until 1985, when sample sizes in suboptimal habitat had become very small, only one year in 15 showed mortality in unburned habitat below that in open, periodically-burned habitat (Fig. 2.10). The single exceptional year (1980) was one of unusually low mortality in both habitats.

2) Variation among years is substantial, regardless of habitat. Even in the optimal habitat, average reproductive success has varied from 1.05 to 2.71 fledglings per pair (Fig. 2.8) and breeder mortality ranged from .04 to .45 (Fig. 2.10). Such wide swings in birth and death rates cause considerable local fluctuations in population size and structure. Assuming that these results are typical for Florida scrub jay populations across the state, *the long-term implications of demographic variability among years must be built into any management or conservation plan.*

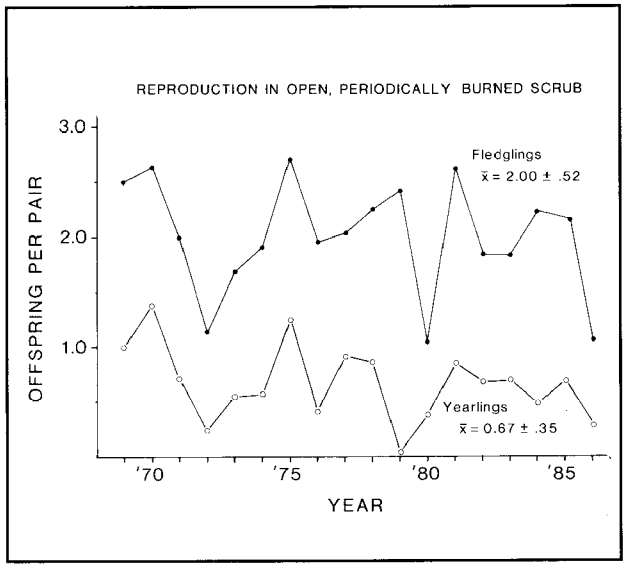


Figure 2.8. Reproduction in open, periodically burned scrubby flatwoods on the main study tract at Archbold Biological Station, 1969-1986. Compare with Fig. 2.9.

3) Variation among years is especially pronounced in the suboptimal habitats, suggesting yet another risk to Florida scrub jay populations inhabiting them. Coefficient of variation (CV) in average fledgling production is lower in periodically-burned scrub compared to unburned scrub (26% vs. 52%), and the same holds for production of

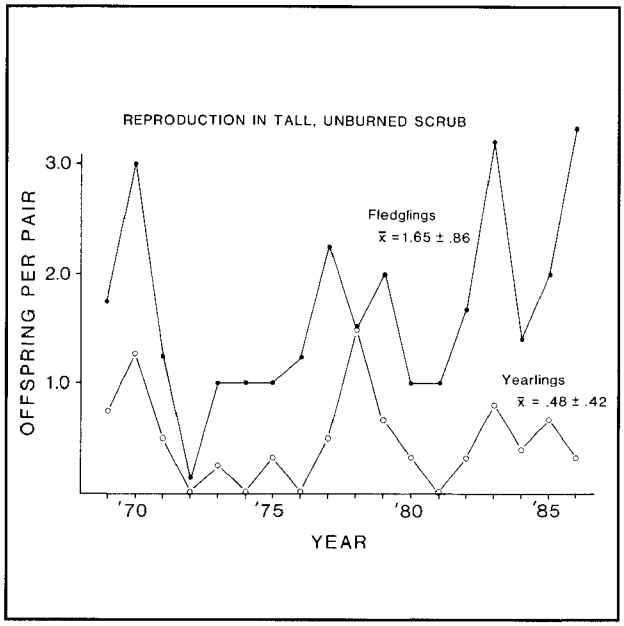


Figure 2.9. Reproduction in tall, unburned scrubby flatwoods and tall ridge scrub with abundant scrub hickory at Archbold Biological Station, 1969-1986. Compare with Fig. 2.8.

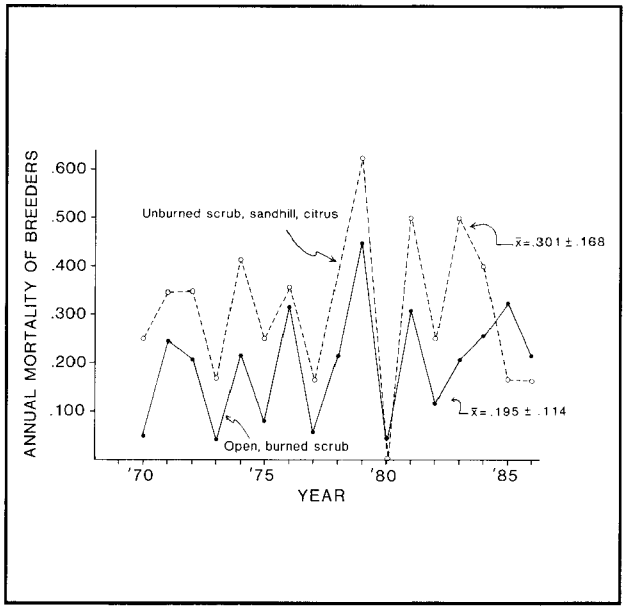


Figure 2.10. Annual mortality of breeding Florida scrub jays at Archbold Biological Station, 1970-1986. Mortality in open, periodically-burned scrub in main study tract is lower than that of several other habitats, all unburned since 1927. Dashed line includes small number of jays living at the edge of a citrus grove bordering tall, unburned ridge scrub for several years before going extinct.

yearlings (52% vs. 88%). Coefficient of variation in annual mortality is similar between the two habitats (54% vs. 55%), but the total range is higher for the unburned habitat (including a year in which nearly two-thirds of the breeders died). Greater variation in demographic parameters leads to greater annual fluctuations in population size. This leads to an important conclusion: *small, isolated populations of Florida scrub jays are more likely to become extinct owing to normal demographic fluctuations if their habitat is not maintained in a low, open condition by periodic burning.*

EPIDEMICS AND OTHER NATURAL CATASTROPHIES

In addition to normal year to year fluctuations in birth and death rates, population numbers are affected by the frequency and severity of catastrophic mortality. All demographic models of extinction probabilities for small populations converge upon one striking conclusion: *the relationship between population size and its probability of extinction depends very heavily upon the frequency and nature of catastrophies* (Ewens et al. 1987, Shaffer 1987).

Epidemics

One catastrophic event has affected the Florida scrub jay population at Archbold Biological Station between 1969 and 1988. Between September 1979 and February 1980 an apparent epidemic swept through the study population, killing about half of all adult-plumaged jays and all but one of 93 juveniles of the 1979 year-class (Fig. 2.11). Characteristics of this epidemic are described in Woolfenden and Fitzpatrick (1984, pp.351-355), and its demographic consequences are summarized here in Table 2.2. Although no epizootic agent was identified, water levels in late summer 1979 were abnormally high throughout the scrub habitat in and around the study area. We suspect that this condition permitted a lethal arbovirus to incubate and spread, possibly borne by mosquitoes. No sick jays were observed, suggesting that death was rapid after infection. In all, 128 of 184 jays (70%) in the study tract died between June, 1979 and May, 1980. Fifty-three of these deaths (41%) were noted during September and October (Fig. 2.11).

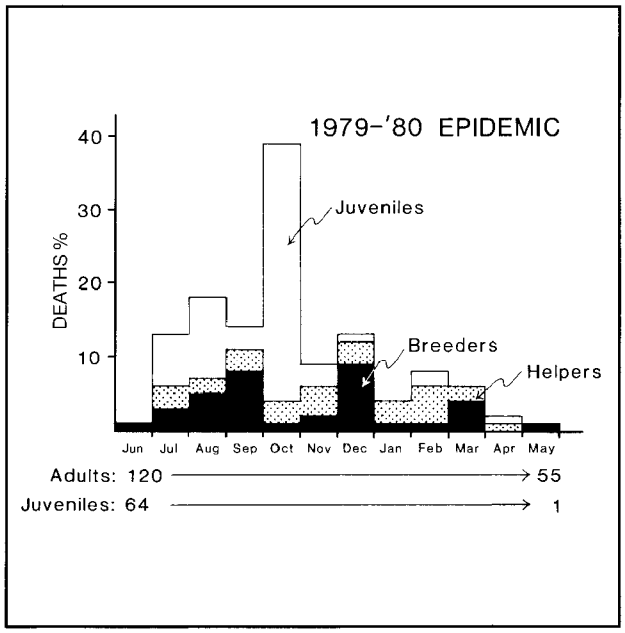


Figure 2.11. Phenology of an apparent epidemic; nearly 70% of the 184 Florida scrub jays alive in mid-June, 1979, were dead by the following May. Breeder and helper mortality approached 50%, and juvenile mortality was essentially complete.

Table 2.2. Effects of apparent epidemic in Florida scrub jay study tract, September 1979-February 1980.

	Previous Averages (1969-1979)	1979-80
ANNUAL SURVIVAL:		
BREEDERS	0.81	0.55*
HELPERS	0.80	0.49
JUVENILES	0.34	0.01
REPRODUCTION:		
(fledglings per pair)	2.04 ($\bar{x}$) 2.42 (1979)	1.05 (1980)
BREEDING DENSITY		
(pairs per 40 ha.)	5.0	3.8 (1980)

*Mortality of oldest breeders (age 9 or older, N = 18) significantly higher than that of youngest breeders (age 2 or 3, N = 26), with rates of .54 vs. 31, respectively ($\chi^2 = 6.32$, $p<.01$).

We have no data to indicate how widespread the 1979 epidemic was in southern Highlands County beyond our study area at the Archbold Biological Station. A few jays of the 1979 year-class immigrated into the study tract over the ensuing year, proving that the regional population of that year-class was not totally destroyed. However, the total population density in our study tract has not recovered to its pre-epidemic levels (Fig. 2.11). Presumably, immigration from surrounding areas of higher density would have been rapid if the population reduction had been limited to the immediate study area. We suspect that elevated mortality afflicted at least the entire population of the Archbold Biological Station (ca. 120 pairs), and probably the contiguous scrub habitats around its borders.

We have no way yet of estimating how frequent or regularly spaced such epidemics are in natural populations of Florida scrub jays. Certainly on our study site they are rare with respect to the average lifetime of a jay, as the study population has experienced only one epidemic, approximately midway through our 20 years of study. For purposes of projecting an expected frequency of epidemics, therefore, we can only make educated guesses. Moreover, the frequency of such catastrophic events presumably varies regionally. Even if we knew their frequency in southern Highlands County, we would need comparable data from several other populations before confidently estimating a general frequency for the species as a whole.

Various circumstances lead us to suspect that a die-off of older breeding jays had overtaken our study tract shortly before the study began in 1969. Largely for this reason, in the demographic models to follow we have chosen to incorporate epidemics occurring at an average frequency of one every 20 years (results assuming a lower frequency are also shown).

Other Catastrophies

Besides epidemic diseases, we know of no other natural catastrophies that affect Florida scrub jay populations. Fire, even when hot and widespread, probably is never catastrophic in its long-term effects. We know that jays continue to use and defend burned oak scrub, and the scrub regenerates extremely quickly after any fire (Abrahamson 1984). Because they do not migrate, and live in a warm temperate climate, Florida scrub jays are not subject to large scale, weather-related disasters that occasionally inflict heavy mortality on migratory bird populations or those restricted to cold, less predictable climes. Major tropical storms and hurricanes periodically batter portions of peninsular Florida, but their effects on oak scrub are minimal. No natural predator is known to be capable of systematically devouring enough individual scrub jays in a local area to affect populations at catastrophic levels. In the absence of habitat alteration by humans, Florida scrub jay populations probably are as resilient to natural catastrophy as any native bird population in Florida.

DISPERSAL CHARACTERISTICS

Florida scrub jays are extremely sedentary, a feature that may have profound influence upon large scale population structures and upon habitat protection measures. Juvenile jays remain in their natal territory for one to five years before dispersing to become breeders. Only during a brief pre-breeding period do Florida scrub jays disperse any appreciable distance. Once they become breeders, jays remain on or near their breeding territory until death. Fig. 2.12 (from Woolfenden and Fitzpatrick 1986) shows documented dispersal distances of 119 color-marked jays that became breeders in or near the study tract at Archbold Biological Station. Typical of most bird species (Greenwood 1980), females on average move slightly farther from their natal ground than do males. No male is known to have dispersed more than 1.5 km. from its birthplace. Average dispersal distance for females is 1.1 km., and the maximum confirmed dispersal distance known to us is 5.6 km. (about 3.4 miles). Most Florida scrub jays become breeders within a few hundred meters of the patch of scrub in which they were hatched.

The sedentary nature of Florida scrub jays has important implications for conservation measures. On the positive side, territorial inheritance and short-distance dispersal insure that protected patches of suitable habitat routinely pass among generations without requiring new colonization events. Successful lineages of jays probably retain "possession" of good patches of habitat for many decades under natural circumstances. In addition, limited contact between local populations may reduce the probability that lethal diseases can spread across major portions of a regional population.

On the negative side, isolated patches of suitable scrub in which jay populations have drifted to extinction may go uncolonized indefinitely if they are more than a few km. from the closest possible source population. Small populations are less likely to go extinct in the first place if they

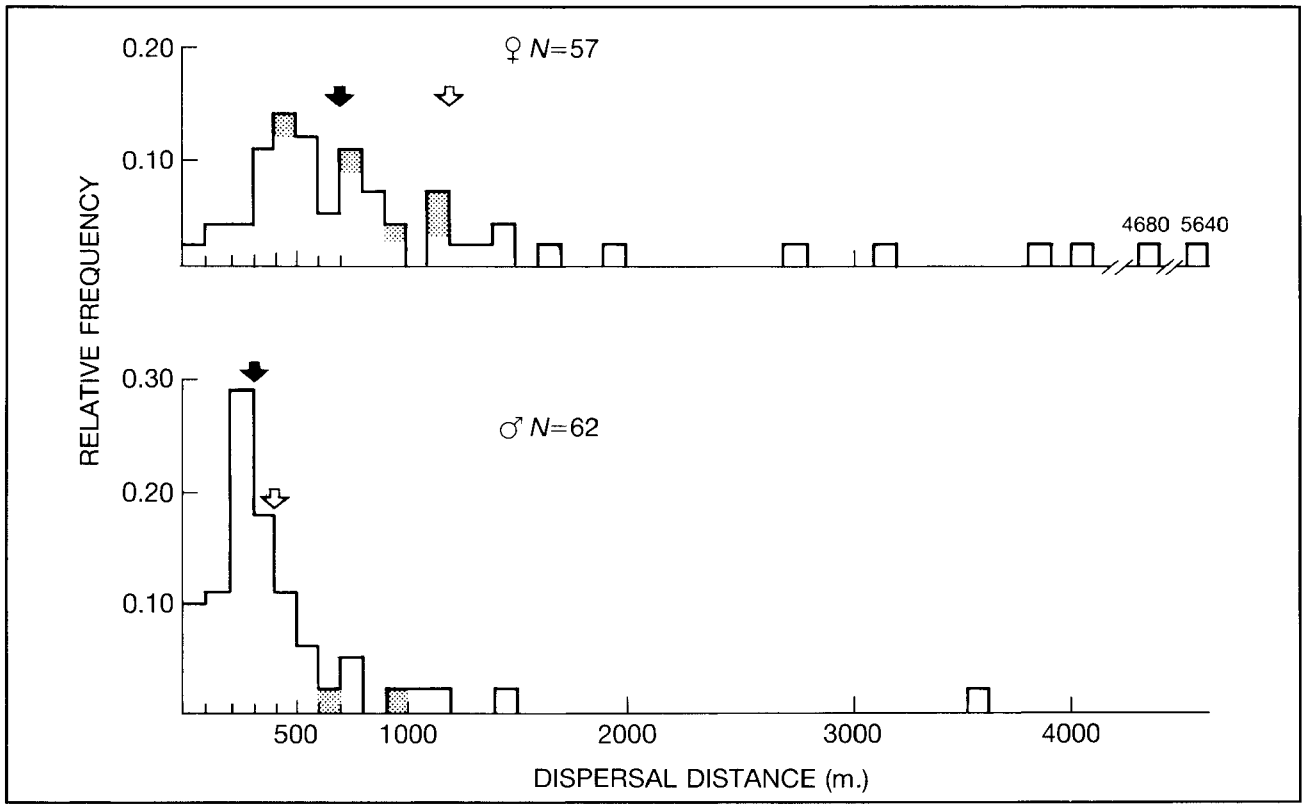


Figure 2.12. Dispersal distances of male and female Florida scrub jays, measured between nest last attended as a helper and first nest of first season as a breeder. Median (solid arrows) and mean (open arrows) dispersal distances are indicated. Shaded samples represent known minimum distances for known-age immigrants upon entering the study tract. From Woolfenden and Fitzpatrick (1986).

are located within the normal dispersal radius of other jay populations. For these reasons, clusters of small to intermediate-sized local populations may constitute a suitable configuration of Florida scrub jay meta-populations where the total area of preserved habitat is limited.

Based on our dispersal data, we suggest that *isolated scrub habitat preserves within about 5 miles of one another are sufficiently close to allow for some occasional movement of Florida scrub jays among them.*

SUBSECTION 2.4
FLORIDA SCRUB JAY CONSERVATION ISSUES

The Florida scrub jay easily could become a symbol of successful conservation efforts within Florida. Not only are its populations eminently preservable, but the birds themselves have numerous qualities that endear them to humans. Foremost among these is the fact that Florida scrub jays can become extremely tame, and even often give the impression of enjoying perching atop the hands or heads of surprised onlookers. Once tame they are easy to attract and observe. They are aesthetically and intellectually pleasing, possessing a rich and complex social system that can be examined at close range. If viewed with respect and admiration for what they tell us about ecology and the environment, they have the potential for capturing the fancy of otherwise disinterested landowners. Protection of Florida scrub jays insures the protection of an entire community of threatened species. The jay can become Florida's most easily advertised conservation success story. In this section we describe the harmful, the non-harmful, and the potentially beneficial effects of humans on Florida scrub jay populations.

POPULATION DECLINE: CAUSES AND PREVENTION

Habitat Elimination

Without question, the most pervasive and final action brought about by humans that reduces or destroys populations of Florida scrub jays is outright elimination of their habitat. The clearing of oak scrub, whether a few thousand acres or patches of a few acres, reduces the number of territories of scrub jays that can be supported. *The popular misconception that clearing a few acres of scrub will simply cause the resident family to "move over" to adjacent scrub is patently false.* If it is suitable for jays, the adjacent scrub is occupied already by its own resident, territorial groups of jays, and these territories cannot be compressed to "make room" for new ones. It is extremely difficult or impossible to increase the local carrying capacity for Florida scrub jays. Jays that are displaced from a territory because of destruction of their habitat are immediately dead, from the population standpoint.

Large-scale developments located in areas containing Florida scrub jays can insure persistence of the jays only by leaving one or more sizeable tracts of oak scrub intact, and by following procedures to avoid degradation of the habitat, especially through management via prescribed burning.

Habitat Fragmentation

Despite all safeguards, some populations of Florida scrub jays become extinct through random fluctuations in their numbers. Undoubtedly some of these local extinctions took place even before humans began accelerating their frequency and making them irreversible. As with populations of any organism, the probability of random extinction increases as population size decreases. In Florida today, several areas of apparently suitable oak scrub lack Florida scrub jays. To our knowledge, no specific local extirpation is *known* to have resulted from random population fluctuations, but the probability is high that some indeed have.

As large continuous tracts of oak scrub are broken into smaller and smaller fragments during the course of human development, local populations of Florida scrub jays are isolated from one another. Inevitably, smaller populations have higher probabilities of extinction than larger ones (MacArthur and Wilson 1967). Inevitably, therefore, fragmentation of habitat increases the rate of local extirpation of jays beyond that which would be expected from the overall loss of habitat alone.

Developments in which Florida scrub jay preservation is being attempted should make every reasonable effort to maximize the area of suitable habitat left intact, and to configure it in the fewest possible patches so as to maximize the size of each isolated population of jays. This technique will minimize the probability that each population will go extinct.

When the choice exists, favor preservation of one or a few large tracts of oak scrub habitat rather than a larger number of smaller preserves. If several tracts can be preserved, small patches of scrub or corridors of scrub between the larger tracts will reduce the probability that the jays in any one patch will go extinct. No Florida scrub jay population containing fewer than 30 territories can be considered safe from extinction over the long term. The ideal system for habitat preservation is a network of at least 750-acre scrub tracts in which no tract is greater than 5 miles from another.

Habitat Degradation

Almost as important as outright obliteration of habitat are various forms of degradation commonly inflicted upon oak scrub in Florida. The most common form of habitat degradation is the supression or prevention of fire, which has the *inevitable* result of changing the structure of the habitat into one that cannot support Florida scrub jays. We have visited numerous isolated tracts of habitat that once had been open, oak-dominated scrub, but in recent years are characterized by dense overstories of pines, especially sand pine, and thickets of tall oak shrubs. Such areas either lack Florida scrub jays entirely, or support a few scattered pairs around the edges where open oaks still exist.

Many oak scrubs in Florida support large populations of sand pines, which form dense canopies when mature. Cox (1984, 1987) found reductions in Florida scrub jay densities in any scrub with more than 20% cover by trees. Florida scrub jays cannot exist in mature sand pine scrub, nor in slash pine scrub (scrubby flatwoods) that has gone unburned more than about 40 years. However, fire or clear-cutting in a mature sand pine scrub community causes a return to conditions acceptable for Florida scrub jays.

It is imperative that assessment of any area as potential habitat for Florida scrub jays include careful biological judgement as to the area's suitability after habitat restoration by prescribed burning and/or clear-cutting. Oak scrub habitats can remain near optimal in condition for Florida scrub jays indefinitely, but only through a fire management program or its equivalent. The best program would be a rotation of prescribed burns, each covering relatively small portions of a preserved tract of scrub. On average, each point in the tract should be burned about once every 10 to 20 years. It is not necessary, nor even advantageous, that every square meter of scrub burn during a prescribed burn. Natural scrub fires usually are extremely patchy, and the jays continue to defend and use their entire territory after it burns. Small patches left unburned provide cover and foraging sites as the scrub regenerates.

Dirt bikes and other off-road vehicles disrupt the sand soil layers and uproot underground stems of oaks and other scrub perennials. The disturbed sandy soil becomes acceptable substrate for numerous exotic species that spread and dominate scrub. Most notorious of these is Brazilian pepper (*Schinus terebinthifolia*), a tall and fast-growing shrub that has taken over extensive areas of scrub formerly occupied by Florida scrub jays, especially in the coastal scrubs inland from the Atlantic Ocean. Such fast-spreading perennials commonly begin along the edges of roadways through scrub.

Other intrusions include frequent and uncontrolled pedestrian traffic, trash dumps, and other casual uses of oak scrub habitat. These activities reduce the quality of scrub habitat for jays, primarily by decreasing the density of oak shrubs or inhibiting their growth. Any such degradation has the effect of reducing the density of territories that can be supported in the area.

Degradation of existing scrub through a variety of human uses is especially hazardous to Florida scrub jay populations located on very small tracts of habitat. Several small (15-30 ha) patches of once-suitable scrub in Indian River County (Cox 1987) were found to lack the jays in 1987. These areas were surrounded by residential housing, and were criss-crossed with dirt-bike trails. Alien annuals and perennials were abundant among the oak shrubs. Refuse was scattered throughout. We suspect that the level of human disturbance *of the habitat* (not of the jays per se) was responsible for these extirpations, although we cannot rule out that mortality, from house cats for example, also played a role.

Florida scrub jays *can* coexist alongside humans, as long as the native structure and species composition of the principal patches of oak scrub are allowed to remain intact. Scrub preserves should be located as far as possible from potential sources of uncontrolled use of off-road vehicles. Trails through the scrub should be few in number and well marked. Refuse dumps should be located elsewhere.

Direct Human-related Mortality

The presence of humans near populations of Florida scrub jays results in a variety of incidental encounters that usually increase the mortality of both juveniles and adults. Certainly most important among these is the killing of jays by household pets, especially house cats. Scrub jays are highly terrestrial birds, and juvenile jays are clumsy and vulnerable. House cats, even a few, whose density is bolstered by human care and feeding, easily could eliminate a small population of Florida scrub jays occupying otherwise suitable habitat (see Churcher and Lawton 1989). Because the jays frequently become extremely tame to human approach (when fed by interested and enlightened persons), they also are exceedingly vulnerable to wanton destruction by children or unenlightened adults.

Various methods of controlling household or garden pests also carry the risk of killing local scrub jays. Most important of these are any of a variety of small-mammal traps, *including live traps*. Virtually any trap that holds a jay and keeps it confined at night will cause its death, either from exposure or from nocturnal predators.

None of the above effects, taken separately, is likely to be enough to eliminate outright a sizeable jay population, with the probable exception of the house cats. However, all will take place when human residences are built within a population of scrub jays. Their cumulative effects easily could elevate average mortality of the jays to a level above that which can be replaced through average reproduction. In such cases, even if gradual, the effect is to drive the whole population toward extinction. Reserves should be large enough to insure that at least several scrub jay territories are located away from the edges, where hunting pressure from house cats is highest.

Vehicle traffic through good scrub jay habitat can have a significant, directly negative effect on the jays occupying territories along the roadside. We measured such an effect at the Archbold Biological Station in 1986 and 1987. Approximately 2 mi (3.3 km.) of optimum-quality oak scrub at the station borders a two-lane, paved state road (SR 17). An estimated 100-150 vehicles pass through this area each day at speeds averaging about 50 mph. As of June, 1986, 28 color-banded breeding jays resided in 14 territories contiguous with this stretch of road. One year later only 16 of these jays were alive, yielding below-average survival rate of 0.57. Survival of breeders during the same 12-month period in contiguous habitat lacking paved roads was significantly higher (0.79; 95 of 121

breeders surviving, Chi-square=5.46, p=0.019). Several road-killed adult jays were found during this period.

Survival of fledglings from nest-leaving to nutritional independence (about age 3 months) also appears to be lower along roadside territories, though our sample sizes are smaller. In the roadside territories 8 of 21 fledglings survived to independence, versus 61 of 112 in non-roadside territories (0.38 vs. 0.55 survival, Chi-square=1.90, p=0.17). Several road-killed fledglings also were found during the period of study.

If the above mortality data are representative, Florida scrub jays cannot maintain stable territory dynamics along roads with appreciable high-speed traffic flow. This result is especially crucial for areas with relatively small jay populations. Any local population in which the overall average mortality is similar to that measured along SR 17 will go extinct within several years. The one practical method of protection against such locally elevated mortality is to preserve contiguous, safer habitat that serves as a source pool for the roadside territories experiencing higher mortality.

Numerous patches of scrub border a major U.S. highway (A1A) through coastal dunes in Brevard and Indian River counties. Historically these sandy coastal islands supported almost continuous scrub jay habitat, but human development has fragmented the jays into a few remnant populations. In these areas jays routinely perch on utility wires and tall vegetation near the highway. However, in all such cases jays occupy patches of scrub that border adjacent, larger tracts of scrub away from the highway. Scrub patches not bordering such protected source areas (as well as a few that do seem to have source areas) appear to be devoid of jays. It is doubtful that small populations of jays, even if totally habituated to major traffic flow, can avoid greatly elevated juvenile and adult mortality along major highways.

HUMAN ACTIVITIES THAT ARE NON-HARMFUL OR ARE BENEFICIAL TO SCRUB JAYS

Probably the most beneficial interaction with humans is the inevitable reduction in numbers of the larger and long-lived natural predators of the jays. Among these are certain snakes (e.g., eastern coachwhip, indigo snake), mammals (e.g., bobcat, gray fox), and birds (especially various hawks and owls). These changes probably reduce mortality somewhat, although they probably do not offset the effects discussed above.

Artificial feeding of wild animals by humans is inevitable, even though it can be harmful for certain species (e.g., hibernating rodents, bears). We have no reason to suspect that the various foods routinely fed to Florida scrub jays by interested residents are harmful in any way, unless tainted with chemical poisons. Indeed, under certain conditions, artificial food might increase slightly a local jay population by decreasing the average size of territories required by the resident jays. Any such effect would, of course, be highly dependent upon the predilections and behavior of individual human residents, and could change frequently through time. For this reason, it is not recommended that artificial feeding be incorporated into a habitat protection plan.

SUBSECTION 2.5
SURVIVORSHIP OF POPULATIONS: SIMULATION MODELS

Recently, considerable attention has been focused on the problem of defining "minimum viable populations" for purposes of conserving biological populations and diversity (reviews in Soule 1987). Although this specific field of inquiry is young, the general principles are drawn from well-established ecological theory and wildlife management practice (Shaffer 1981, 1983; Soule 1980; Wright and Hubbell 1983). No formulae exist for calculating minimum viable populations; the biological world is too complex and unpredictable for an exact minimum viable population size to exist for any species. We are, however, well equipped to model the survival probabilities of Florida scrub jay populations under a variety of circumstances, because our long-term demographic study allows us to use real-world values for the critical variables in simulation models.

DEMOGRAPHIC MODELS OF EXTINCTION TIMES FOR FLORIDA SCRUB JAYS

Our approach is to begin with a hypothetical population of jays containing a given number of territories. Through Monte Carlo simulation techniques, natural birth and death processes are allowed to take place year after year indefinitely, until the number of breeders is reduced to one or zero, at which time the population is deemed extinct. The number of years is counted in which at least one breeding pair had remained. The process is repeated a large number of times (in the present case, N=100) for each population size to generate a frequency distribution of years-to-extinction (= persistence times) for that size. Such distributions always take the form of a negative exponential distribution (Goodman 1987), and can be described or depicted in a number of ways. The median persistence time is one comparative index of the viability of populations of a specified size. Alternatively, the cumulative probability of extinction can be plotted against time since isolation, with various population sizes plotted on the same graph (e.g., Figs. 2.13, 2.14).

The following assumptions are incorporated into the simulation model, each of which represents a real-world biological feature of Florida scrub jay population: 1) each territory contains one and only one pair of breeding jays; 2) the population is assumed to be at carrying capacity to start with, and is not allowed to exceed the initial number of territories at any time during the "life" of the population; 3) the initial population begins with one helper of potential breeding age in each territory; 4) the number of helpers is permitted to vary between 0 (= no helpers present) and three times the number of territories (= average of 3 helpers per territory); 5) yearlings are not allowed to breed; 6) the pool of non-breeders older than age one year permits an equal chance for each individual to become a breeder (i.e., no age-specific differences in success probability after the first year); 7) all breeders have an equal probability of dying during a given year; 8) *average* demographic values are set to a steady state population (no intrinsic population growth or decline), but individual survival and reproduction is treated probabalistically. This simulates natural environmental variability (stochasticity).

Various demographic features are open to variation within the simulated lifespans of a population. Table 2.3 shows the important variables, and lists the assumed values for our primary simulations.

Perhaps the most far-reaching conclusion proven by recent models of population extinction is the overwhelming importance of environmental variation in affecting expected persistence times for populations (Belovsky 1987, Ewens et al. 1987, Shaffer 1987). Our own models indicate the same result. The effects of year-to-year variation are so

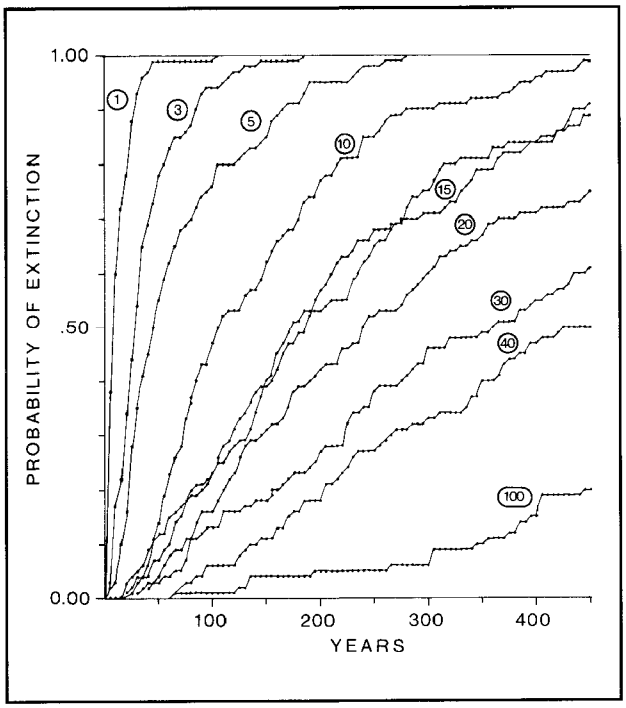


Figure 2.13. Cumulative extinction probabilities versus time for Florida scrub jay populations of different maximum sizes, measured in number of territories (circled numbers). For each population size, 100 replicate populations were simulated using a computer model, with natural demographic variables for birth and death rates and annual variations in these values. All were permitted to run until extinction occurred (i.e., when fewer than 2 jays remained). Points show cumulative proportions extinct at 5-year intervals through the first 460 years after beginning the run (e.g., after isolation of the preserve). Two separate runs of 100 populations each are plotted for population size 15 territories, to illustrate robustness of the curves. In this graph epidemics are assumed to occur at random intervals with a mean frequency of one every twenty years (cf. Fig. 2.15).

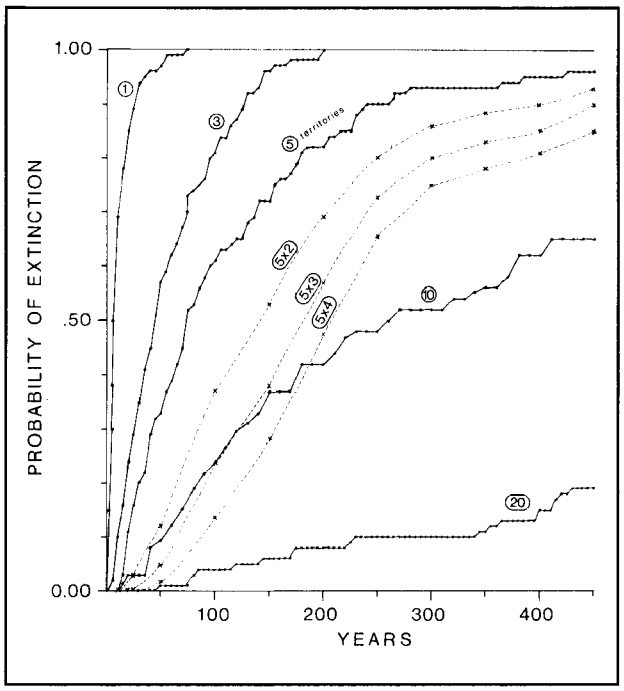


Figure 2.14. Cumulative extinction probabilities versus time for Florida scrub jay populations of different maximum sizes. Methods exactly as in Fig. 2.13, but here epidemics are assumed to occur at average frequencies of one every fifty years. Dashed lines show analogous extinction curves for Florida scrub jay populations fragmented into 2, 3, or 4 isolated populations of 5 territories each, so that probability of overall extinction is expressed as probability of extinction of the 5-territory sample, raised to the power of 2, 3, or 4. Relative positions of these lines compared with that for a single population of 10 territories illustrates that in this size range one larger preserve is preferable to several smaller preserves.

profound that we include here a quote from one expert on the design of biological reserves (Goodman 1987, p. 34):

> "Inasmuch as incorporation of effects of environmental variation leads to qualitative as well as enormous quantitative differences, in the predictions of stochastic population models bearing on the central questions of conservation biology, we conclude that: (1) practical models must take environmental variation into account, (2) serious attention must be given *to field programs of estimation of the relevant parameters of environmental variation* . . . and (3) strategies for population management and reserve design must be re-evaluated in light of the results of models which incorporate environmentally driven variation." (italicizing ours).

We incorporate environmental variation, including epidemics, into our simulation model. Our method assumes a *distribution* of annual mean birth rates and death rates, rather than a fixed average value for these variables that remains constant each year. The distributions we use are exactly those shown in Figs. 2.8 and 2.10, namely the measured annual values during 18 years of study at Archbold Biological Station. Each year during the simulation the program randomly chooses a value from the observed frequency distributions of mean annual birth rates and death rates. For every year in which the population persists, each individual's probability of surviving, and each pair's probability of fledging from 0 to 4 young, are corrected so that an infinitely large population would conform to that year's mean demographic values.

Epidemics are incorporated as follows: when the highest observed value for breeder mortality is selected (0.45 in our model), the program is flagged to assume that an epidemic has spread through the population that year. During such a year, the juvenile death rate becomes 0.99, the death rate of helpers older than one year is elevated (from its stable value of 0.23) to 0.50, and the following year's mean reproduction is set at its lowest observed value (1.1 fledglings per pair, compared with the overall average of 2.0). Because we do not know the natural frequency of such epidemics, our choice of frequencies was arbitrary. Our primary simulation assumed a once-in-20-year average frequency (.05 probability each year). For comparison, similar simulations were performed assuming a lower frequency (once in 50 years, or .02 annual probability).

SIMULATION RESULTS

For each specified population size, 100 hypothetical populations were allowed to proceed through random birth and death processes (e.g., Fig. 2.15) until they went extinct through demographic extinction. The resulting 100 "population lifespans" or persistence times conformed to the general results of Goodman (1987). Broadly leptokurtic distributions closely resemble the negative exponential; the only deviation from true negative exponential extinction probabilities reflects the "safe" period at the onset of isolation, because it always takes some time

Table 2.3. Demographic values and their annual variations used in computer simulation of Florida scrub jay populations.

X ANNUAL FECUNDITY:

frequency	$\bar{x}$ annual fledgl./pr
.17	1.12
.06	1.73
.06	1.94
.32	2.04
.11	2.24
.11	2.45
.17	2.65

$\bar{X}$ ANNUAL SURVIVAL:

juveniles to age 1 year	
normal:	.35
epidemic:	0
yearlings to age 2 years	
normal:	.70
epidemic:	.50
older helpers	
normal:	.77
epidemic:	.50

breeders: frequency	annual survival
.16	.950
.11	.925
.06	.875
.05	.825
.33	.775
.06	.725
(.17)*	.68
(.05)*	.55 = epidemic

*lowest values for mortality are varied according to specified frequency of epidemics.

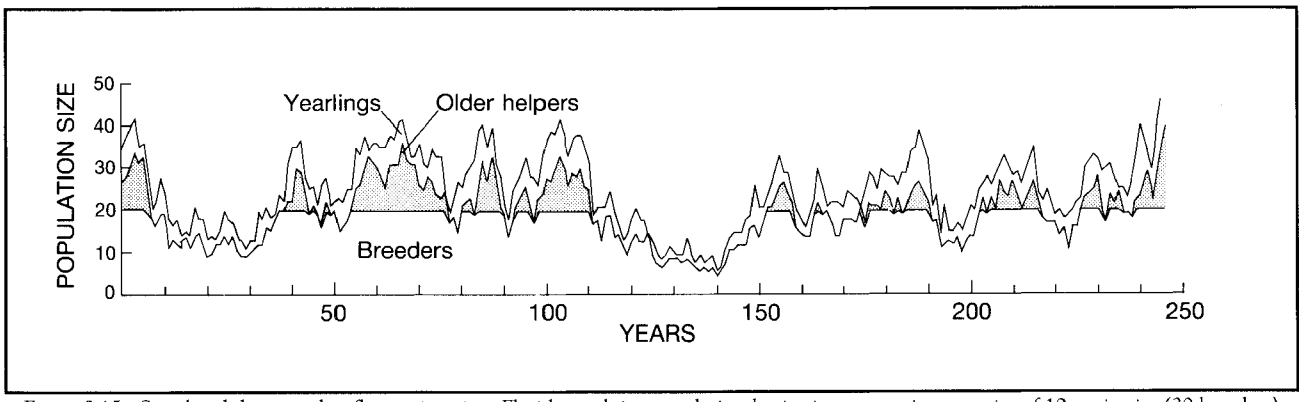


Figure 2.15. Simulated demographic fluctuations in a Florida scrub jay population beginning at carrying capacity of 10 territories (20 breeders), illustrating the behavior of the model used to estimate persistence times. Breeder numbers are prohibited from exceeding the specified size, as would be the case in a small habitat preserve. Shaded portions illustrate the numbers of non-breeding helper jays older than one year, waiting to become breeders. Epidemics occur at random intervals, with an average frequency of once every 20 years. Their long-term effects on the population structure are apparent. Portions of this figure closely resemble the 18-year fluctuations documented in a real world population at Archbold Biological Station.

for extant individuals all to die even in the face of minimal reproduction and recruitment.

Our general results are shown in Figs. 2.13, 2.14, and 2.16. Cumulative extinction probabilities increase with time, but this increase is slower for larger populations. These graphs emphasize the importance of approaching preservation of small populations from the viewpoint of probability. It is well known that any population subject to annual variability and periodic catastrophic reduction has some finite probability of going extinct through demographic fluctuation within a relatively short period. The goal of habitat preservation in this context is to reduce these probabilities to as low a level as possible in the context of economic reality. Ultimately, the decision is arbitrary as to how high an extinction probability can be tolerated. *We recommend as a minimum guideline attempting to insure a 90% probability that each local Florida scrub jay population will survive for at least 100 years.*

Recommended Preserve Size

It is clear from Figs. 2.13 - 2.16 that under conditions of isolation, habitat preserves containing as few as 1 to 5 territories of Florida scrub jays are highly subject to local

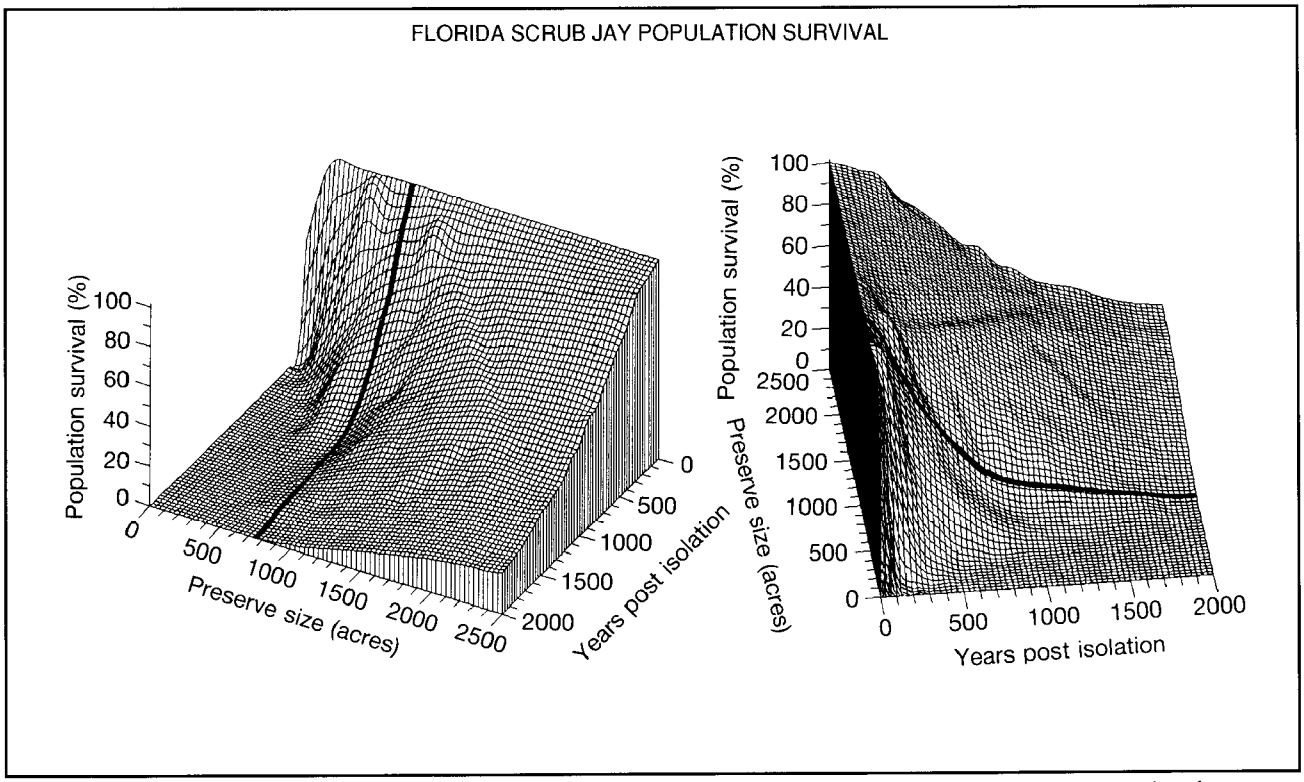


Figure 2.16. Two views of the same three-dimensional graph showing relationships between preserve area, population survival, and time in simulated Florida scrub jay populations. Preserve area is expressed in acres and assumes about 25 acres per Florida scrub jay territory. For a given population size, the graph indicates approximately what proportion of such populations would likely remain extant after N years after isolation. The isobar for a 30-territory preserve is darkened for reference. Populations larger than 30 territories show 90% or better probability of surviving at least 100 years. This graph assumes that epidemics occur on average once in 20 years.

extinction. Even if epidemics are absent from such populations, extinction is likely to occur rapidly. Furthermore, populations maintained for even a few generations at this small size are known to undergo severe reduction in genetic variability, with detrimental effects owing to inbreeding and loss of ability to cope with small environmental perturbations (e.g., Lande and Barrowclough 1987). In larger populations these genetic considerations are of secondary importance compared to the overwhelming problem of extinction-risk from demographic causes (R. Lande, personal communication).

Populations of between 15 and 30 territories should be considered marginally protected. Depending on the frequency of epidemics these populations may or may not exhibit 90% survival probability over 100 years. However, a population of 15 territories (= 15 breeding pairs) still is well below a generally accepted population size at which genetic variability is maintained (Soule 1980). The adequacy of a preserve limited to this range of sizes is in large part dependent upon its proximity to other, better protected preserves that can supply occasional colonists. *Florida scrub jay populations of 15 to 30 territories should be considered adequately protected only if placed within 3 to 5 miles of at least one other protected population containing more than 30 territories.*

Populations containing 30 or more territories probably are the smallest populations in which long-term survival is 90% guaranteed for 100 years or more. Such a population typically would contain at least 60 breeding individuals and a non-breeding population of 30 to 50 jays that serve as demographic and genetic buffers against population extinction or degradation. *In average habitat, therefore, about 750 acres of periodically-burned oak scrub are required to support an adequately protected population of Florida scrub jays* (assuming 25 acres per territory and 30 contiguous territories). Fig. 2.17 schematically illustrates how extinction probability varies with time among isolated Florida scrub jay populations, with larger population sizes affording greater degrees of protection from extinction (progressively darker shading).

One Large Preserve vs. Multiple Small Ones

For certain kinds of animals, numerous small preserves may provide equal or larger overall probability of long-term survival than a small number of large ones. In the case of Florida scrub jays, Fig. 2.17 illustrates that a single larger preserve is to be preferred. From a demographic standpoint, extinction probabilities are lower in a single preserve of 10 territories, for example, than they would be in two preserves containing 5 territories each (unless they were so close together as to act as a single preserve of 10). Indeed, in the example shown, one 10-territory preserve is more effective at reducing extinction probabilities than *four* preserves of 5 territories each.

Management problems also favor a smaller number of

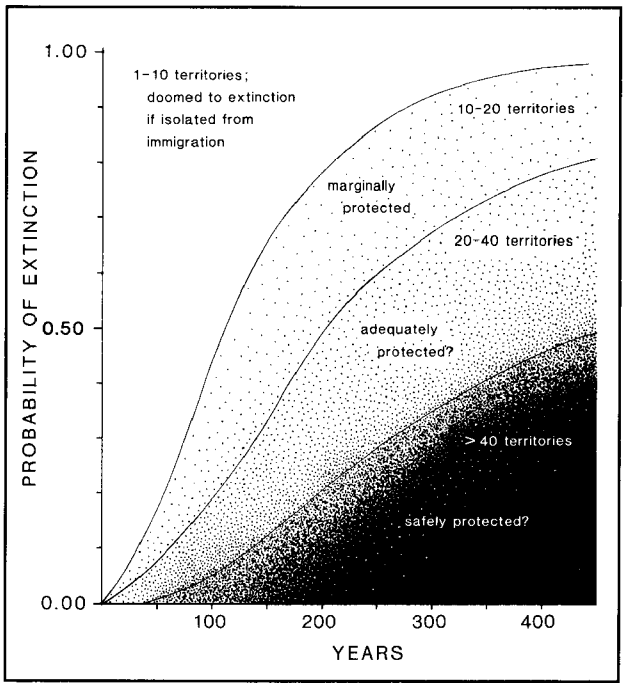


Figure 2.17. Schematic relationship between Florida scrub jay population size within a habitat preserve and the degree of protection from demographic extinction thus provided by that preserve. Adapted from Figs. 2.13, 2.14 and 2.16. Assumes an epidemic frequency intermediate between twenty-year and fifty-year intervals.

larger preserves in the vicinity of humans. Small preserves always expose more of their enclosed territories to the edge of the protected habitat patch. This subjects a larger proportion of the total jay population to pressure from cats, roads, humans, and other incidental sources of mortality. Such effects mean that the average mortality in smaller populations is elevated, further reducing their effective size. *The larger the population and the more circular its configuration the greater proportion of its inhabitants will be protected from the ill effects of living at the edge.* Finally, in general, the control of human access, authorized or otherwise, and prescribed burning of the habitat with minimal impact on surrounding dwellings are both much easier in a single large, circular preserve.

Metapopulations

The spatial configuration of locally protected populations on a larger geographic scale is of considerable importance for both long-term survival and maintenance of genetic diversity regionally (Levins 1970, Gilpin 1987). In the context of large-scale developments, where economic realities are likely to act against the interests of Florida scrub jay preservation, the regional need for and impact of habitat protection should be carefully examined in assessing where and how large to create any given habitat preserve.

In certain instances, for example, the existence of a large, protected population of Florida scrub jays near or at the border outside a development project adds considerable value to each territory potentially preserved within the development tract. In such cases, protection of a scrub

tract considerably less than 750 acres may have an equal or greater impact on regional survival of the species than a much larger preserve might have in complete isolation elsewhere. Placement of the new preserve as close as possible to existing or potentially protected ones outside the developed area is vital. Providing habitat corridors between these preserves can be more beneficial, in certain cases, than simply adding area to a reasonably large existing preserve. These and a host of related issues make it imperative that each potential new preserve be examined in the context of the regional structure of Florida scrub jay populations ("metapopulations" of Levins 1970). Regional analysis often may provide developers and state agencies with avenues for compromise in terms of total land area set aside for scrub habitat protection.

The regional context also dictates an axiom that should be adhered to in all cases of large-scale development: every isolated population of Florida scrub jays, no matter how small, is now a vital part of a disappearing metapopulation. Each "island" of scrub habitat serves both as a stepping stone between other such islands and as a potential source of new colonists and new genetic input for other small populations some distance away. No regional population fragmented to the extent now shown by Florida scrub jays (Fig. 2.4) can afford to lose whole local populations. *Therefore, it is strongly recommended that no local population of Florida scrub jays, no matter how small or isolated, be permitted to be extirpated as a direct result of development.*

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Appendix G

USFWS Information for Planning and Consultation (IPaC) Trust Resources Report

IPaC Information for Planning and Consultation **U.S. Fish & Wildlife Service**

IPaC resource list

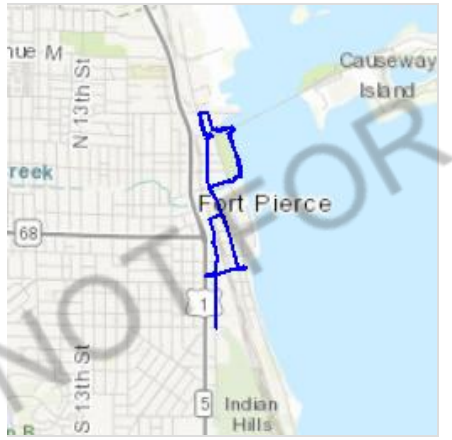
This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

NOT FOR CONSULTATION

Location

St. Lucie County, Florida



Local office

South Florida Ecological Services Field Office

(772) 562-3909
(772) 562-4288

1339 20th Street
Vero Beach, FL 32960-3559

http://fws.gov/verobeach

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species

[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

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1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

NOT FOR CONSULTATION

Mammals

NAME	STATUS
Florida Panther Puma (=Felis) concolor coryi No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1763	Endangered
Puma (=mountain Lion) Puma (=Felis) concolor (all subsp. except coryi) No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6049	SAT
Southeastern Beach Mouse Peromyscus polionotus niveiventris No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/3951	Threatened
West Indian Manatee Trichechus manatus There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/4469	Threatened Marine mammal

Birds

NAME	STATUS
Audubon's Crested Caracara Polyborus plancus audubonii No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8250	Threatened
Everglade Snail Kite Rostrhamus sociabilis plumbeus There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/7713	Endangered
Florida Scrub-jay Aphelocoma coerulescens No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6174	Threatened
Ivory-billed Woodpecker Campephilus principalis No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8230	Endangered
Kirtland's Warbler Setophaga kirtlandii (= Dendroica kirtlandii) No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8078	Endangered

NOT FOR CONSULTATION

Piping Plover Charadrius melodus — Threatened
There is **final** critical habitat for this species. Your location is outside the critical habitat.
https://ecos.fws.gov/ecp/species/6039

Red Knot Calidris canutus rufa — Threatened
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/1864

Red-cockaded Woodpecker Picoides borealis — Endangered
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/7614

Whooping Crane Grus americana — EXPN
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/758

Wood Stork Mycteria americana — Threatened
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/8477

Reptiles

NAME	STATUS

American Alligator Alligator mississippiensis — SAT
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/776

Eastern Indigo Snake Drymarchon corais couperi — Threatened
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/646

Hawksbill Sea Turtle Eretmochelys imbricata — Endangered
There is **final** critical habitat for this species. Your location is outside the critical habitat.
https://ecos.fws.gov/ecp/species/3656

Leatherback Sea Turtle Dermochelys coriacea — Endangered
There is **final** critical habitat for this species. Your location is outside the critical habitat.
https://ecos.fws.gov/ecp/species/1493

Loggerhead Sea Turtle Caretta caretta — Threatened
There is **final** critical habitat for this species. Your location is outside the critical habitat.
https://ecos.fws.gov/ecp/species/1110

NOT FOR CONSULTATION

Insects

NAME	STATUS
Miami Blue Butterfly Cyclargus (=Hemiargus) thomasi bethunebakeri No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/3797	Endangered

Flowering Plants

NAME	STATUS
Fragrant Prickly-apple Cereus eriophorus var. fragrans No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/982	Endangered
Lakela's Mint Dicerandra immaculata No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6390	Endangered
Tiny Polygala Polygala smallii No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/996	Endangered

NOT FOR CONSULTATION

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

This location overlaps the critical habitat for the following species:

NAME	TYPE
West Indian Manatee Trichechus manatus https://ecos.fws.gov/ecp/species/4469#crithab	Final

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act

[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see maps of where birders and the general public have sighted birds in and around your project area, visit E-bird tools such as the E-bird data mapping tool (search for the name of a bird on your list to see specific locations where that bird has been reported to occur within your project area over a certain timeframe) and the E-bird Explore Data Tool (perform a query to see a list of all birds sighted in your county or region and within a certain timeframe). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NOT FOR CONSULTATION

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)
American Oystercatcher Haematopus palliatus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8935	Breeds Apr 15 to Aug 31

Bachman's Sparrow Aimophila aestivalis — Breeds May 1 to Sep 30
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/6177

Bald Eagle Haliaeetus leucocephalus — Breeds Sep 1 to Jul 31
This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1626

Black Skimmer Rynchops niger — Breeds May 20 to Sep 15
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/5234

Black-whiskered Vireo Vireo altiloquus — Breeds May 1 to Aug 15
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Clapper Rail Rallus crepitans — Breeds Apr 10 to Oct 31
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

King Rail Rallus elegans — Breeds May 1 to Sep 5
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8936

Least Tern Sterna antillarum — Breeds Apr 20 to Sep 10
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Lesser Yellowlegs Tringa flavipes — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9679

Limpkin Aramus guarauna — Breeds Jan 15 to Aug 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Magnificent Frigatebird Fregata magnificens — Breeds Oct 1 to Apr 30
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

NOT FOR CONSULTATION

Prairie Warbler Dendroica discolor — Breeds May 1 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Prothonotary Warbler Protonotaria citrea — Breeds Apr 1 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Red-headed Woodpecker Melanerpes erythrocephalus — Breeds May 10 to Sep 10
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Reddish Egret Egretta rufescens — Breeds Mar 1 to Sep 15
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/7617

Seaside Sparrow Ammodramus maritimus — Breeds May 10 to Aug 20
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Semipalmated Sandpiper Calidris pusilla — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Short-billed Dowitcher Limnodromus griseus — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9480

Short-tailed Hawk Buteo brachyurus — Breeds Mar 1 to Jun 30
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/8742

Swallow-tailed Kite Elanoides forficatus — Breeds Mar 10 to Jun 30
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8938

Whimbrel Numenius phaeopus — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9483

NOT FOR CONSULTATION

Willet Tringa semipalmata — Breeds Apr 20 to Aug 5
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Wilson's Plover Charadrius wilsonia — Breeds Apr 1 to Aug 20
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in your project's counties during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

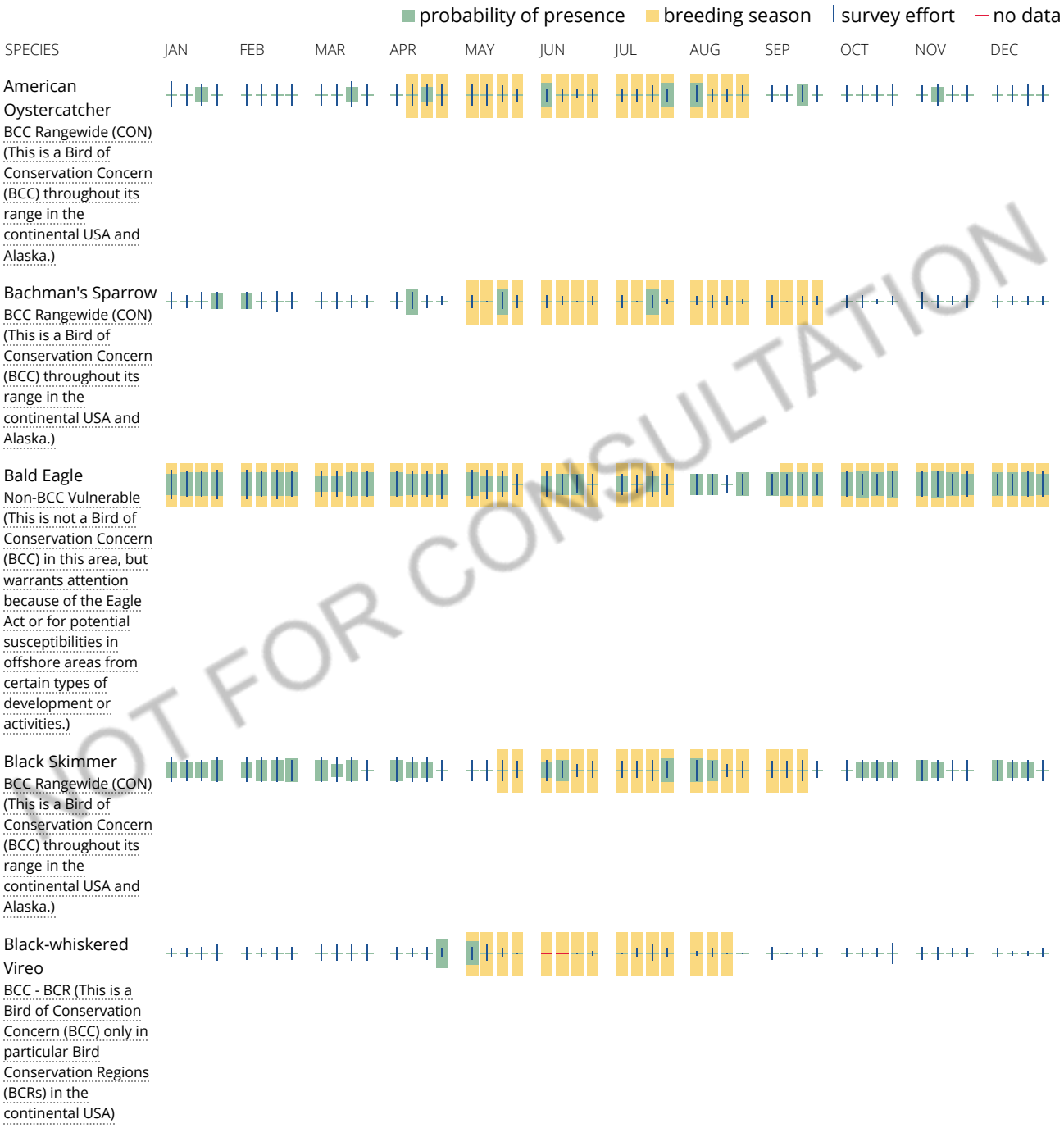
Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the counties of your project area. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

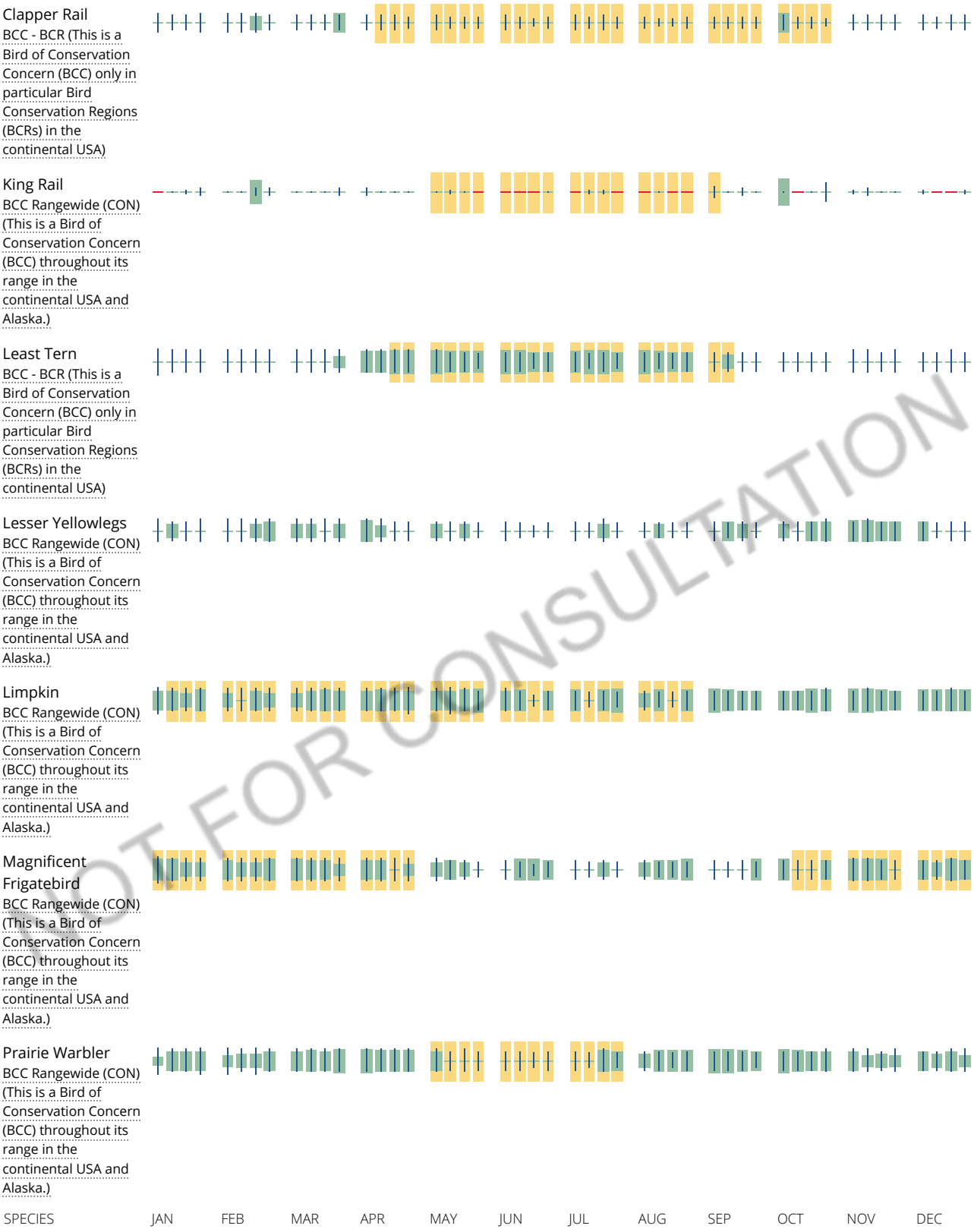
NOT FOR CONSULTATION

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information.

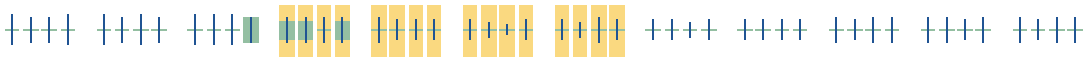


NOT FOR CONSULTATION



NOT FOR CONSULTATION

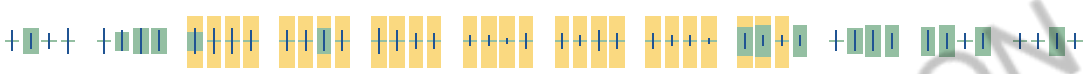
Prothonotary Warbler
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



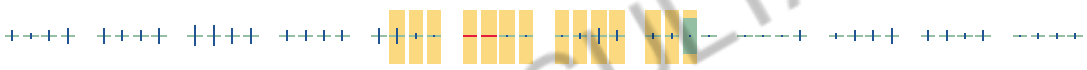
Red-headed Woodpecker
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Reddish Egret
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Seaside Sparrow
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



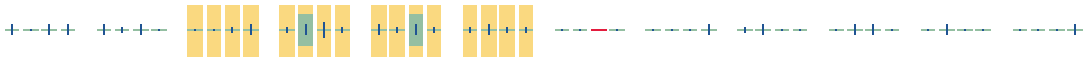
Semipalmated Sandpiper
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Short-billed Dowitcher
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Short-tailed Hawk
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)



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Swallow-tailed Kite
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Whimbrel
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Willet
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Wilson's Plover
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

NOT FOR CONSULTATION

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the counties which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the E-bird Explore Data Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird entry on your migratory bird species list indicates a breeding season, it is probable that the bird breeds in your project's counties at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the BGEPA should such impacts occur.

NOT FOR CONSULTATION

Marine mammals

Marine mammals are protected under the Marine Mammal Protection Act. Some are also protected under the Endangered Species Act

[1] and the Convention on International Trade in Endangered Species of Wild Fauna and Flora[2].

The responsibilities for the protection, conservation, and management of marine mammals are shared by the U.S. Fish and Wildlife Service [responsible for otters, walruses, polar bears, manatees, and dugongs] and NOAA Fisheries

[3] [responsible for seals, sea lions, whales, dolphins, and porpoises]. Marine mammals under the responsibility of NOAA Fisheries are **not** shown on this list; for additional information on those species please visit the Marine Mammals page of the NOAA Fisheries website.

The Marine Mammal Protection Act prohibits the take (to harass, hunt, capture, kill, or attempt to harass, hunt, capture or kill) of marine mammals and further coordination may be necessary for project evaluation. Please contact the U.S. Fish and Wildlife Service Field Office shown.

1. The Endangered Species Act (ESA) of 1973.
2. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is a treaty to ensure that international trade in plants and animals does not threaten their survival in the wild.
3. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following marine mammals under the responsibility of the U.S. Fish and Wildlife Service are potentially affected by activities in this location:

NAME

West Indian Manatee Trichechus manatus
https://ecos.fws.gov/ecp/species/4469

NOT FOR CONSULTATION

Facilities

Wildlife refuges and fish hatcheries

REFUGE AND FISH HATCHERY INFORMATION IS NOT AVAILABLE AT THIS TIME

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers

District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

ESTUARINE AND MARINE DEEPWATER

E1UBLx

A full description for each wetland code can be found at the National Wetlands Inventory website: https://ecos.fws.gov/ipac/wetlands/decoder

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

NOT FOR CONSULTATION

Appendix H

USFWS Standard Protection Measures for The Eastern Indigo Snake

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

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

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

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

POSTER INFORMATION

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

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

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

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

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

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

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

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

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

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

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

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

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

PRE-CONSTRUCTION ACTIVITIES

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

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

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

DURING CONSTRUCTION ACTIVITIES

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

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

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

POST CONSTRUCTION ACTIVITIES

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

Appendix I

Preliminary Long-Range Estimates (LRE)

Date: 9/25/2018 8:27:54 AM

FDOT Long Range Estimating System - Production

R3: Project Details by Sequence Report

Project: 440033-1-52-01 **Letting Date:** 01/2099

Description: Historic Downtown Fort Pierce Retrofit Trail Segment includes constructing an approximately 2.3-mile long multi-use paved trail from Georgia Avenue to North Causeway Drive/SR A1A in St. Lucie County

District: 04 **County:** 94 ST. LUCIE **Market Area:** 11 **Units:** English
Contract Class: **Lump Sum Project:** N **Design/Build:** N **Project Length:** 2.300 MI

Project Manager:

Version 2 Project Grand Total **$379,117.74**
Description: Preferred Downtown Route

Sequence: 1 MIS - Miscellaneous Construction **Net Length:** 0.290 MI
1,531 LF

Description: This segment starts at Georgia Avenue and ends at Citrus Ave and will parallel South 3rd street.
Special Conditions: The proposed project will consist of constructing an 8-14' paved multi-use path. For estimate purposes we will assume 10' average width.

EARTHWORK COMPONENT

User Input Data

Description	Value
Standard Clearing and Grubbing Limits L/R	0.00 / 0.00
Incidental Clearing and Grubbing Area	0.00

X-Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
110-1-1	CLEARING & GRUBBING	1.05	AC	$13,867.17	$14,560.53
	Comment: Sequence length (0.29 miles) X (10' average pavement width + 10' on each side of multi-use path)				
	Earthwork Component Total				$14,560.53

ROADWAY COMPONENT

X-Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
160-4	TYPE B STABILIZATION	2,382.00	SY	$5.35	$12,743.70
	Comment: Type "B" stabilization 14' in width X constructible length (0.29 miles)				
285-701	OPTIONAL BASE,BASE GROUP 01	1,814.00	SY	$14.15	$25,668.10
	Comment: Optional base group one 10.66' in width X constructible length (0.29 miles)				
339-1	MISCELLANEOUS ASPHALT PAVEMENT	170.00	TN	$231.63	$39,377.10
	Comment: 2" of 100 lb/cy per inch asphalt for a 10' multiuse path X the constructible length (0.29 miles)				
710-11-241	PAINTED PAVT MARK,STD,YELLOW,DOT,6"	0.26	GM	$342.89	$89.15

	Comment: Yellow skip strip used to designate centerline in areas where adequate passing sight distance is available.(90% of constructible length 0.29 miles)			
711-15-201	THERMOPLASTIC, STD-OP,YELLOW, SOLID, 6"	0.03 GM	$4,252.14	$127.56
	Comment: Used to separate opposite directions of travel where passing is inadvisable and at approaches to intersections.			
	Roadway Component Total			$78,005.61

SHOULDER COMPONENT

User Input Data

Description	**Value**

X-Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
104-10-3	SEDIMENT BARRIER	1,531.00	LF	$1.45	$2,219.95
	Comment: For constructible length				
570-1-1	PERFORMANCE TURF	3,402.00	SY	$1.64	$5,579.28
	Comment: Performance turf to fill in areas that will be cleared and not refilled by multi-use trail.				
	Shoulder Component Total				$7,799.23

DRAINAGE COMPONENT

X-Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
430-173-112	PIPE CULV OPT MATL, ROUND, 12", GD	48.00	LF	$89.93	$4,316.64
	Comment: Proposed 12" pipe culverts at an estimated 4 locations.				
	Drainage Component Total				$4,316.64

SIGNING COMPONENT

X-Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
700-1-11	SINGLE POST SIGN, F&I GM, <12 SF	3.00	AS	$450.57	$1,351.71
	Comment: 4 sign posts every mile in each direction. 0.29 miles X 2 X 4 per mile.				
700-1-12	SINGLE POST SIGN, F&I GM, 12-20 SF	2.00	AS	$1,195.08	$2,390.16
	Comment: 1 sign in each direction of 0.29 mile multi-use				
	Signing Component Total				$3,741.87

Sequence 1 Total	$108,423.88

Sequence: 2 MIS - Miscellaneous Construction **Net Length:** 0.280 MI
1,478 LF

Description: This segment starts at the intersection of AE Backus and 2nd St. and ends when it can be tied into the existing riverwalk (Inside park along Indian River Dr.)

Special Conditions: The proposed project will consist of constructing an 8-14' paved multi-use path. For estimate purposes we will assume 10' average width.

EARTHWORK COMPONENT

User Input Data

Description	Value
Standard Clearing and Grubbing Limits L/R	0.00 / 0.00
Incidental Clearing and Grubbing Area	0.00

X-Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
110-1-1	CLEARING & GRUBBING	1.01	AC	$13,867.17	$14,005.84
	Comment: Sequence length (0.28 miles) X (10' average pavement width + 10' on each side of multi-use path)				
	Earthwork Component Total				$14,005.84

ROADWAY COMPONENT

X-Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
160-4	TYPE B STABILIZATION	2,300.00	SY	$5.35	$12,305.00
	Comment: Type "B" stabilization 14' in width X constructible length (0.28 miles)				
285-701	OPTIONAL BASE,BASE GROUP 01	1,751.00	SY	$14.15	$24,776.65
	Comment: Optional base group one 10.66' in width X constructible length (0.28 miles)				
339-1	MISCELLANEOUS ASPHALT PAVEMENT	164.00	TN	$231.63	$37,987.32
	Comment: 2" of 100 lb/cy per inch asphalt for a 10' multiuse path X the constructible length (0.28 miles)				
710-11-241	PAINTED PAVT MARK,STD,YELLOW,DOT,6"	0.28	GM	$342.89	$96.01
	Comment: Yellow skip strip used to designate centerline in areas where adequate passing sight distance is available.(90% of constructible length 0.28 miles)				
711-15-201	THERMOPLASTIC, STD-OP,YELLOW, SOLID, 6"	0.03	GM	$4,252.14	$127.56
	Comment: Used to separate opposite directions of travel where passing is inadvisable and at approaches to intersections.				
	Roadway Component Total				$75,292.54

SHOULDER COMPONENT

User Input Data

Description	Value

X-Items

Pay item	Description	Quantity Unit	Unit Price	Extended Amount
104-10-3	SEDIMENT BARRIER	1,478.00 LF	$1.45	$2,143.10
	Comment: For constructible length			
570-1-1	PERFORMANCE TURF	3,285.00 SY	$1.64	$5,387.40
	Comment: Performance turf to fill in areas that will be cleared and not refilled by multi-use trail.			
	Shoulder Component Total			$7,530.50

DRAINAGE COMPONENT

X-Items

Pay item	Description	Quantity Unit	Unit Price	Extended Amount
430-173-112	PIPE CULV OPT MATL, ROUND, 12", GD	48.00 LF	$89.93	$4,316.64
	Comment: Proposed 12" pipe culverts at an estimated 4 locations.			
	Drainage Component Total			$4,316.64

SIGNING COMPONENT

X-Items

Pay item	Description	Quantity Unit	Unit Price	Extended Amount
700-1-11	SINGLE POST SIGN, F&I GM, <12 SF	3.00 AS	$450.57	$1,351.71
	Comment: 4 sign posts every mile in each direction. 0.28 miles X 2 X 4 per mile.			
700-1-12	SINGLE POST SIGN, F&I GM, 12-20 SF	2.00 AS	$1,195.08	$2,390.16
	Comment: 1 sign in each direction of 0.28 mile multi-use			
	Signing Component Total			$3,741.87

Sequence 2 Total $104,887.39

Sequence: 3 MIS - Miscellaneous Construction **Net Length:** 0.120 MI
634 LF

Description: This segment starts at the end of the existing riverwalk path on the north side of Seaway Dr. and ends at the intersection of Indian River Dr. and 2nd St

Special Conditions: The proposed project will consist of constructing an 8-14' paved multi-use path. For estimate purposes we will assume 10' average width.

EARTHWORK COMPONENT

User Input Data

Description	Value
Standard Clearing and Grubbing Limits L/R	0.00 / 0.00
Incidental Clearing and Grubbing Area	0.00

X-Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
110-1-1	CLEARING & GRUBBING	0.29	AC	$13,867.17	$4,021.48
	Comment: Sequence length (0.12 miles) X (10' average pavement width + 10' on each side of multi-use path)				
	Earthwork Component Total				$4,021.48

ROADWAY COMPONENT

X-Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
160-4	TYPE B STABILIZATION	985.00	SY	$5.35	$5,269.75
	Comment: Type "B" stabilization 14' in width X constructible length (0.12 miles)				
285-701	OPTIONAL BASE,BASE GROUP 01	750.00	SY	$14.15	$10,612.50
	Comment: Optional base group one 10.66' in width X constructible length (0.08 miles)				
339-1	MISCELLANEOUS ASPHALT PAVEMENT	70.00	TN	$231.63	$16,214.10
	Comment: 2" of 100 lb/cy per inch asphalt for a 10' multiuse path X the constructible length (0.08 miles)				
710-11-241	PAINTED PAVT MARK,STD,YELLOW,DOT,6"	0.10	GM	$342.89	$34.29
	Comment: Yellow skip strip used to designate centerline in areas where adequate passing sight distance is available.(90% of constructible length 0.12 miles)				
711-15-201	THERMOPLASTIC, STD-OP,YELLOW, SOLID, 6"	0.02	GM	$4,252.14	$85.04
	Comment: Used to separate opposite directions of travel where passing is inadvisable and at approaches to intersections.				
	Roadway Component Total				$32,215.68

SHOULDER COMPONENT

User Input Data

Description	Value

X-Items

Pay item	Description	Quantity Unit	Unit Price	Extended Amount
104-10-3	SEDIMENT BARRIER	634.00 LF	$1.45	$919.30
	Comment: For constructible length			
570-1-1	PERFORMANCE TURF	1,408.00 SY	$1.64	$2,309.12
	Comment: Performance turf to fill in areas that will be cleared and not refilled by multi-use trail.			
	Shoulder Component Total			$3,228.42

DRAINAGE COMPONENT

X-Items

Pay item	Description	Quantity Unit	Unit Price	Extended Amount
430-173-112	PIPE CULV OPT MATL, ROUND, 12", GD	16.00 LF	$89.93	$1,438.88
	Comment: Proposed 12" pipe culverts at an estimated 1 locations.			
	Drainage Component Total			$1,438.88

SIGNING COMPONENT

X-Items

Pay item	Description	Quantity Unit	Unit Price	Extended Amount
700-1-11	SINGLE POST SIGN, F&I GM, <12 SF	2.00 AS	$450.57	$901.14
	Comment: 4 sign posts every mile in each direction. 0.08 miles X 2 X 4 per mile.			
	Signing Component Total			$901.14

Sequence 3 Total $41,805.60

Sequence: 4 MIS - Miscellaneous Construction **Net Length:** 0.128 MI 678 LF

Description: This segment starts at the intersection of Indian River Dr. and Ave H and ends at the intersection of Ave H and US1/FEC ROW

Special Conditions: The proposed project will consist of constructing an 8-14' paved multi-use path. For estimate purposes we will assume 10' average width.

EARTHWORK COMPONENT

User Input Data

Description	Value
Standard Clearing and Grubbing Limits L/R	0.00 / 0.00
Incidental Clearing and Grubbing Area	0.00

X-Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
110-1-1	CLEARING & GRUBBING	0.47	AC	$13,867.17	$6,517.57
	Comment: Sequence length (0.06 miles) X (10' average pavement width + 10' on each side of multi-use path)				
	Earthwork Component Total				$6,517.57

ROADWAY COMPONENT

X-Items

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
160-4	TYPE B STABILIZATION	1,068.00	SY	$5.35	$5,713.80
	Comment: Type "B" stabilization 14' in width X constructible length (0.13 miles)				
285-701	OPTIONAL BASE,BASE GROUP 01	813.00	SY	$14.15	$11,503.95
	Comment: Optional base group one 10.66' in width X constructible length (0.13 miles)				
339-1	MISCELLANEOUS ASPHALT PAVEMENT	76.30	TN	$231.63	$17,673.37
	Comment: 2" of 100 lb/cy per inch asphalt for a 10' multiuse path X the constructible length (0.13 miles)				
710-11-241	PAINTED PAVT MARK,STD,YELLOW,DOT,6"	0.12	GM	$342.89	$41.15
	Comment: Yellow skip strip used to designate centerline in areas where adequate passing sight distance is available.(90% of constructible length 0.12 miles)				
711-15-201	THERMOPLASTIC, STD-OP,YELLOW, SOLID, 6"	0.02	GM	$4,252.14	$85.04
	Comment: Used to separate opposite directions of travel where passing is inadvisable and at approaches to intersections.				
	Roadway Component Total				$35,017.31

SHOULDER COMPONENT

User Input Data

Description	Value

X-Items

Pay item	Description	Quantity Unit	Unit Price	Extended Amount
104-10-3	SEDIMENT BARRIER	686.00 LF	$1.45	$994.70
	Comment: For constructible length			
570-1-1	PERFORMANCE TURF	1,525.00 SY	$1.64	$2,501.00
	Comment: Performance turf to fill in areas that will be cleared and not refilled by multi-use trail.			
	Shoulder Component Total			$3,495.70

DRAINAGE COMPONENT

X-Items

Pay item	Description	Quantity Unit	Unit Price	Extended Amount
430-173-112	PIPE CULV OPT MATL, ROUND, 12", GD	32.00 LF	$89.93	$2,877.76
	Comment: Proposed 12" pipe culverts at an estimated 2 locations.			
	Drainage Component Total			$2,877.76

SIGNING COMPONENT

X-Items

Pay item	Description	Quantity Unit	Unit Price	Extended Amount
700-1-11	SINGLE POST SIGN, F&I GM, <12 SF	2.00 AS	$450.57	$901.14
	Comment: 4 sign posts every mile in each direction. 0.13 miles X 2 X 4 per mile.			
	Signing Component Total			$901.14

Sequence 4 Total $48,809.48

Date: 9/25/2018 8:27:55 AM

FDOT Long Range Estimating System - Production

R3: Project Details by Sequence Report

Project: 440033-1-52-01 **Letting Date:** 01/2099

Description: Historic Downtown Fort Pierce Retrofit Trail Segment includes constructing an approximately 2.3-mile long multi-use paved trail from Georgia Avenue to North Causeway Drive/SR A1A in St. Lucie County

District: 04 **County:** 94 ST. LUCIE **Market Area:** 11 **Units:** English
Contract Class: **Lump Sum Project:** N **Design/Build:** N **Project Length:** 2.300 MI

Project Manager:

Version 2 Project Grand Total **$379,117.74**
Description: Preferred Downtown Route

Project Sequences Subtotal			**$303,926.35**
102-1	Maintenance of Traffic	8.00 %	$24,314.11
101-1	Mobilization	10.00 %	$32,824.05
Project Sequences Total			**$361,064.51**
Project Unknowns		0.00 %	$0.00
Design/Build		0.00 %	$0.00

Non-Bid Components:

Pay item	Description	Quantity	Unit	Unit Price	Extended Amount
999-25	INITIAL CONTINGENCY AMOUNT (DO NOT BID)		LS	$18,053.23	$18,053.23
Project Non-Bid Subtotal					**$18,053.23**
Version 2 Project Grand Total					**$379,117.74**