

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
TECHNICAL REPORT COVERSHEET

650-050-38
ENVIRONMENTAL
MANAGEMENT
08/22

Natural Resource Evaluation

Florida Department of Transportation

District One

SR 72 at SR 70 Project Development and Environment Study

Limits of Project: SR 72 from CR 661 to SR 70, and SR 70 from CR 661 to the Peace River bridge

DeSoto County, Florida

Financial Management Number: 443123-2-22-01

ETDM Number: N/A

Date: October 2023

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by the Florida Department of Transportation (FDOT) pursuant to 23 U.S.C. § 327 and a Memorandum of Understanding dated May 26, 2022 and executed by the Federal Highway Administration and FDOT.



Natural Resource Evaluation

**SR 72 at SR 70
Project Development and Environment Study**

DeSoto County, Florida

Work Program ID No. 443123-1

ETDM Number: N/A

Prepared by:
Quest Ecology Inc.
735 Lakeview Dr.
Wimauma, Florida 33598

In association with:
The Balmoral Group, LLC
165 Lincoln Ave.
Winter Park, FL 32789

October 2023

Table of Contents

EXECUTIVE SUMMARY	iv
Protected Species & Habitat	iv
Wetlands	vi
Essential Fish Habitat	vii
1.0 PROJECT OVERVIEW	1
1.1 PD&E Study Purpose	1
1.2 Project Purpose and Need	1
1.3 Report Purpose	3
2.0 EXISTING ENVIRONMENTAL CONDITIONS	4
2.1 Drainage and Topography	4
2.2 Existing Land Use.....	4
2.3 Soils	6
3.0 PROTECTED SPECIES AND HABITAT	7
3.1 Methodology.....	7
3.2 Survey Results	13
3.3 Federally Listed Wildlife Species	13
3.3.1 Wood Stork	13
3.3.2 Florida Bonneted Bat	16
3.3.3 Florida Scrub-Jay	16
3.3.4 Eastern Indigo Snake	16
3.3.5 Audubon's Crested Caracara	17
3.3.6 West Indian Manatee.....	17
3.1.7 Florida Panther	18
3.4 State Listed Wildlife and Plant Species	18
3.4.1 Florida Sandhill Crane	19
3.4.2 Gopher Tortoise	19
3.4.3 Little Blue Heron	19
3.4.4 Tricolored heron.....	20
3.4.5 Roseate Spoonbill.....	20
3.4.6 Cardinal Airplant	20
3.4.7 Florida Loosestrife.....	20
3.4.8 Giant Airplant	21

3.4.9	Jameson’s Waterlily	21
3.4.10	Northern Needleleaf.....	21
3.5	Non-Listed, Protected Species	21
3.5.1	Bald Eagle	21
3.5.2	Osprey	22
3.5.4	Snowy Egret	22
3.5.4	White Ibis	22
3.6	Candidate Species	22
3.6.1	Tricolored Bat.....	22
4.0	WETLAND EVALUATION.....	24
4.1	Methodology.....	24
4.2	Survey Results	25
4.3	Wetland Impacts.....	25
4.4	Uniform Mitigation Assessment Method (UMAM)	26
4.5	Wetland Mitigation	27
4.6	Essential Fish Habitat	27
5.0	ANTICIPATED PERMITS	28
5.1	Coordination with the Permitting Agencies.....	28
5.1.1	Southwest Florida Water Management District (SWFWMD)	28
5.1.2	Florida Department of Environmental Protection (FDEP)	28
6.0	CONCLUSIONS AND COMMITMENTS.....	29
6.1	Protected Species & Habitat	29
6.2	Wetlands	30
6.3	Implementation Measures.....	31
6.4	Commitments.....	31
REFERENCES		32

Figures

Figure 1-1	Project Location.....	1
Figure 3-1	Documented Protected Species	9
Figure 3-2	Wood Stork Colonies and Core Foraging Areas.....	15

Tables

Table ES-1	Protected Wildlife Species and Effect Determination.....	v
Table ES-2	Protected Plant Species and Effect Determinations	v
Table ES-3	Wetlands and Other Surface Waters in the Project Area.....	vi
Table 2-1	Existing Land Use Within 300 Feet of Project Area	5
Table 2-2	NRCS Soils Within 300 Feet of Project Area	6
Table 3-1	Potentially Occurring Protected and Candidate Wildlife Species	11
Table 3-2	Potentially Occurring Protected Plant Species.....	12
Table 4-1	Wetlands and Other Surface Waters Within the Project Area.....	25
Table 4-2	Impacts to Wetlands and Surface Waters	25
Table 4-3	Functional Analysis Summary for Wetlands in the Project Area.....	26
Table 6-1	Protected and Candidate Wildlife Species and Effect Determinations.....	29
Table 6-2	Protected Plant Species and Effect Determinations	30
Table 6-3	Impacts to Wetlands and Surface Waters Within the Project Area	30

Appendices

Appendix A	Additional Figures
Appendix B	Descriptions of Existing Land Use
Appendix C	Listed Species Effect Determination Keys
Appendix D	Florida Bonneted Bat Acoustic Survey Report
Appendix E	Standard Protection Measures for the Eastern Indigo Snake
Appendix F	Representative Photographs of Wetlands and Other Surface Waters
Appendix G	UMAM Forms for Representative Wetland Types

EXECUTIVE SUMMARY

The Florida Department of Transportation (FDOT), District One, is conducting a Project Development and Environment (PD&E) study to evaluate proposed roadway improvements west of Arcadia in DeSoto County, Florida. The project area includes State Road (SR) 72 from County Road (CR) 661 to SR 70, and SR 70 from CR 661 to the Peace River bridge.

The objective of the PD&E Study is to document the need for the proposed roadway improvements as well as the anticipated social, physical, and natural environmental effects and costs of these improvements. The PD&E Study will identify the benefits (such as improved traffic operations and safety) and the impacts (such as environmental effects and construction costs).

This Natural Resources Evaluation (NRE) report was prepared as part of the PD&E Study. This report summarizes the possible impacts to wetlands, federally and state protected species, and protected habitats. This project qualifies as a Type 2 Categorical Exclusion (CE), therefore only the preferred alternative is included in the PD&E Study. The proposed roadway improvements generally occur within existing right of way (R/W), but the realignment of SR 72 would require acquisition of additional land northwest of the existing R/W.

PROTECTED SPECIES & HABITAT

The project area was assessed for the presence of suitable habitat for federal- and/or state-listed protected species in accordance with 50 Code of Federal Regulations (CFR) Part 402 of the Endangered Species Act (ESA) of 1973, as amended, Chapters 5B-40: *Preservation of Native Flora of Florida* and 68A-27 Florida Administrative Code (F.A.C.) *Rules Relating to Endangered or Threatened Species, and Protected Species and Habitat* in the FDOT PD&E Manual.

Based on this evaluation, the project area does not contain federally designated critical habitat for any species. A total of seven (7) federally listed wildlife species, four (4) state listed wildlife species, five (5) non-listed protected wildlife species, and one (1) candidate species for federal listing were identified as potentially occurring within the project area based on documented geographic distribution and suitable habitat. Where applicable, Effect Determination Keys were utilized for listed species likely to occur within the project area. **Table ES-1** includes the name, protected status, and effect determination for each wildlife species evaluated. Additionally, five (5) state listed plant species were identified as potentially occurring in the project area based on known distribution and habitat. **Table ES-2** includes the name, protected status, and effect determination for each plant species evaluated.

Table ES-1 Protected Wildlife Species and Effect Determination

Wildlife Species		Effect Determination*
Federally Listed Endangered		
Florida bonneted bat	<i>Eumops floridanus</i>	NE
Florida panther	<i>Puma concolor coryi</i>	NE
Federally Listed Threatened		
Audubon's crested caracara	<i>Polygorus plancus audubonii</i>	NE
eastern indigo snake	<i>Drymarchon corais couperi</i>	MANLAA
Florida manatee	<i>Trichechus manatus</i>	NE
Florida scrub-jay	<i>Amphelocoma coerulescens</i>	NE
wood stork	<i>Mycteria americana</i>	MANLAA
State Listed Threatened		
Florida sandhill crane	<i>Grus canadensis</i>	NEA
gopher tortoise	<i>Gopherus polyphemus</i>	NAEA
little blue heron	<i>Egretta caerulea</i>	NAEA
tricolored heron ¹	<i>Egretta tricolor</i>	NAEA
Not Listed		
bald eagle ^{2, 3}	<i>Haliaeetus leucocephalus</i>	N/A
osprey ^{1, 2}	<i>Pandion haliaetus</i>	N/A
roseate spoonbill ¹	<i>Platalea ajaja</i>	N/A
white ibis ¹	<i>Eudocimus albus</i>	N/A
snowy egret ¹	<i>Egretta thula</i>	N/A
tricolored bat ⁴	<i>Perimyotis subflavus</i>	N/A

* NE = No Effect; MANLAA = May Affect, Not Likely to Adversely Affect; NEA = No Effect Anticipated; NAEA = No Adverse Effect Anticipated

1 - These species are included in the FWC's Imperiled Species Management Plan (ISMP).

2 - These species are federally protected under the Migratory Bird Treaty Act (MBTA).

3 - Bald Eagles are additionally protected under the Bald and Golden Eagle Protection Act (BGEPA) and the State Eagle Rule.

4 – Tricolored bats are not currently protected but are proposed for federal listing as endangered.

Table ES-2 Protected Plant Species and Effect Determinations

Plant Species		Effect Determination*
State Listed Endangered		
Florida loosestrife	<i>Lythrum flagellare</i>	NEA
Jameson's waterlily	<i>Nymphaea jamesoniana</i>	NEA
cardinal airplant	<i>Tillandsia fasciculata</i>	NEA
giant airplant	<i>Tillandsia utriculata</i>	NEA
State Listed Threatened		
northern needleleaf	<i>Tillandsia balbisiana</i>	NEA

* NEA = No Effect Anticipated

Field surveys were conducted to assess potential habitat and document protected species within and adjacent to the project area. Acoustic surveys were conducted to detect Florida bonneted bats (*Eumops floridanus*). No protected wildlife or plant species were observed in or adjacent to the project area during

field surveys or recorded during acoustic surveys. Calls identified as tricolored bat (*Perimyotis subflavus*), a candidate for federal listing, were recorded during the acoustic surveys. Provided Best Management Practices (BMPs) are implemented, and appropriate mitigation is applied, impacts are not anticipated to any of the protected species assessed.

WETLANDS

Pursuant to Executive Order 11990 entitled “Protection of Wetlands,” (May 1977) the U.S. Department of Transportation (USDOT) has developed a policy, *Preservation of the Nation’s Wetlands* (USDOT Order 5660.1A), dated August 24, 1978, which requires all federally funded highway projects to protect wetlands to the fullest extent possible. In accordance with this policy, as well as *Wetlands and Other Surface Waters* of the FDOT *PD&E Manual*, the project area was to determine potential wetland impacts associated with the proposed construction.

Field surveys were conducted to identify and delineate wetlands within the project area. Each wetland was classified according to the FDOT’s *Florida Land Use, Cover and Forms Classification System* (FLUCCS) *Manual*, (1999) and according to the *Classification of Wetlands and Deepwater Habitats of the United States* (1979) utilized by the United States Fish and Wildlife Service (USFWS). **Table ES-3** provides a summary of the wetlands present within the project area.

Table ES-3 Wetlands and Other Surface Waters in the Project Area

Name	Land Use Type (FLUCCS)	USFWS Classification*	Acres in Project Area
Wetland 1	Stream (Bottomland) (6150)	R3UB2	0.04
Wetland 2	Mixed Wetland Hardwoods (6170)	PFO1	0.60
Wetland 3	Mixed Wetland Hardwoods (6170)	PFO1	0.46
Wetland 4	Mixed Wetland Hardwoods (6170)	PFO1	5.63
Wetland 5	Mixed Wetland Hardwoods (6170)	PFO1	0.43
Wetland 6	Wet Prairie (6430)	PEM1	1.72
Surface Water 1	Ditch (5100)	-	0.05
Surface Water 2	Ditch (5100)	-	0.09
Surface Water 3	Ditch (5100)	-	0.25
Surface Water 4	Ditch (5100)	-	0.50
Total Wetland Acres			8.88
Total Surface Water Acres			0.89

* **R3UB2** = Riverine, Upper Perennial, Unconsolidated Bottom, Sand; **PFO1** = Palustrine, Forested, Broad-Leaved Deciduous; **PEM1** = Palustrine, Emergent, Persistent

Compensatory wetland mitigation will likely be required for wetland impacts within the project area. Wetland mitigation options include purchase of wetland mitigation credits through an approved wetland mitigation bank, or creation, restoration, or enhancement of wetlands within the project watersheds. A functional analysis was completed for each wetland in the project area, utilizing the Uniform Mitigation Assessment Method (UMAM).

ESSENTIAL FISH HABITAT

The Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) designated Essential Fish Habitat (EFH) areas as “...those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” [16 U.S.C. § 1802(10)]. Pursuant to 50 CFR § 600.920(e) the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) found that Essential Fish Habitat (EFH) consultation can be incorporated into the PD&E process. According to the *Inland EFH Mapper* published by NOAA, EFH has not been designated within the project area. Therefore, an EFH Assessment is not required and consultation with NMFS is not required.

1.0 PROJECT OVERVIEW

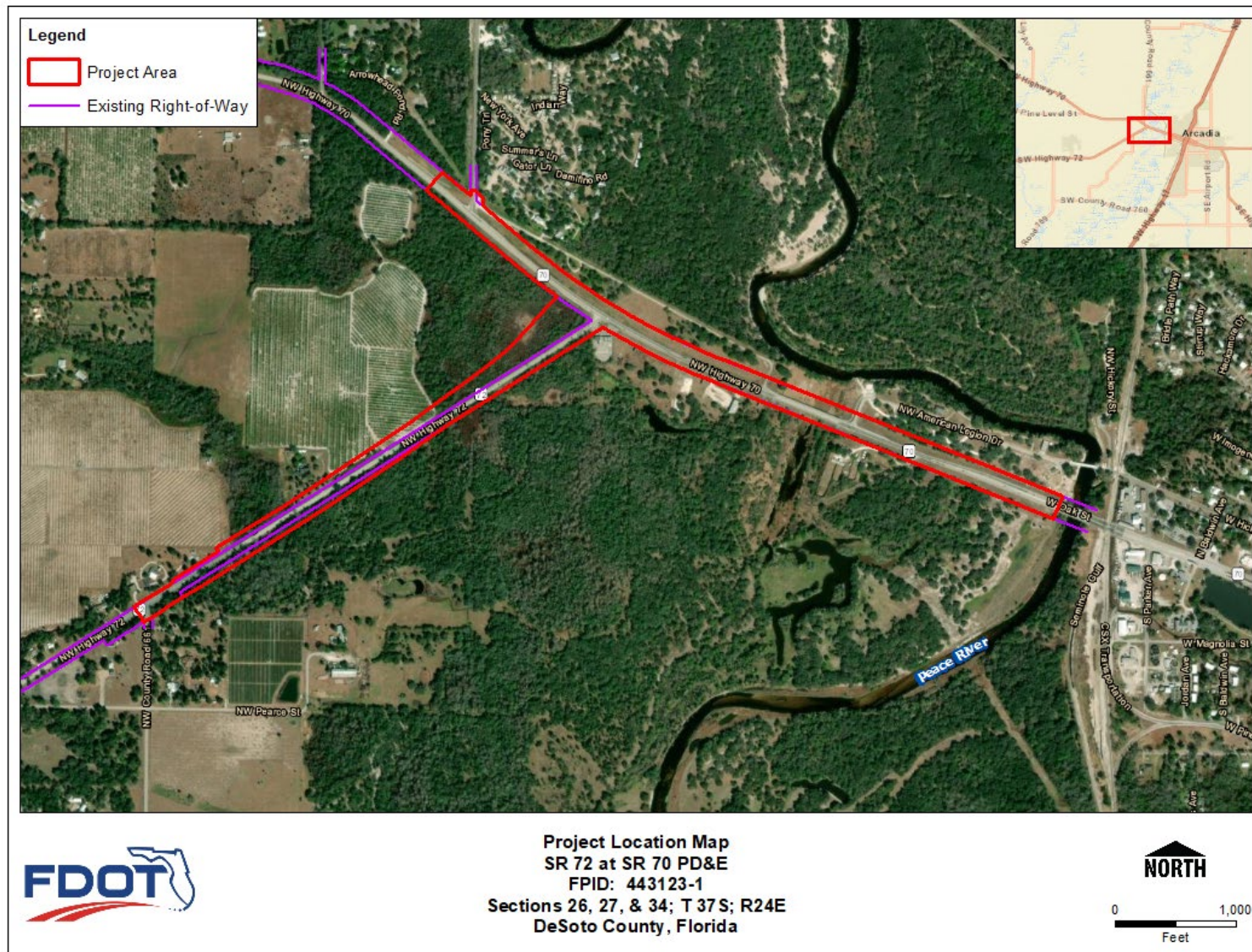
The Florida Department of Transportation (FDOT), District One, is conducting a Project Development and Environment (PD&E) study to evaluate proposed roadway improvements west of Arcadia in DeSoto County, Florida. The project area includes SR 72 from CR 661 to SR 70, and SR 70 from CR 661 to the Peace River bridge, as depicted in **Figure 1-1**.

1.1 PROJECT DESCRIPTION

The Florida Department of Transportation (FDOT), District One, is conducting a Project Development and Environment (PD&E) Study for proposed improvements, including consideration of a single lane roundabout at the intersection of State Road (SR) 70 and SR 72 west of Arcadia, Florida.

This project involves raising and realigning SR 72 for approximately 0.85 miles between County Road (CR) 661 and SR 70. The SR 70 alignment will also be raised above historic flood levels and will require roughly a 1.05 mile of raising and reconstruction of SR 70 from CR 661 to the Peace River Bridge. A roundabout is proposed in lieu of the stop-controlled intersection. The proposed project would improve the overall safety and operations of both roadway facilities by mitigating the risk of flood damage to the road, reducing unplanned road closures due to severe flooding, and improve the overall safety of the intersection. Multimodal improvements, including a shared use path are proposed as additional safety improvements.

Figure 1-1 Project Location



1.2 PROJECT PURPOSE AND NEED

The purpose of this PD&E study is the analysis of Alternatives to address needs identified within the study area and any potential impacts of projects that address the needs of the area. Evaluation of Alternatives to address the safe operation of the SR 72 and SR 70 intersection and facilities within the area are the foundation of the Study. The area has FDOT facilities that have been greatly impacted by flooding and there are numerous safety concerns with existing infrastructure. The study evaluates resilient design Alternatives to alleviate flooding on SR 72 and SR 70 caused by the Peace River. Severe storms and historic flooding have been known to inundate segments of SR 72 and SR 70, making them impassable. This consequently restricts mobility in the region, makes a Strategic Intermodal Systems (SIS) and Evacuation Route (SR 70) impassable, affects safety, and reduces emergency response for the local area. As part of this study, the potential engineering and environmental effects have been evaluated, including the need for right-of-way (R/W). Alternatives will be resiliency focused and include evaluation of roadway profiles of SR 72 and SR 70 in the locations where flooding is most prevalent and safety improvements where need exists.

SR 70 provides intrastate travel between the City of Fort Pierce, St Lucie County on the east coast to City of Bradenton, Manatee County on the west coast and spans five counties. SR 72 is an alternative route to the coast starting from its Eastern terminus at SR 70 and is the most direct route to Siesta Key, Sarasota, and Venice in Sarasota County. Maintaining access to this route is crucial for commerce, safety, and the overall transportation network and regional connectivity.

The segment of SR 72 between CR 661 and SR 70 has been prone to severe flooding over the years. The Federal Emergency Management Agency's (FEMA) effective Flood Insurance Rate Maps (FIRMs), dated November 6, 2013, depict Zone AE, A, and X floodplain limits within the project proximity. The Zone AE floodplains, which are areas that have a 1% chance of annual flooding, and are consistent with the Peace River and its overbank area. This riverine floodplain encroaches into the SR 72 and SR 70 right-of-way and has a Base Flood Elevation (BFE) of 25.0 feet and 26.0 feet. The Zone A floodplains, which are areas that have a 1% annual chance of flooding, but do not have an established BFE are located along the western portion of SR 72 within the project limits. Several publications and other historical records have shown this portion of the roadway frequently inundating during hurricane season. A shallow base clearance coupled with repeated flooding, decreases the overall service life of the roadway and leads to more unscheduled repairs and maintenance. The project area is within an open basin where runoff flows via sheet flow to roadside ditches and through existing cross drains in a general southeast direction towards the Peace River. There is currently no existing permit for the area and the runoff is untreated prior to

discharge. Frequent flooding restricts regional travel as well as adversely affects access and mobility for the local community. Public safety is at notable risk during these flooding events as it can delay emergency response from first responders, restrict access to important shelters, hospitals, or medical facilities and restrict access to other goods and necessities.

The intersection of SR 72 & SR 70 is current a T-intersection, stop controlled at the terminus of SR 72 where it intersects with SR 70. SR 72 has a high level of truck traffic due to citrus fruits being brought from regional groves to the Peace River Citrus Products facility, located approximately 0.70 miles southwest of the project limits on SR 72. Peace River Citrus Products "supplies juices and by-products to major national brands as well as private label producers." The facility processes, boxes and extracts juices that are then shipped to numerous locations for distribution or further processing. The truck traffic from this facility and other regional agricultural or rural-residential uses creates a high number of large-vehicle turning movements at the intersection of SR 72 and SR 70.

Further complicating the safety of this intersection is the presence of the Sunoco Gas Station at the south corner, with large, full access driveways on SR 72 and SR 70. The driveway apron on SR 72 is located approximately 65 feet from the SR 70 intersection and the apron on SR 70 is located within approximately 10 feet of the return radius of the intersection of SR 72. The proximity of these driveways and the full access turning movements creates additional conflict points within the area of influence of this intersection. These driveways are far less than the separations required by FDM Table 201.4.2. Previous intersection evaluations and crash data show a need for this intersection be evaluated by this PD&E. The data shows that a high number of crashes that occur result in injury.

The final element being analyzed is the lack of bicycle and pedestrian connectivity in the area. The DeSoto Veterans Memorial Park is located adjacent to the project area on the north side of SR 70 and the Peace River Campground and Canoe Rental business is located the northwest of the project area. Each of these recreation facilities creates non-vehicular demand, primarily for visiting the Sunoco Gas Station. No pedestrian pathways connect to the store and no crossing facilities exist at the SR 72 and SR 70 intersection or within the project area. Crash data shows a pedestrian fatality occurred within the project area along SR 70 in 2016 in an area with no pedestrian facilities where a pedestrian was struck while walking along the westbound SR 70 shoulder.

The project is currently in the design phase, working towards Phase 2 plans.

1.3 REPORT PURPOSE

This *Natural Resources Evaluation* (NRE) is one of several documents prepared as part of this PD&E Study. Generally, the NRE documents natural resources within the project area including protected species and habitat, wetlands, and essential fish habitat (EFH). A desktop review of the project area indicated that it does not fall within EFH. As such, EFH is not evaluated or discussed in this report.

In accordance with *Protected Species and Habitat* of the FDOT *PD&E Manual*, this report documents existing wildlife resources and habitat within the project area, as well as the potential occurrence of federally and state protected species. Potential impacts to protected species and habitat that may support these species are addressed in this report.

Pursuant to Presidential Executive Order 11990 entitled “Protection of Wetlands,” the United States Department of Transportation (USDOT) developed a policy, *Preservation of the Nation’s Wetlands* (USDOT Order 5660.1A), dated August 24, 1978, which requires all federally funded highway projects to protect wetlands to the fullest extent possible. In accordance with this policy, as well as the FDOT *PD&E Manual*, (2023) the project area was evaluated to determine potential wetland impacts associated with proposed construction.

2.0 EXISTING ENVIRONMENTAL CONDITIONS

2.1 DRAINAGE AND TOPOGRAPHY

Drainage and topography within the project area were assessed utilizing desktop review of the National Hydrography Dataset (NHD) and U.S. Geological Survey (USGS) topographic contours, as well as observations made during field reviews.

Drainage within the project area is generally provided by roadside ditches and swales, as well as culverts under the roadways. The project area is located within the Peace River drainage basin and within the Peace River comprehensive watershed.

Elevations are generally lowest near the eastern project limit, adjacent to the Peace River, and highest along the south R/W of SR 72 where adjacent uplands are higher than the roadway. Elevations within the project area range from 5 feet (ft) National Geodetic Vertical Datum (NGVD) to about 45 ft. A map of USGS topographic contours within the project area is provided in **Appendix A**.

2.2 EXISTING LAND USE

Land within 300 feet of the study area was classified according to the FDOT's *Florida Land Use, Cover and Forms Classification System (FLUCCS) Manual*, (1999). A desktop review of the project area was conducted utilizing land use data from the Southwest Florida Water Management District (SWFWMD), ArcMap basemap imagery sourced from DeSoto County (2020) and Google Earth aerial imagery dated October 2022. Results of the desktop review were ground-truthed during field reviews in February 2023.

Ground truthing generally agreed with the SWFWMD's land use mapping; however, minor updates were made to the map to reflect field observations. The map of existing land use classifications within the project area is provided in **Appendix A**. Dominant land uses within the study area include open land (1900), roads and highways (8140), and mixed wetland hardwoods (6170). Additional land uses include upland hardwood forests – coniferous mix (4340), tree crops (2200), and wet prairies (6430), with less than one acre each of excavated ditches (5100), streams (6150), and low-density residential areas (100). **Table 2-1** provides a summary of land use cover types and prevalence within 300 feet of the study area.

Table 2-1 Existing Land Use Within 300 Feet of Project Area

FLUCCS CODE	FLUCCS DESCRIPTION	ACRES IN 300 FOOT BUFFER	ACRES IN PROJECT AREA
UPLANDS			
1100	RESIDENTIAL LOW DENSITY < 2 DWELLING UNITS PER ACRE	19.1	0.8
1400	COMMERCIAL AND SERVICES	8.7	0.0
1800	RECREATIONAL	10.7	0.1
1900	OPEN LAND	42.0	22.0
2200	TREE CROPS	14.2	2.3
4340	UPLAND HARDWOOD - CONIFEROUS MIX	43.9	3.8
8140	ROADS AND HIGHWAYS	11.8	10.6
TOTAL UPLANDS		150.4	39.6
OTHER SURFACE WATERS			
5100	STREAMS AND WATERWAYS	4.1	0.2
5100	UPLAND CUT DITCH	0.9	0.9
5300	RESERVOIRS	0.6	0.0
TOTAL OTHER SURFACE WATERS		5.6	1.1
WETLANDS			
6150	STREAM AND LAKE SWAMPS (BOTTOMLAND)	2.7	0.2
6170	MIXED WETLAND HARDWOODS	26.9	6.5
6410	FRESHWATER MARSHES	5.3	0.5
6430	WET PRAIRIES	6.9	1.7
6440	EMERGENT AQUATIC VEGETATION	0.7	0.0
TOTAL WETLANDS		42.4	8.9
GRAND TOTAL		198.3	49.5

Appendix B contains detailed descriptions of upland and wetland communities within the project area. **Section 4.0** contains a more detailed description of wetland delineation methods and impact assessment, including functional loss analysis. A map depicting approximate boundaries of wetlands and other surface waters is included in **Appendix A**. Representative photographs are included in **Appendix F**.

Field reviews confirmed community boundaries, dominant vegetation, and nuisance and exotic vegetation coverage in natural communities within the project area. Surveys also determined the presence or potential for the occurrence of protected species. These species, and the study area habitats in which they may be expected to occur, are also discussed in greater detail in **Section 3.0**.

2.3 SOILS

Review of the project area and 300-foot buffer using United States Department of Agriculture (USDA) NRCS Web Soil Survey identified 13 soil types within 14 map units, which are listed in **Table 2-2** below. Of these, Bradenton-Felda-Chobee complex, occasionally flooded (7*) is dominant, making up approximately 59% of the project area.

Table 2-2 NRCS Soils Within 300 Feet of Project Area

MAP UNIT SYMBOL	MAP UNIT NAME	HYDRIC RATING (%)	ACRES IN 300 FT BUFFER	ACRES IN PROJECT AREA
4*	Basinger fine sand, frequently flooded	100	17.0	3.5
7*	Bradenton-Felda-Chobee complex, occasionally flooded	97	99.3	28.0
8*	Bradenton-Felda-Chobee complex, frequently flooded	100	15.0	3.0
9	Cassia fine sand, 0 to 2 percent slopes	0	5.8	2.1
15*	Felda fine sand, 0 to 2 percent slopes	89	0.6	0.0
18*	Floridana mucky fine sand, frequently ponded, 0 to 1 percent slopes	100	10.3	2.7
20	Immokalee fine sand, 0 to 2 percent slopes	6	8.6	3.1
24	Myakka fine sand, 0 to 2 percent slopes	5	0.2	0.0
25	Ona fine sand, 0 to 2 percent slopes	5	5.1	1.5
36	Smyrna fine sand, 0 to 2 percent slopes	6	3.9	1.5
37	Tavares fine sand, 0 to 5 percent slopes	0	2.9	0.0
41	Wabasso fine sand, 0 to 2 percent slopes	10	8.8	1.2
42	Zolfo fine sand, 0 to 2 percent slopes	3	18.1	2.9
99	Water	N/A	2.7	0.0
TOTAL ACRES			198.3	49.5

* indicates soil with majority hydric components

The Web Soil Survey utilizes multiple sources to identify and rate map units based on their components. The hydric rating indicates the percentage of components meeting the criteria for hydric soils within each map unit. According to the Florida Association of Environmental Soil Scientists (FAESS), a soil may not be classified as hydric in all situations. Nullifying factors include the inclusion of certain soil types or the composition of the dominant soil in addition to the soil being located within a specific landform type (e.g., marine terrace, sloughs, tidal marsh, etc.). Final determination of the hydric condition for those soils which may be hydric will be determined during the permitting and design stage of this project. A map of Web Soil Survey results within the project area is included in **Appendix A**.

3.0 PROTECTED SPECIES AND HABITAT

The project area was assessed for the presence of suitable habitat for federal- and/or state-listed species in accordance with 50 Code of Federal Regulation (CFR) Part 402 of the ESA of 1973, as amended, Chapters 5B-40 and 68A-27 F.A.C., and *Protected Species and Habitat* of the FDOT PD&E Manual.

3.1 METHODOLOGY

Desktop reviews were conducted in February 2023 to identify state and federally protected species occurring or potentially occurring within the project area. Available data and recent aerial imagery were reviewed to determine habitat types occurring within and adjacent to the project area, as discussed in **Section 2.0**. Information sources and databases utilized include but were not limited to the following:

- USFWS Information for Planning and Consulting (IPaC)
- Florida Natural Areas Inventory (FNAI) Biodiversity Matrix
- Audubon EagleWatch Bald Eagle Nest Locator Map
- Florida Department of Environmental Protection Map Direct
 - Florida wood stork foraging areas (October 7, 2021)
- Florida Fish and Wildlife Conservation Commission (FWC) GIS Data Library
 - Florida panther telemetry, mortality, and confirmed human-panther interactions
 - manatee synoptic survey locations and manatee carcass recovery locations
 - wading bird rookeries
- Global Biodiversity Information Facility (GBIF)
- University of South Florida (USF) Atlas of Florida Plants

Based on the results of database searches, field survey methods for specific habitat types and lists of target species were developed. Please refer to **Figure 3-1** for a depiction of the documented species occurrence results from the database searches.

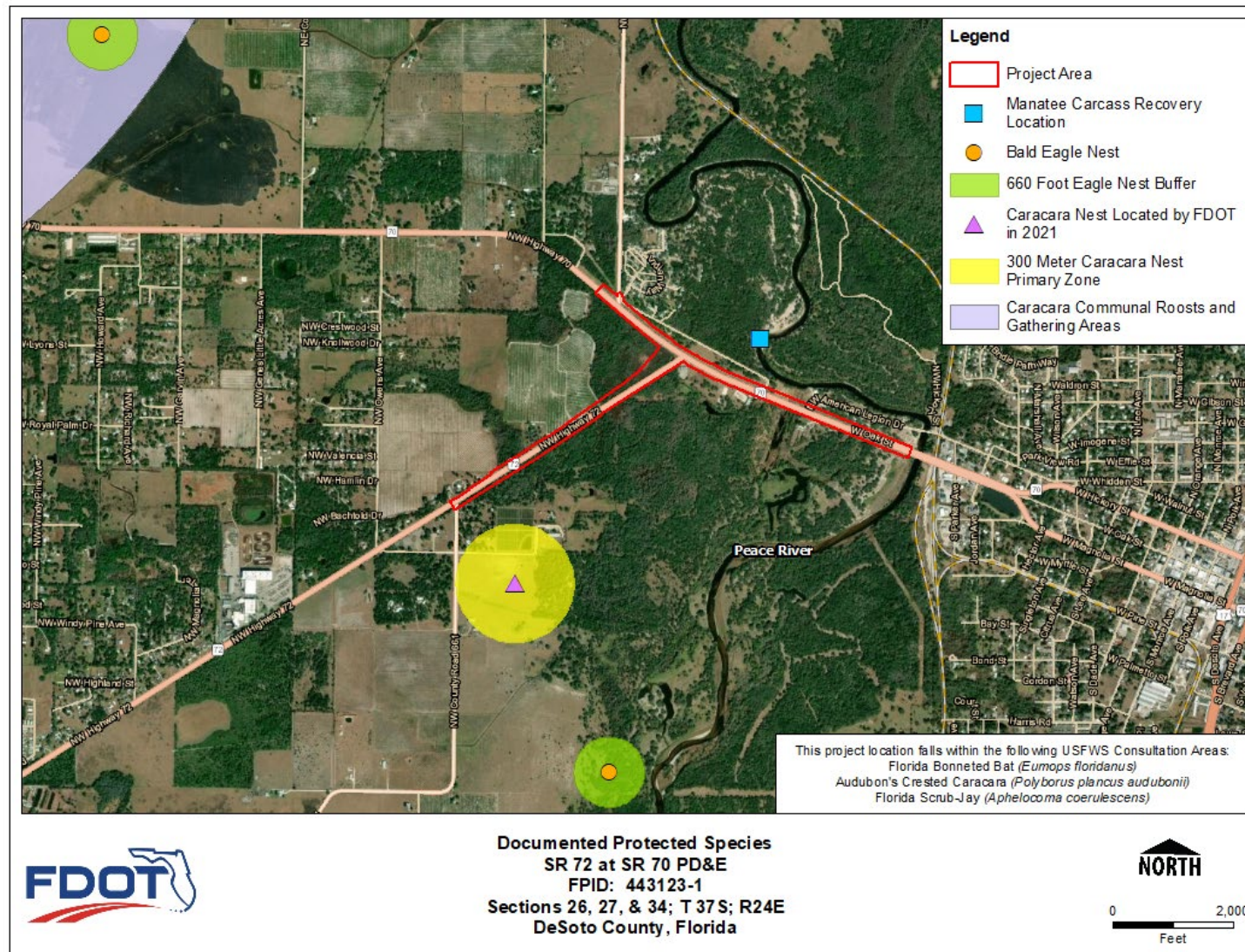
Based on this evaluation, the project area does not contain federally designated critical habitat for any species. A total of seven (7) federally listed wildlife species, five (5) state listed wildlife species, four (4) non-listed protected wildlife species, and one (1) candidate wildlife species for federal listing were

identified as potentially occurring within the project area based on designated consultation areas and/or documented range falling within the project area. **Table 3-1** lists these wildlife species. Where applicable, Effect Determination Keys published by the USFWS were utilized for listed species likely to occur within the project area. These keys are provided in **Appendix C**.

Five (5) state listed plant species were identified as potentially occurring within the project area based on known species distribution and suitable habitat within the project area. These plant species are provided in **Table 3-2**. Additional listed plant species documented within DeSoto County, including the federally listed endangered pygmy fringetree (*Chionanthus pygmaeus*), were not included due to a lack of suitable habitat within the project area.

Field reviews took place in February 2023 and consisted of vehicular surveys, roadside observations, and pedestrian surveys through natural areas and altered habitats with the potential to support protected species. The purpose was to document any protected plant and wildlife species or indicators of their presence (e.g., vocalizations, tracks, scat, burrows, etc.) within or immediately adjacent to the study area. During pedestrian surveys visual observations were also conducted on adjacent lands.

Figure 3-1 Documented Protected Species



Based on the above methods, a list of potentially occurring protected species was developed, and each species was assigned a low, moderate, or high likelihood for occurrence within habitats found within the study area. Definitions for likelihood of occurrence are provided below:

Low — Species with a low likelihood of occurrence within the study area are defined as those species that are known to occur in Manatee County or the bioregion, but preferred habitat is limited within the study area, or the species is rare or has been extirpated.

Moderate — Species with a moderate likelihood for occurrence are those species known to occur in Manatee or nearby counties, and for which suitable habitat is well represented within the study area, but no observations or positive indications exist to verify their presence.

High — Species with a high likelihood for occurrence are suspected within the study area based on known ranges and existence of sufficient preferred habitat within the project corridor; are known to occur adjacent to the corridor; or have been previously observed or documented within the vicinity.

Table 3-1 Potentially Occurring Protected and Candidate Wildlife Species

Species		Potential for Adverse Effect			Protected Status*	Notes	Effect**
		Low	Medium	High			
Audubon's crested caracara	<i>Polygorus plancus audubonii</i>	x			FED-T	no suitable habitat	NE
bald eagle	<i>Haliaeetus leucocephalus</i>	x			NL; MBTA; BGEPA; State Eagle Rule	no nests identified within 660 feet; not observed	N/A
eastern indigo snake	<i>Drymarchon corais couperi</i>	x			FED-T	Effect Determination Key 2017/ Standard Protection Measures Required	MANLAA
Florida bonneted bat	<i>Eumops floridanus</i>	x			FED-E	Effect Determination Key 2019/ Acoustic Survey did not detect	NE
Florida panther	<i>Puma concolor coryi</i>	x			FED-E	Effect Determination Key 2007 / No change in traffic patterns	NE
Florida sandhill crane	<i>Grus canadensis</i>	x			FL-T	not observed	NEA
Florida scrub-jay	<i>Amphelocoma coerulescens</i>	x			FED-T	no suitable habitat	NE
gopher tortoise	<i>Gopherus polyphemus</i>	x			FL-T	not observed	NAEA
little blue heron	<i>Egretta caerulea</i>	x			FL-T	not observed	NAEA
osprey	<i>Pandion haliaetus</i>	x			NL; MBTA; ISMP	not observed	N/A
roseate spoonbill	<i>Platalea ajaja</i>	x			FL-T; ISMP	not observed	NEA
snowy egret	<i>Egretta thula</i>	x			NL; ISMP	not observed	N/A
tricolored bat	<i>Perimyotis subflavus</i>				not protected; proposed FED-E	calls recorded during acoustic survey; not protected	N/A
tricolored heron	<i>Egretta tricolor</i>	x			FL-T; ISMP	not observed	NAEA
West Indian manatee	<i>Trichechus manatus</i>	x			FED-T	Effect Determination Key (2013) / no in-water work or impacts to manatee accessible waters	NE
white ibis	<i>Eudocimus albus</i>	x			NL; ISMP	not observed	N/A
wood stork	<i>Mycteria americana</i>	x			FED-T	Effect Determination Key 2010 / provide SFH compensation per Section 404	MANLAA

* **FED** = Federally Listed; **FL** = State Listed; **T** = Threatened; **E** = Endangered; **NL** = Not Listed; **ISMP** = Imperiled Species Management Plan (FWC); **MBTA** = Migratory Bird Treaty Act (USFWS); **BGEPA** = Bald and Golden Eagle Protection Act (USFWS)

** **NE** = No Effect; **MANLAA** = May Affect, Not Likely to Adversely Affect; **NEA** = No Effect Anticipated; **NAEA** = No Adverse Effect Anticipated

Table 3-2 Potentially Occurring Protected Plant Species

Species		Potential for Adverse Effect			Protected Status*	Notes	Effect**
		Low	Medium	High			
cardinal airplant	<i>Tillandsia fasciculata</i>	x			FL-E	not observed	NEA
Florida loosestrife	<i>Lythrum flagellare</i>	x			FL-E	not observed	NEA
giant airplant	<i>Tillandsia utriculata</i>	x			FL-E	not observed	NEA
Jameson's waterlily	<i>Nymphaea jamesoniana</i>	x			FL-E	not observed	NEA
northern needleleaf	<i>Tillandsia balbisiana</i>	x			FL-T	not observed	NEA

* **FL** = State Listed; **T** = Threatened; **E** = Endangered

***NEA** = No Effect Anticipated

3.2 SURVEY RESULTS

No protected wildlife or plant species were observed during field reviews. Descriptions of the wildlife and plant species with the potential to occur within the study area, based on potential availability of suitable habitat and known ranges, are provided below.

3.3 FEDERALLY LISTED WILDLIFE SPECIES

No federally listed wildlife species were observed during field surveys or detected during acoustic surveys within the vicinity of the project area. A total of seven (7) federally listed wildlife species were evaluated due to having designated consultation areas and/or documented range within the project area. The project area falls within the USFWS Consultation Area for Florida bonneted bat (*Eumops floridanus*), Florida scrub-jay (*Aphelocoma coerulescens*), and Audubon's crested caracara (*Polyborus plancus audubonii*). Additional potentially occurring federally listed species include the eastern indigo snake (*Drymarchon corais couperi*), wood stork (*Mycteria americana*), and Florida panther (*Puma concolor coryi*). The West Indian manatee (*Trichechus manatus*) was evaluated based on project vicinity to the Peace River, although the Peace River is not included in the project area. Federally listed species are also considered state listed species.

3.3.1 Wood Stork

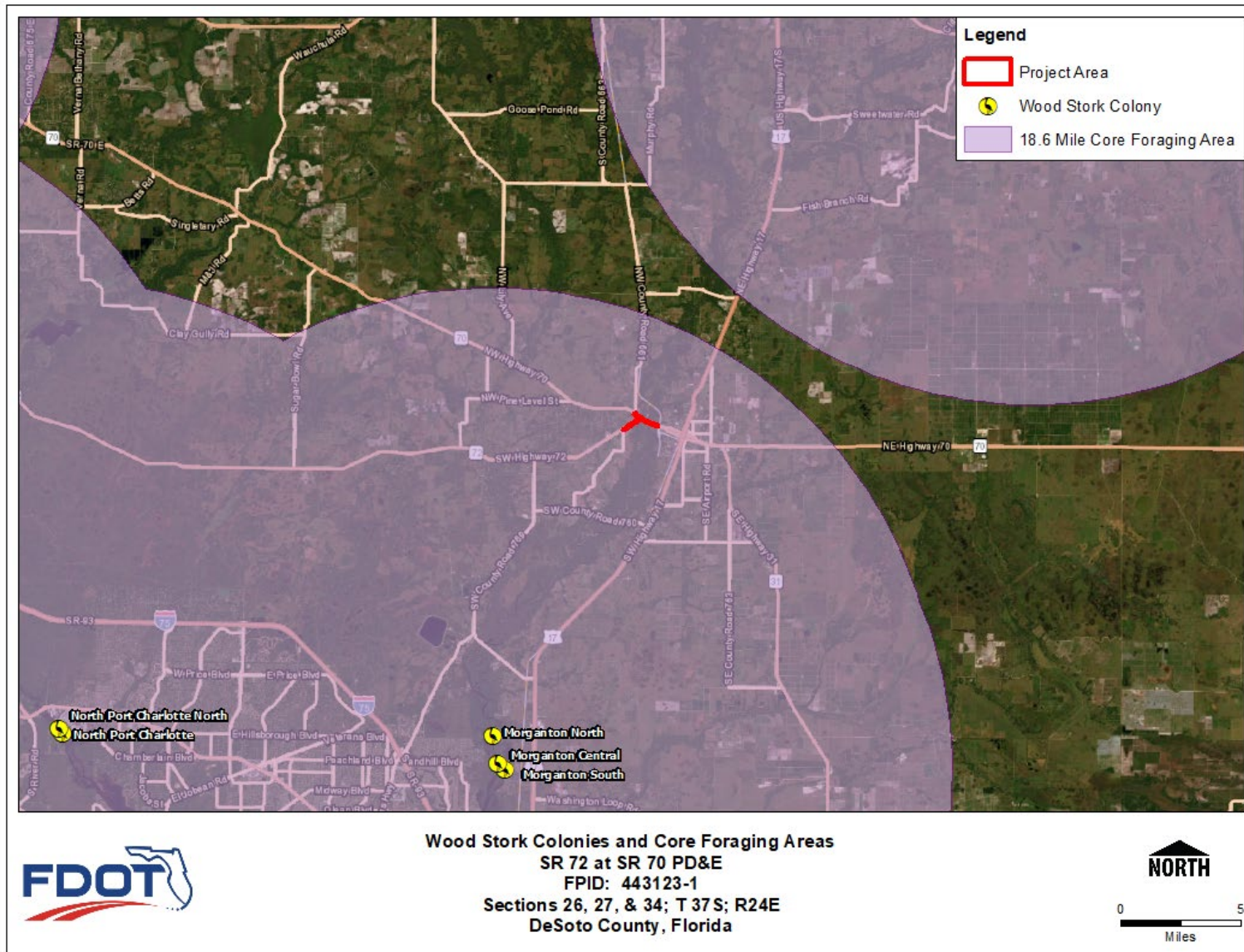
Wood storks utilize freshwater and estuarine habitats for nesting, foraging, and roosting. These large white birds are typically colonial nesters and construct their nests in medium to tall trees located within wetlands or on islands. Wood storks are federally listed as Threatened.

Surface water ditches and non-forested wetlands within the project area may provide suitable foraging habitat (SFH) for wood storks. As defined by the USFWS, SFH for wood storks includes wetlands and surface waters which have areas of water that are relatively calm, uncluttered by dense thickets of aquatic vegetation, and have permanent or seasonal water depth between 2 and 15 inches. Wetlands and surface waters that meet the criteria of SFH generally include herbaceous and saltwater marshes and herbaceous ditches/swales, ponds, and riverine systems. Wet prairie/pastures may provide foraging habitat during periods of high rainfall. SFH within the project area will be re-evaluated during final permitting of the project as the vegetative structure of wetlands will change over time and due to maintenance activities associated with other surface water systems. Detailed calculations of CFA biomass may be required during future permitting phases of the project if foraging habitat is lost and the USFWS continues to utilize these calculations to determine mitigation.

No rookeries or wood storks were observed during field surveys. The core foraging area (CFA) for South Florida populations of wood stork is 18.6 miles. **Figure 3-2** depicts the CFA and known wood stork colonies in relation to the project area. Three (3) wood stork colonies are documented within the CFA: Morganton North is 13.8 miles from the project area, Morganton Central is 14.9 miles from the project area, and Morganton South is 15.0 miles from the project area. Morganton North and Central were classified as active during the most recent FWC survey (2019), but Morganton South has not been classified active since 2012.

This project is greater than 0.47 mile from a colony site and includes potential impacts to SFH greater than 0.5 acre within the CFA of wood stork colonies. FDOT will provide mitigation for impacts to wood stork Suitable Foraging Habitat within the Service Area of a Service-approved wetland mitigation bank or wood stork conservation bank. Therefore, Pursuant to the Wood Stork Effect Determination Key (2010), included in **Appendix C**, the project may affect but is not likely to adversely affect the wood stork (A < B < C < E).

Figure 3-2 Wood Stork Colonies and Core Foraging Areas



3.3.2 Florida Bonneted Bat

The Florida bonneted bat is federally listed as Endangered. This species requires a suitable habitat for roosting and for foraging. Roosting habitat includes any forested area containing mature, tall trees. This species has also been known to utilize artificial structures including buildings, bridges, utility poles, and bat houses for roosting. Foraging habitat must contain sources of drinking water as well as relatively open areas to find and catch prey.

The project area is within the USFWS Consultation Area for the Florida bonneted bat and suitable habitats for roosting and foraging are present within the project area. In accordance with the USFWS *Florida Bonneted Bat Consultation Guidelines* (October 2019), a full acoustic survey was conducted February 8 – 16, 2023. **Appendix D** contains the report detailing the acoustic survey methods and results. Florida bonneted bats were not detected within the project area. Pursuant to the *Florida Bonneted Bat Consultation Key* included in **Appendix C**, the project will have no effect on the Florida bonneted bat ($1a < 2a < 3b < 6b$). The *Florida Bonneted Bat Consultation Guidelines* state that USFWS concurrence is not required for a “no effect” determination.

3.3.3 Florida Scrub-Jay

Florida scrub-jays are endemic to peninsular Florida and are federally listed as Threatened. No critical habitat has been designated. These birds have blue heads, wings, and tails. They live in family groups that can consist of both breeding adults and helper adults, along with juveniles. Breeding adults nest between March 1 and June 30 each year. This species is only found in xeric or scrub habitat with trees less than two meters tall, sparse groundcover, and open sandy areas. The birds utilize these open sandy areas for foraging and caching food.

The project area is within the USFWS Consultation Area, but the required habitat types are not present in the project area or adjacent areas. Scrub-jays were not observed in or adjacent to the project area during field reviews. According to data published by the Cornell Lab of Ornithology, made available by the Global Biodiversity Information Facility (GBIF), the nearest recorded occurrence of a scrub-jay is 6.3 miles southeast of the project area. As no suitable habitat is located within the project area, the project will have no effect on this species.

3.3.4 Eastern Indigo Snake

Eastern indigo snakes are federally listed as Threatened. These large, black, non-venomous snakes occur in a variety of habitats, including forested uplands and wetlands as well as wet and dry prairies. This species feeds on snakes, frogs, salamanders, toads, small mammals, birds, and young turtles.

Some areas of suitable habitat for this species occur within and adjacent to the project area. However, no individuals were observed during the field surveys. Furthermore, no gopher tortoise burrows, either potentially occupied or abandoned, were identified within the project area. Therefore, the probability of occurrence for this species within the study area is low.

The most recent version of the USFWS “*Standard Protection Measures for the Eastern Indigo Snake*” will be utilized during construction. Current construction guidelines (dated March 23, 2021) “*Standard Protection Measures for the Eastern Indigo Snake*” are provided in **Appendix E**. Since standard protection guidelines will be incorporated in the final project design and implemented during construction, pursuant to the USFWS *Consultation Key for the Eastern Indigo Snake* (2017) included in **Appendix C**, this project is not likely to adversely affect the eastern indigo snake (A < B < C < D < E).

3.3.5 Audubon's Crested Caracara

The crested caracara is federally listed as Threatened. No critical habitat has been designated for this species. This raptor has a distinct appearance, with a black crest, white head and throat, red face, black body, and long yellow legs. Habitat for the caracara consists of open land containing scattered cabbage palm (*Sabal palmetto*). In central Florida, these areas may include wet prairie, dry prairie, and cattle ranches. Caracaras utilize cabbage palms for nesting between November and April. Juveniles are known to roost in groups in cabbage palms or oak trees (*Quercus sp.*) after leaving the nest. The USFWS has documented the general locations of non-breeding communal roosts and gathering places for caracaras, one of which is located approximately 1.5 miles northwest of the project area, as shown in **Figure 3-1**.

The project area falls within the USFWS consultation area for the crested caracara. A caracara survey conducted in 2021, before the scope of this project was fully defined, documented one nest outside of the current project area. No suitable habitat for this species is present within the project area and no suitable nesting trees will be removed as part of the project scope. No caracaras were observed during field reviews in February 2023. One nest was identified outside of the current project area during a caracara survey conducted prior to the scope of the project being fully defined. Therefore, project will have no effect on this species.

3.3.6 West Indian Manatee

The West Indian manatee is federally listed as Threatened and critical habitat has been designated by the USFWS. Manatees are mammals found in marine, estuarine, and freshwater waterbodies, where they feed on underwater vegetation. The project area falls within the USFWS consultation area for

the West Indian manatee, but not within the designated critical habitat. No suitable habitat for this species is present within the project area.

The Peace River, which is accessible to manatees, is not included in the project area. The proposed scope of work does not include in-water work or modifications to drainage features in the Peace River. Pursuant to the *Manatee Key* (2013) published by the United States Army Corps of Engineers (USACE), since the project is not located in waters accessible to manatees and will not directly or indirectly affect manatees, it will have no effect on this species (A < no effect). The *Manatee Key* is provided in **Appendix C**.

3.1.7 Florida Panther

The Florida panther is federally listed as Endangered. This large wild cat varies in overall color from light brown to rusty, with dull white to buff underside. The tip of their tail, back of their ears, and sides of their nose are dark brown to black. Males have been recorded up to seven (7) feet long from nose to tail tip and females are typically up to six (6) feet long. The project area falls within the Florida panther range, but outside of the panther focus area defined by the USFWS. Critical habitat has not been designated. Panthers require large contiguous areas of suitable habitat, which consists of pinelands, upland hardwood forests, hardwood swamps and cypress swamps with dense understory vegetation.

Panther occurrences have not been documented within or adjacent to the project area and panthers were not observed during the field surveys. The nearest documented panther occurrence is a 2017 mortality located 11.3 miles east of the project area, included in the *Florida Panther Mortality* dataset (FWC 2022). The proposed project area is greater than 1 acre in size but will not change existing vehicle traffic patterns. Therefore, pursuant to the *USFWS Florida Panther Effect Determination Key* (2007) provided in **Appendix C**, the project will have no effect on the Florida panther (A < B). Consultation with the USFWS is not required.

3.4 STATE LISTED WILDLIFE AND PLANT SPECIES

No state listed wildlife or plant species were observed in the vicinity of the project area. Five (5) state listed wildlife species were evaluated based on designated consultation areas and documented range: Florida sandhill crane (*Grus canadensis*), gopher tortoise (*Gopherus polyphemus*), little blue heron (*Egretta caerulea*), tricolored heron (*Egretta tricolor*), and roseate spoonbill (*Platalea ajaja*). Additionally, five (5) state listed plant species were evaluated based documented species distribution and suitable habitat within the project area: cardinal airplant (*Tillandsia fasciculata*), Florida

loosestrife (*Lythrum flagellare*), giant airplant (*Tillandsia utriculata*), Jameson's waterlily (*Nymphaea jamesoniana*), and northern needleleaf (*Tillandsia balbisiana*).

3.4.1 Florida Sandhill Crane

The Florida sandhill crane is state designated Threatened. Sandhill cranes have gray feathered bodies and a distinct patch of red skin on their heads. They can be up to 47 inches tall, with long necks and long legs. They have a distinct rattling bugle call that can be heard up to 2.5 miles away.

They forage for roots, seeds, insects, snakes, and frogs as well as young birds or small mammals. This species inhabits freshwater marshes, pastures, and prairies. Sandhill cranes are monogamous breeders; they nest in late winter and spring on floating vegetation mats within shallow wetlands. Little to no suitable habitat for this species is present within the project area, and the species was not observed during field reviews. There is no effect anticipated to this species.

3.4.2 Gopher Tortoise

The gopher tortoise is state designated Threatened. Suitable habitat for gopher tortoises must include well-drained sandy soils for burrowing, herbaceous plants for forage, and areas with sparse canopy. This species can be found in disturbed environments including utility easements, residential yard, and pastures. No gopher tortoise burrows were observed within the study area during field reviews. No adverse effects are anticipated for the gopher tortoise. Additional gopher tortoise burrow surveys may be required prior to permitting and construction, as survey results are not valid for more than 90 days pursuant to FWC *Gopher Tortoise Permitting Guidelines*.

3.4.3 Little Blue Heron

The little blue heron is state designated Threatened. It is a small wading bird species with a gray-blue body. Its head and neck are red during breeding season and purple during the remainder of the year. The little blue heron nests in colonies, using trees and shrubs near water or wetland vegetation. It feeds alone, wading in freshwater systems or walking on floating vegetation, and its diet includes amphibians, fish and invertebrates including insects and shrimp. This wading bird is usually found in swamps, estuaries, ponds, lakes, and rivers within Florida. Although suitable habitat is present within the project area, the species was not observed during field reviews. No adverse effects are anticipated to the little blue heron.

3.4.4 Tricolored heron

The tricolored heron is state designated Threatened. It has a long slender neck and bill; it is named for its distinct coloring, with a dark blue head, purple chest, and white underside. Tricolored heron colonies nest between February and August in trees or shrubs located on salt marsh islands or in standing water. This wading bird is usually found in swamps, estuaries, ponds, lakes, and rivers within Florida, where it feeds primarily on fish. Although suitable habitat is present within the project area, the species was not observed during field reviews. No adverse effects are anticipated to the tricolored heron.

3.4.5 Roseate Spoonbill

The roseate spoonbill is state designated Threatened and is federally protected by the Migratory Birds Program per the MBTA. Its distinct appearance includes pink wings, a white neck and back, and a featherless gray head with a large spoon-shaped bill. It feeds on crustaceans and small fish using its specialized bill to forage in shallow water. Roseate spoonbills nest in colonies in mangroves and other trees, mostly on the coast. Nesting habitat for this species includes coastal areas, mangrove islands and dredge-spoil islands. Shallow water that is potentially suitable foraging habitat exists within the project area, but suitable nesting habitat is not present. No roseate spoonbills were observed during field surveys. No adverse effects are anticipated to the roseate spoonbill.

3.4.6 Cardinal Airplant

The cardinal airplant, also known as common wild-pine, is state designated Threatened. This epiphyte forms rosettes with stiff gray-green leaves that have a leathery appearance. It is distinguished from giant airplant by having leaves that are narrower at the base and by its brightly colored purple flower and overlapping red floral bracts. Habitat includes swamps, hammocks, flatwoods, and the edges of sloughs and marshes. It is typically observed on cypress (*Taxodium sp.*), live oak (*Quercus virginiana*) or other trees with thick ridged bark, which allows for easy attachment. Although suitable habitat is present within the project area, the species was not observed during field reviews. No effects are anticipated to the cardinal airplant.

3.4.7 Florida Loosestrife

The Florida loosestrife is state designated Threatened. It is an herbaceous perennial with thin erect stems, oblong leaves, flowers that are purple to white with a cylindrical flower tube and crinkled petals. It is distributed from south Florida north to Orange and Hernando Counties. Habitat for this species includes swamps, marshes, and depressions. Although suitable habitat is present within the

project area, the species was not observed during field reviews. No effects are anticipated to the Florida loosestrife.

3.4.8 Giant Airplant

The giant airplant, also known as spreading airplant, is state designated Threatened. It is a large epiphyte that forms rosettes of long, triangular leaves. Its floral bracts are spaced widely and erect. The bracts are green or tinged purple and the flowers are white. Habitat includes bright areas in swamps, hammocks, mesic flatwoods, improved pasture, and the edges of basin marshes, where it is found on live oaks and other trees with thick ridged bark. Although suitable habitat is present within the project area, the species was not observed during field reviews. No effects are anticipated to the giant airplant.

3.4.9 Jameson's Waterlily

Jameson's waterlily, also known as night blooming waterlily, is state designated Threatened. It is a floating aquatic plant with a showy white flower that blooms only at night. Habitat includes freshwater marshes, lakes, and roadside ditches. Although suitable habitat is present within the project area, the species was not observed during field reviews. No effects are anticipated to Jameson's waterlily.

3.4.10 Northern Needleleaf

The northern needleleaf, also known as Balbis' airplant, is state designated Threatened. It is an epiphyte with gray leaves that are twisted and may be flushed red. The base of the plant has a swollen appearance due to inflated leaf sheaths. Habitat for this species includes hammocks and swamps, as well as the edges of marshes or sloughs. It is known to anchor to a variety of host trees or shrubs. Although suitable habitat is present within the project area, the species was not observed during field reviews. No effects are anticipated to the northern needleleaf.

3.5 NON-LISTED, PROTECTED SPECIES

3.5.1 Bald Eagle

The bald eagle was removed from the USFWS endangered species list in 2007 and from the FWC imperiled species list in 2008. However, the species continues to receive federal protection under the Migratory Birds Program per the *Migratory Bird Treaty Act* (MBTA) and the *Bald and Golden Eagle Protection Act* (BGEPA). Additionally, the species is protected by the State Bald Eagle Rule (68A-16.002 F.A.C.). The USFWS regulates activity within 660 feet of an active bald eagle nest. No bald eagle nests

are documented within 660 feet of the project area, and none were observed during field reviews. The project is not anticipated to impact this species.

3.5.2 Osprey

The osprey is not a listed species but is federally protected by the Migratory Birds Program per the MBTA. Additionally, it is included in the FWC Imperiled Species Management Plan. Habitat for this species includes coastal areas, rivers, lakes, and swamps, where they feed on fish. Ospreys build nests of large sticks on top of trees in these areas, and also use manmade structures including utility poles, cell towers, and nest platforms. Although suitable habitat exists within the project area, no osprey or osprey nests were observed during field reviews. The project is not anticipated to impact this species.

3.5.4 Snowy Egret

The snowy egret is not a listed species but is federally protected by the Migratory Birds Program per the MBTA. Additionally, it is included in the FWC Imperiled Species Management Plan. The snowy egret is a small wading bird with a white body, yellow around the eyes, a black bill, and black legs with bright yellow feet. It feeds in freshwater and saltwater habitats among flocks of other wading birds. Its diet consists of small fish and small invertebrates including shrimp. Habitat for this species includes shallow estuarine areas, mangroves, saltmarsh pools, and tidal channels found throughout Florida. Estuarine habitat is not present within the project area and snowy egrets were not observed during field surveys. The project is not anticipated to impact this species.

3.5.4 White Ibis

The white ibis is not a listed species but is included in the FWC Imperiled Species Management Plan. Adult white ibis have a white body with black tipped wings. Their legs, face, and downturned bill are reddish. They forage for crustaceans, fish, insects, frogs, and snakes by probing the ground with their bill. Large colonies nest on the ground or as high as 50 feet in trees along the coast and inland between February and October. Habitat for this species includes coastal marshes and wetlands including saltwater, brackish, and freshwater. While the project area contains some suitable habitat, white ibis were not observed during field surveys. The project is not anticipated to impact this species.

3.6 CANDIDATE SPECIES

3.6.1 Tricolored Bat

The tricolored bat is not currently protected at the federal or state level. As of September 13, 2022, the USFWS has proposed listing the tricolored bat as federally Endangered due to impacts of white-nose syndrome. If the species is listed during future phases of this project, and the project area falls

within the consultation area, the FDOT will coordinate with the USFWS as needed. White-nose syndrome describes a fungus that grows on bats' wings and muzzles during hibernation. Tricolored bats hibernate in caves, tunnels, and abandoned mines in the winter, and roost in trees during spring, summer, and fall. They hunt insects at night over waterbodies and at forested edges. Tricolored bat calls were recorded during acoustic surveys (**Appendix G**) and the project contains suitable roosting and hunting habitat for this species. The project is not anticipated to impact this species.

4.0 WETLAND EVALUATION

In accordance with Executive Order 11990, Protection of Wetlands (May 1977), and *Wetlands and Other Surface Waters* within the FDOT PD&E Manual (July 2023), the proposed project has been evaluated for potential effects to wetlands. Wetlands and other surface waters may provide habitat for fish and wildlife, protect water quality, and diminish the risk of flooding by storing excess water following rain events. Federal and state regulations require that wetland and other surface waters be identified and delineated within and adjacent to the project area, and that proposed impacts be assessed and mitigated to ensure no overall functional loss to the ecosystem.

At the federal level, the USACE regulates waters of the United States (WOTUS) under the Rivers and Harbors Act and the CWA Section 404. In Florida, wetlands and other surface waters are regulated by the FDEP and Water Management Districts (WMDs). Per the Retained Waters Screening Tool published by the FDEP, WOTUS within the project area are no longer under the jurisdiction of the USACE but instead are considered state assumed waters pursuant to Chapter 62-331, F.A.C. Therefore, wetlands and other surface waters within the project area are regulated by the Southwest Florida Water Management District (SWFWMD) pursuant to Chapter 62-330 F.A.C. and the FDEP pursuant to the State 404 Program Chapter 62-331 F.A.C.

4.1 METHODOLOGY

A variety of resources including the USFWS National Wetlands Inventory (NWI) data, NRCS Web Soil Survey data, aerial imagery, Digital Elevation Model (DEM) imagery, and field surveys were employed to identify the wetland communities that occur within the project area. The results of desktop review were ground truthed during field reviews in February 2023.

Wetland boundaries were delineated using the USACE *Wetland Delineation Manual* (1987), the USACE *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region* (2010), the FDEP *The Florida Wetlands Delineation Manual* (1995), and *Rule 62-340, F.A.C., Delineation of the Landward Extent of Wetlands and Surface Waters*. GPS points utilizing Avenza™ mobile phone application were taken along each delineated boundary.

Distinction between wetland habitat and other surface water systems was required for this project primarily due to the linear and generally man-made features which are present along much of the study area. Man-made systems such as excavated ditch systems are identified as other surface waters, which may or may not be jurisdictional. Shallow swale systems associated with the roadway are not

considered wetlands or other surface waters, and therefore, were not evaluated or recorded during field surveys.

4.2 SURVEY RESULTS

The results of field surveys were conducted in February 2023 are included in **Table 4-1**. Approximately 8.88 acres of wetlands and 0.89 acre of other surface waters were identified and delineated within the project area. Wetland areas within the project area are of high to moderate quality with some indicators of disturbance and low to moderate coverage of nuisance and exotic species present. **Appendix B** contains detailed descriptions of wetland communities and **Appendix C** contains representative photographs. Surface waters within the project area consist of excavated ditches.

4.3 WETLAND IMPACTS

This project qualifies as a Type 2 Categorical Exclusion (CE), therefore only one build alternative is included in the PD&E study. For the purpose of this PD&E study, wetland impacts are based on the entire project area being a primary impact area and the 25-foot buffer around the project area being a secondary impact area. Actual impacts may be lower based on the final project design. **Table 4-1** lists the primary and secondary impacts to wetlands and other surface waters within the project area.

Table 4-1 Impacts to Wetlands and Surface Waters

ID	CLASSIFICATION		IMPACTS (ACRES)	
	FLUCCS	USFWS*	PRIMARY	SECONDARY
Wetland 1	Stream (Bottomland) (6150)	R3UB2	0.04	0.05
Wetland 2	Mixed Wetland Hardwoods (6170)	PFO1	0.60	0.28
Wetland 3	Mixed Wetland Hardwoods (6170)	PFO1	0.46	0.20
Wetland 4	Mixed Wetland Hardwoods (6170)	PFO1	5.63	0.94
Wetland 5	Mixed Wetland Hardwoods (6170)	PFO1	0.43	0.80
Wetland 6	Wet Prairie (6430)	PEM1	1.72	0.42
Surface Water 1	Ditch (5100)	-	0.05	-
Surface Water 2	Ditch (5100)	-	0.09	-
Surface Water 3	Ditch (5100)	-	0.25	-
Surface Water 4	Ditch (5100)	-	0.50	-
TOTAL WETLAND IMPACTS			8.88	2.69
TOTAL SURFACE WATER IMPACTS			0.89	-

* **R3UB2** = Riverine, Upper Perennial, Unconsolidated Bottom, Sand; **PFO1** = Palustrine, Forested, Broad-Leaved Deciduous; **PEM1** = Palustrine, Emergent, Persistent

4.4 UNIFORM MITIGATION ASSESSMENT METHOD (UMAM)

Wetlands in the project area were assessed the Uniform Mitigation Assessment Method (UMAM) pursuant to Chapter 62-345 F.A.C. Each wetland was assigned a score between 0 and 10 for each of three (3) categories of wetland function: landscape and location support, water environment, and community structure. Functional loss was calculated for each wetland by comparing the scores for current conditions to the scores for conditions expected as a result of primary impacts and secondary impacts, as detailed in Chapter 62-345.600(3) F.A.C. **Table 4-2** summarizes the functional analysis for each wetland in the project area including functional loss and required mitigation credits. UMAM forms are included in **Appendix G**.

Table 4-2 Functional Analysis Summary for Wetlands in the Project Area

WETLAND ID		Wetland 1	Wetland 2	Wetland 3	Wetland 4	Wetland 5	Wetland 6
WETLAND CLASSIFICATION	FLUCCS	6150	6170	6170	6170	6170	6430
	USFWS	R3UB2	PFO1	PF01	PFO1	PFO1	PEM1
UMAM SCORE	CURRENT CONDITIONS	0.8	0.7	0.8	0.7	0.8	0.7
	WITH PRIMARY IMPACT	0.0	0.0	0.0	0.0	0.0	0.0
	WITH SECONDARY IMPACT	0.8	0.7	0.8	0.7	0.7	0.6
IMPACTS (ACRES)	PRIMARY	0.04	0.60	0.46	5.63	0.43	1.72
	SECONDARY	0.05	0.28	0.20	0.94	0.80	0.42
FUNCTIONAL LOSS	WITH PRIMARY IMPACT	0.0	-0.4	-0.4	-4.1	-0.3	-1.1
	WITH SECONDARY IMPACT	0.0	0.0	0.0	-0.1	0.0	0.0
MITIGATION CREDITS REQUIRED	PER WETLAND	0.0	0.4	0.4	4.2	0.4	1.2
	PER WETLAND CLASSIFICATION	0.0	5.3				1.1

4.5 WETLAND MITIGATION

Whenever possible, permanent wetland impacts will be avoided or minimized to the greatest extent practical through design modification. Any temporary impacts to wetlands will be conducted utilizing Best Management Practices (BMPs) and FDOT's *"Standard Specifications for Road and Bridge Construction."* The proposed project will have no significant short-term or long-term adverse impacts to wetlands.

Unavoidable wetland impacts will likely require wetland mitigation. Based on the current wetland impact calculations, which consider the entire project area a primary impact area and the 25-foot buffer around the project area a secondary impact area, 5.3 freshwater forested wetland mitigation credits and 1.1 freshwater herbaceous wetland mitigation credits will be required to offset primary and secondary impacts. Actual impacts, and therefore required mitigation credits, may be lower based on the final project design. Wetland mitigation options include purchase of wetland mitigation credits through an approved mitigation bank, or creation, restoration, or enhancement of wetlands within the project watersheds.

The project area is located within the Peace River comprehensive watershed and the Peace River drainage basin as designated by the SWFWMD. Additionally, the project area is within the service area of the Peace River Mitigation Bank, Tippen Bay Wetland Mitigation Bank, Boran Ranch Mitigation Bank, and Horse Creek Mitigation Bank. SWFWMD mitigation credits are currently available for both freshwater forested wetland and freshwater herbaceous wetlands at all four (4) banks, and wood stork habitat credits are available at Peace River Mitigation Bank and Boran Ranch Mitigation Bank. Availability of mitigation bank credits change over time and should be confirmed during later phases of the project. Efforts will be made to fully mitigate impacts within the same drainage basin as the impacts occurred, thereby avoiding unacceptable cumulative impacts.

4.6 ESSENTIAL FISH HABITAT

The Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) designated Essential Fish Habitat (EFH) areas as "...those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." [16 U.S.C. § 1802(10)]. Pursuant to 50 CFR § 600.920(e) the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) found that Essential Fish Habitat (EFH) consultation can be incorporated into the PD&E process. According to the Inland EFH Mapper published by NOAA, EFH has not been designated within the project area. Therefore, an EFH Assessment is not required and consultation with NMFS is not required.

5.0 ANTICIPATED PERMITS

5.1 COORDINATION WITH THE PERMITTING AGENCIES

This project is likely to require environmental permits, coordination, and authorizations from the following agencies:

5.1.1 Southwest Florida Water Management District (SWFWMD)

- Environmental Resource Permit (ERP) - Wetland impacts will require an ERP, issued by SWFWMD under the authority of Part IV of Chapter 373, Florida Statutes (F.S.).

5.1.2 Florida Department of Environmental Protection (FDEP)

- State 404 Permit - Per the *Retained Waters Screening Tool* published by the FDEP, waters of the United States (WOTUS) within the project corridor are no longer under the jurisdiction of the US Army Corps of Engineers (USACE) but instead are considered state assumed waters pursuant to the State 404 Program (Chapter 62-331 F.A.C.). It is anticipated that impacts to wetlands will require a State 404 Permit pursuant to 62-331 F.A.C.
- National Pollutant Discharge Elimination System (NPDES) Permit - Construction activities that disturb 1.0 acre or more of land, or discharge stormwater to surface waters of the state, require an NPDES permit, issued by FDEP under the authority of section 403.0885, Florida Statutes F.S.

6.0 CONCLUSIONS AND COMMITMENTS

6.1 PROTECTED SPECIES & HABITAT

Applicable Effect Determination Keys, provided in **Appendix C**, have been utilized for listed species likely to occur within the project area. The effect determination for each wildlife species is included in **Table 6-1** and the effect determination for each plant species is included in **Table 6-2**.

Table 6-1 Protected and Candidate Wildlife Species and Effect Determinations

Wildlife Species		Effect Determination*
Federally Listed Endangered		
Florida bonneted bat	<i>Eumops floridanus</i>	NE
Florida panther	<i>Puma concolor coryi</i>	NE
Federally Listed Threatened		
Audubon's crested caracara	<i>Polygorus plancus audubonii</i>	NE
eastern indigo snake	<i>Drymarchon corais couperi</i>	MANLAA
Florida manatee	<i>Trichechus manatus</i>	NE
Florida scrub-jay	<i>Amphelocoma coerulescens</i>	NE
wood stork	<i>Mycteria americana</i>	MANLAA
State Listed Threatened		
Florida sandhill crane	<i>Grus canadensis</i>	NEA
gopher tortoise	<i>Gopherus polyphemus</i>	NAEA
little blue heron	<i>Egretta caerulea</i>	NAEA
tricolored heron ¹	<i>Egretta tricolor</i>	NAEA
roseate spoonbill ¹	<i>Platalea ajaja</i>	NAEA
Not Listed		
bald eagle ^{2, 3}	<i>Haliaeetus leucocephalus</i>	N/A
osprey ^{1, 2}	<i>Pandion haliaetus</i>	N/A
snowy egret ¹	<i>Egretta thula</i>	N/A
white ibis ¹	<i>Eudocimus albus</i>	N/A
tricolored bat ⁴	<i>Perimyotis subflavus</i>	N/A

* NE = No Effect; MANLAA = May Affect, Not Likely to Adversely Affect; NEA = No Effect Anticipated; NAEA = No Adverse Effect Anticipated

1 - These species are included in the FWC's Imperiled Species Management Plan (ISMP).

2 - These species are federally protected under the Migratory Bird Treaty Act (MBTA).

3 - Bald Eagles are additionally protected under the Bald and Golden Eagle Protection Act (BGEPA) and the State Eagle Rule.

4 - Tricolored bats are not currently protected but are proposed for federal listing as endangered.

Table 6-2 Protected Plant Species and Effect Determinations

Plant Species		Effect Determination*
State Listed Endangered		
Florida loosestrife	<i>Lythrum flagellare</i>	NEA
Jameson's waterlily	<i>Nymphaea jamesoniana</i>	NEA
cardinal airplant	<i>Tillandsia fasciculata</i>	NEA
giant airplant	<i>Tillandsia utriculata</i>	NEA
State Listed Threatened		
northern needleleaf	<i>Tillandsia balbisiana</i>	NEA

* NEA = No Effect Anticipated

6.2 WETLANDS

Additional R/W acquisition will be required for the proposed realignment of SR 72 near the intersection with SR 70. The project area contains six (6) jurisdictional wetlands comprising 8.9 acres and five (5) other surface waters comprising 0.9 acre. Impacts to excavated surface water ditches are generally exempt from mitigation requirements by the regulatory agencies but may be subject to mitigation for loss of wood stork SFH. A summary of wetlands and other surface waters within the project area and calculated impacts is included in **Table 6-3**.

Table 6-3 Impacts to Wetlands and Surface Waters Within the Project Area

ID	CLASSIFICATION		IMPACTS (ACRES)	
	FLUCCS	USFWS	PRIMARY	SECONDARY
Wetland 1	6150	R3UB2	0.04	0.05
Wetland 2	6170	PFO1	0.60	0.28
Wetland 3	6170	PFO1	0.46	0.20
Wetland 4	6170	PFO1	5.63	0.94
Wetland 5	6170	PFO1	0.43	0.80
Wetland 6	6430	PEM1	1.72	0.42
Surface Water 1	5100	-	0.05	-
Surface Water 2	5100	-	0.09	-
Surface Water 3	5100	-	0.25	-
Surface Water 4	5100	-	0.50	-
TOTAL WETLAND IMPACTS			8.88	2.69
TOTAL SURFACE WATER IMPACTS			0.89	-

6.3 IMPLEMENTATION MEASURES

- FWC guidelines consider the results of gopher tortoise burrow surveys to be valid for 90 days. Therefore, additional surveys will be conducted during the permitting phase to document any new burrows within the project area. Burrows within the project area will be avoided if possible; a relocation permit from FWC will be obtained for any burrows that cannot be avoided.
- Should any protected plant species be identified within the project area during later project phases, FDOT will report them to the Florida Department of Agriculture and Consumer Services (FDACS).
- Unavoidable wetland impacts will be mitigated to satisfy all mitigation requirements of Part IV, Chapter 373, F.S. and 33 U.S.C.S 1344 by purchase of mitigation bank credits, or creation, restoration, or enhancement of wetlands.

6.4 COMMITMENTS

- The FDOT will provide mitigation for impacts to wood stork Suitable Foraging Habitat within the Service Area of a Service-approved wetland mitigation bank or wood stork conservation bank.
- The most recent version of the USFWS “*Standard Protection Measures for the Eastern Indigo Snake*” will be utilized during construction.
- The tricolored bat is not currently protected but is a candidate for federal listing. Should the listing status of the tricolored bat be elevated by the USFWS to Threatened or Endangered and the Preferred Alternative is located within the consultation area during the design and permitting phase of the proposed project, the FDOT commits to re-initiating consultation with the USFWS to determine the appropriate survey methodology and to address the USFWS regulations regarding the protection of the tricolored bat.

REFERENCES

- Audubon Eagle Watch Program. *Bald Eagle Nest Locator Map*. Accessed February 2023. <<https://cbop.audubon.org/conservation/about-eaglewatch-program>>
- Auer T, Barker S, Borgmann K, Charnoky M, Childs D, Curtis J, Davies I., ... H, Wood C (2022). EOD – eBird Observation Dataset. Cornell Lab of Ornithology. Occurrence dataset. Accessed via GBIF.org on 2023-07-28. <<https://www.gbif.org/occurrence/3640169107>>
- Avenza Systems. *Avenza Maps Plus* (version 5.0.1). [Mobile App]. Apple App Store. <<https://apps.apple.com/app/apple-store/id388424049>>.
- Bell, C. Ritchie & Taylor, Bryan J. 1982. *Florida Wild Flowers and Roadside Plants*. Laurel Hill Press. Chapel Hill, North Carolina. 308 pp.
- Cornell Lab of Ornithology eBird Observation Dataset. December 3, 2021.
- Cowardin et. al. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. U.S. Department of the Interior Fish and Wildlife Service. Washington, D.C.
- Esri. ArcMap (10.8.2). [Desktop App]. *World Imagery Basemap*. DeSoto County 2020.
- Federal Geographic Data Committee. 2013. *Classification of Wetlands and Deepwater Habitats of the United States*. Accessed March 2023. <<https://www.fgdc.gov/standards/projects/wetlands/nwcs-2013>>
- Florida Association of Environmental Soil Scientists. 2007. *Hydric Soils of Florida Handbook*, 4th Edition, Gainesville, FL.
- Florida Department of Environmental Protection. *Retained Waters Screening Tool*. Accessed March 2023. <https://fddep.maps.arcgis.com/apps/webappviewer/index.html?id=2cb8724cfd18402cb8724cfd18408db80c8f2d7bb68a2e>
- Florida Department of Environmental Protection Open Data Administrator. *Florida Wood Stork Foraging Areas*. (October 7, 2021). Downloaded July 2023. <<https://geodata.dep.state.fl.us/datasets/FDEP::florida-wood-stork-foraging-areas/about>>
- Florida Department of State. *The Uniform Mitigation Assessment Method*. Chapter 62-345 F.A.C. <<https://www.flrules.org>>
- Florida Department of Transportation. January 1999. *Florida Land Use, Cover and Forms Classification System*. Surveying and Mapping Thematic Mapping Section. Tallahassee, Florida. 91 pp.
- Florida Department of Transportation. July 2023. *Project Development and Environment Manual*. Office of Environmental Management. 1165 pp.

- Florida Fish and Wildlife Conservation Commission. November 2016, Amended December 2018 and September 2022. *Florida Imperiled Species Management Plan*. Florida Fish and Wildlife Conservation Commission. Tallahassee, Florida. 169 pp.
- Florida Fish and Wildlife Conservation Commission. *Species Profiles*. Accessed February 2023 and July 2023. <<https://myfwc.com/wildlifehabitats/profiles>>.
- Florida Fish and Wildlife Conservation Commission GIS Librarian. *Florida Panther Telemetry*. (July 21, 2022). <<https://geodata.myfwc.com/datasets/myfwc::florida-panther-telemetry/explore>>.
- Florida Fish and Wildlife Conservation Commission GIS Librarian. *Florida Panther Mortality*. (December 22, 2022). <<https://geodata.myfwc.com/datasets/myfwc::florida-panther-mortality/about>>
- Florida Fish and Wildlife Conservation Commission GIS Librarian. *Confirmed Human-Panther Interactions*. (April 18, 2022). <<https://geodata.myfwc.com/datasets/b9d732e73d6f44e4997638a6d2533951/explore>>
- Florida Fish and Wildlife Conservation Commission GIS Librarian. *Manatee Synoptic Survey Observation Locations*. (November 21, 2006). <<https://geodata.myfwc.com/datasets/myfwc::manatee-synoptic-survey-observation-locations/about>>.
- Florida Fish and Wildlife Conservation Commission GIS Librarian. *Manatee Carcass Recovery Locations in Florida*. (December 5, 2022). <<https://geodata.myfwc.com/datasets/myfwc::manatee-carcass-recovery-locations-in-florida/about>>.
- Florida Fish and Wildlife Conservation Commission GIS Librarian. *Wading Bird Rookeries – 1999*. (April 28, 2011). <<https://geodata.myfwc.com/datasets/be5de4a4165f4f09bbd6b7117fb395bc/about>>
- Florida Natural Areas Inventory and Florida Department of Natural Resources, 1990. *Guide to the Natural Communities of Florida*. Tallahassee, FL.
- Florida Natural Areas Inventory. FNAI Field Guides. Accessed February 2023. <<https://www.fnai.org/PDFs/FieldGuides>>.
- Florida Natural Areas Inventory. FNAI Biodiversity Matrix. Accessed July 8, 2023. <<https://www.fnai.org/BiodiversityMatrix/index.html>>
- Gilbert, K.M., Tobe, J.D., Cantrell, R.W., Sweeley, M.E., Cooper, J.R. 1995. *The Florida Wetlands Delineation Manual*. Florida Department of Environmental Protection. 198 pp.
- Google Earth Pro version 7.3.3.9345. (October 2022) Desktop Application. Accessed February 2023.
- National Oceanic and Atmospheric Administration. *EFH Inland Mapper*. Accessed February 2023. <<https://efhtools.github.io/InlandEFH/Mapper.html>>

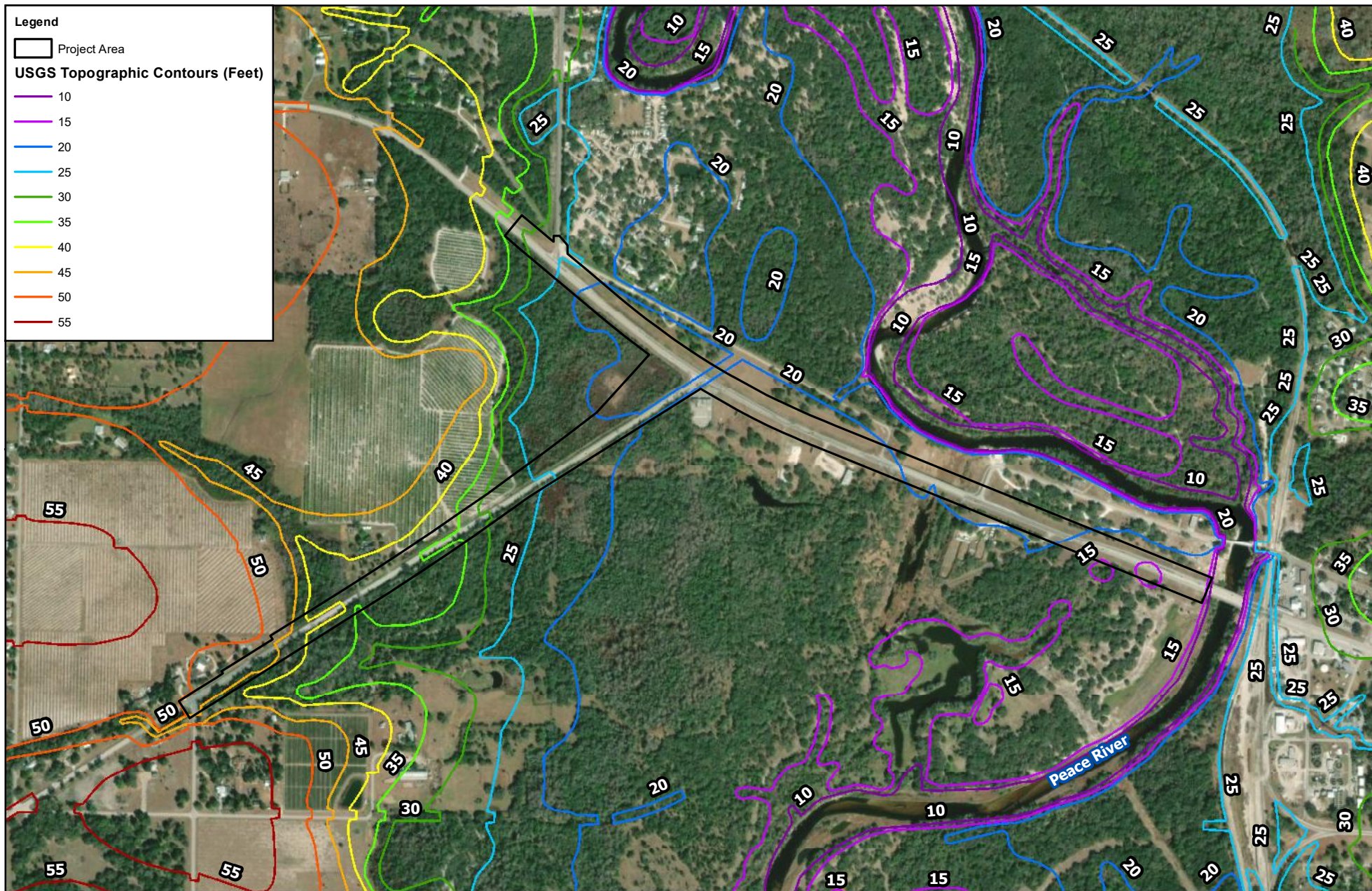
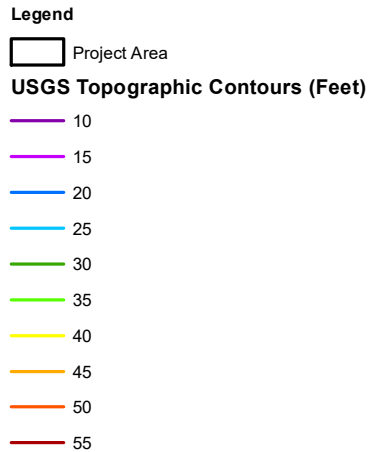
- Southwest Florida Water Management District. 2007. *Environmental Resource Permitting Information Manual*. Southwest Florida Water Management District. Brooksville, Florida.
- Southwest Florida Water Management District. *Land_Use_Land_Cover_2017*. Downloaded September 6, 2019. <<http://www.swfwmd.state.fl.us/data/gis>>.
- Tobe, J. D., Burks, K.C., Cantrell, R.W., Garland, M.A., Sweeley, M.E., Hall, D.W., ...Raymond, N. 1998. *Florida Wetland Plants An Identification Manual*. Florida Department of Environmental Protection. Tallahassee, Florida.
- University of Florida Institute of Systemic Botany. *Atlas of Florida Plants*. Accessed February 2023. <<http://www.florida.plantatlas.usf.edu>>.
- U.S. Army Corps of Engineers (Jacksonville District). 1987. *Corps of Engineers' Wetlands Delineation Manual, Technical Report Y-87-10*. US Army Corps of Engineers. Jacksonville, Florida. 319 pp.
- U.S. Army Corps of Engineers Wetlands Regulatory Assistance Program. 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region*, Version 2.0. 169 pp.
- U.S. Army Corps of Engineers and State of Florida. April 2013. *Effect Determination Key for the Manatee in Florida*.
- U.S. Department of Agriculture. *Web Soil Survey*. Natural Resources Conservation Service. Accessed March 14, 2023. <<https://websoilsurvey.nrcs.usda.gov/app>>.
- U.S. Department of Agriculture, Natural Resources Conservation Service. 2016. *Field Indicators of Hydric Soils in the United States*, Version 8.0. L.M. Vasilas, G.W. Hurt, and J.F. Berkowitz (eds.). USDA, NRCS, in cooperation with the National Technical Committee for Hydric Soils.
- U.S. Department of the Interior Fish and Wildlife Service. February 19, 2007. *Florida Panther Effect Determination Key*.
- U.S. Department of the Interior Fish and Wildlife Service. August 1, 2017. *Consultation Key for the Eastern Indigo Snake – Revised*.
- U.S. Department of the Interior Fish and Wildlife Service. May 18, 2010. *Wood Stork Effect Determination Key*.
- U.S. Fish and Wildlife Service. *National Wetlands Inventory*. Downloaded October 14, 2021. <www.fws.gov/wetlands/Data/State-Downloads.html>.
- U.S. Fish and Wildlife Service. *Information for Planning and Consultation*. Accessed February 2023. <<https://ipac.ecosphere.fws.gov/>>

REFERENCES

- U.S. Fish and Wildlife Service South Florida Ecological Services Office. October 2019. *Florida Bonneted Bat Consultation Guidelines*. <https://www.fws.gov/sites/default/files/documents/20191023_2019_FBB%20Consultation%20GuidelinesFinal.pdf>
- U.S. Fish and Wildlife Service. *WOST_ColoniesActive_2010_2019_FL*. Downloaded April 10, 2020. <website no longer available>.
- U.S. Fish and Wildlife Service. September 13, 2022. *Proposal to List the Tricolored Bat as Endangered*. <<https://www.fws.gov/press-release/2022-09/proposal-list-tricolored-bat-endangered>>.
- U.S. Geological Survey. The National Map. *Contours*. Downloaded July 27, 2018. <<https://viewer.nationalmap.gov/basic>>.
- U.S. Geological Survey. The National Map. *National Hydrography Dataset*. Downloaded April 10, 2020. <<https://apps.nationalmap.gov/downloader/#>>
- Yarlett, Lewis L. 1996. *Common Grasses of Florida and the Southeast*. The Florida Native Plant Society. Spring Hill, Florida. 167 pp.

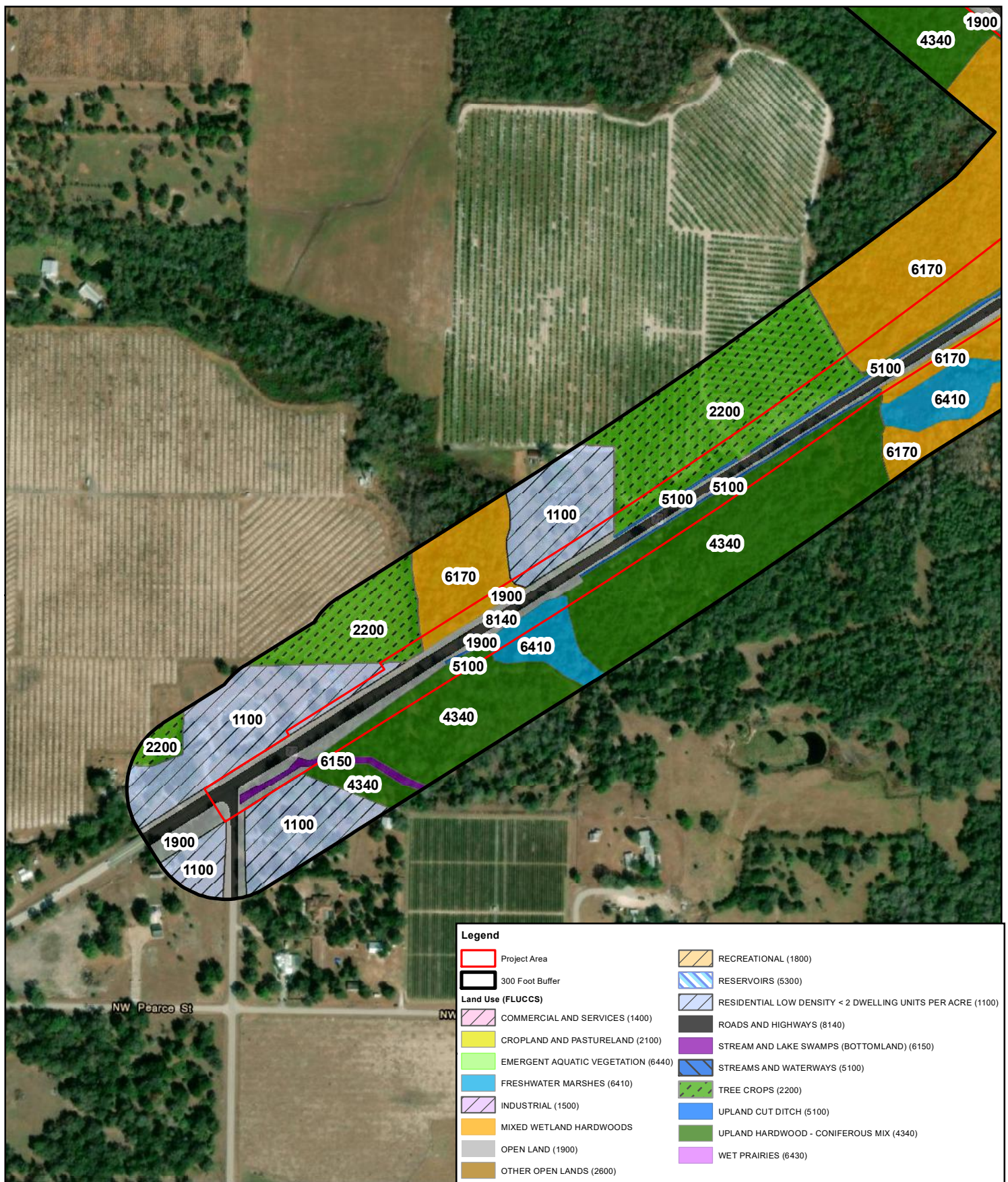
APPENDIX A

ADDITIONAL FIGURES



USGS Topographic Contours
SR 72 at SR 70 PD&E
FPID: 443123-1
Sections 26, 27, & 34; T 37S; R24E
DeSoto County, Florida

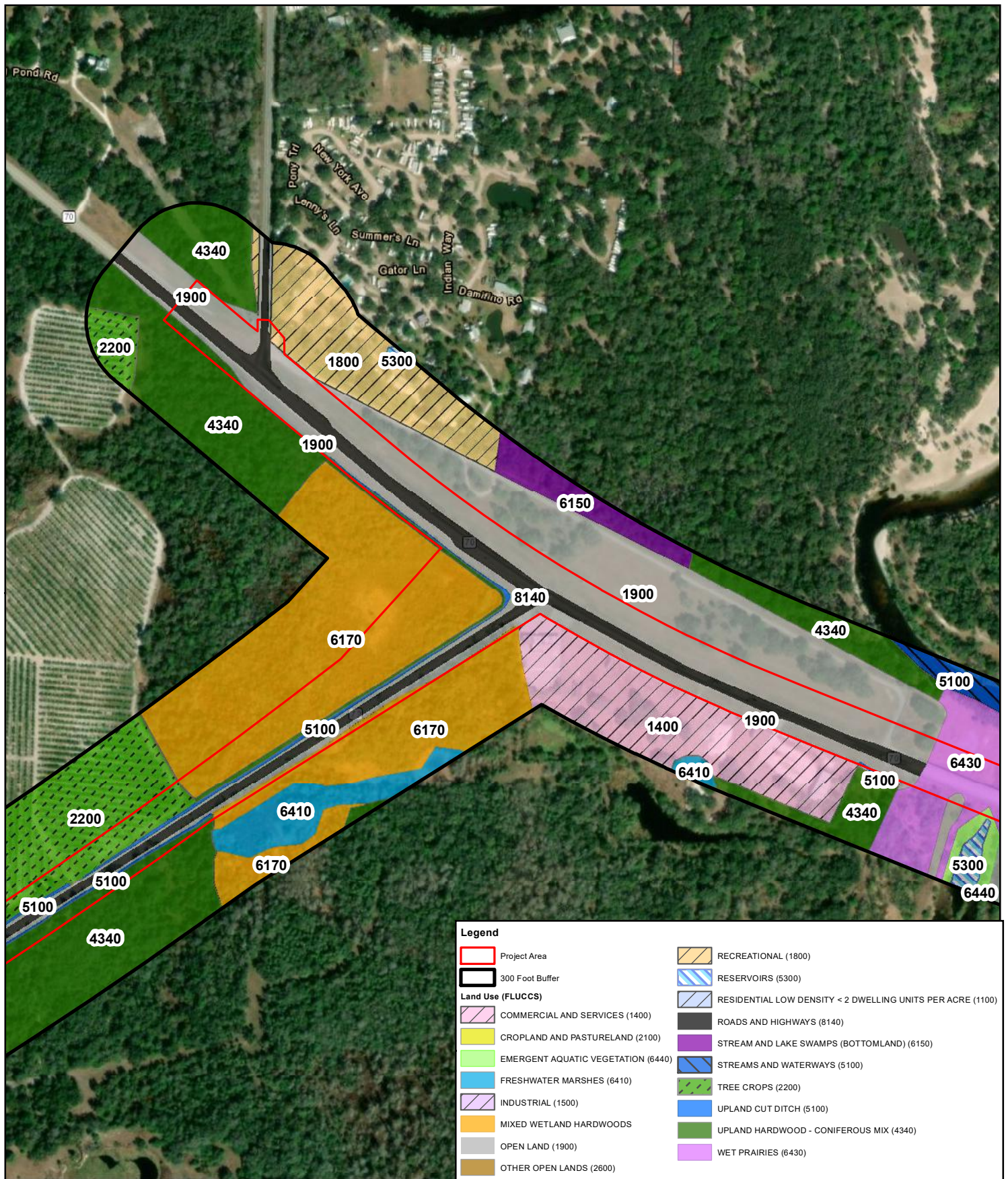




Existing Land Use (FLUCCS)
SR 72 at SR 70 PD&E
FPID: 443123-1
Sections 26, 27, & 34; T 37S; R24E
DeSoto County, Florida

NORTH

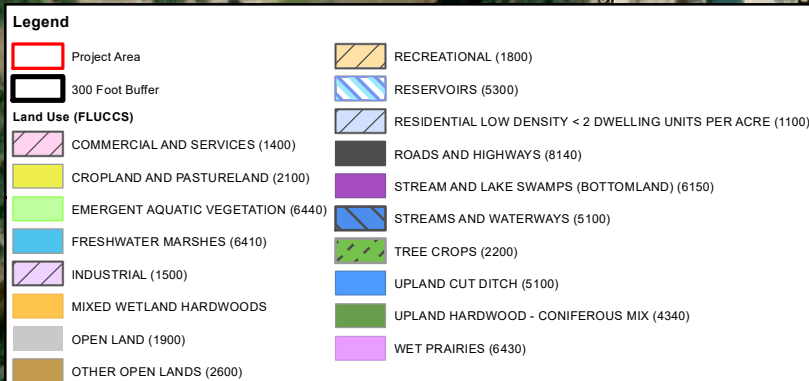
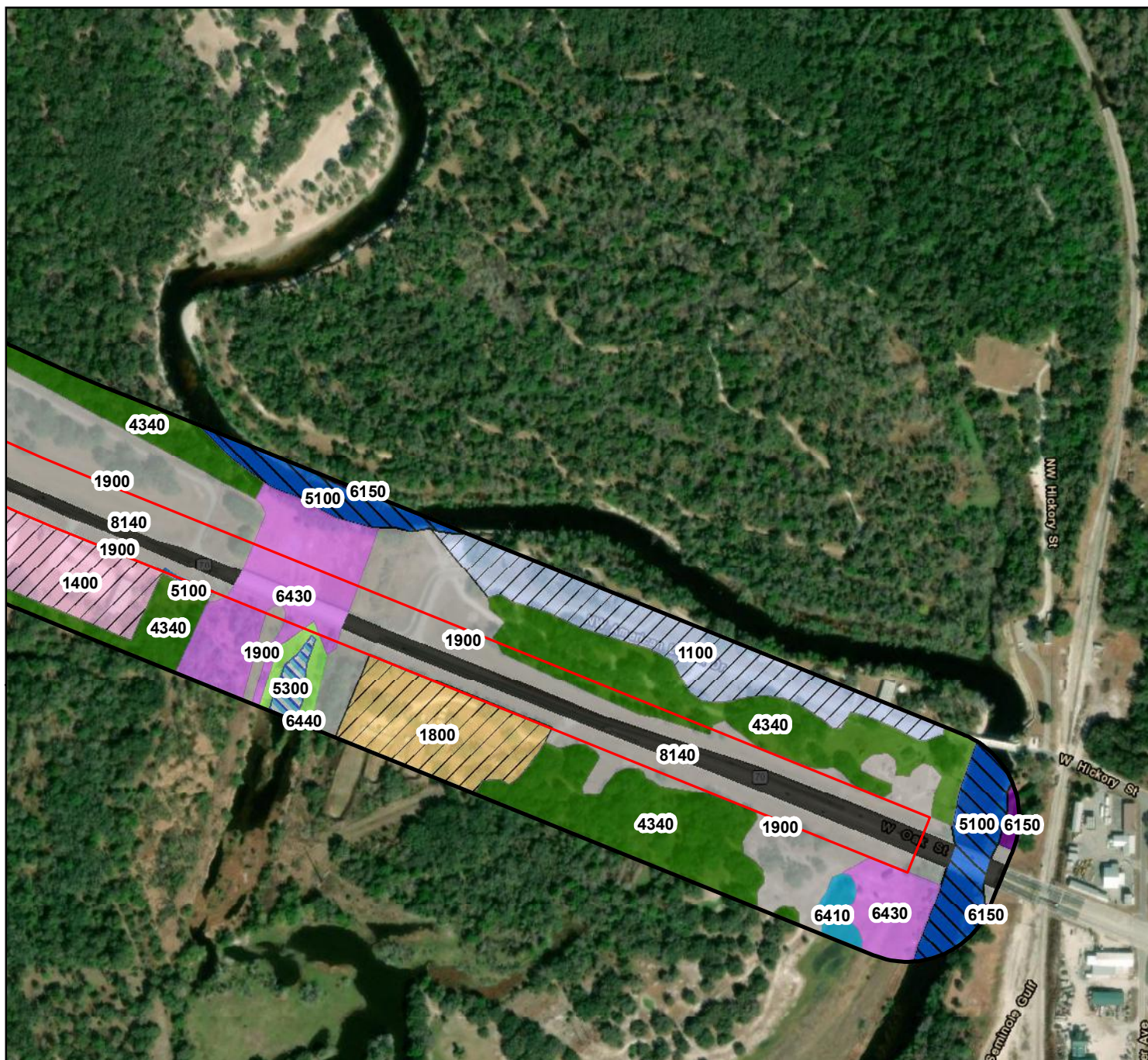
0 500
 Feet



Existing Land Use (FLUCCS)
 SR 72 at SR 70 PD&E
 FPID: 443123-1
 Sections 26, 27, & 34; T 37S; R24E
 DeSoto County, Florida



0 500
 Feet



Existing Land Use (FLUCCS)
 SR 72 at SR 70 PD&E
 FPID: 443123-1
 Sections 26, 27, & 34; T 37S; R24E
 DeSoto County, Florida

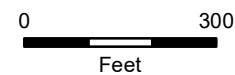




Legend

- Project Area
- Approximate Boundaries**
- Wetland
- Other Surface Water

Wetlands and Other Surface Waters
SR 72 at SR 70 PD&E
FPID: 443123-1
Sections 26, 27, & 34; T 37S; R24E
DeSoto County, Florida

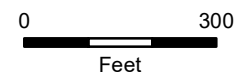




Legend

- Project Area
- Approximate Boundaries**
- Wetland
- Other Surface Water

Wetlands and Other Surface Waters
SR 72 at SR 70 PD&E
FPID: 443123-1
Sections 26, 27, & 34; T 37S; R24E
DeSoto County, Florida

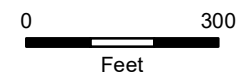


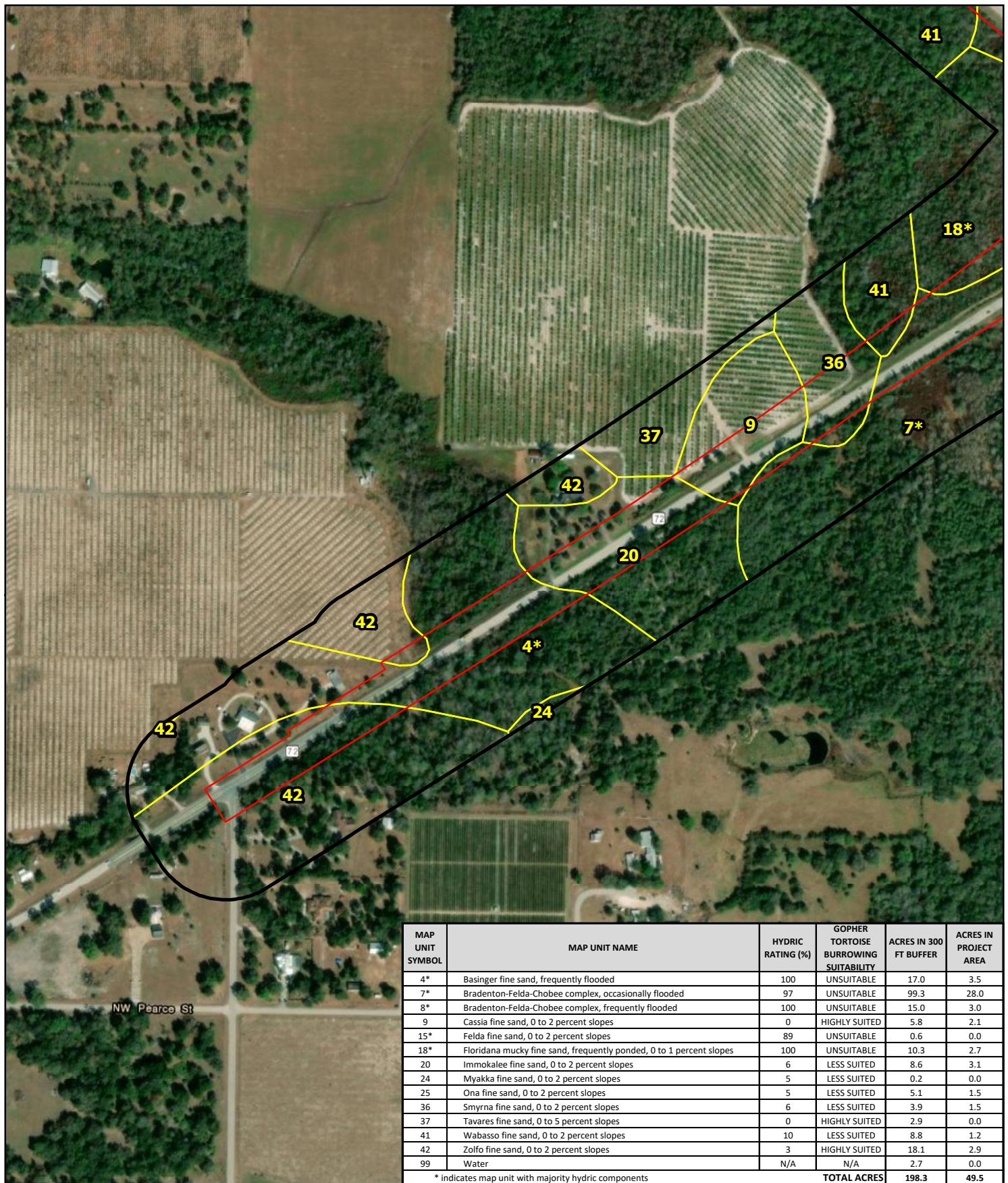


Legend

-  Project Area
- Approximate Boundaries**
-  Wetland
-  Other Surface Water

Wetlands and Other Surface Waters
SR 72 at SR 70 PD&E
FPID: 443123-1
Sections 26, 27, & 34; T 37S; R24E
DeSoto County, Florida



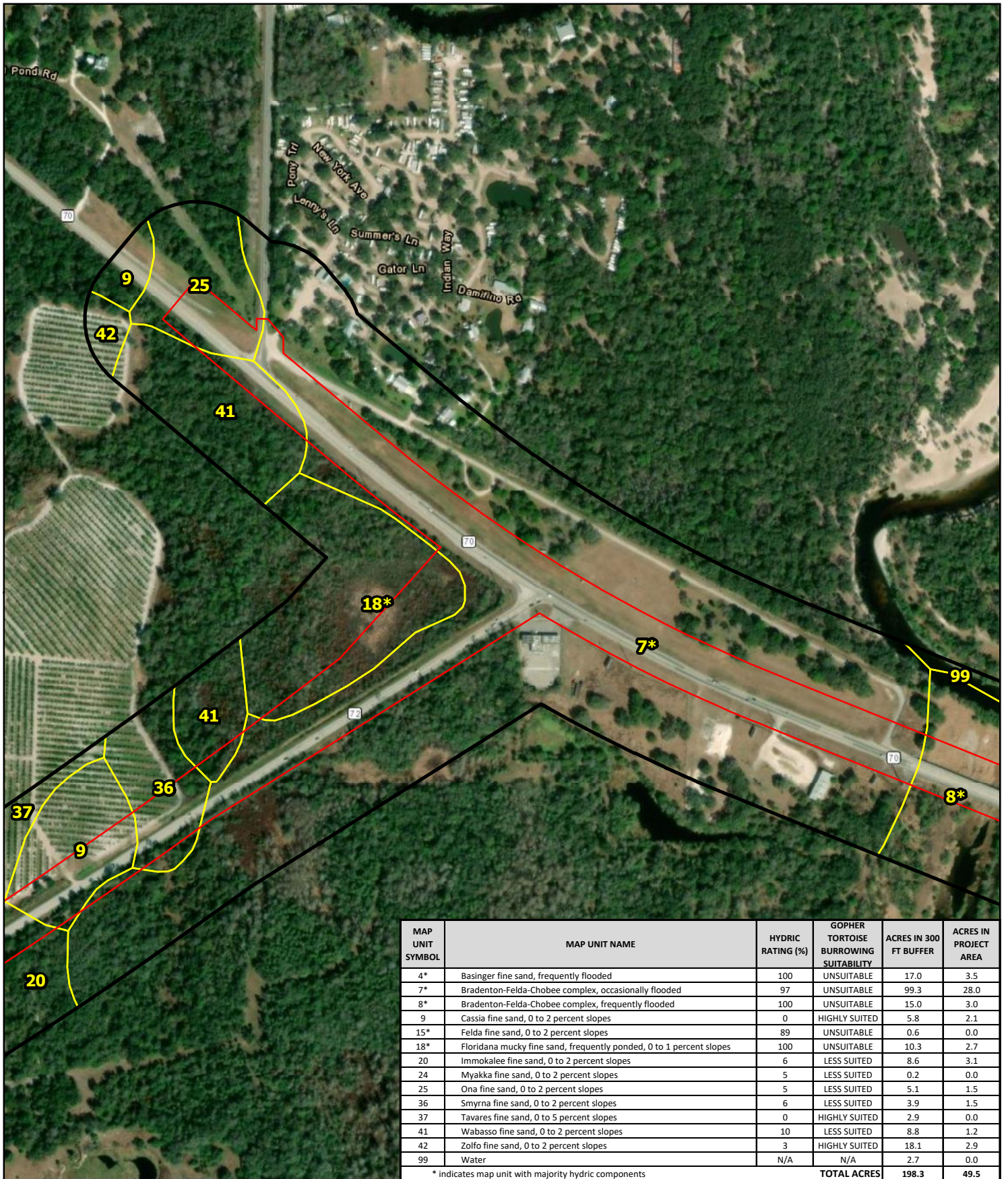


Legend

- Project Area
- 300 Foot Buffer
- Soils

NRCS Soils
SR 72 at SR 70 PD&E
FPID: 443123-1
Sections 26, 27, & 34; T 37S; R24E
DeSoto County, Florida





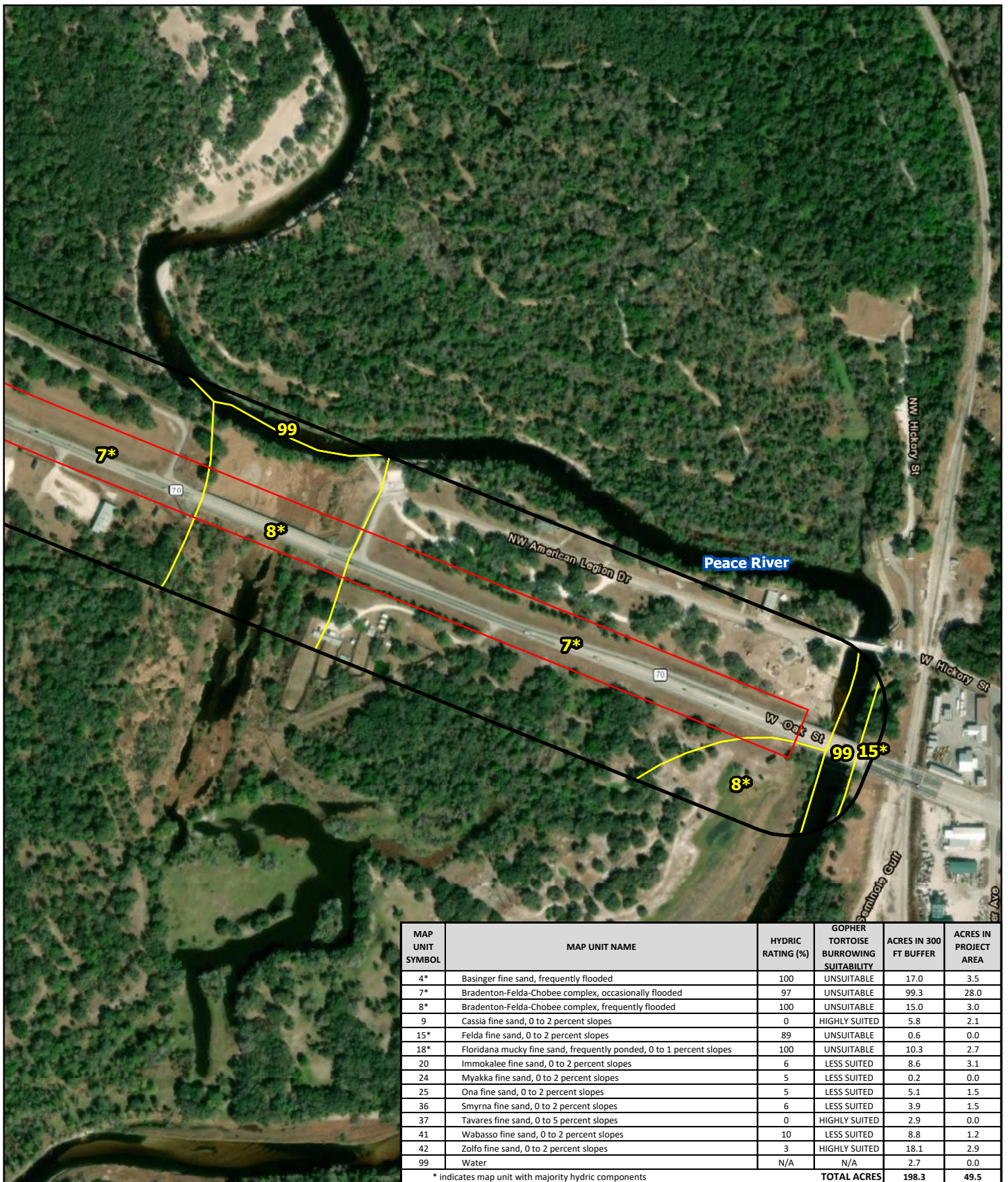
Legend

- Project Area
- 300 Foot Buffer
- Soils

NRCS Soils
SR 72 at SR 70 PD&E
FPID: 443123-1
Sections 26, 27, & 34; T 37S; R24E
DeSoto County, Florida



0 500
 Feet



Legend

- Project Area
- 300 Foot Buffer
- Soils

NRCS Soils
SR 72 at SR 70 PD&E
FPID: 443123-1
Sections 26, 27, & 34; T 37S; R24E
DeSoto County, Florida



APPENDIX B

EXISTING LAND USE DESCRIPTIONS

EXISTING UPLAND COMMUNITIES WITHIN THE PROJECT AREA

Open Lands (FLUCCS 1900)

The majority of the project area is comprised of open lands, defined as undeveloped land without structure, most of which is within the maintained ROW. These areas were generally cleared of canopy and shrub species and maintained low-growing grasses and weedy species. Much of the ROW appears to be regularly mowed. At the time of review, litter was observed along the entirety of the ROW ranging from small items including food wrappers to larger items including tires. No protected species were observed within open lands during field surveys for this project.

Roads and Highways (FLUCCS 8140)

The roads within the project corridor include SR 72 and SR 70, both two-lane paved highways. No protected species were observed on the roadways during field reviews.

Upland Hardwoods – Coniferous Mix (FLUCCS 4340)

Upland forests with a mix of hardwoods and conifers are present at the outer edges of the ROW along portions of SR 72. Canopy species include slash pine (*Pinus eliottii*), laurel oak (*Quercus laurifolia*), and live oak (*Quercus virginiana*). Saw palmetto (*Serenoa repens*) is present in the understory. Category I invasive species including caesarweed (*Urena lobata*) and Brazilian pepper (*Schinus terebinthifolia*) were observed in the upland hardwoods community at approximately 5% cover each. No protected species were observed within this community during field reviews for this project.

Tree Crops (FLUCCS 2200)

An orange grove is present adjacent to the SR 72 ROW. The edges of the property are comprised of dirt roads, and rows of orange trees are planted within the interior. No protected species were observed within this land use during field surveys for this project.

Residential Low Density (FLUCCS 1100)

This classification encompasses low-density rural areas with less than two homes per acre. This land use type comprises less than one-acre of the project area. Bahia grass (*Paspalum notatum*) and other sod-type grasses are present in the residential lands, along with some trees. No protected species were observed within residential land use during field surveys for this project.

EXISTING WETLAND AND SURFACE WATER COMMUNITIES WITHIN THE PROJECT AREA

Mixed Wetland Hardwoods (FLUCCS 6170)

Mixed wetland hardwoods habitat within the project area is represented by four wetlands: Wetland 2, Wetland 3, Wetland 4, and Wetland 5. Wetland 2 overlaps the north ROW of SR 72 and is connected by a culvert under the roadway to Wetland 3, which drains to the Peace River. Wetland 5 overlaps the south ROW of SR 72. The project area is limited to existing ROW in the vicinity of Wetlands 2, 3, and 5,

and only overlaps the edges and transition zones of these wetlands. Wetland 4 is located at the intersection of SR 72 and SR 70, where acquisition of additional ROW is proposed to facilitate the roadway realignment. The project area overlaps the edge, transition zone, and portions of the interior of Wetland 4. Refer to the *Wetlands and Other Surface Waters* figure in **Appendix A**.

At the time of field review, the edges and transition zones of all four forested wetlands contained fallen and leaning trees and shrubs, potentially as a lasting effect of Hurricane Ian (September 2022). The canopy and subcanopy contained a moderate to high density of vines including muscadine grape (*Vitis rotundifolia*), saw greenbrier (*Smilax bona-nox*), and Virginia creeper (*Parthenocissus quinquefolia*) at the wetland edges and into the transition zones. Piles of white sand were observed within the ROW near the edge of Wetland 3 and along the edge of Wetland 5. The source of the sand was not clear, but may have been deposited during flooding during and after Hurricane Ian. Hydrology generally ranges from moist to saturated soils at the wetland edges and transition zones. Indicators of long-term hydrology observed during field review include water staining on the bases of shrubs and trees, as well as rack lines.

Canopy throughout the transition zones of these wetlands is comprised of red maple (*Acer rubrum*), sweet bay (*Magnolia virginiana*), American elm (*Ulmus americana*), dahoon holly (*Ilex cassine*), laurel oak, and cabbage palm (*Sabal palmetto*). The subcanopy includes wax myrtle (*Morella cerifera*), Carolina willow (*Salix caroliniana*), and buttonbush (*Cephalanthus occidentalis*) as well as red maple, sweet bay, laurel oak, and water oak. Elderberry (*Sambucus canadensis*) and blackberry (*Rubus sp.*) are present at wetland edges. Groundcover throughout the transition zones is dominated by ferns including hottentot fern (*Thelypteris interrupta*), southern shield fern (*Thelypteris kunthii*), swamp fern (*Telmatoblechnum serrulatum*), and Virginia chain fern (*Woodwardia virginiana*). Lizard's tail (*Saururus cernuus*), dotted smartweed (*Persicaria punctata*), and bushy bluestem (*Andropogon glomeratus*) are also present. Category I invasive species including Peruvian primrosewillow (*Ludwigia peruviana*) and caesarweed were observed at the wetland edges and transition zones ranging from 5 – 10% cover.

The interior of Wetland 4 was evaluated separately from the edges and transition zones. Hydrology in the interior ranged from saturated, mucky soils to standing water. The canopy is comprised of red maple, water oak (*Quercus nigra*), and cypress (*Taxodium sp.*). The subcanopy includes red maple, water oak, buttonbush, and Carolina willow. Groundcover is dominated by swamp fern, and areas of standing water support bulltongue arrowhead (*Sagittaria lancifolia*), water spangles (*Salvinia minima*), and pickerelweed (*Pontederia cordata*). The Category I invasive species small leaf climbing fern (*Lygodium microphyllum*) was observed at approximately 5% cover in the wetland interior.

Wet Prairie (FLUCCS 6430)

According to the FLUCCS manual, wet prairie is composed predominately of grassy vegetation and is less inundated than freshwater marshes. Within the project area, this classification is represented by Wetland 6, located within the SR 70 ROW. Wetland 6 is part of the Peace River floodplain, located south of the Peace River and north of a freshwater marsh. Piles of white sand were observed along either side of the bridge, indicating the area has been disturbed, likely by Hurricane Ian. Standing water was

observed only directly underneath the bridge, otherwise soils were moist at the time of field review. The wetland is dominated by grasses including two Category I invasive species: torpedograss (*Panicum repens*) and paragrass (*Urochloa mutica*). Carolina willow shrubs line the edges of the wetland, and a few scattered individuals have established in the interior. Protected species were not observed.

Ditches (FLUCCS 5100)

According to the FLUCCS manual, this category includes rivers, creeks, canals, and other linear water bodies. Areas mapped as FLUCCS 5100 within the project corridor are excavated ditches associated with stormwater drainage. Other surface waters (OSW) 1 - 4 are located wholly within the maintained ROW and OSW 5 is mostly south of the project area. OSW 1 connects to the west end of Wetland 3 within the ROW and OSW 3 connects to the west end of Wetland 5 within the ROW. OSW 4 is separated from Wetland 4 by an upland berm running along the wetland edge. Standing water was observed in OSW 2 and OSW 4 at the time of review, but hydrology within these drainage ditches varies with season and rainfall.

Man-made systems such as these excavated ditch systems are identified as jurisdictional only in the portions which are located within hydric soil mapping units and otherwise may or may not be jurisdictional. OSW 1, OSW 5, and portions of OSW 4 are located within hydric soil mapping units, while OSW 2 and OSW 3 are located wholly within non-hydric soil mapping units.

Stream and Lake Swamps (Bottomland) (FLUCCS 6150)

The stream and lake swamps (bottomland) classification is represented by Wetland 1 within the project area. Wetland 1 is a winding freshwater stream which overlaps the south ROW of SR 72, just east of the intersection with CR 661. It appears to flow toward the Peace River. Within the project area, the stream consists mostly of open water, with sprigs of wild taro (*Colocasia esculenta*) and dayflower (*Commelina diffusa*) observed. Wetland 1 cuts through upland hardwood coniferous mix habitat described in Section 2.2. The banks are populated by trees and shrubs including laurel oak and black cherry (*Prunus serotina*), along with a thick layer of vines including muscadine grape and Virginia creeper.

APPENDIX C

EFFECT DETERMINATION KEYS



United States Department of the Interior

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



May 18, 2010

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

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

Dear Mr. Kinard:

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

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

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

Wood stork

Habitat

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



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

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

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

Conservation Measures

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

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

In an effort to reduce correspondence in effect determinations and responses, the Service is providing the Wood Stork Effect Determination Key below. If the use of this key results in a Corps determination of “no effect” for a particular project, the Service supports this determination. If the use of this Key results in a determination of NLAA, the Service concurs with this determination¹. This Key is subject to revisitation as the Corps and Service deem necessary.

The Key is as follows:

- A. Project within 0.76 km (0.47 mile)² of an active colony site³ “*may affect*”⁴
- Project impacts Suitable Foraging Habitat (SFH)⁵ at a location greater than 0.76 km (0.47 mile) from a colony site..... “*go to B*”

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

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

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

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

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

- Project does not affect SFH..... “no effect¹”.
- B. Project impact to SFH is less than 0.20 hectare (one-half acre)⁶.....NLAA¹”
- Project impact to SFH is greater in scope than 0.20 hectare (one-half acre).....go to C
- C. Project impacts to SFH not within the CFA (29.9 km, 18.6 miles) of a colony sitego to D
- Project impacts to SFH within the CFA of a colony sitego to E
- D. Project impacts to SFH have been avoided and minimized to the extent practicable; compensation (Service approved mitigation bank or as provided in accordance with Mitigation Rule 33 CFR Part 332) for unavoidable impacts is proposed in accordance with the CWA section 404(b)(1) guidelines; and habitat compensation replaces the foraging value matching the hydroperiod⁷ of the wetlands affected and provides foraging value similar to, or higher than, that of impacted wetlands. See Enclosure 3 for a detailed discussion of the hydroperiod foraging values, an example, and further guidance⁸..... NLAA¹”
- Project not as above..... “may affect⁴”
- E. Project provides SFH compensation in accordance with the CWA section 404(b)(1) guidelines and is not contrary to the HMG; habitat compensation is within the appropriate CFA or within the service area of a Service-approved mitigation bank; and habitat compensation replaces foraging value, consisting of wetland enhancement or restoration matching the hydroperiod⁷ of the wetlands affected, and provides foraging value similar

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

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

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

to, or higher than, that of impacted wetlands. See Enclosure 3 for a detailed discussion of the hydroperiod foraging values, an example, and further guidance⁸ "NLAA"¹"

Project does not satisfy these elements "may affect"⁴"

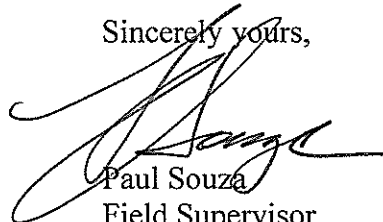
This Key does not apply to Comprehensive Everglades Restoration Plan projects, as they will require project-specific consultations with the Service.

Monitoring and Reporting Effects

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

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

Sincerely yours,



Paul Souza
Field Supervisor
South Florida Ecological Services Office

Enclosures

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

LITERATURE CITED

- Ceilley, D.W. and S.A. Bortone. 2000. A survey of freshwater fishes in the hydric flatwoods of flint pen strand, Lee County, Florida. Proceedings of the 27th Annual Conference on Ecosystems Restoration and Creation, 70-91. Hillsborough Community College; Hillsborough County, Florida.
- Flemming, D.M., W.F. Wolff, and D.L. DeAngelis. 1994. Importance of landscape heterogeneity to wood storks. Florida Everglades Management 18: 743-757.
- Kahl, M.P., Jr. 1964. Food ecology of the wood stork (*Mycteria americana*) in Florida. Ecological Monographs 34:97-117.
- Ogden, J.C. 1991. Nesting by wood storks in natural, altered, and artificial wetlands in central and northern Florida. Colonial Waterbirds 14:39-45.
- Ogden, J.C., J.A. Kushlan, and J.T. Tilmant. 1976. Prey selectivity by the wood stork. Condor 78(3):324-330.
- Ogden, J.C. 1996. Wood Stork in J.A. Rodgers, H. Kale II, and H.T. Smith, eds. Rare and endangered biota of Florida. University Press of Florida; Gainesville, Florida.
- Rodgers, J.A. Jr., A.S. Wenner, and S.T. Schwikert. 1987. Population dynamics of wood storks in northern and central Florida, USA. Colonial Waterbirds 10:151-156.
- Rodgers, J.A., Jr., S.T. Schwikert, and A. Shapiro-Wenner. 1996. Nesting habitat of wood storks in north and central Florida, USA. Colonial Waterbirds 19:1-21.
- U.S. Fish and Wildlife Service. 1990. Habitat management guidelines for the wood stork in the southeast region. Prepared by John C. Ogden for the Southeast Region U.S. Fish and Wildlife Service; Atlanta, Georgia.
- U.S. Fish and Wildlife Service. 1999. South Florida multi-species recovery plan. Fish and Wildlife Service; Atlanta, Georgia. Available from: <http://verobeach.fws.gov/Programs/Recovery/vbms5.html>.

HABITAT MANAGEMENT GUIDELINES FOR THE WOOD STORK IN THE SOUTHEAST REGION



**HABITAT MANAGEMENT GUIDELINES
FOR THE WOOD STORK IN THE
SOUTHEAST REGION**

Prepared by

John C. Ogden
Acting Program Manager
Wildlife Research
Everglades National Park

for the

Southeast Region
U.S. Fish and Wildlife Service

Cover design by
Florida Power & Light Company
Miami, Florida

HABITAT MANAGEMENT GUIDELINES FOR THE WOOD STORK IN THE SOUTHEAST REGION

Introduction

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

General

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

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

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

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

I. Feeding habitat.

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

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

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

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

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

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

II. Nesting habitat.

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

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

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

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

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

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

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

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

III. Roosting habitat.

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

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

IV. Management zones and guidelines for feeding sites.

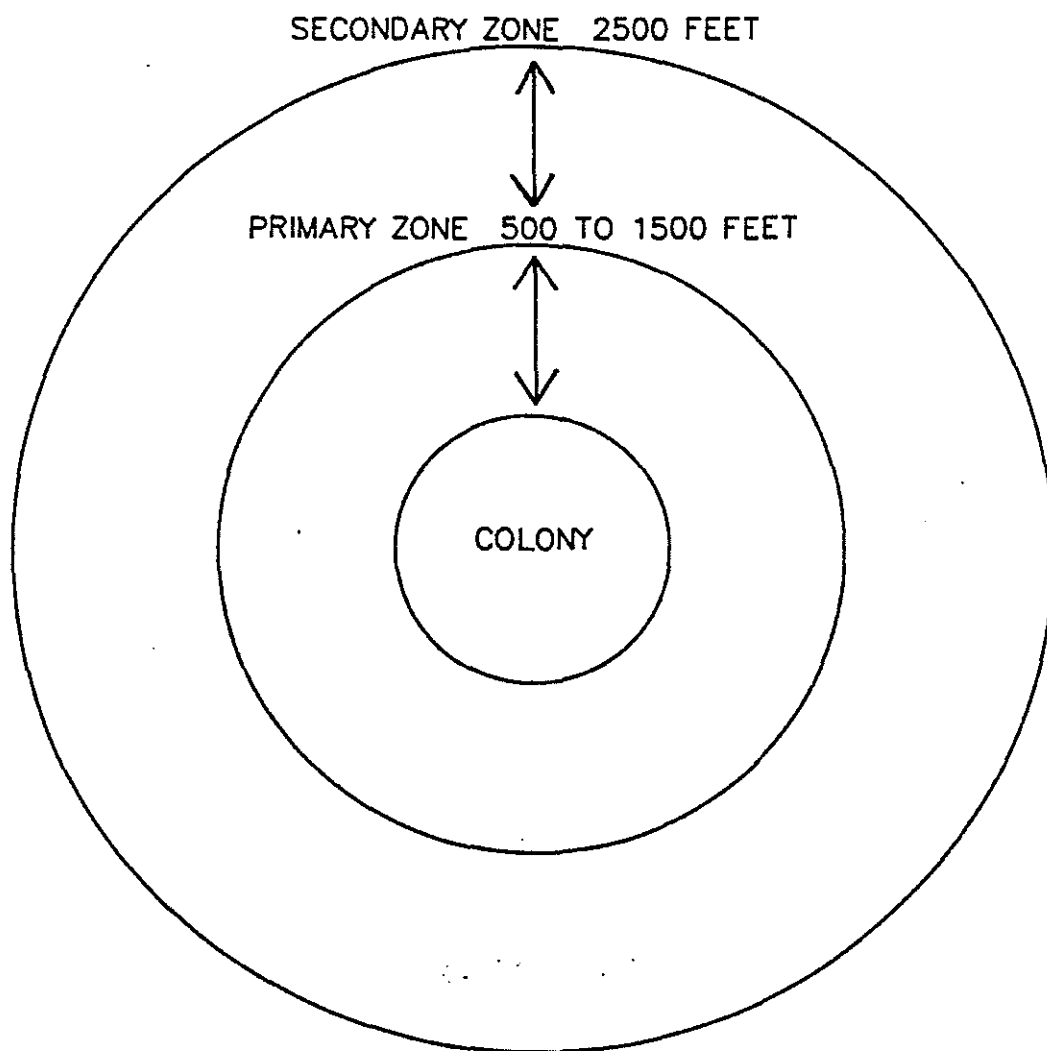
To the maximum extent possible, feeding sites should be protected by adherence to the following protection zones and guidelines:

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

- B. Feeding sites should not be subjected to water management practices that alter traditional water levels or the seasonally normal drying patterns and rates. Sharp rises in water levels are especially disruptive to feeding storks.
- C. The introduction of contaminants, fertilizers, or herbicides into wetlands that contain stork feeding sites should be avoided, especially those compounds that could adversely alter the diversity and numbers of native fishes, or that could substantially change the characteristics of aquatic vegetation. Increase in the density and height of emergent vegetation can degrade or destroy sites as feeding habitat.
- D. Construction of tall towers (especially with guy wires) within three miles, or high power lines (especially across long stretches of open country) within one mile of major feeding sites should be avoided.

V. Management zones and guidelines for nesting colonies.

- A. Primary zone: This is the most critical area, and must be managed according to recommended guidelines to insure that a colony site survives.
 - 1. Size: The primary zone must extend between 1000 and 1500 feet in all directions from the actual colony boundaries when there are no visual or broad aquatic barriers, and never less than 500 feet even when there are strong visual or aquatic barriers. The exact width of the primary zone in each direction from the colony can vary within this range, depending on the amount of visual screen (tall trees) surrounding the colony, the amount of relatively deep, open water between the colony and the nearest human activity, and the nature of the nearest human activity. In general, storks forming new colonies are more tolerant of existing human activity, than they will be of new human activity that begins after the colony has formed.
 - 2. Recommended Restrictions:
 - a. Any of the following activities within the primary zone, at any time of the year, are likely to be detrimental to the colony:
 - (1) Any lumbering or other removal of vegetation, and
 - (2) Any activity that reduces the area, depth, or length of flooding in wetlands under and surrounding the colony, except where periodic (less than annual) water control may be required to maintain the health of the aquatic, woody vegetation, and
 - (3) The construction of any building, roadway, tower, power line, canal, etc.
 - b. The following activities within the primary zone are likely to be detrimental to a colony if they occur when the colony is active:
 - (1) Any unauthorized human entry closer than 300 feet of the colony, and



- (2) Any increase or irregular pattern in human activity anywhere in the primary zone, and
 - (3) Any increase or irregular pattern in activity by animals, including livestock or pets, in the colony, and
 - (4) Any aircraft operation closer than 500 feet of the colony.
- B. Secondary Zone: Restrictions in this zone are needed to minimize disturbances that might impact the primary zone, and to protect essential areas outside of the primary zone. The secondary zone may be used by storks for collecting nesting material, for roosting, loafing, and feeding (especially important to newly fledged young), and may be important as a screen between the colony and areas of relatively intense human activities.
- 1. Size: The secondary zone should range outward from the primary zone 1000-2000 feet, or to a radius of 2500 feet of the outer edge of the colony.
 - 2. Recommended Restrictions:
 - a. Activities in the secondary zone which may be detrimental to nesting wood storks include:
 - (1) Any increase in human activities above the level that existed in the year when the colony first formed, especially when visual screens are lacking, and
 - (2) Any alteration in the area's hydrology that might cause changes in the primary zone, and
 - (3) Any substantial (>20 percent) decrease in the area of wetlands and woods of potential value to storks for roosting and feeding.
 - b. In addition, the probability that low flying storks, or inexperienced, newly-fledged young will strike tall obstructions, requires that high-tension power lines be no closer than one mile (especially across open country or in wetlands) and tall transmission towers no closer than 3 miles from active colonies. Other activities, including busy highways and commercial and residential buildings may be present in limited portions of the secondary zone at the time that a new colony first forms. Although storks may tolerate existing levels of human activities, it is important that these human activities not expand substantially.

VI. Roosting site guidelines.

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

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

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

VII. Legal Considerations.

A. Federal Statutes

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

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

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

B. State Statutes

1. State of Alabama

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

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

2. State of Florida

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

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

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

3. State of Georgia

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

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

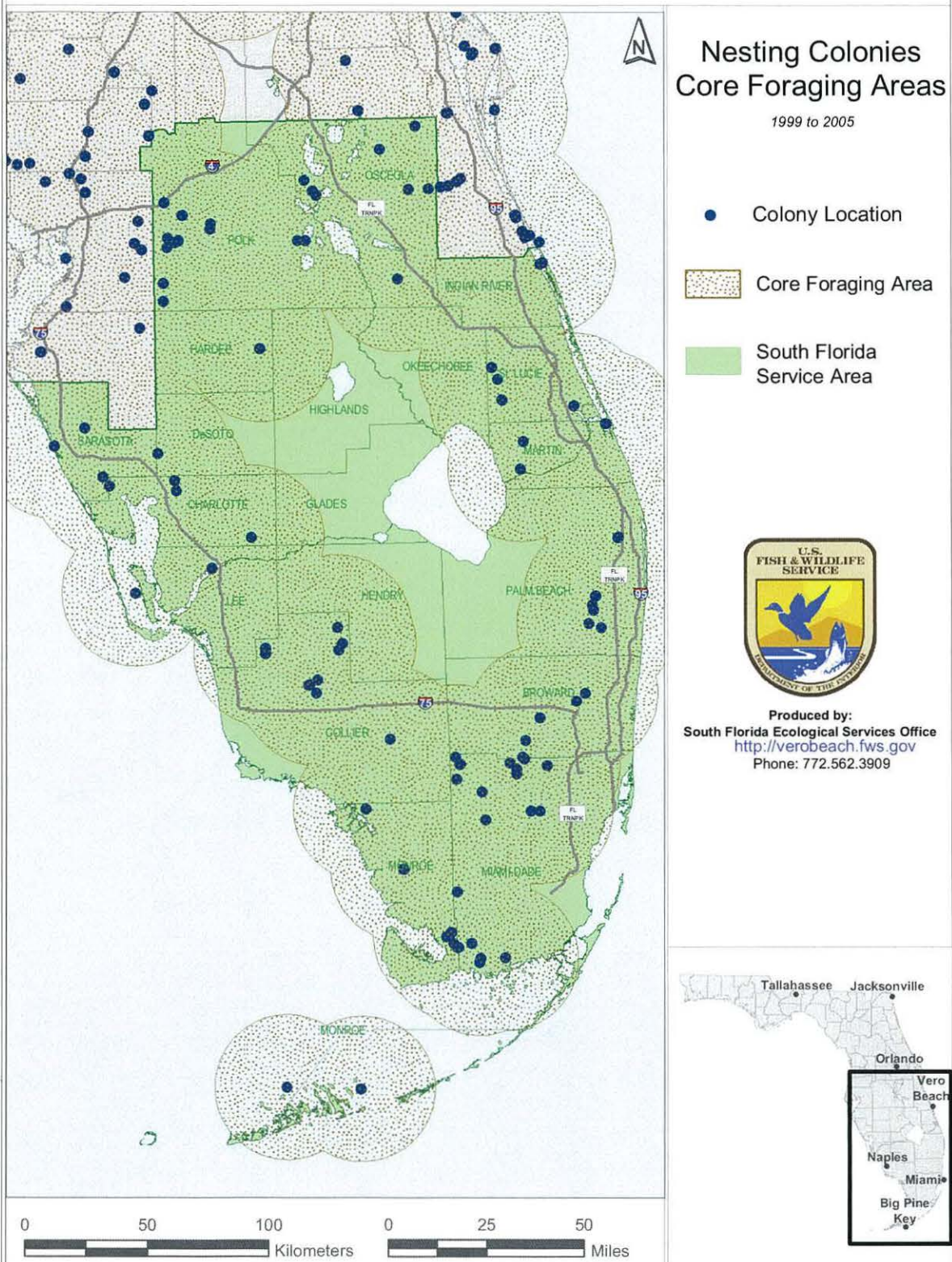
Section 27-3-22 states, in part, "It shall be unlawful for any person to hunt, trap, take, possess, sell, purchase, ship, or transport any hawk, eagle, owl, or any other bird or any part, nest, or egg thereof..."

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

4. State of South Carolina

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

Wood Stork



Enclosure 3

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

Foraging Habitat

Researchers have shown that wood storks forage most efficiently and effectively in habitats where prey densities are high and the water shallow and canopy open enough to hunt successfully (Ogden et al. 1978, Browder 1984, Coulter 1987). Prey availability to wood storks is dependent on a composite variable consisting of density (number or biomass/m²) and the vulnerability of the prey items to capture (Gawlik 2002). For wood storks, prey vulnerability appears to be largely controlled by physical access to the foraging site, water depth, the density of submerged vegetation, and the species-specific characteristics of the prey. For example, fish populations may be very dense, but not available (vulnerable) because the water depth is too deep (greater than 30 cm) for storks or the tree canopy at the site is too dense for storks to land. Calm water, about 5-40 cm (2-16 in) in depth, and free of dense aquatic vegetation is ideal (Coulter and Bryan 1993).

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

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

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

Table 1: Vegetation classes

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

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

Table 2: Habitat Foraging Suitability

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

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

Table 3. Foraging Suitability Percentages

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

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

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

Hydroperiod: The hydroperiod of a wetland can affect the prey densities in a wetland. For instance, research on Everglades fish populations using a variety of quantitative sampling techniques (pull traps, throw traps, block nets) have shown that the density of small forage fish increases with hydroperiod. Marshes inundated for less than 120 days of the year average ± 4 fish/m²; whereas, those flooded for more than 340 days of the year average ± 25 fish/m² (Loftus and Eklund 1994, Trexler et al. 2002).

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

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

Table 4. SFWMD Hydroperiod Classes – Everglades Protection Area

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

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

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

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

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

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

In consideration of this assessment, the Service used the data presented in Trexler et al.'s (2002) study on the number of fish per square-meter per hydroperiod for fish 8 cm or less to be applicable for estimating the total biomass per square-meter per hydroperiod for all fish. In determining the biomass of fish per square-meter per hydroperiod, the Service relied on the summary data provided by Turner et al. (1999), which provides an estimated fish biomass of 6.5 g/m² for a Class 7 hydroperiod for all fish and used the number of fish per square-meter per hydroperiod from Trexler et al.'s data to extrapolate biomass values per individual hydroperiods.

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

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

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

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

Table 6. Extrapolated Fish Densities for SFWMD Hydroperiods

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

Fish Biomass per Hydroperiod: A more important parameter than fish per square-meter in defining fish densities is the biomass these fish provide. In the ENP and WCA-3, based on studies by Turner et al. (1999), Turner and Trexler (1997), and Carlson and Duever (1979), the standing stock (biomass) of large and small fishes combined in unenriched Class 5 and 6 hydroperiod wetlands averaged between 5.5 to 6.5 grams-wet-mass/m². In these studies, the data was provided in g/m² dry-weight and was converted to g/m² wet-weight following the procedures referenced in Kushlan et al. (1986) and also referenced in Turner et al. (1999). The fish density data provided in Turner et al. (1999) included both data from samples representing fish 8 cm or smaller and fish larger than 8 cm and included summaries of Turner and Trexler (1997) data, Carlson and Duever (1979) data, and Loftus and Eklund (1994) data. These data sets also reflected a 0.6 g/m² dry-weight correction estimate for fish greater than 8 cm based on Turner et al.'s (1999) block-net rotenone samples.

Relating this information to the hydroperiod classes developed by the SFWMD, we estimated the mean annual biomass densities per hydroperiod. For our assessment, we considered Class 7 hydroperiod wetlands based on Turner et al. (1999) and Trexler et al. (2002) studies to have a mean annual biomass of 6.5 grams-wet-mass/m² and to be composed of 25 fish/m². The remaining biomass weights per hydroperiod were determined as a direct proportion of the number of fish per total weight of fish for a Class 7 hydroperiod (6.5 grams divided by 25 fish equals 0.26 grams per fish).

For example, given that a Class 3 hydroperiod has a mean annual fish density of 9 fish/m², with an average weight of 0.26 grams per fish, the biomass of a Class 3 hydroperiod would be 2.3 grams/m² (9*0.26 = 2.3). Based on the above discussion, the biomass per hydroperiod class is:

Table 7. Extrapolated Mean Annual Fish Biomass for SFWMD Hydroperiods

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

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

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

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

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

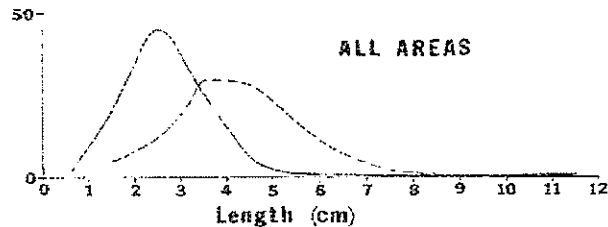


FIGURE 4. Length frequency distribution of fish available to and consumed by Wood Storks in different habitats.

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

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

Wood stork suitable prey base (biomass per hydroperiod): To estimate that fraction of the available fish biomass that might be consumed by wood storks, the following analysis was conducted. Trexler et al.'s (2002) 2-year throw trap data of absolute and relative fish abundance per hydroperiod distributed across 20 study sites in the ENP and the WCAs was considered to be representative of the Everglades fish assemblage available to wood storks ($n = 37,718$ specimens of 33 species). Although Trexler et al.'s (2002) data was based on throw-trap data and representative of fish 8 cm or smaller, the Service believes the data set can be used to predict the biomass/m² for total fish (those both smaller and larger than 8 cm). This approach is also supported, based on our assessment of prey consumption by wood storks in Ogden et al.'s (1976) study (Figure 4), that the wood storks general preference is for fish measuring 1.5 cm to 9 cm and is generally inclusive of Trexler et al.'s (2002) throw-trap data of fish 8 cm or smaller.

To estimate the fraction of the fish biomass that might be consumed by wood storks, the Service, using Trexler et al.'s (2002) throw-trap data set, determined the mean biomass of each fish species that fell within the wood stork prey size limits of 1.5 to 9.0 cm. The mean biomass of each fish species was estimated from the length and wet mass relationships for Everglades' ichthyofauna developed by Kushlan et al. (1986). The proportion of each species that was outside of this prey length and biomass range was estimated using the species mean and variance provided in Table 1 in Kushlan et al. (1986). These biomass estimates assumed the length and mass distributions of each species was normally distributed and the fish biomass could be estimated by eliminating that portion of each species outside of this size range. These biomass estimates of available fish prey were then standardized to a sum of 6.5 g/m² for Class 7 hydroperiod wetlands (Service 2009).

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

Standardizing these data to a sample size of 6.5 g/m², the warmouth biomass for long hydroperiod wetlands would be about 0.427 g (Service 2009). However, the size frequency distribution (assumed normal) for warmouth (Kushlan et al. 1986) indicate 48 percent are too large for wood storks and 0.6 percent are too small (outside the 1.5 cm to 9 cm size range most likely consumed), so the warmouth biomass within the wood stork's most likely consumed size range is only 0.208 g ($0.427*(0.48+0.006)=0.2075$) in a 6.5 g/m² sample. Using this approach summed over all species in long hydroperiod wetlands, only 3.685 g/m² of the 6.5 g/m² sample consists of fish within the size range likely consumed by wood storks or about 57 percent ($3.685/6.5*100=56.7$) of the total biomass available.

An alternative approach to estimate the available biomass is based on Ogden et al. (1976). In their study (Table 8), the sunfishes and four other species that accounted for 84 percent of the biomass eaten by wood storks totaled 2.522 g of the 6.5 g/m² sample (Service 2009). Adding the remaining 16 percent from other species in the sample, the total biomass would suggest that 2.97 g of a 6.5 g/m² sample are most likely to be consumed by wood storks or about 45.7 percent ($2.97/6.5=0.4569$)

The mean of these two estimates is 3.33g/m² for long hydroperiod wetlands ($3.685 + 2.97 = 6.655 / 2 = 3.33$). This proportion of available fish prey of a suitable size ($3.33 \text{ g/m}^2 / 6.5 \text{ g/m}^2 = 0.51$ or 51 percent) was then multiplied by the total fish biomass in each hydroperiod class to provide an estimate of the total biomass of a hydroperiod that is the appropriate size and species composition most likely consumed by wood storks.

As an example, a Class 3 SFWMD model hydroperiod wetland with a biomass of 2.3 grams/m², adjusted by 51 percent for appropriate size and species composition, provides an available biomass of 1.196 grams/m². Following this approach, the biomass per hydroperiod potentially available to predation by wood storks based on size and species composition is:

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

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

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

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

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

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

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

Table 10 Actual Biomass Consumed by Wood Storks

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

Sample Project of Biomass Calculations and Corresponding Concurrence Determination

Example 1:

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

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

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

Biomass lost $(5 \times 4,047 \times 0.39 \text{ (Table 10)} \times 0.37 \text{ (Table 3)}) = 2,919.9 \text{ grams or } 2.92 \text{ kg}$

In the example provided, the 5 acres of wetlands, converted to square-meters (1 acre = 4,047 m²) would provide 2.9 kg of biomass ($5 \times 4,047 \times 0.39 \text{ (Table 10)} \times 0.37 \text{ (Table 3)} = 2,919.9 \text{ grams or } 2.9 \text{ kg}$), which would be lost from development.

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

Biomass Pre: $(3 \times 4,047 \times 0.39 \text{ (Table 10)} \times 0.37 \text{ (Table 3)}) = 1,751.95 \text{ grams or } 1.75 \text{ kg}$

Biomass Post: $(3 \times 4,047 \times 0.39 \text{ (Table 10)} \times 1 \text{ (Table 3)}) = 4,734.99 \text{ grams or } 4.74 \text{ kg}$

Net increase: $4.74 \text{ kg} - 1.75 \text{ kg} = 2.98 \text{ kg Compensation Site}$

Project Site Balance $2.98 \text{ kg} - 2.92 \text{ kg} = 0.07 \text{ kg}$

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

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

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

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

Example 2:

In the above example, if the onsite preserve wetlands were a class 4 hydroperiod, which has a value of 0.71. grams/m² instead of a class 3 hydroperiod with a 0.39 grams/m² [Table 10]), there would be a loss of 2.92 kg of short hydroperiod wetlands (as above) and a net gain of 8.62 kg of long-hydroperiod wetlands.

Biomass lost: $(5 \times 4,047 \times 0.39 \text{ (Table 10)}) \times 0.37 \text{ (Table 3)} = 2,919.9 \text{ grams or } 2.92 \text{ kg}$

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

Biomass Pre: $(3 \times 4,047 \times 0.71 \text{ (Table 10)}) \times 0.37 \text{ (Table 3)} = 3,189.44 \text{ grams or } 3.19 \text{ kg}$

Biomass Post: $(3 \times 4,047 \times 0.71 \text{ (Table 10)}) \times 1 \text{ (Table 3)} = 8,620.11 \text{ grams or } 8.62 \text{ kg}$

Net increase: $8.62 \text{ kg} - 3.19 \text{ kg} = 5.43 \text{ kg}$

Project Site Balance $5.43 \text{ kg} - 2.92 \text{ kg} = 2.51 \text{ kg}$

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

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

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

LITERATURE CITED

- Browder, J.S. 1984. Wood stork feeding areas in southwest Florida. *Florida Field Naturalist* 12:81-96.
- Carlson, J.E., and M.J. Duever. 1979. Seasonal fish population fluctuation in south Florida swamps. *Proceedings of Annual Conference of Southeastern Association of Fish and Wildlife Agencies* 31:603-611.
- Chick, J. H., C. R. Ruetz III, and J. C. Trexler. 2004. Spatial Scale and abundance patterns of large fish communities in freshwater marshes of the Florida Everglades. *Wetlands*. 24 (3):652-644. *American Journal of Fisheries Management* 19: 957-967.
- Chick, J. H., S. Coyns, and J. C. Trexler. 1999. Effectiveness of airboat electrofishing for sampling fishes in shallow, vegetated habitats. *North American Journal of Fisheries Management* 19: 957-967.
- Coulter, M.C. 1987. Foraging and breeding ecology of wood storks in east-central Georgia. Pages 21-27 in *Proceedings of the Third Southeastern Nongame and Endangered Wildlife Symposium* (R.R. Odom, K.A. Riddleberger, and J.C. Ozier, eds.). Georgia Department of Natural Resources, Atlanta, Georgia.
- Coulter, M.C., and A.L. Bryan, Jr. 1993. Foraging ecology of wood storks (*Mycteria americana*) in east-central Georgia: I. Characteristics of foraging sites. *Colonial Waterbirds* 16(1):59-70.
- Coulter, M.C., J.A. Rodgers, J.C. Ogden, and F.C. Depkin. 1999. Wood stork (*Mycteria americana*). *The Birds of North America*, Issue No. 409 (A. Poole, ed.). Cornell Lab of Ornithology, Ithaca, New York.
- Fleming, D.M., W.F. Wolff, and D.L. DeAngelis. 1994. Importance of landscape heterogeneity to wood storks in Florida Everglades. *Environmental Management* 18(5):743-757.
- Gawlik, D.E. 2002. The effects of prey availability on the numerical response of wading birds. *Ecological Monographs* 72(3):329-346.
- Kushlan, J.A., S.A. Voorhees, W.F. Loftus, and P.C. Frohning. 1986. Length, mass and caloric relationships of Everglades animals. *Florida Scientist* 49(2):65-79.
- Loftus, W.F., and A.M. Eklund. 1994. Long-term dynamics of an Everglades small-fish assemblage. Pages 461-484 in *Everglades: the ecosystem and its restoration* (S.M. Davis and J.C. Ogden, eds.). St. Lucie Press, Delray, Florida.
- O'Hare, N.K., and G.H. Dalrymple. 1997. Wildlife in southern Everglades invaded by melaleuca (*Melaleuca quinquenervia*). *Bulletin of the Florida Museum of Natural History* 41(1):1-68. University of Florida, Gainesville, Florida.

- Ogden, J.C., J.A. Kushlan, and J.T. Tilmant. 1976. Prey selectivity by the wood stork. *The Condor* 78(3):324-330.
- Ogden, J.C., J.A. Kushlan, and J.T. Tilmant. 1978. The food habits and nesting success of wood storks in Everglades National Park in 1974. U.S. Department of the Interior, National Park Service, Natural Resources Report No. 16.
- Trexler, J. C., and C. W. Goss. 2009. Aquatic Fauna as Indicators for Everglades Restoration: Applying Dynamic Targets in Assessments. *Ecological Indicators*. Vol 9: 108-119.
- Trexler, J.C., W.F. Loftus, F. Jordan, J.H. Chick, K.L. Kandl, T.C. McElroy, and O.L. Bass. 2002. Ecological scale and its implications for freshwater fishes in the Florida Everglades. Pages 153-182 in *The Everglades, Florida Bay, and Coral Reefs of the Florida Keys: An ecosystem sourcebook* (J.W. Porter and K.G. Porter, eds.). CRC Press, Boca Raton, Florida.
- Turner, A., and J. C. Trexler. 1997. Sampling invertebrates from the Florida Everglades: a comparison of alternative methods. *Journal of the North American Benthological Society* 16:694-709
- Turner, A.W., J.C. Trexler, C.F. Jordan, S.J. Slack, P. Geddes, J.H. Chick, and W.F. Loftus. 1999. Targeting ecosystem features for conservation: standing crops in the Florida Everglades. *Conservation Biology* 13(4):898-911.
- U.S. Fish and Wildlife Service. 2006. August 31, 2006, Lake Belt Mining Region of Miami-Dade County Biological Opinion. South Florida Ecological Services Office; Vero Beach, Florida
- U.S. Fish and Wildlife Service. 2009. February 12, 2009, Fort Myers Mine No 2 Biological Opinion. South Florida Ecological Services Office, Vero Beach, Florida.
<http://www.fws.gov/filedownloads/ftp%5verobeach>



United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960
October 22, 2019



Shawn Zinszer
U.S. Army Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32232-0019

Subject: Consultation Key for the Florida bonneted bat; 04EF2000-2014-I-0320-R001

Dear Mr. Zinszer:

This letter replaces the December 2013, Florida bonneted bat guidelines provided to the U.S. Army Corps of Engineers (Corps) to assist your agency with effect determinations within the range of the Florida bonneted bat (*Eumops floridanus*). This October 2019 revision supersedes all prior versions. The enclosed *Florida Bonneted Bat Consultation Guidelines* and incorporated *Florida Bonneted Bat Consultation Key* (Key) are provided pursuant to the U.S. Fish and Wildlife Service's (Service) authorities under the Endangered Species Act of 1973, as amended (Act) (87 Stat. 884; 16 U.S.C.1531 *et seq.*). This letter, guidelines, and Key have been assigned Service Consultation Code: 41420- 04EF2000-2014-I-0320-R001.

The purpose of the guidelines and Key is to aid the Corps (or other Federal action agency) in making appropriate effect determinations for the Florida bonneted bat under section 7 of the Act, and streamline informal consultation with the Service for the Florida bonneted bat when the proposed action is consistent with the Key. There is no requirement to use the Key. There will be cases when the use of the Key is not appropriate. These include, but are not limited to: where project specific information is outside of the scope of the Key, applicants do not wish to implement the identified survey or best management practices, or if there is new biological information about the species. In these cases, we recommend the Corps (or other Federal action agency) initiate traditional consultation pursuant to section 7 of the Act, and identify that consultation is being requested outside of the Key.

This Key uses type of habitat (*i.e.*, roosting or foraging), survey results, and project size as the basis for making determinations of "may affect, but is not likely to adversely affect" (MANLAA) and "may affect, and is likely to adversely affect" (LAA). The Key is structured to focus on the type(s) of habitat that will be affected by a project. When proposed project areas provide features that could support roosting of Florida bonneted bats, it is considered roosting habitat. If evaluation of roosting habitat determines that roosting is not likely, then the area is subsequently evaluated for its value to the species as foraging habitat.

Roosting habitat

The guidelines describe the features of roosting habitat. When a project is proposed in roosting habitat, the likelihood that roosting is occurring is evaluated through surveys (*i.e.*, full acoustic or limited roost). When a roost is expected and the proposed activity will affect that roost, formal consultation is required. This is because the proposed activity is expected to take individuals through the destruction of the roost and the appropriate determination is that the project may affect, and is likely to adversely affect (LAA) the species. When roosting is expected, but all impacts to the roost can be avoided, and only foraging habitat (without roost structure) will be affected, the Service finds that it is reasonable to conclude that the proposed action is not likely to impair feeding, breeding, or sheltering. Thus, the proposed project may affect, but is not likely to affect the Florida bonneted bat (MANLAA).

The exception to this logic path is if the proposed action will affect more than 50 acres of foraging habitat in proximity to the roost. Under this scenario, we anticipate that the loss of the larger amount of foraging habitat near the roost could significantly impair feeding of young and overall breeding (*i.e.*, LAA). Consequently, these projects would require formal consultation to analyze the effect of the incidental take.

If the roost surveys demonstrate that roosting is not likely, the project is then evaluated for its effects to foraging habitat. Our evaluation of these actions is described below. The exception is for projects less than or equal to 5 acres if a limited roost survey is conducted. Limited roost surveys rely on peeping and visual surveys to determine whether roosting is likely. On these small projects, this survey strategy is believed to be more economical and is considered a reasonable effort to evaluate the potential for roosting. The Service acknowledges that this approach is less reliable in evaluating the likelihood of roosting when it is not combined with acoustic surveys. Therefore, when limited roost surveys are conducted for projects that are less than or equal to 5 acres in size and the determination is that roosting is not likely, we conclude that the proposed project may affect, but is not likely to adversely affect the species (MANLAA).

Foraging habitat

The guidelines describe the features of foraging habitat. Data informing the home range size of the Florida bonneted bats is limited. Global Positioning System (GPS) and radio-telemetry data for Florida bonneted bats documents that they move large distances and likely have large home ranges. Data from recovered GPS satellite tags on Florida bonneted bats tagged at Babcock-Webb Wildlife Management Area (BWWMA) found the maximum distance detected from a capture site was 24.2 mi (38.9 km); the greatest path length travelled in a single night was 56.3 mi (90.6 km) (Ober 2016; Webb 2018a-b). At BWWMA, researchers found that most individual locations were within one mile of the roost (point of capture) (Ober 2015). Additional data collected during the month of December documented the mean maximum distance Florida bonneted bats (n=8) with tags traveled from the roost was 9.5 mi (Webb 2018b).

The Service recognizes that the movement information comes from only one site (BWWMA and vicinity), and data are from small numbers (n=20) of tagged individuals for only short periods of time (Webb 2018a-b). We expect that across the Florida bonneted bat's range differences in

habitat quality, prey availability, and other factors will result in variable habitat use and home range sizes between locations. Foraging distances and home range sizes in high quality habitats are expected to be smaller while foraging distances and home range sizes in low quality habitat would be expected to be larger. Regardless, we use these studies as our best available information to evaluate when changes to foraging habitat may have an effect on the species ability to feed, breed, and shelter and subsequently result in incidental take. When considering where most of the nightly activity was observed, we calculate a foraging area centered on a roost with a 1 mile radius would include approximately 2,000 acres, and a foraging area centered on a 9.5 mile radius would encompass approximately 181,000 acres, on any given night.

Given the Service's limited understanding of how the Florida bonneted bat moves throughout its home range and selects foraging areas, we choose to use 50 acres of habitat as a conservative estimate to when loss of foraging habitat may affect the fitness of an individual to the extent that it would impair feeding and breeding. Projects that would remove, destroy or convert less than 50 acres of Florida bonneted bat foraging habitat are expected to result in a loss of foraging opportunities; however, this decrease is not expected to significantly impair the ability of the individual to feed and breed. Consequently, projects impacting less than 50 acres of foraging habitat that implement the identified best management practices in the Key would be expected to avoid take, and the appropriate determination is that the project may affect, but is not likely to adversely affect the species (MANLAA).

Next, the Service incorporated the level of bat activity into our Key to evaluate when a foraging area may have greater value to the species. When surveys document high bat activity, we deduce that this area has increased value and importance to the species. Thus, when high bat activity is detected in parcels with greater than 50 acres of foraging habitat, we anticipate that the loss, destruction, or conversion of this habitat could significantly impair the ability of an individual to feed and breed (*i.e.*, LAA); thus formal consultation is warranted.

If surveys do not indicate high bat activity, we anticipate that loss of this additional foraging habitat may affect, but is not likely to adversely affect the species (MANLAA). This is because although the acreage is large, the area does not appear to be important at the landscape scale of nightly foraging. Therefore, its loss is not anticipated to significantly impair the ability of an individual to feed or breed.

The exception to this approach is for projects greater than 50 acres when they occur in potential roosting habitat that is not found to support roosting or high bat activity. Under this scenario, the Service concludes that the loss of the large acreage of suitable roosting habitat has the potential to significantly impair the ability of an individual to breed or shelter (*i.e.*, LAA) because the species is cavities for roosting are expected to be limited range wide and the project will impair these limited opportunities for roosting.

Determinations

The Corps (or other Federal action agency) may reach one of several determinations when using this Key. Regardless of the determination, when acoustic bat surveys have been conducted, the Service requests that these survey results are provided to our office to increase our knowledge of

the species and improve our consultation process. Surveys results and reports should be transmitted to the Service at FBBsurveyreport@fws.gov or mail electronic file to U.S. Fish and Wildlife Service, Attention Florida bonneted bat surveys, 1339 20th Street, Vero Beach, Florida 32960. When formal consultation is requested, survey results and reports should be submitted with the consultation request to verobeach@fws.gov.

No effect: If the use of the Key results in a determination of “no effect,” no further consultation is necessary with the Service. The Service recommends that the Corps (or other Federal action agency) documents the pathway used to reach the determination in the project record and proceeds with other species analyses as warranted.

May Affect, Not Likely to Adversely Affect (MANLAA): In this Key we have identified two ways that consultation can conclude informally, MANLAA-P and MANLAA-C.

MANLAA-P: If the use of the Key results in a determination of “MANLAA- P,” the Service concurs with this determination based on the rationale provide above, and no further consultation is necessary for the effects of the proposed action on the Florida bonneted bat. The Service recommends that the Corps (or other Federal action agency) documents the pathway used to reach the determination in the project record and proceeds with other species analyses as warranted.

MANLAA-C: If the use of the Key results in a determination of MANLAA-C, further consultation with the Service is required to confirm that the Key has been used properly, and the Service concurs with the evaluation of the survey results. Survey results should be submitted with the consultation request.

May Affect, Likely to Adversely Affect (LAA) - When the determination in the Key is “LAA” technical assistance with the Service and modifications to the proposed action may enable the project to be reevaluated and conclude with a MANLAA-C determination. Under other circumstance, “LAA” determinations will require formal consultation.

Working with the Fish and Wildlife Foundation of Florida, the Service has established a fund to support conservation and recovery for the Florida bonneted bat. Any project that has the potential to affect the Florida bonneted bat and/or its habitat is encouraged to make a voluntary contribution to this fund. If you would like additional information about how to make a contribution and how these monies are used to support Florida bonneted bat recovery please contact Ashleigh Blackford, Connie Cassler, or José Rivera at 772-562-3909.

This revised Key is effective immediately upon receipt by the Corps. Should circumstances change or new information become available regarding the Florida bonneted bat and/or implementation of the Key, the determinations herein may be reconsidered and this Key further revised or amended. We have established an email address to collect comments on the Key and the survey protocols at: FBBguidelines@fws.gov.

Thank you for your continued cooperation in the effort to conserve fish and wildlife resources. If you have any questions regarding this Key, please contact the South Florida Ecological Services Office at 772-562-3909.

Sincerely,



Roxanna Hinzman
Field Supervisor
South Florida Ecological Services

Enclosure

Cc: electronic only

Corps, Jacksonville, Florida (Dale Beter, Muriel Blaisdell, Ingrid Gilbert, Alisa Zarbo, Melinda Charles-Hogan, Susan Kaynor, Krista Sabin, John Fellows)

LITERATURE CITED

- Ober, H. 2015. Annual report to USFWS for calendar year 2015. Permit number TE23583B-1. University of Florida, Department of Wildlife Ecology and Conservation, North Florida Research and Education Center. Quincy, Florida.
- Ober, H. 2016. Annual report to USFWS for calendar year 2016. Permit number TE23583B-1. University of Florida, Department of Wildlife Ecology and Conservation, North Florida Research and Education Center. Quincy, Florida.
- Webb, E.N. 2018a. Email to Paula Halupa *et al.* University of Florida, Department of Wildlife Ecology and Conservation. Gainesville, Florida. April 1, 2018.
- Webb, E.N. 2018b. Presentation given at Florida bonneted bat working group meeting at The Conservancy of Southwest Florida. University of Florida, Department of Wildlife Ecology and Conservation. Gainesville, Florida. May 24, 2016.

**U.S. Fish and Wildlife Service
South Florida Ecological Services Office**

FLORIDA BONNETED BAT CONSULTATION GUIDELINES

October - 2019

The U.S. Fish and Wildlife Service's South Florida Ecological Services Field Office (Service) developed the Florida Bonneted Bat Consultation Guidelines (Guidelines) to assist in avoiding and minimizing potential negative effects to roosting and foraging habitat, and assessing effects to the Florida bonneted bat (*Eumops floridanus*) from proposed projects. The Consultation Key within the Guidelines assists applicants in evaluating their proposed projects and identifying the appropriate consultation paths under sections 7 and 10 of the Endangered Species Act of 1973 (Act), as amended (87 Stat. 884; 16 U.S.C. 1531 *et seq.*). These Guidelines are primarily for use in evaluating regulatory projects where development and land conversions are anticipated. These Guidelines focus on conserving roosting structures in natural and semi-natural environments. The following Consultation Area map (Figure 1 and Figure 2, Appendix A), Consultation Flowchart (Figure 3), Consultation Key, Survey Framework (Appendices B-C), and **Best Management Practices (BMPs)** (Appendix D) are based upon the best available scientific information. As more information is obtained, these Guidelines will be revised as appropriate. If you have comments, or suggestions on these Guidelines or the Survey Protocols (Appendix B and C), please email your comments to FBBguidelines@fws.gov. These comments will be reviewed and incorporated in an annual review.

Terms in bold are further defined in the Glossary.

Wherever possible, proposed development projects within the Consultation Area should be designed to avoid and minimize take of Florida bonneted bats and to retain their habitat. Applicants are encouraged to enter into early technical assistance/consultation with the Service so we may provide recommendations for avoiding and minimizing adverse effects. Although these Guidelines focus on the effects of a proposed action (*e.g.*, development) on natural habitat, (*i.e.*, non-urban), Appendix E also provides Best Management Practices for Land Management Projects.

If you are renovating an existing artificial structure (*e.g.*, building) within the urban environment with or without additional ground disturbing activities, these Guidelines do not apply. The Service is developing separate guidelines for consultation in these situations. Until the urban guidelines are complete, please contact the Service for additional guidance.

The final listing rule for the Florida bonneted bat (Service 2013) describes threats identified for the species. Habitat loss and degradation, as well as habitat modification, have historically affected the species. Florida bonneted bats are different from most other Florida bat species because they are reproductively active through most of the year, and their large size makes them capable of foraging long distances from their roost (Ober *et al.* 2016). Consequently, this species is vulnerable to disturbances around the roost during a greater portion of the year and considerations about foraging habitat extend further than the localized roost.

Use of Consultation Area, Flowchart, and Key

Figure 1 shows the Consultation Area for the Florida bonneted bat where this consultation guidance applies. For information on how the Consultation Area was delineated see Appendix A. The Consultation Flowchart (Figure 3) and Consultation Key direct project proponents through a series of couplets that will provide a conclusion or determination for potential effects to the Florida bonneted bat. *Please Note: If additional listed species, or candidate or proposed species, or designated or proposed critical habitat may be affected, a separate evaluation will be needed for these species/critical habitats.*

Currently, the Consultation Flowchart (Figure 3) and Consultation Key cannot be used for actions proposed within the urban development boundary in Miami-Dade and Broward County. The urban development boundary is part of the Consultation Area, but it is excluded from these Guidelines because Florida bonneted bats use this area differently (roosting largely in artificial structures), and small natural foraging areas are expected to be important. Applicants with projects in this area should contact the Service for further guidance and individual consultation.

Determinations may be either “no effect,” “may affect, but is not likely to adversely affect” (**MANLAA**), or “may affect, and is likely to adversely affect” (**LAA**). An applicant’s willingness and ability to alter project designs could sufficiently minimize effects to Florida bonneted bats and allow for a **MANLAA** determination for this species (informal consultation). The Service is available for early technical assistance/consultation to offer recommendations to assist in project design that will minimize effects. When take cannot be avoided, applicants and action agencies are encouraged to incorporate compensation to offset adverse effects. The Service can assist with identifying compensation options (*e.g.*, conservation on site, conservation off-site, contributions to the Service’s Florida bonneted bat conservation fund, *etc.*).

Using the Key and Consultation Flowchart

- “No effect” determinations do not need Service concurrence.
- “May affect, but is not likely to adversely affect” **MANLAA**. Applicants will be expected to incorporate the appropriate BMPs to reach a **MANLAA** determination.
 - **MANLAA-P** (in blue in Consultation Flowchart) have programmatic concurrence through the transmittal letter of these Guidelines, and therefore no further consultation with the Service is necessary unless assistance is needed in interpreting survey results.
 - **MANLAA-C** (in black in Consultation Flowchart) determinations require further consultation with the Service.
- “May affect, and is likely to adversely affect” (**LAA**) determinations require consultation with the Service. Project modifications could change the **LAA** determinations in numbers 5, 8, 9, 11, 12, and 17 to **MANLAA**. When take cannot be avoided, **LAA** determinations will require a biological opinion.
- The Service requests copies of surveys used to support all determinations. If a survey is required by the Consultation Key and the final determination is “no effect” or “MANLAA-P”, send the survey to FBBsurveyreport@fws.gov, or mail electronic file to U.S. Fish and Wildlife Service, Attention Florida bonneted bat surveys, 1339 20th Street, Vero Beach, Florida 32960. If a survey is required by the Consultation Key and the determination is “MANLAA-C” or “LAA”, submit the survey in the consultation request.

For the purpose of making a decision at Couplet 2: If any potential roosting structure is present, then the habitat is classified as **potential roosting habitat**, and the left half of the flowchart should be followed (see Figure 3). We recognize that roosting habitat may also be used by Florida bonneted bats for foraging. If the project site only consists of **foraging habitat** (*i.e.*, no suitable roosting structures), then the right side of the flowchart should be followed beginning at step 13.

For couplets 11 and 12: **Potential roosting habitat** is considered **Florida bonneted bat foraging habitat** when a determination is made that roosting is not likely.

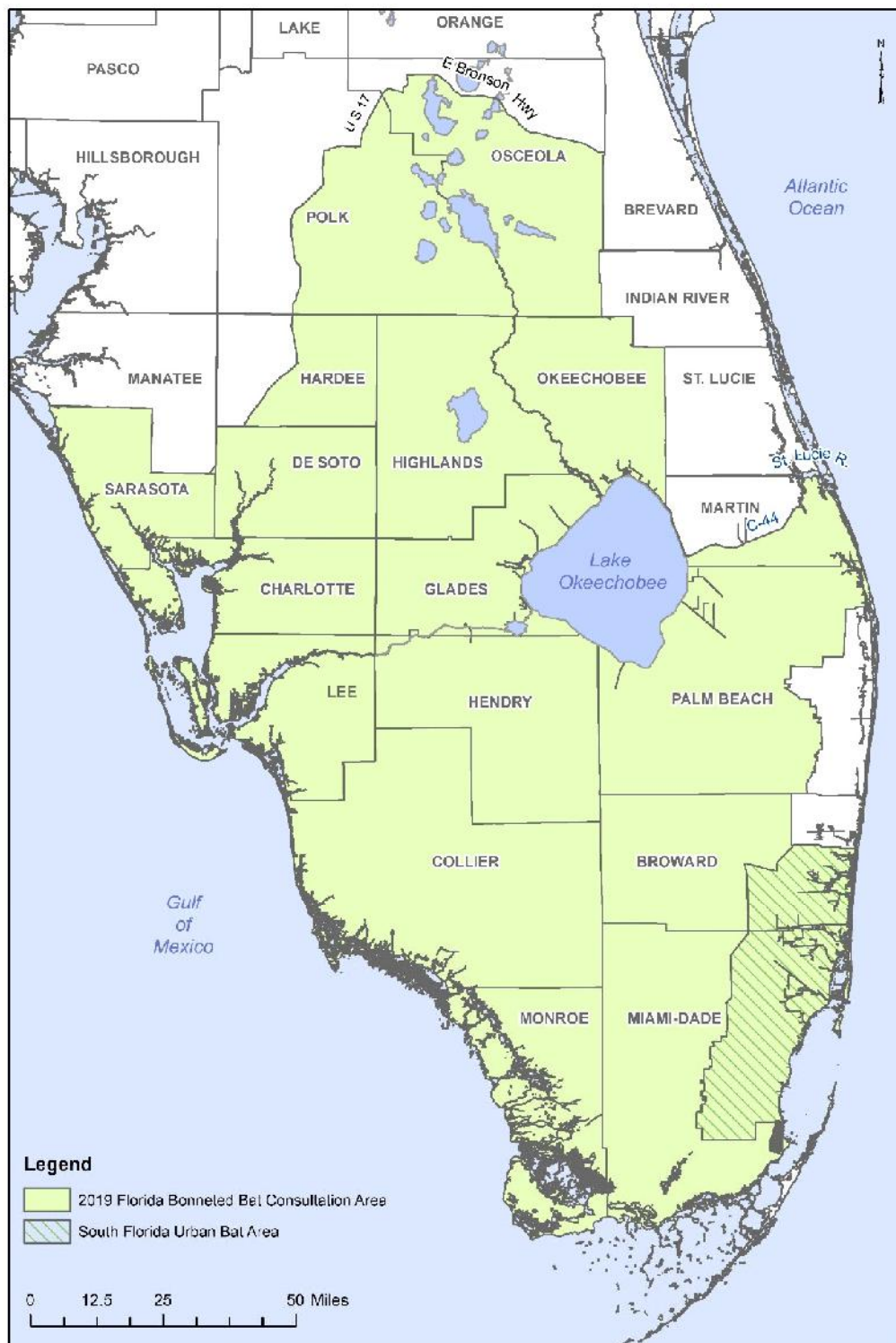


Figure 1. Florida Bonneted Bat Consultation Area. Hatched area (Figure 2) identifies the urban development boundary in Miami-Dade and Broward County. Applicants with projects in this area should contact the Service for specific guidance addressing this area and individual consultation. The Consultation Key should not be used for projects in this area.



Figure 2. Urban development boundary in Miami-Dade and Broward County. The Consultation Key should not be used for projects in this area. Applicants with projects in this South Florida Urban Bat Area should contact the Service for specific guidance addressing this area and individual consultation.

Florida Bonneted Bat Consultation Key[#]

Use the following key to evaluate potential effects to the Florida bonneted bat (FBB) from the proposed project. Refer to the Glossary as needed.

- 1a. Proposed project or land use change is partially or wholly within the Consultation Area (Figure 1).....**Go to 2**
- 1b. Proposed project or land use change is wholly outside of the Consultation Area (Figure 1).....**No Effect**

- 2a. Potential FBB roosting habitat exists within the project area.....**Go to 3**
- 2b. No potential FBB roosting habitat exists within the project area.....**Go to 13**

- 3a. Project size/footprint* $\leq$ 5 acres (2 hectares)..... **Conduct Limited Roost Survey (Appendix C)**
then **Go to 4**
- 3b. Project size/footprint* $>$ 5 acres (2 hectares).....**Conduct Full Acoustic/Roost Surveys (Appendix B)** then
Go to 6

- 4a. Results show FBB roosting is likely**Go to 5**
- 4b. Results do not show FBB roosting is likely.....**MANLAA-P if BMPs (Appendix D) used and survey reports are submitted. Programmatic concurrence.**

- 5a. Project will affect roosting habitat.....**LAA⁺ Further consultation with the Service required.**
- 5b. Project will not affect roosting habitat..... **MANLAA-C with required BMPs (Appendix D). Further consultation with the Service required.**

- 6a. Results show some FBB activity.....**Go to 7**
- 6b. Results show no FBB activity.....**No Effect**

- 7a. Results show FBB roosting is likely.....**Go to 8**
- 7b. Results do not show FBB roosting is likely.....**Go to 10**

- 8a. Project will not affect roosting habitat.....**Go to 9**
- 8b. Project will affect roosting habitat.....**LAA⁺ Further consultation with the Service required.**

- 9a. Project will affect* $>$ 50 acres (20 hectares) (wetlands and uplands) of foraging habitat.....**LAA⁺ Further consultation with the Service required.**
- 9b. Project will affect* $\leq$ 50 acres (20 hectares) (wetlands and uplands) of foraging habitat..... **MANLAA-C with required BMPs (Appendix D). Further consultation with the Service required.**

- 10a. Results show high FBB activity/use.....**Go to 11**
- 10b. Results do not show high FBB activity/use.....**Go to 12**

- 11a. Project will affect* $>$ 50 acres (20 hectares) (wetlands and uplands) of FBB habitat (roosting and/or foraging)..... **LAA⁺ Further consultation with the Service required.**
- 11b. Project will affect* $\leq$ 50 acres (20 hectares) (wetlands and uplands) of FBB habitat (roosting and/or foraging)..... **MANLAA-C with required BMPs (Appendix D). Further consultation with the Service required.**

- 12a. Project will affect* $>$ 50 acres (20 hectares) (wetlands and uplands) of FBB habitat..... **LAA⁺ Further consultation with the Service required.**
- 12b. Project will affect* $\leq$ 50 acres (20 hectares) (wetlands and uplands) of FBB habitat..... **MANLAA-P if BMPs (Appendix D) used and survey reports are submitted. Programmatic concurrence.**

- 13a. FBB foraging habitat exists within the project area and foraging habitat will be affected.....**Go to 14**
- 13b. FBB foraging habitat exists within the project area and foraging habitat will not be affected **OR** no FBB foraging habitat exists within the project area.....**No Effect**
- 14a. Project size* > 50 acres (20 hectares) (wetlands and uplands)**Go to 15**
- 14b. Project size* ≤ 50 acres (20 hectares) (wetlands and uplands) **MANLAA-P if BMPs (Appendix D) used. Programmatic concurrence.**
- 15a. Project is within 8 miles (12.9 kilometers) of high quality potential roosting areas^.....**Conduct Full Acoustic Survey (Appendix B) and Go to 16**
- 15b. Project is not within 8 miles (12.9 kilometers) of high quality potential roosting area^.....**MANLAA-P if BMPs (Appendix D) used. Programmatic concurrence.**
- 16a. Results show some FBB activity.....**Go to 17**
- 16b. Results show no FBB activity.....**No Effect**
- 17a. Results show high FBB activity/use.....**LAA+ Further consultation with the Service required.**
- 17b. Results do not show high FBB activity/use..... **MANLAA-P if BMPs (Appendix D) used and survey reports submitted. Programmatic concurrence.**

If you are within the urban environment and you are renovating an existing artificial structure (with or without additional ground disturbing activities), these Guidelines do not apply. The Service is developing separate guidelines for consultation in these situations. Until the urban guidelines are complete, please contact the Service for additional guidance

*Includes wetlands and uplands that are going to be altered along with a 250- foot (76.2- meter) buffer around these areas if the parcel is larger than the altered area.

+Project modifications could change the LAA determinations in numbers 5, 8, 9, 11, 12, and 17 to **MANLAA** determinations.

^Determining if **high quality potential roosting areas** are within 8 mi (12.9 km) of a project is intended to be a desk-top exercise looking at most recent aerial imagery, not a field exercise.

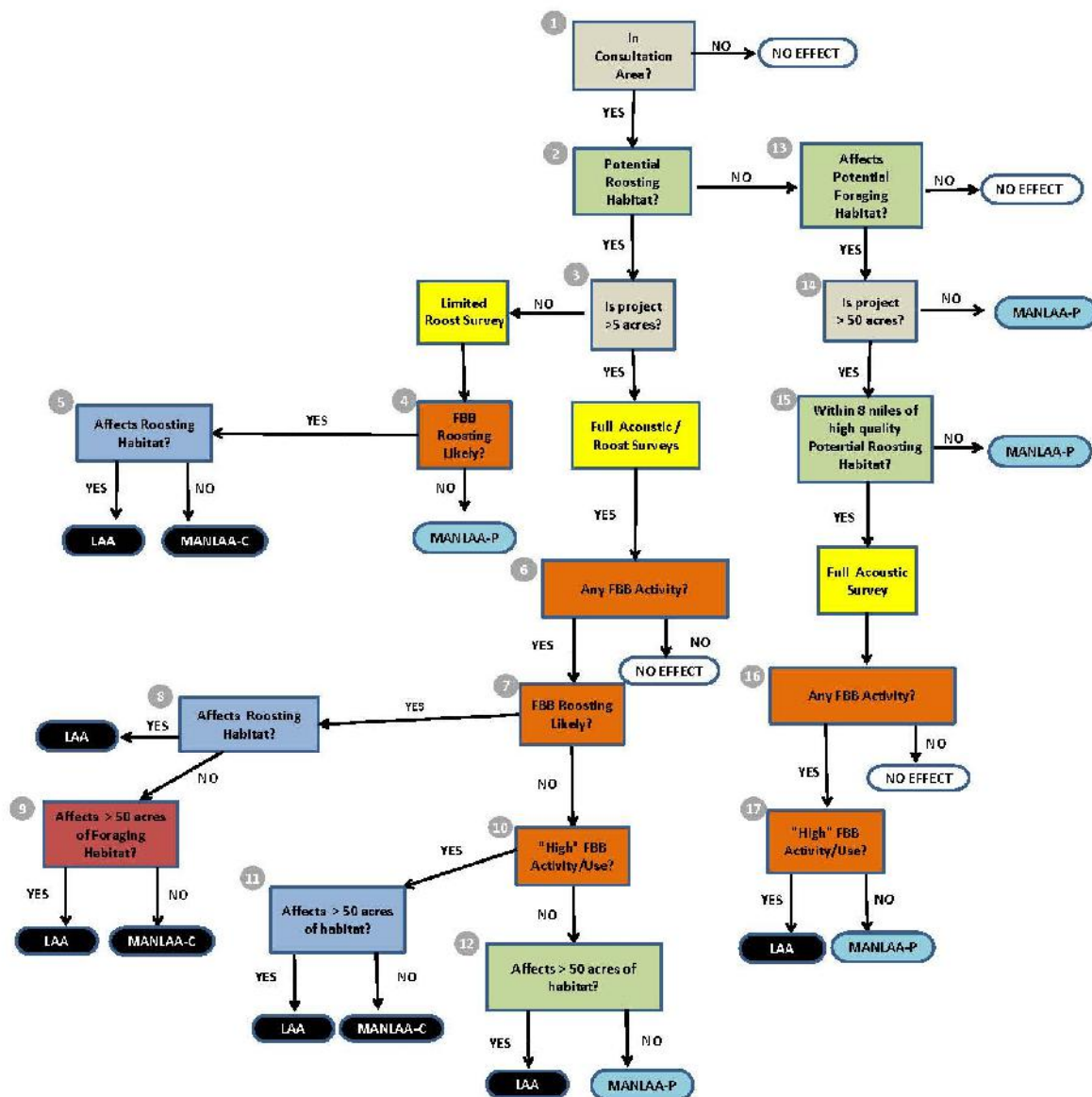


Figure 3. Florida bonneted bat Consultation Flowchart. “No effect” determinations do not need Service concurrence. “May affect, but not likely to adversely affect”, **MANLAA-P**, in blue have programmatic concurrence through the transmittal letter of these Guidelines, and therefore no further consultation with the Service is necessary unless assistance is needed in interpreting survey results. **MANLAA-C** determinations in black require further consultation with the Service. Applicants are expected to incorporate the appropriate **BMPs** to reach a **MANLAA** determination. “May affect, and is likely to adversely affect”, **LAA**, (also in black) determinations require consultation with the Service. Further consultation with the Service may identify project modifications that could change the **LAA** determinations in numbers 5, 8, 9, 11, 12, and 17 to **MANLAA** determinations. The Service requests Florida bonneted bat survey reports for all determinations.

GLOSSARY

BMPs – Best Management Practices. Recommendations for actions to conserve roosting and foraging habitat to be implemented before, during, and after proposed development, land use changes, and land management activities.

FBB Activity – Florida bonneted bat (FBB) activity is when any Florida bonneted bat calls are recorded during an acoustic survey or human observers see or hear Florida bonneted bats on a site.

FORAGING HABITAT - Comprised of relatively open (*i.e.*, uncluttered or reduced numbers of obstacles, such as fewer tree branches and leaves, in the flight environment) areas to find and catch prey, and sources of drinking water. In order to find and catch prey, Florida bonneted bats forage in areas with a reduced number of obstacles. This includes: open fresh water, permanent or seasonal freshwater wetlands, within and above wetland and upland forests, wetland and upland shrub, and agricultural lands (Bailey *et al.* 2017). In urban and residential areas drinking water, prey base, and suitable foraging can be found at golf courses, parking lots, and parks in addition to relatively small patches of natural habitat.

FULL ACOUSTIC/ROOST SURVEY - This is a comprehensive survey that will involve systematic acoustic surveys (*i.e.*, surveys conducted 30 minutes prior to sunset to 30 minutes after sunrise, over multiple consecutive nights). Depending upon acoustic results and habitat type, targeted roost searches through thorough visual inspection using a tree-top camera system or observations at emergence (*e.g.*, looking and listening for bats to come out of tree cavities around sunset) or more acoustic surveys may be necessary. See Appendix B for a full description.

HIGH FBB ACTIVITY/USE - High Florida bonneted bat (FBB) activity/use or importance of an area can be defined using several parameters (*e.g.*, types of calls, numbers of calls). An area will be considered to have high FBB activity/use if **ANY** of the following are found: (a) multiple FBB feeding buzzes are detected; (b) FBB social calls are recorded; (c) large numbers of Florida bonneted bat calls (9 or more) are recorded throughout one night. Each of these parameters is considered to indicate that an area is actively used and important to FBBs, however, the Service will further evaluate the activity/use of the area within the context of the site (*i.e.*, spatial distribution of calls, site acreage, habitat on site, as well as adjacent habitat) and provide additional guidance.

HIGH QUALITY POTENTIAL ROOSTING AREAS - Sizable areas (>50 acres) [20 hectares] that contain large amounts of high-quality, natural roosting structure – (*e.g.*, predominantly native, mature trees; especially pine flatwoods or other areas with a large number of cavity trees, tree hollows, or high woodpecker activity).

LAA - May Affect, and is Likely to Adversely Affect. The appropriate conclusion if any adverse effect to listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not: discountable, insignificant, or

beneficial [see definition of “may affect, but is not likely to adversely affect” (**MANLAA**)]. In the event the overall effect of the proposed action is beneficial to the listed species, but also is likely to cause some adverse effects, then the proposed action is “likely to adversely affect” the listed species. If incidental take is anticipated to occur as a result of the proposed action, an “is likely to adversely affect” (**LAA**) determination should be made. An “is likely to adversely affect” determination requires the initiation of formal section 7 consultation.

LIMITED ROOST SURVEY - This is a reduced survey that may include the following methods: acoustics, observations at emergence (*e.g.*, looking and listening for bats to come out of tree cavities around sunset), and visual inspection of trees with cavities or loose bark using tree-top cameras (or combination of these methods). Methods are fairly flexible and dependent upon composition and configuration of project site and willingness and ability of applicant and partners to conserve roosting structures on site. See also Appendix C for a full description.

MANLAA - May Affect, but is Not Likely to Adversely Affect. The appropriate conclusion when effects on listed species are expected to be discountable, insignificant, or completely beneficial. Beneficial effects are contemporaneous positive effects without any adverse effects to the species. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are those extremely unlikely to occur. Based on best judgment, a person would not: (1) be able to meaningfully measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur. To use these Guidelines and Consultation Key applicants must incorporate the appropriate **BMPs** (Appendix D) to reach a **MANLAA** determination.

In this Consultation Key we have identified two ways that consultation can conclude informally, **MANLAA-P** and **MANLAA-C**:

MANLAA-P: programmatic concurrence is provided through the transmittal letter of these Guidelines, no additional consultation is required with the Service for Florida bonneted bats. All survey results must be submitted to Service.

MANLAA-C: further consultation with the Service is required to confirm that the Consultation Key has been used properly, and the Service concurs with the evaluation of the survey results. Request for consultation must include survey results.

NO EFFECT - The appropriate conclusion when the action agency determines its proposed action will not affect listed species or designated critical habitat.

POTENTIAL ROOSTING HABITAT - Includes forest and other areas with tall, mature trees or other areas with suitable roost structures (*e.g.*, utility poles, artificial structures). Forest is defined as all types including: pine flatwoods, scrubby flatwoods, pine rocklands, royal palm hammocks, mixed or hardwood hammocks, cypress, sand pine scrub, or other forest types. (Forrest types currently include exotic forests such as melaleuca, please contact the Service for additional guidance as needed). More specifically, this includes habitat in which suitable structural features for breeding and sheltering are present. In general, roosting habitat contains one or more of the following structures: tree snags, and trees with cavities, hollows, deformities, decay, crevices, or loose bark. Structural characteristics are of primary importance.

Florida bonneted bats have been found roosting in habitat with the following structural features, but may also occur outside of these parameters:

- trees greater than 33 feet (10 meters) in height, greater than 8 inches (20 centimeters) in diameter at breast height (DBH), with cavity elevations higher than 16 feet (5 meters) above ground level (Braun de Torrez 2019);
- areas with a high incidence of large or mature live trees with various deformities (e.g., large cavities, hollows, broken tops, loose bark, and other evidence of decay) (e.g., pine flatwoods);
- rock crevices (e.g., limestone in Miami-Dade County); and/or
- artificial structures, mimicking natural roosting conditions (e.g., bat houses, utility poles, buildings), situated in natural or semi-natural habitats.

In order for a building to be considered a roosting structure, it should be a minimum of 15 feet high and contain one or more of the following features: chimneys, gaps in soffits, gaps along gutters, or other structural gaps or crevices (outward entrance approximately 1 inch (2.5 centimeters) in size or greater. Structures similar to the above (e.g., bridges, culverts, minimum of 15 feet high) are expected to also provide roosting habitat, based upon the species' morphology and behavior (Keeley and Tuttle 1999). Florida bonneted bat roosts will be situated in areas with sufficient open space for these bats to fly (e.g., open or semi-open canopy, canopy gaps, above the canopy, and edges which provide relatively uncluttered conditions [*i.e.*, reduced numbers of obstacles, such as fewer tree branches and leaves, in the flight environment]).

For the purpose of this Consultation Key: Roosting habitat refers to habitat with structures that can be used for daytime and maternity roosting. Roosting at night between periods of foraging can occur in a broader range of structure types. For the purposes of this guidance we are focusing on day roosting habitat.

ROOSTING IS LIKELY— Determining likelihood of roosting is challenging. The Service has provided the following definition for the express purpose of these Guidelines. Researchers use additional cues to assist in locating roosts. As additional indicators are identified and described we expect our Guidelines will be improved.

In this Consultation Key the Service will consider the following evidence indicative that roosting is likely nearby (*i.e.*, reasonably certain to occur) if **ANY** of the following are documented: (a) Florida bonneted bat calls are recorded within 30 minutes before sunset to 1½ hours following sunset or within 1½ hours before sunrise; (b) emergence calls are recorded; (c) human observers see (or hear) Florida bonneted bats flying from or to potential roosts; (d) human observers see and identify Florida bonneted bats within a natural roost or artificial roost; and/or (e) other bat sign (e.g., guano, staining, etc.) is found that is identified to be Florida bonneted bat through additional follow-up.

In addition to the aforementioned events, researchers consider roosting likely in an area when (1) large numbers of Florida bonneted bat calls are recorded throughout the night (e.g., ≥ 25 files per night at a single acoustic station when 5 second file lengths are recorded); (2) large numbers of FBB calls are recorded over multiple nights (e.g., an average of ≥ 20 files per night from a single detector when 5 second file lengths are recorded); or (3) social calls are recorded. Because social calls and large numbers of calls recorded over one or more nights can be indicative of high

FBB activity/use or when roosting is likely, the Service is choosing not to use these as indicators to make the determination that roosting is likely. Instead we are relying on the indicators that are only expected to occur at or very close to a roost location [(a)-(e) above].

TAKE - to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct. [ESA §3(19)] Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is defined by the Service as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. [50 CFR §17.3].

Literature Cited

- Bailey, A.M., H.K. Ober, A.R. Sovie, and R.A. McCleery. 2017. Impact of land use and climate on the distribution of the endangered Florida bonneted bat. *Journal of Mammalogy*. 98:1586-1593.
- Braun de Torrez, E. 2019. Email from biologist E. Braun de Torrez, Florida Fish and Wildlife Conservation Commission to biologist, S. Sneckenberger, U.S. Fish and Wildlife Service. July 24, 2019. Gainesville, Florida.
- Keeley, B.W., and M.D. Tuttle. 1999. Bats in American bridges. Bat Conservation International, Inc. Austin, Texas.
- Ober, H.K., E.C. Braun de Torrez, J.A. Gore, A.M. Bailey, J.K. Myers, K.N. Smith, and R.A. McCleery. 2016. Social organization of an endangered subtropical species, *Eumops floridanus*, the Florida bonneted bat. *Mammalia* 2016:1-9.
- U.S. Fish and Wildlife Service. 2013. Endangered and threatened wildlife and plants; endangered species status for the Florida bonneted bat. *Federal Register* 78:61004-61043.

Appendix A. Delineation and Justification for Consultation Area

The Consultation Area (Figure 1) represents the general range of the species. The Consultation Area represents the area within which consideration should be given to potential effects to Florida bonneted bats from proposed projects or actions. Coordination and consultation with the Service helps to determine whether proposed actions and activities may affect listed species. This Consultation Area defines the area where proposed actions and activities may affect the Florida bonneted bat.

This area was delineated using confirmed presence data, key habitat features, reasonable flight distances and home range sizes. Where data were lacking, we used available occupancy models that predict probability of occurrence (Bailey *et al.* 2017). Below we describe how each one of these data sources was used to determine the overall Consultation Area.

Presence data: Presence data included locations for: (1) confirmed Florida bonneted bat acoustic detections; (2) known roost sites (occupied or formerly occupied; includes natural roosts, bat houses, and utility poles); (3) live Florida bonneted bats observed or found injured; (4) live Florida bonneted bats captured during research activities; and (5) Florida bonneted bats reported as dead. The Geographic Information Systems (GIS) dataset incorporates information from January 2003 to May 2019.

The vast majority of the presence data came from acoustic surveys. The species' audible, low frequency, distinct, echolocation calls are conducive for acoustic surveys. However, there are limitations in the range of detection from ultrasonic devices, and the fast, high-flying habits of this species can confound this. Overall, detection probabilities for Florida bonneted bats are generally considered to be low. For example, in one study designed to investigate the distribution and environmental associations of Florida bonneted bat, Bailey *et al.* 2017 found overall nightly detection probability was 0.29. Based on the estimated detection probabilities in that study, it would take 9 survey nights (1 detector per night) to determine with 95% certainty whether Florida bonneted bat are present at a sampling point. Positive acoustic detection data are extremely valuable. However, it is important to recognize that there are issues with false negatives due to limitations of equipment, low detection probabilities, difference in detection due to prey availability and seasonal movement over the landscape, and in some circumstances improperly conducted surveys (*i.e.*, short duration or in unsuitable weather conditions).

Key habitat features: We considered important physical and biological features with a focus on potential roosting habitat and applied key concepts of bat conservation (*i.e.*, need to conserve roosting habitat, foraging habitat, and prey base). To date, all known natural Florida bonneted bat roosts (n=19) have been found in live trees and snags of the following types: slash pine, longleaf pine, royal palm, and cypress (Braun de Torrez 2018). Several of the recent roost discoveries are located in fire-maintained vegetation communities, and it appears that Florida bonneted bats are fire-adapted and can benefit from prescribed burn regimes that closely mimic historical fire patterns (Ober *et al.* 2018).

From a landscape and roosting perspective, we consider key habitat features to include forested areas and other areas with mature trees, wetlands, areas used by red-cockaded woodpeckers

(*Picoides borealis*; RCW), and fire-managed and other conservation areas. However, recent work suggests that Florida bonneted bats do not use pinelands more than other land cover types (Bailey *et al.* 2017). In fact, Bailey *et al.* 2017 detected Florida bonneted bats in all land cover types investigated in their study (e.g., agricultural, developed, upland, and wetland). For the purposes of these consultation guidelines, we are focusing on the conservation of potential roosting habitats across the species' range. However, we also recognize the need for comprehensive consideration of foraging habitats, habitat connectivity, and long-term suitability.

Flight distances and home range sizes: Like most bats, Florida bonneted bats are colonial central-place foragers that exploit distant and scattered resources (Rainho and Palmeirim 2011). Morphological characteristics (narrow wings, high wing-aspect ratio) make *Eumops* spp. well-adapted for efficient, low-cost, swift, and prolonged flight in open areas (Findley *et al.* 1972, Norberg and Rayner 1987). Other *Eumops* including Underwood's mastiff bat (*Eumops underwoodi*), and Greater mastiff bat or Western mastiff bat (*Eumops perotis*) are known to forage and/or travel distances ranging from 6.2 miles to 62 miles from the roost with multiple studies documenting flight distances approximately 15- 18 miles from the roost (Tibbitts *et al.* 2002, Vaughn 1959 as cited in Best *et al.* 1996, Siders *et al.* 1999, Siders 2005, Vaughan 1959 as cited in Siders 2005.)

Like other *Eumops*, Florida bonneted bats are strong fliers, capable of travelling long distances (Belwood 1992). Recent Global Positioning System (GPS) and radio-telemetry data for Florida bonneted bats documents that they also move large distances and likely have large home ranges. Data from recovered GPS satellite tags on Florida bonneted bats tagged at Babcock-Webb Wildlife Management Area (WMA), found the maximum distance detected from a capture site was 24.2 mi (38.9 km); the greatest path length travelled in a single night was 56.3 mi (90.6 km) (Ober 2016; Webb 2018a-b). Additional data collected during the month of December documented the mean maximum distance of Florida bonneted bats (n=8) with tags traveled from the roost was 9.5 mi (Webb 2018b). The Service recognizes that the movement information comes from only one site (Babcock-Webb WMA and vicinity), and data are from small numbers (n=20) of tagged individuals for only short periods of time (Webb 2018a-b). We expect that across the Florida bonneted bat's range differences in habitat quality, prey availability, and other factors will result in variable habitat use and home range sizes between locations. Foraging distances and home range sizes in high quality habitats are expected to be smaller while foraging distances and home range sizes in low quality habitat would be expected to be larger. Consequently, because Babcock-Webb WMA provides high quality roosting habitat, this movement data could represent the low end of individual flight distances from a roost.

Given the species' morphology and habits (e.g., central-place forager) and considering available movement data from other *Eumops* and Florida bonneted bats discussed above, we opted to use 15 miles (24 km) as a reasonable estimate of the distance Florida bonneted bats would be expected to travel from a roost on any given night. For the purposes of delineating a majority of the Consultation Area, we used available confirmed presence point location data and extended out 15 miles (24 km), with modifications for habitat features (as described above). As more movement data are obtained and made available, this distance estimate may change in the future.

Occupancy model – Research by Bailey *et al.* (2017) indicates the species' range is larger than previously known. Their model performed well across a large portion of the previously known

range when considering confirmed Florid bonneted bat locations; thus it is anticipated to be useful where limited information is available for the species.

We used the model output from Bailey *et al.* (2017) to more closely examine areas where we are data-deficient (*i.e.*, areas where survey information is particularly lacking). We considered 0.27 probability of occurrence a filter for high likelihood of occurrence because 0.27 was the model output for Babcock-Webb WMA, an area where Florida bonneted bats are known to occupy and heavily use. Large portions of Sarasota, Martin, and Palm Beach counties were identified as having probability of occurrence of 0.27. The consultation area should include areas where the species has a high likelihood of occurring. Based on this reasoned approach, all of Sarasota County, portions of Martin County, and greater parts of Palm Beach County were included in the Consultation Area.

We recognize that there are areas in the northern portion of the range where the model is less successful predicting occurrence based on the known Florida bonneted bat locations (*i.e.*, the model predicts low likelihood of occurrence on Avon Park Air Force range, where the species is known to roost). Consequently, the Service is proactively working with partners to conduct surveys in the areas added based on the model to confirm that inclusion of these portions of the aforementioned counties is appropriate. The Consultation Area may be adjusted based on changes in this information.

Literature Cited -Appendix A

- Bailey, A.M., H.K. Ober, A.R. Sovie, and R.A. McCleery. 2017. Impact of land use and climate on the distribution of the endangered Florida bonneted bat. *Journal of Mammalogy*. 98:1586-1593.
- Belwood, J.J. 1992. Florida mastiff bat *Eumops glaucinus floridanus*. Pages 216-223 in S.R. Humphrey (ed.), *Rare and Endangered Biota of Florida*. Vol. I. Mammals. University Press of Florida. Gainesville, Florida.
- Best, T.L., Kiser, W.M., and P.W. Freeman. 1996. *Eumops perotis*. *Mammalogy Papers: University of Nebraska State Museum*. Lincoln.
- Braun de Torrez, E.C. 2018c. Presentation given at Florida bonneted bat working group meeting at The Conservancy of Southwest Florida. Florida Fish and Wildlife Research Institute, Florida Fish and Wildlife Conservation Commission. Gainesville, Florida. May 23, 2016.
- Findley, J.S., E.H. Studier, and D.E. Wilson. 1972. Morphologic properties of bat wings. *Journal of Mammalogy* 53(3): 429-444.
- Norberg, U.M. and J.M.V. Rayner. 1987. Ecological morphology and flight in bats (Mammalia; Chiroptera): wing adaptations, flight performance, foraging strategy and echolocation. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences* 316(1179):335-427.
- Ober, H. 2016. Annual report to USFWS for calendar year 2016. Permit number TE23583B-1. University of Florida, Department of Wildlife Ecology and Conservation, North Florida Research and Education Center. Quincy, Florida.
- Ober, H.K., R.A. McCleery, and E.C. Braun de Torrez. 2018. Managing with fire to promote the recently listed Florida bonneted bat, *Eumops floridanus*. Final report. JFSP Project ID: 14-1-05-7. University of Florida, Department of Wildlife Ecology and Conservation. Gainesville, Florida.
- Rainho, A., and J.M. Palmeirim. 2011. The importance of distance to resources in the spatial modelling of bat foraging habitat. *PLoS ONE* 6(4): e19227.
- Siders, M. 2005. *Eumops perotis*, Western mastiff bat. Western Bat Working Group. Species Accounts. Updated at the 2005 Portland Biennial Meeting.
http://www.wbwg.org/species_accounts
- Siders, M. S., Rabe, M. J., Snow, T. K., and K. Yasuda. 1999. Long foraging distances in two uncommon bat species (*Euderma maculatum* and *Eumops perotis*) in northern Arizona. In *Proceedings of the Fourth Biennial Conference of Research on the Colorado Plateau*. US Geological Survey, Flagstaff, AZ, Vol. 4.
- Tibbitts, T., A. Pate, Y. Petryszyn, and B. Barns. 2002. Determining foraging and roosting areas

for Underwood's mastiff bat (*Eumops underwoodi*) using radiotelemetry, at Organ Pipe Cactus National Monument, Arizona. Final summary report, year two – December 2002. Organ Pipe Cactus National Monument. Ajo, Arizona.

Webb, E.N. 2018a. Email to Paula Halupa *et al.* University of Florida, Department of Wildlife Ecology and Conservation. Gainesville, Florida. April 1, 2018.

Webb, E.N. 2018b. Presentation given at Florida bonneted bat working group meeting at The Conservancy of Southwest Florida. University of Florida, Department of Wildlife Ecology and Conservation. Gainesville, Florida. May 24, 2016.

Appendix B: Full Acoustic / Roost Survey Framework

Purpose: The purpose of this survey is to: (1) determine if Florida bonneted bats are likely to be actively roosting or using the site; (2) locate active roost(s) and avoid the loss of the structure, if possible; and, (3) avoid or minimize the take of individuals. In some cases, changes in project designs or activities can help avoid and minimize take. For example, project proponents may be able to retain suspected roosts or conserve roosting and foraging habitats. Changing the timing or nature of activities can also help reduce the losses of non-volant young or effects to pregnant or lactating females. If properly conducted, acoustic surveys are the most effective way to determine presence and assess habitat use. If the applicant is unable to follow or does not want to follow the Full Acoustic/Roost Survey framework when recommended according to the Key, the Corps (or other Action Agency) will not be able to use these Guidelines and will need to provide a biologically supported rationale using the best available information for their determination in their request for consultation.

General Description: This is a *comprehensive survey effort*, and robust acoustic surveys (*i.e.*, surveys conducted 30 minutes prior to sunset to 30 minutes after sunrise, over multiple nights) are a fundamental component of the approach. Depending upon acoustic results and habitat type, it may also include: observations at emergence (*e.g.*, emergence surveys during which observers look and listen for bats to come out of roost structures around sunset), visual inspection of trees/snags (*i.e.*, those with cavities, hollows, and loose bark) and other roost structures with tree-top cameras, or follow-up targeted acoustic surveys. Methods are dependent upon composition and configuration of project site and willingness and ability of applicant and partners to conserve roosting and foraging habitats on site.

General Survey Protocol:

[Note: The Service will provide more information in separate detailed survey protocols in the near future. This will include specific information on: detector types, placement, orientation, verification of proper functioning, analysis, reporting requirements, etc.]

- Approach is intended for project sites > 5 acres (2 hectares).
- For sites containing roosting habitat, acoustic surveys should primarily focus on assessing roosting habitat within the project site that will be lost or modified (*i.e.*, areas that will not be conserved), and locations on the property within 250 feet (76.2 meters) of areas that will not be conserved. This will help avoid or minimize the loss of an active roost and individuals. Secondly, since part of the purpose is to determine if Florida bonneted bats are using the site, acoustic devices should also be placed near open water and wetlands to maximize chances of detection and aid in assessing foraging habitat that may be lost.
- For sites that do not contain ANY roosting habitat, but do contain foraging habitat (see Figure 3 - Consultation Flowchart and Key, Step 2 [no], Step 13 [yes]), efforts should focus on assessing foraging habitat within the project site that will be lost or modified (*i.e.*, areas that will not be conserved).
- Acoustic surveys should be performed by those who are trained and experienced in setting up, operating, and maintaining acoustic equipment; and retrieving, saving,

analyzing, and interpreting data. Surveyors should have completed one or more of the available bat acoustic courses/workshops, or be able to show similar on-the-job or academic experience (Service 2018).

- Due to the variation in the quality of recordings, the influence of clutter, the changing performances of software packages over time, and other factors, manual verification is recommended (Loeb *et al.* 2015). Files that are identified to species from auto-ID programs must be visually reviewed and manually verified by experienced personnel.
- Acoustic devices should be set up to record from 30 minutes prior to sunset to 30 minutes after sunrise for multiple nights, under suitable weather conditions.
- Acoustic surveys can be conducted any time of year as long as weather conditions meet the criteria. If any of the following weather conditions exist at a survey site during acoustic sampling, note the time and duration of such conditions, and repeat the acoustic sampling effort for that night: (a) temperatures fall below 65°F (18.3°C) during the first 5 hours of survey period; (b) precipitation, including rain and/or fog, that exceeds 30 minutes or continues intermittently during the first 5 hours of the survey period; and (c) sustained wind speeds greater than 9 miles/hour (4 meters/second; 3 on Beaufort scale) for 30 minutes or more during the first 5 hours of the survey period (Service 2018). At a minimum, nightly weather conditions for survey sites should be checked using the nearest NOAA National Weather Service station and summarized in the survey reports. Although not required at this time, it has been demonstrated that conducting surveys on warm nights late in the spring can help maximize detection probabilities (Ober *et al.* 2016; Bailey *et al.* 2017).
- Acoustic devices should be calibrated and properly placed. Microphones should be directed away from surrounding vegetation, not beneath tree canopy, away from electrical wires and transmission lines, away from echo-producing surfaces, and away from external noises. Directional microphones should be aimed to sample the majority of the flight path/zone. Omnidirectional microphones should be deployed on a pole in the center of the flight path/zone and oriented horizontally. For monitoring possible roost sites, microphones should be directed to maximize likelihood of detection.
- To standardize recordings, acoustic device recordings should have a 2-second trigger window and a maximum file length of 15 seconds.
- The number of acoustic survey sites and nights needed for the assessment is dependent upon the overall acreage of suitable habitat proposed to be impacted by the action.
 - For non-linear projects, a minimum of 16 detector nights per 20 acres of suitable habitat expected to be impacted is recommended.
 - For linear projects (*e.g.*, roadways, transmission lines), a minimum of five detector nights per 0.6 mi (0.97 km) is recommended. Detectors can be moved to multiple locations within each kilometer surveyed, but must remain in a single location throughout any given night.
 - For any site, and in particular for sites > 250 acres, please contact the Service to assist in designing an appropriate approach.
- If results of acoustic surveys show **high Florida bonneted bat activity** or **Florida bonneted bat roosting likely** (*e.g.*, high activity early in the evening) (see definitions in Glossary), follow-up methods such as emergence surveys, visual inspection of the roosting structures, or follow-up acoustic surveys are recommended to locate potential roosts. Using a combination of methods may be helpful.

- For bat emergence surveys, multiple observers should be stationed at potential roosts if weather conditions (as above) are suitable. Surveyors should be quietly stationed 30 minutes before sunset so they are ready to look and listen for emerging FBBs from sunset to 1½ hours after sunset. When conducting emergence surveys it is best to orient observers so that the roost is silhouetted in the remaining daylight; facing west can help maximize the ability to notice movement of animals out of a roost structure.
- Visual inspection of trees with cavities and loose bark during the day may be helpful. Active RCW trees should not be visually inspected during the RCW breeding season (April 15 through June 15).
- Visual inspection alone is not recommended due to the potential for roosts to be too high for cameras to reach, too small for cameras to fit, or shaped in a way that contents are out of view (Braun de Torrez *et al.* 2016).
- If roosting is suspected on site, use tree-top cameras during the day to search those trees/snags or other structures that have potential roost features (*i.e.*, cavities, hollows, crevices, or other structure for permanent shelter). If unsuccessful (*e.g.*, cannot see entire contents within a given cavity, cannot reach cavity, cannot see full extent of cavity) OR occupied roosts are found with the tree-top camera within the area in which high Florida bonneted bat activity/likely Florida bonneted bats roosting were identified, we recommend emergence surveys and/or acoustics to verify occupancy and/or identify bat species.
- Provide report showing effort, methods, weather conditions, findings, and summary of acoustic data relating to Florida bonneted bats (*e.g.*, # of calls, time of calls, and station number) organized by the date on which the data were collected. Sonograms of all calls with signatures at or below 20kHz shall be included in the report. The report shall be provided to the Corps project manager assigned to the project for which the survey was conducted and to the Service via the email address verobeach@fws.gov. **Raw acoustic data should be provided to the Service for all surveys. Raw acoustic data should be provided as “all raw data” and “all raw data with signatures at or below 20kHz”. Data can be submitted to the Service via flash drive, memory stick, or hard drive. Data can be submitted digitally to verobeach@fws.gov or via mail to U.S. Fish and Wildlife Service, Attn: Florida bonneted bat data manager, 1339 20th Street, Vero Beach, Florida 32960.**
- Negative surveys are valid for 1 year after completion of the survey.

If you have comments, or suggestions on this survey protocols, please email your comments to FBBguidelines@fws.gov. These comments will be reviewed and incorporated in an annual review.

Literature Cited – Appendix B

- Bailey, A.M., H.K. Ober, A.R. Sovie, and R.A. McCleery. 2017. Impact of land use and climate on the distribution of the endangered Florida bonneted bat. *Journal of Mammalogy*. 98:1586-1593.
- Braun de Torrez, E.C., H.K. Ober, and R.A. McCleery. 2016. Use of a multi-tactic approach to locate and endangered Florida bonneted bat roost. *Southeastern Naturalist* 15(2):235-242.
- Loeb, S.C., T.J. Rodhouse, L.E. Ellison, C.L. Lausen, J.D. Reichard, K.M. Irvine, T.E. Ingersoll, J.T.H. Coleman, W.E. Thogmartin, J.R. Sauer, C.M. Francis, M.L. Bayless, T.R. Stanley, and D.H. Johnson. 2015. A plan for the North American bat monitoring program (NABat). United States Department of Agriculture. Forest Service. Research & Development, Southern Research Station. General Technical Report SRS-208.
- Ober, H.K., E.C. Braun de Torrez, J.A. Gore, A.M. Bailey, J.K. Myers, K.N. Smith, and R.A. McCleery. 2016. Social organization of an endangered subtropical species, *Eumops floridanus*, the Florida bonneted bat. *Mammalia* 2016:1-9.
- U.S. Fish and Wildlife Service. 2018. Range-wide Indiana bat survey guidelines. <https://www.fws.gov/midwest/endangered/mammals/inba/surveys/pdf/2018RangewideIBatSurveyGuidelines.pdf>

Appendix C: Limited Roost Survey Framework

Purpose: The purpose of this survey is to: (1) determine if Florida bonneted bats are likely to be actively roosting within suitable structures on-site; (2) locate active roost(s) and avoid the loss of the structure, if possible; and, (3) avoid or minimize the take of individuals. In some cases, changes in project designs or activities can help avoid and minimize take. For example, applicants and partners may be able to retain the suspected roosts or conserve roosting and foraging habitats. Changing the timing of activities can also help reduce the losses of non-volant young or effects to pregnant or lactating females.

General Description: This is a *reduced survey effort* that may include the following methods: visual inspection of trees/snags (*i.e.*, those with cavities, hollows, and loose bark) and other roost structures with tree-top cameras, observations at emergence (*e.g.*, emergence surveys during which observers look and listen for bats to come out of roost structures around sunset), acoustic surveys, or a combination of these methods. Methods are fairly flexible and dependent upon composition and configuration of project site and willingness and ability of applicant and partners to conserve roosting habitat on site.

General Survey Protocol:

[Note: The Service will provide more information in separate, detailed survey protocols in the near future. This will include specific information on: detector types, placement, orientation, verification of proper functioning, analysis, reporting requirements, etc.]

- Approach is **intended only for small project sites** (*i.e.*, sites ≤ 5 acres [2 hectares]).
- Efforts should focus on assessing potential roosting structures within the project site that will be lost or modified (*i.e.*, areas that will not be conserved), or are located on the property within 250 feet (76.2 meters) of areas that will not be conserved.

Identification of potential roost structures

- This step is necessary prior to any of the methods that follow.
- Run line transects through roosting habitat close enough that all trees and snags are easily inspected. Transect spacing will vary with habitat structure and season from a maximum of 91 m (300 ft) between transects in very open pine stands to 46 m (150 ft) or less in areas with dense mid-story. Transects should be oriented north to south, to optimize cavity detectability because many RCW cavity entrances are oriented in a westerly direction (Service 2004).
- Visually inspect all trees and snags or other structures for evidence of cavities, hollows, crevices that can be used for permanent shelter. Using binoculars, examine structures for cavities, loose bark, hollows, or other crevices that are large enough for Florida bonneted bats (diameter of opening $>$ or $=$ to 1 inch (2.5 cm) (Braun de Torrez *et al.* 2016).
- When potential roosting structures are found, record their location in the field using a Global Positioning System (GPS) unit.

Visual Inspection of trees and snags with tree-top cameras

- Visually inspect all cavities using a video probe (peeper) and assess the cavity contents.

Active RCW trees should not be visually inspected during the RCW breeding season (April 15 through June 15).

- Visual inspection alone is valid only when the entire cavity is observed and the contents can be identified. Typically, acoustics at emergence will also be needed to definitively identify bat species, if bats are present or suspected.
- If bats are suspected, or if contents cannot be determined, or if the entire cavity cannot be observed with the video probe; follow methods for an Acoustic Survey or an Emergence Survey (below). If the Corps (or other action agency) or applicant does not wish to conduct acoustic or emergence surveys, the Corps (or other action agency) cannot use the key and must request formal consultation with the Service.
- Record tree species or type of cavity structure, tree diameter and height, cavity height, cavity orientation and cavity contents.

Emergence Surveys

- For bat emergence surveys, multiple observers should be stationed at potential roosts if weather conditions (as described below in Acoustic Surveys) are suitable.
- Surveyors should be quietly stationed 30 minutes prior to sunset so they are ready to look and listen for emerging Florida bonneted bats from sunset to 1½ hours after sunset.
- When conducting emergence surveys it is best to orient observers so that the roost is silhouetted in the remaining daylight; facing west can help maximize the ability to notice movement of animals out of a roost structure.
- Record number of bats that emerged, the time of emergence, and if bat calls were heard.

Acoustic surveys

- Acoustic surveys should be performed by those who are trained and experienced in setting up, operating, and maintaining acoustic equipment; and retrieving, saving, analyzing, and interpreting data. Surveyors should have completed one or more of the available bat acoustic courses/workshops, or be able to show similar on-the-job or academic experience (Service 2018).
- Due to the variation in the quality of recordings, the influence of clutter, and the changing performances of software packages over time, and other factors, manual verification is recommended (Loeb *et al.* 2015). Files that are identified to species from auto-ID programs must be visually reviewed and manually verified by experienced personnel.
- Acoustic devices should be set up to record from 30 minutes prior to sunset to 30 minutes after sunrise for multiple nights, under suitable weather conditions.
- Acoustic surveys can be conducted any time of year as long as weather conditions meet the criteria. If any of the following weather conditions exist at a survey site during acoustic sampling, note the time and duration of such conditions, and repeat the acoustic sampling effort for that night: (a) temperatures fall below 65°F (18.3°C) during the first 5 hours of survey period; (b) precipitation, including rain and/or fog, that exceeds 30 minutes or continues intermittently during the first 5 hours of the survey period; and (c) sustained wind speeds greater than 9 miles/hour (4 meters/second; 3 on Beaufort scale) for 30 minutes or more during the first 5 hours of the survey period (Service 2018). At a minimum, nightly weather conditions for survey sites should be checked using the nearest NOAA National Weather Service station and summarized in the survey reports. Although not required at this time, it has been demonstrated that conducting surveys on

warm nights late in the spring can help maximize detection probabilities (Ober *et al.* 2016; Bailey *et al.* 2017).

- Acoustic devices should be calibrated and properly placed. Microphones should be directed away from surrounding vegetation, not beneath tree canopy, away from electrical wires and transmission lines, away from echo-producing surfaces, and away from external noises. Directional microphones should be aimed to sample the majority of the flight path/zone. Omnidirectional microphones should be deployed on a pole in the center of the flight path/zone and oriented horizontally. For monitoring possible roost sites, microphones should be directed to maximize likelihood of detection.
- To standardize recordings, acoustic device recordings should have a 2-second trigger window and a maximum file length of 15 seconds.
- Acoustic surveys should be conducted over a minimum of four nights.
- If acoustic devices cannot be left in place for the entire night for multiple nights as above, then a combination of short acoustic surveys (from sunset and extending for 1½ hours), stationed observers for emergence surveys or visual inspection of trees/snags with tree-top cameras may be acceptable. Contact the Service for guidance under this circumstance.

Reporting

- Provide report showing effort, methods, weather conditions, findings, and summary of acoustic data relating to Florida bonneted bat by date (*e.g.*, # of calls, time of calls). Sonograms of all calls with signatures at or below 20kHz shall be included in the report. The report shall be provided to the Corps project manager assigned to the project for which the survey was conducted and to the Service via the email address **verobeach@fws.gov**. **Raw acoustic data should be provided to the Service for all surveys. Raw acoustic data should be provided as “all raw data” and “all raw data with signatures at or below 20kHz”. Data can be submitted to the Service via flash drive, memory stick, or hard drive. Data can be submitted digitally to verobeach@fws.gov or via mail to U.S. Fish and Wildlife Service, Attn: Florida bonneted bat data manager, 1339 20th Street, Vero Beach, Florida 32960.**
- Negative surveys are valid for 1 year after completion of the survey

If you have comments, or suggestions on this survey protocols, please email your comments to FBBguidelines@fws.gov. These comments will be reviewed and incorporated in an annual review.

Literature Cited – Appendix C

- Bailey, A.M., H.K. Ober, A.R. Sovie, and R.A. McCleery. 2017. Impact of land use and climate on the distribution of the endangered Florida bonneted bat. *Journal of Mammalogy*. 98:1586-1593.
- Braun de Torrez, E.C., H.K. Ober, and R.A. McCleery. 2016. Use of a multi-tactic approach to locate and endangered Florida bonneted bat roost. *Southeastern Naturalist* 15(2):235-242.
- Loeb, S.C., T.J. Rodhouse, L.E. Ellison, C.L. Lausen, J.D. Reichard, K.M. Irvine, T.E. Ingersoll, J.T.H. Coleman, W.E. Thogmartin, J.R. Sauer, C.M. Francis, M.L. Bayless, T.R. Stanley, and D.H. Johnson. 2015. A plan for the North American bat monitoring program (NABat). United States Department of Agriculture. Forest Service. Research & Development, Southern Research Station. General Technical Report SRS-208.
- Ober, H.K., E.C. Braun de Torrez, J.A. Gore, A.M. Bailey, J.K. Myers, K.N. Smith, and R.A. McCleery. 2016. Social organization of an endangered subtropical species, *Eumops floridanus*, the Florida bonneted bat. *Mammalia* 2016:1-9.
- U.S. Fish and Wildlife Service. 2004. South Florida Ecological Services Office DRAFT July 12, 2004 Species Conservation Guidelines South Florida Red-cockaded Woodpecker. Appendix A. Red-cockaded Woodpecker South Florida Survey Protocol. July 12, 2004. South Florida Ecological Service Office, Vero Beach Florida.
<https://www.fws.gov/verobeach/BirdsPDFs/200407SlopesCompleteRedCockadedWoodpecker.pdf>
- U.S. Fish and Wildlife Service. 2018. Range-wide Indiana bat survey guidelines.
<https://www.fws.gov/midwest/endangered/mammals/inba/surveys/pdf/2018RangewideIBatSurveyGuidelines.pdf>

Appendix D: Best Management Practices (BMPs) for Development Projects

Ongoing research and monitoring will continue to increase the understanding of the Florida bonneted bat and its habitat needs and will continue to inform habitat and species management recommendations. These BMPs incorporate what is known about the species and also include recommendations that are beneficial to all bat species in Florida. These BMPs are intended to provide recommendations for improving conditions for use by Florida bonneted bats, and to help conserve Florida bonneted bats that may be foraging or roosting in an area.

The BMPs required to reach a “may affect, but is not likely to adversely affect” (MANLAA) determination vary depending on the couplet from the Consultation Key used to reach that particular MANLAA. The requirements for each couplet are provided below followed by the list of BMPs. If the applicant is unable or does not want to do the required BMPs, then the Corps (or other Action Agency) will not be able to use this Guidance and formal consultation with the Service is required.

Couplet Number for MANLAA from Consultation Key	Required BMPs
4b	BMP number 1 if more than 3 months has occurred between the survey and start of the project, and any 3 BMPs out of BMPs 4 through 13
5b	BMP number 2, and any 3 BMPs out of BMPs 3 through 13
9b	BMPs number 2 and 3, and any 4 BMPs out of BMPs 5 through 13
11b	BMPs number 1 and 4, and any 4 BMPs out of BMPs 5 through 13
12b	BMP number 1, and any 3 BMPs out of BMPs 3 through 13
14b	Any 2 BMPs out of BMPs 3 through 13
15b	Any 3 BMPs out of BMPs 3 through 13
17b	Any 4 BMPs out of BMPs 3 through 13

BMPs for development, construction, and other general activities:

1. If potential roost trees or structures need to be removed, check cavities for bats within 30 days prior to removal of trees, snags, or structures. When possible, remove structure outside of breeding season (*e.g.*, January 1 – April 15). If evidence of use by any bat species is observed, discontinue removal efforts in that area and coordinate with the Service on how to proceed.
2. When using heavy equipment, establish a 250 foot (76 m) buffer around known or suspected roosts to limit disturbance to roosting bats.
3. For every 5 acres of impact, retain a minimum of 1.0 acre of native vegetation. If upland habitat is impacted, then upland habitat with native vegetation should be retained.
4. For every 5 acres of impact, retain a minimum of 0.25 acre of native vegetation. If upland habitat is impacted, then upland habitat with native vegetation should be retained..
5. Conserve open freshwater and wetland habitats to promote foraging opportunities and avoid impacting water quality. Created/restored habitat should be designed to replace the function of native habitat.

6. Conserve and/or enhance riparian habitat. A 50-ft (15.2 m) buffer is recommended around water bodies and stream edges. In cases where artificial water bodies (*i.e.*, stormwater ponds) are created, enhance edges with native plantings especially in cases in which wetland habitat was affected.
7. Avoid or limit widespread application of insecticides (*e.g.*, mosquito control, agricultural pest control) in areas where Florida bonneted bats are known or expected to forage or roost.
8. Conserve natural vegetation to promote insect diversity, availability, and abundance. For example, retain or restore 25% of the parcel in native contiguous vegetation.
9. Retain mature trees and snags that could provide roosting habitat. These may include live trees of various sizes and dead or dying trees with cavities, hollows, crevices, and loose bark. See “Roosting Habitat” in “Background” above.
10. Protect known Florida bonneted bat roost trees, snags or structures and trees or snags that have been historically used by Florida bonneted bats for roosting, even if not currently occupied, by retaining a 250 foot (76 m) disturbance buffer around the roost tree, snag, or structure to ensure that roost sites remain suitable for use in the future.
11. Avoid and minimize the use of artificial lighting, retain natural light conditions, and install wildlife friendly lighting (*i.e.*, downward facing and lowest lumens possible). Avoid permanent night-time lighting to the greatest extent practicable.
12. Incorporate engineering designs that discourage bats from using buildings or structures. If Florida bonneted bats take residence within a structure, contact the Service and Florida Fish and Wildlife Conservation Commission prior to attempting removal or when conducting maintenance activities on the structure.
13. Use or allow prescribed fire to promote foraging habitat.

Appendix E: Additional Best Management Practices (BMPs) for Land Management Projects

Ecological Land Management

The Service reviews and develops Ecological Land Management projects that use land management activities to restore and maintain native, natural communities that are beneficial to bats. These activities include prescribed fire, mechanical treatments to reduce vegetation densities, timber thinning to promote forest health, trail maintenance, and the treatment of exotic vegetation. The following BMPs provide recommendations for conserving Florida bonneted bat roosting and foraging habitat during ecological land management activities. The Service recommends incorporating these BMP into ecological land management plans.

If potential roost trees need to be removed, check cavities for bats prior to removal of trees or snags. If evidence of use by any bat species is observed, discontinue removal efforts in that area and coordinate with the Service on how to proceed.

Ecological Land Management BMPs:

- Protect potential roosting habitat during ecological land management activities, if feasible. Avoid removing trees or snags with cavities.
- Rake and/or manually clear vegetation around the base of known or suspected roost trees to remove fuel prior to prescribed burning.
- If possible, use ignition techniques such as spot fires or backing fire to limit the intensity of fire around the base of the tree or snag containing the roost. The purpose of this action is to prevent the known or suspected roost tree or snag from catching fire and also to attempt to limit the exposure of the roosting bats to heat and smoke. A 250-ft (76 m) buffer is recommended.
- If prescribed fire is being implemented to benefit Florida bonneted bats, Braun de Torrez et al. (2018) noted that fire in the dry/spring season could be most beneficial.
- When creating firebreaks or conducting fire-related mechanical treatment, mark and avoid any known or suspected bat roosts.
- When using heavy equipment, establish a buffer of 250 feet (76 m) around known roosts to limit disturbance to roosting bats.
- Establish forest management efforts to maintain tree species and size class diversity to ensure long-term supply of potential roost sites.
- For every 5 acres (2 hectares) of timber that is harvested, retain a clump of trees 1-2 acres (0.4 - 0.8 hectare) in size containing potential roost trees, especially pines and royal palms (live or dead). Additionally, large snags in open canopy should be preserved.

Literature Cited – Appendix E

Braun de Torrez, E.C., H.K. Ober, and R.A. McCleery. 2018. Activity of an Endangered Bat Increases Immediately Following Prescribed Fire. *The Journal of Wildlife Management*.



United States Department of the Interior

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



August 1, 2017

Donnie Kinard
U.S. Army Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32232-0019

Subject: Consultation Key for the Eastern Indigo Snake – Revised

Dear Mr. Kinard:

This letter revises and replaces the January 25, 2010, and August 13, 2013, letters to the U.S. Army Corps of Engineers (Corps) regarding the use of the eastern indigo snake programmatic effect determination key (Key) for projects occurring within the South Florida Ecological Service's Office (SFESO) jurisdiction. This revision supersedes all prior versions of the Key in the SFESO area. The purpose of this revision is to clarify portions of the previous keys based on questions we have been asked, specifically related to habitat and refugia used by eastern indigo snakes (*Drymarchon corais couperi*), in the southern portion of their range and within the jurisdiction of the SFESO. This Key is provided pursuant to the Service's authorities under the Endangered Species Act of 1973, as amended (Act) (87 Stat. 884; 16 U.S.C.1531 *et seq.*). This Key revision has been assigned Service Consultation Code: 41420-2009-I-0467-R001.

The purpose of this Key is to assist the Corps (or other Federal action agency) in making appropriate effects determinations for the eastern indigo snake under section 7 of the Act, and streamline informal consultation with the SFESO for the eastern indigo snake when the proposed action can be walked through the Key. The Key is a tool available to the Corps (or other Federal action agency) for the purposes of expediting section 7 consultations. There is no requirement to use the Key. There will be cases when the use of the Key is not appropriate. These include, but are not limited to: where project specific information is outside of the scope of the Key or instances where there is new biological information about the species. In these cases, we recommend the Corps (or other Federal action agency) initiates traditional consultation pursuant to section 7 of the Act, and identify that consultation is being requested outside of the Key.

This Key uses project size and home ranges of eastern indigo snakes as the basis for making determinations of "may affect, but is not likely to adversely affect" (NLAA) and "may affect, and is likely to adversely affect" (may affect). Suitable habitat for the eastern indigo snake consists of a mosaic of habitats types, most of which occur throughout South Florida. Information on home ranges for individuals is not available in specific habitats in South Florida. Therefore, the SFESO uses the information from a 26-year study conducted by Layne and Steiner (1996) at Archbold Biological Station, Lake Placid, Florida, as the best available

information. Layne and Steiner (1996) determined the average home range size for a female eastern indigo snake was 46 acres and 184 acres for a male.

Projects that would remove/destroy less than 25 acres of eastern indigo snake habitat are expected to result in the loss of a portion of an eastern indigo snakes home range that would not impair the ability of the individual to feed, breed, and shelter. Therefore, the Service finds that take would not be reasonably certain to occur due to habitat loss. However, these projects have the potential to injure or kill an eastern indigo snake if the individual is crushed by equipment during site preparation or other project aspects. The Service's *Standard Protection Measures for the Eastern Indigo Snake* (Service 2013 or most current version) and the excavation of underground refugia (where a snake could be buried, trapped and/or injured), when implemented, are designed to avoid these forms of take. Consequently, projects less than 25 acres that include the Service's *Standard Protection Measures for the Eastern Indigo Snake* (Service 2013 or most current version) and a commitment to excavate underground refugia as part of the proposed action would be expected to avoid take and thus, may affect, but are not likely to adversely affect the species.

If a proposed project would impact less than 25 acres of vegetated eastern indigo snake habitat (not urban/ human-altered) completely surrounded by urban development, and an eastern indigo snake has been observed on site, the Key should not be used. The Service recommends formal consultation for this situation because of the expected increased value of the vegetated habitat within the individual's home range.

Projects that would remove 25 acres or more of eastern indigo snake habitat could remove more than half of a female eastern indigo snakes home range. This loss of habitat within a home range would be expected to significantly impair the ability of that individual to feed, breed, and shelter. Therefore, the Service finds take through habitat loss would be reasonably certain to occur and formal consultation is appropriate. Furthermore, these projects have the potential to injure or kill an eastern indigo snake if the individual is crushed by equipment during site preparation or other project aspects. The Service's *Standard Protection Measures for the Eastern Indigo Snake* (Service 2013 or most current version) and the excavation of underground refugia (where a snake could be buried, trapped and/or injured), when implemented, are designed to avoid these forms of take.

Eastern indigo snakes use a variety of habitat and are difficult to detect. Therefore, site specific information on the land use, observations of eastern indigo snakes within the vicinity, as well as other factors, as appropriate, will all be considered by the Service when making a final recommendation on the appropriate effects determination and whether it is appropriate to conclude consultation with the Corps (or other Federal action agency) formally or informally for projects that will impact 25 acres or more of habitat. Accordingly, when the use of the Key results in a determination of "may affect," the Corps (or other Federal action agency) is advised that consultation may be concluded informally or formally, depending on the project specific effects to eastern indigo snakes. Technical assistance from the Service can assist you in making a determination prior to submitting a request for consultation. In circumstances where the Corps (or other Federal action agency) desires to proceed with a consultation request prior to receiving

additional technical assistance from the Service, we recommend the agency documents the biological rationale for their determination and proceed with a request accordingly.

If the use of the Key results in a determination of “no effect,” no further consultation is necessary with the SFESO. If the use of the Key results in a determination of “NLAA,” the SFESO concurs with this determination based on the rationale provide above, and no further consultation is necessary for the effects of the proposed action on the eastern indigo snake. For “no effect” or “NLAA” determinations, the Service recommends that the Corps (or other Federal action agency) documents the pathway used to reach your no effect or NLAA determination in the project record and proceed with other species analysis as warranted.

Eastern Indigo Snake Programmatic Effect Determination Key
Revised July 2017
South Florida Ecological Service Office

Scope of the Key

This Key should be used only in the review of permit applications for effects determinations for the eastern indigo snake (*Drymarchon corais couperi*) within the South Florida Ecological Service's Office (SFESO) area (Broward, Charlotte, Collier, De Soto, Glades, Hardee, Hendry, Highlands, Lee, Indian River, Martin, Miami-Dade, Monroe, Okeechobee, Osceola, Palm Beach, Polk, Sarasota, and St. Lucie Counties). There is no designated critical habitat for the eastern indigo snake.

This Key is subject to revision as the Corps (or other Federal action agency) and Service deem necessary and in particular whenever there is new information on eastern indigo snake biology and effects of proposed projects.

The Key is a tool available to the Corps (or other Federal action agency) for the purposes of expediting section 7 consultations. There is no requirement to use the Key. There will be cases when the use of the Key is not appropriate. These include, but are not limited to: where project specific information is outside of the scope of the Key or instances where there is new biological information about the species. In these cases, we recommend the Corps (or other Federal action agency) initiates traditional consultation pursuant to section 7 of the Act, and identify that consultation is being requested outside of the Key.

Habitat

Habitat use varies seasonally between upland and wetland areas, especially in the more northern parts of the species' range. In southern parts of their range eastern indigo snakes are habitat generalists which use most available habitat types. Movements between habitat types in northern areas of their range may relate to the need for thermal refugia (protection from cold and/or heat).

In northern areas of their range eastern indigo snakes prefer an interspersed of tortoise-inhabited sandhills and wetlands (Landers and Speake 1980). In these northern regions eastern indigo

snakes most often use forested areas rich with gopher tortoise burrows, hollowed root channels, hollow logs, or the burrows of rodents, armadillos, or land crabs as thermal refugia during cooler seasons (Lawler 1977; Moler 1985a; Layne and Steiner 1996). The eastern indigo snake in the northern region is typically classified as a longleaf pine savanna specialist because here, in the northern four-fifths of its range, the eastern indigo snake is typically only found in vicinity of xeric longleaf pine–turkey oak sandhills inhabited by the gopher tortoise (Means 2006).

In the milder climates of central and southern Florida, comprising the remaining one fifth of its range, thermal refugia such as those provided by gopher tortoise burrows may not be as critical to survival of indigo snakes. Consequently, eastern indigo snakes in these regions use a more diverse assemblage of habitats such as pine flatwoods, scrubby flatwoods, floodplain edges, sand ridges, dry glades, tropical hammocks, edges of freshwater marshes, muckland fields, coastal dunes, and xeric sandhill communities; with highest population concentrations of eastern indigo snakes occurring in the sandhill and pineland regions of northern and central Florida (Service 1999). Eastern indigo snakes have also been found on agricultural lands with close proximity to wetlands (Zeigler 2006).

In south Florida, agricultural sites (*e.g.*, sugar cane fields and citrus groves) are occupied by eastern indigo snakes. The use of sugarcane fields by eastern indigo snakes was first documented by Layne and Steiner in 1996. In these areas there is typically an abundance of wetland and upland ecotones (due to the presence of many ditches and canals), which support a diverse prey base for foraging. In fact, some speculate agricultural areas may actually have a higher density of eastern indigo snakes than natural communities due to the increased availability of prey. Gopher tortoise burrows are absent at these locations but there is an abundance of both natural and artificial refugia. Enge and Endries (2009) reporting on the status of the eastern indigo snake included sugarcane fields and citrus groves in a Global Information Systems (GIS)-base map of potential eastern indigo snake habitat. Numerous sightings of eastern indigo snakes within sugarcane fields have been reported within south Florida (Florida Fish and Wildlife Conservation Commission Indigo Snake Database [Enge 2017]). A recent study associated with the Comprehensive Everglades Restoration Plan (CERP) (A-1 FEB Project formerly A-1 Reservoir; Service code: 41420-2006-F-0477) documented eastern indigo snakes within sugarcane fields. The snakes used artificial habitats such as piles of limerock, construction debris, and pump stations. Recent studies also associated with the CERP at the C-44 Project (Service code: 41420-2009-FA-0314), and C-43 Project (Service code: 41420-2007-F-0589) documented eastern indigo snakes within citrus groves. The snakes used artificial habitats such as boards, sheets of tin, construction debris, pipes, drain pipes in abandoned buildings and septic tanks.

In extreme south Florida (*i.e.*, the Everglades and Florida Keys), eastern indigo snakes also utilize tropical hardwood hammocks, pine rocklands, freshwater marshes, abandoned agricultural land, coastal prairie, mangrove swamps, and human-altered habitats. Though eastern indigo snakes have been found in all available habitats of south Florida it is thought they prefer hammocks and pine forests since most observations occur there and use of these areas is disproportionate compared to the relatively small total area of these habitats (Steiner *et al.* 1983).

Even though thermal stress may not be a limiting factor throughout the year in south Florida, eastern indigo snakes still seek and use underground refugia. On the sandy central ridge of central Florida, eastern indigo snakes use gopher tortoise burrows more (62 percent) than other underground refugia (Layne and Steiner 1996). Other underground refugia used include armadillo (*Dasypus novemcinctus*) burrows near citrus groves, cotton rat (*Sigmodon hispidus*) burrows, and land crab (*Cardisoma guanhumi*) burrows in coastal areas (Layne and Steiner 1996; Wilson and Porras 1983). Natural ground holes, hollows at the base of trees or shrubs, ground litter, trash piles, and crevices of rock-lined ditch walls are also used (Layne and Steiner 1996). These refugia are used most frequently where tortoise burrows are not available, principally in low-lying areas off the central and coastal ridges.

Minimization Measures

The Service developed protection measures for the eastern indigo snake “Standard Protection Measures for the Eastern Indigo Snake” (Service 2013) located at:

https://www.fws.gov/verobeach/ReptilesPDFs/20130812_EIS%20Standard%20Protection%20Measures_final.pdf. These protection measures (or the most updated version) are considered a minimization measure for projects proposed within eastern indigo snake habitat.

Determinations

If the use of this Key results in a determination of “**no effect**,” no further consultation is necessary with the SFESO.

If the use of this Key results in a determination of “**NLAA**,” the SFESO concurs with this determination and no further consultation is necessary for the effects of the proposed action on the eastern indigo snake.

For no effect or NLAA determinations, the Corps (or other Federal action agency) should make a note in the project file indicating the pathway used to reach your no effect or NLAA determination.

If a proposed project would impact less than 25 acres of vegetated eastern indigo snake habitat (not urban/ human-altered) completely surrounded by urban development, and an eastern indigo snake has been observed on site, the subsequent Key should not be used. The Service recommends formal consultation for this situation because of the expected increased value of the vegetated habitat within the individual’s home range.

If the use of this Key results in a determination of “**may affect**,” consultation may be concluded informally or formally depending on project effects to eastern indigo snakes. Technical assistance from the Service can assist you in making a determination prior to submitting a request for consultation. In circumstances where the Corps desires to proceed with a consultation request prior to receiving additional technical assistance from the Service, we recommend the Corps document the biological rationale for their determination and proceed with a request accordingly.

- A. Project is not located in open water or salt marsh.....go to B
 Project is located solely in open water or salt marsh.....**no effect**
- B. Permit will be conditioned for use of the Service's most current guidance for Standard Protection Measures For The Eastern Indigo Snake (currently 2013) during site preparation and project construction.....go to C
 Permit will not be conditioned as above for the eastern indigo snake, or it is not known whether an applicant intends to use these measures and consultation with the Service is requested.....**may affect**
- C. The project will impact less than 25 acres of eastern indigo snake habitat (*e.g.*, sandhill, scrub, pine flatwoods, pine rocklands, scrubby flatwoods, high pine, dry prairie, coastal prairie, mangrove swamps, tropical hardwood hammocks, hydric hammocks, edges of freshwater marshes, agricultural fields [including sugar cane fields and active, inactive, or abandoned citrus groves], and coastal dunes).....go to D
 The project will impact 25 acres or more of eastern indigo snake habitat (*e.g.*, sandhill, scrub, pine flatwoods, pine rocklands, scrubby flatwoods, high pine, dry prairie, coastal prairie, mangrove swamps, tropical hardwood hammocks, hydric hammocks, edges of freshwater marshes, agricultural fields [including sugar cane fields and active, inactive, or abandoned citrus groves], and coastal dunes).....**may affect**
- D. The project has no known holes, cavities, active or inactive gopher tortoise burrows, or other underground refugia where a snake could be buried, trapped and/or injured during project activities.....**NLAA**
 The project has known holes, cavities, active or inactive gopher tortoise burrows, or other underground refugia where a snake could be buried, trapped and /or injured.....go to E
- E. Any permit will be conditioned such that all gopher tortoise burrows, active or inactive, will be excavated prior to site manipulation in the vicinity of the burrow¹. If an eastern indigo snake is encountered, the snake must be allowed to vacate the area prior to additional site manipulation in the vicinity. Any permit will also be conditioned such that holes, cavities, and snake refugia other than gopher tortoise burrows will be inspected each morning before planned site manipulation of a particular area, and, if occupied by an eastern indigo snake, no work will commence until the snake has vacated the vicinity of proposed work.....**NLAA**²
 Permit will not be conditioned as outlined above.....**may affect**

End Key

¹ If excavating potentially occupied burrows, active or inactive, individuals must first obtain state authorization via a Florida Fish and Wildlife Conservation Commission Authorized Gopher Tortoise Agent permit. The excavation method selected should also minimize the potential for injury of an indigo snake. Applicants should follow the excavation guidance provided within the most current Gopher Tortoise Permitting Guidelines found at <http://myfwc.com/gophertortoise>.

² Please note, if the proposed project will impact less than 25 acres of vegetated eastern indigo snake habitat (not urban/ human-altered) completely surrounded by urban development, and an eastern indigo snake has been observed on site, NLAA is not the appropriate conclusion. The Service recommends formal consultation for this situation because of the expected increased value of the vegetated habitat within the individual's home range

Working with the Fish and Wildlife Foundation of Florida, the Service has established a fund to support conservation and recovery for the eastern indigo snake. Any project that has the potential to affect the eastern indigo snake and/or its habitat is encouraged to make a voluntary contribution to this fund. If you would like additional information about how to make a contribution and how these monies are used to support eastern indigo snake recovery please contact Ashleigh Blackford, Connie Cassler, or José Rivera at 772-562-3559.

This revised Key is effective immediately upon receipt by the Corps. Should circumstances change or new information become available regarding the eastern indigo snake and/or implementation of the Key, the determinations herein may be reconsidered and this Key further revised or amended.

Thank you for your continued cooperation in the effort to conserve fish and wildlife resources. If you have any questions or comments regarding this Key, please contact the SFESO at 772-562-3909.

Sincerely,



Roxanna Hinzman
Field Supervisor
South Florida Ecological Services

Cc:

Corps, Jacksonville, Florida (Dale Beter, Muriel Blaisdell, Ingrid Gilbert, Angela Ryan,
Irene Sadowski, Victoria White, Alisa Zarbo)
Service, Athens, Georgia (Michelle Elmore)
Service, Jacksonville, Florida (Annie Dziergowski)
Service, Panama City, Florida (Sean Blomquist)

LITERATURE CITED

- Enge K. M. 2017. Personal communication. Email from Kevin Enge, Florida Fish and Wildlife Conservation Commission, Gainesville, Florida to Steve Mortellaro, U.S. Fish and Wildlife Service, Vero Beach, Florida, July 5, 2017. Locations of Eastern Indigo Snake (*Drymarchon couperi*).
- Enge K. M. and M. J. Endries. 2009. Status of the Eastern Indigo Snake (*Drymarchon couperi*) in Florida. Southeast Partners in Amphibian and Reptile Conservation Meeting.
- Landers, J. L. and D.W. Speake. 1980. Management Needs of Sandhill Reptiles in Southern Georgia. Proceedings Annual Conference of Southeastern Association of Fish and Wildlife Agencies. 34: 515-529.
- Layne, J.N., and T.M. Steiner. 1996. Eastern indigo snake (*Drymarchon corais couperi*): summary of research conducted on Archbold Biological Station. Report prepared under Order 43910-6-0134 to the U.S. Fish and Wildlife Service; Jackson, Mississippi.
- Lawler, H.E. 1977. The status of *Drymarchon corais couperi* (Holbrook), the eastern indigo snake, in the southeastern U.S.A. *Herpetological Review* 8(3):76-79.
- Means, D. B. 2006. Vertebrate faunal diversity of longleaf pine ecosystems. In *The Longleaf Pine Ecosystem* pp. 157-213. Springer New York.
- Molar, P.E. 1985a. Distribution of the eastern indigo snake, *Drymarchon corais couperi*, in Florida. *Herpetological Review* 16(2):37-38.
- Moler, P.E. 1985b. Home range and seasonal activity of the eastern indigo snake, *Drymarchon corais couperi*, in northern Florida. Final performance report, Study E-1-06, III-A-5. Florida Game and Fresh Water Fish Commission; Tallahassee, Florida.
- Steiner, T.M., O.L. Bass, Jr., and J.A. Kushlan. 1983. Status of the eastern indigo snake in Southern Florida National Parks and vicinity. South Florida Research Center Report SFRC-83-01, Everglades National Park; Homestead, Florida.
- U.S. Fish and Wildlife Service (Service). 1999. South Florida multi-species recovery plan. 23 pp.
- U.S. Fish and Wildlife Service (Service). 2013. Standard Protection Measures for the Eastern Indigo Snake. August 12, 2013. U.S. Fish and Wildlife Service, South Florida Ecological Services Office; Vero Beach, Florida.
- Wilson, L.D. and L. Porras. 1983. The ecological impact of man on the south Florida herpetofauna. *University of Kansas Museum of Natural History Special Publication* 9:1-89.
- Zeigler, M. 2006. Personal communication. Citrus grove operations manager. Meeting with the U.S. Fish and Wildlife Service on August 1, 2006. Agricultural Resource Management; Vero Beach, Florida.

Appendix B

Caracara Key

SPECIES-SPECIFIC AVOIDANCE AND MINIMIZATION MEASURES

Audubon's Crested Caracara (*Caracara cheriway*)

If by using this key, a *may affect, not likely to adversely affect* determination is reached, then the U.S. Fish and Wildlife Service (USFWS) concurs with this determination and no additional consultation is needed. If a *may affect* determination is reached, then consultation (informal or formal) with the USFWS is needed to further assess potential impacts to Audubon's crested caracara from the project. A *no effect* determination does not require further consultation or concurrence. Definitions are provided below for terms used within this key.

Conduct a Habitat Assessment. If results indicate:

- A. Project within consultation area but will not affect suitable caracara habitat **No Effect**
 Project within consultation area and may affect suitable caracara habitat *Go to B*
- B. Project does not occur within a gathering area *Go to C*
 Project does occur within a gathering area **May Affect** (*consult with USFWS*)
- C. Suitable nesting habitat is not located in the project footprint or within 985 feet of the project footprint **May Affect, Not Likely to Adversely Affect**
 Suitable nesting habitat is located in the project footprint or within 985 feet of the project footprint *Go to D*
- D. The project will not result in the removal of a potential nest tree (defined as any tree $\geq$ 22 feet [7 meters] in height) **May Affect, Not Likely to Adversely Affect**
 The project will result in the removal of potential nest tree (defined as any tree $\geq$ 22 feet [7 meters] in height) *Conduct Abbreviated Survey* and Go to E*
- E. Results of caracara nest survey indicate that active caracara nests do not occur within the project footprint or within 985 feet of the project footprint **May Affect, Not Likely to Adversely Affect**
 Results of caracara nest survey indicate that active caracara nests do occur within the project footprint or within 985 feet of the project footprint **May Affect** (*consult with the USFWS*)

DEFINITIONS:

***Abbreviated survey:** Prior to work occurring in the months of January, February or March, within 985 feet of suitable nesting habitat, conduct a caracara nest survey. Surveys during the month of December are not valid. Schedule work such that surveys can be conducted before work begins. The survey will be conducted over two mornings each week for a total of two consecutive weeks (4 survey days total). Each survey will start 15 minutes before sunrise and last for 3 hours

total. Assuming the site is active, territorial occupancy and the nest tree itself will usually be confirmed by observations made after only three visits (Morrison, 2001). The abbreviated survey will:

- Use background research involving review of previous surveys conducted in the region, existing BO's and available GIS data.
- Be performed by Qualified Observers as defined by USFWS in conformance with Survey Design and Planning section of USFWS caracara survey protocol (USFWS, 2017).
- Survey stations for abbreviated surveys must generally be divided up along the corridor with the reviewer remaining stationary at each station for at least 45 minutes. Enough survey stations must be identified to cover all suitable habitats within the project boundary and 985 foot buffer. A survey station is defined as an area easily observable from one vantage point.
- Surveys should be conducted on days where weather conditions allow visibility across a large area (i.e., no rain, no fog) and wind is less than 12mph.

Foraging habitat: Improved pastures, newly plowed or burned fields, dairies, around dwelling and farm buildings, slaughterhouses, poultry houses and urban dumps; drainage ditches, small ponds and wetlands within improved pastures, drying marshes or stock ponds, shallow roadside and agriculture ditches; marshes associated with river oxbows; agriculture land (sod, cane field, citrus grove) to a lesser extent (Morrison, 2001).

Gathering areas: Communal roosts for juvenile caracaras in their first flight year. They may change from year-to-year but are known to occur in several general areas including floodplains and pasture lands along the Kissimmee River as well as other areas identified in Highlands and Glades counties (See Figure 1 in USFWS 2004). A KMZ file to show this area is also available on the OEM resources page at <https://www.fdot.gov/environment/protected-species-and-habitat>.

Nesting habitat: Open landscapes supporting single or small clumps of trees (e.g., cabbage palms, live oaks, cypress) surrounded by short ground vegetation with minimal to absent understory or shrub layers (Morrison 2001). Cabbage palms are generally favored as nest trees but other single, isolated trees or trees within a group of 3-10 may also be utilized. Characteristic nesting habitat includes large expanses of pastures, grasslands, and prairies.

References

- Morrison, J. L. 2001. Recommended management practices and survey protocols for Audubon's crested caracaras (*Caracara cheriway audubonii*) in Florida. Technical Report No. 18. Florida Fish and Wildlife Conservation Commission. Tallahassee, Florida.
- USFWS. 2003. Crested Caracara Consultation Area Map. South Florida Ecological Services Office. July 14, 2003. <https://www.fws.gov/verobeach/BirdsPDFs/CrestedCaracaraConsultationArea.pdf?spcode=A003>
- USFWS. 2004. Audubon's Crested Caracara Species Conservation Guidelines South Florida. South Florida Ecological Services Office. April 20, 2004. <https://www.fws.gov/verobeach/BirdsPDFs/2004SpeciesConservationGuidelinesCaracaraALLINCLUSIVE.pdf?spcode=A003>

USFWS. 2016. USFWS Crested Caracara Draft Survey Protocol – Additional Guidance (2016 – 2017 Breeding Season. South Florida Ecological Services Office.
https://www.fws.gov/verobeach/BirdsPDFs/20161209_CCsurveyprotocol.pdf

THE CORPS OF ENGINEERS, JACKSONVILLE DISTRICT, AND THE STATE OF FLORIDA EFFECT DETERMINATION KEY FOR THE MANATEE IN FLORIDA

April 2013

Purpose and background of the key

The purpose of this document is to provide guidance to improve the review of permit applications by U.S. Army Corps of Engineers' (Corps) Project Managers in the Regulatory Division regarding the potential effects of proposed projects on the endangered West Indian manatee (*Trichechus manatus*) in Florida, and by the Florida Department of Environmental Protection or its authorized designee or Water Management District, for evaluating projects under the State Programmatic General Permit (SPGP) or any other Programmatic General Permits that the Corps may issue for administration by the above agencies. Such guidance is contained in the following dichotomous key. The key applies to permit applications for in-water activities such as, but not limited to: (1) dredging [new or maintenance dredging of not more than 50,000 cubic yards], placement of fill material for shoreline stabilization, and construction/placement of other in-water structures as well as (2) construction of docks, marinas, boat ramps and associated trailer parking spaces, boat slips, dry storage or any other watercraft access structures or facilities.

At a certain step in the key, the user is referred to graphics depicting important manatee areas or areas with inadequate protection. The maps can be downloaded from the Corps' web page at <http://www.saj.usace.army.mil/Missions/Regulatory/SourceBook.aspx>. We intend to utilize the most recent depiction of these areas, so should these areas be modified by statute, rule, ordinance and/or other legal mandate or authorization, we will modify the graphical depictions accordingly. These areas may be shaded or otherwise differentiated for identification on the maps.

Explanatory footnotes are provided in the key and must be closely followed whenever encountered.

Scope of the key

This key should only be used in the review of permit applications for effect determinations on manatees and should not be used for other listed species or for other aquatic resources such as Essential Fish Habitat (EFH). Corps Project Managers should ensure that consideration of the project's effects on any other listed species and/or on EFH is performed independently. This key may be used to evaluate applications for all types of State of Florida (State Programmatic General Permits, noticed general permits, standard general permits, submerged lands leases, conceptual and individual permits) and Department of the Army (standard permits, letters of permission, nationwide permits, and regional general permits) permits and authorizations. The final effect determination will be based on the project location and description; the potential effects to manatees, manatee habitat, and/or manatee critical habitat; and any measures (such as project components, standard construction precautions, or special conditions included in the authorization) to avoid or minimize effects to manatees or manatee critical habitat. Projects that key to a "may affect" determination equate to "likely to adversely affect" situations, and those projects should not be processed under the SPGP or any other programmatic general permit. For

all “may affect” determinations, Corps Project Managers shall refer to the Manatee Programmatic Biological Opinion, dated March 21, 2011, for guidance on eliminating or minimizing potential adverse effects resulting from the proposed project. If unable to resolve the adverse effects, the Corps may refer the applicant to the U.S. Fish and Wildlife Service (Service) for further assistance in attempting to revise the proposed project to a “may affect, not likely to adversely affect” level. The Service will coordinate with the Florida Fish and Wildlife Conservation Commission (FWC) and the counties, as appropriate. Projects that provide new access for watercraft and key to “may affect, not likely to adversely affect” may or may not need to be reviewed individually by the Service.

MANATEE KEY
Florida¹
April 2013

The key is not designed to be used by the Corps' Regulatory Division for making their effect determinations for dredging projects greater than 50,000 cubic yards, the Corps' Planning Division in making their effect determinations for civil works projects or by the Corps' Regulatory Division for making their effect determinations for projects of the same relative scope as civil works projects. These types of activities must be evaluated by the Corps independently of the key.

- A. Project is not located in waters accessible to manatees and does not directly or indirectly affect manatees (see Glossary).....*No effect*
- Project is located in waters accessible to manatees **or** directly or indirectly affects manatees B
- B. Project consists of one or more of the following activities, all of which are *May affect*:
1. blasting or other detonation activity for channel deepening and/or widening, geotechnical surveys or exploration, bridge removal, movies, military shows, special events, etc.;
 2. installation of structures which could restrict or act as a barrier to manatees;
 3. new or changes to existing warm or fresh water discharges from industrial sites, power plants, or natural springs or artesian wells (but only if the new or proposed change in discharge requires a Corps permit to accomplish the work);
 4. installation of new culverts and/or maintenance or modification of existing culverts (where the culverts are 8 inches to 8 feet in diameter, ungrated and in waters accessible, or potentially accessible, to manatees)²;
 5. mechanical dredging from a floating platform, barge or structure³ that restricts manatee access to less than half the width of the waterway;
 6. creation of new slips or change in use of existing slips, even those located in a county with a State-approved Manatee Protection Plan (MPP) in place and the number of slips is less than the MPP threshold, to accommodate docking for repeat use vessels, (*e.g.*, water taxis, tour boats, gambling boats, etc; or slips or structures that are not civil works projects, but are frequently used to moor large vessels (>100') for shipping and/or freight purposes; does not include slips used for docking at boat sales or repair facilities or loading/unloading at dry stack storage facilities and boat ramps); [*Note*: For projects within Bay, Dixie, Escambia, Franklin, Gilchrist, Gulf, Hernando, Jefferson, Lafayette, Monroe (south of Craig Key), Nassau, Okaloosa, Okeechobee, Santa Rosa, Suwannee, Taylor, Wakulla or Walton County, the reviewer should proceed to Couplet C.]
 7. any type of in-water activity in a Warm Water Aggregation Area (WWAA) or No Entry Area (see Glossary and accompanying Maps⁴); [*Note*: For residential docking facilities in a Warm Water Aggregation Area that is not a Federal manatee sanctuary or No Entry Area, the reviewer should proceed to couplet C.]
 8. creation or expansion of canals, basins or other artificial shoreline and/or the connection of such features to navigable waters of the U.S.; [*Note*: For projects proposing a single residential dock, the reviewer should proceed to couplet C; otherwise, project is a *May Affect*.]

9. installation of temporary structures (docks, buoys, etc.) utilized for special events such as boat races, boat shows, military shows, etc., but only when consultation with the U.S. Coast Guard and FWS has not occurred; [Note: See programmatic consultation with the U.S. Coast Guard on manatees dated May 10, 2010.].
- Project is other than the activities listed above..... C
- C. Project is located in an Important Manatee Area (IMA) (see Glossary and accompanying Maps⁴) D
- Project is not located in an Important Manatee Area (IMA) (see Glossary and accompanying Maps⁴) G
- D. Project includes dredging of less than 50,000 cubic yards E
- Project does not include dredging G
- E. Project is for dredging a residential dock facility or is a land-based dredging operation..... N
- Project not as above..... F
- F. Project proponent **does not elect** to follow all dredging protocols described on the maps for the respective IMA in which the project is proposed *May affect*
- Project proponent **elects** to follow all dredging protocols described on the maps for the respective IMA in which the project is proposed G
- G. Project provides new⁵ access for watercraft, *e.g.*, docks or piers, marinas, boat ramps and associated trailer parking spaces, new dredging, boat lifts, pilings, floats, floating docks, floating vessel platforms, boat slips, dry storage, mooring buoys, or other watercraft access (residential boat lifts, pilings, floating docks, and floating vessel platforms installed in existing slips are not considered new access) or improvements allowing increased watercraft usage..... H
- Project does not provide new⁵ access for watercraft, *e.g.*, bulkheads, seawalls, riprap, maintenance dredging, boardwalks and/or the maintenance (repair or rehabilitation) of currently serviceable watercraft access structures provided all of the following are met: (1) the number of slips is not increased; (2) the number of existing slips is not in question; and (3) the improvements do not allow increased watercraft usage..... N
- H. Project is located in the Braden River Area of Inadequate Protection (Manatee County) (see Glossary and accompanying AIP Map⁴) *May affect*
- Project is not located in the Braden River Area of Inadequate Protection (Manatee County) (see Glossary and accompanying AIP Map⁴)..... I
- I. Project is for a multi-slip facility (see Glossary) J
- Project is for a residential dock facility or is for dredging (see Glossary)..... N
- J. Project is located in a county that currently has a State-approved MPP in place (BREVARD, BROWARD, CITRUS, CLAY, COLLIER, DUVAL, INDIAN RIVER, LEE, MARTIN, MIAMI-DADE, PALM BEACH, ST. LUCIE, SARASOTA, VOLUSIA) or shares contiguous waters with a county having a State-approved MPP in place (LAKE, MARION, SEMINOLE)⁶ K
- Project is located in a county not required to have a State-approved MPP L

- K. Project has been developed or modified to be consistent with the county's State-approved MPP **and** has been verified by a FWC review (or FWS review if project is exempt from State permitting) **or** the number of slips is below the MPP threshold N
- Project has not been reviewed by the FWC or FWS **or** has been reviewed by the FWC or FWS **and** determined that the project is not consistent with the county's State-approved MPP *May affect*
- L. Project is located in one of the following counties: CHARLOTTE, DESOTO⁷, FLAGLER, GLADES, HENDRY, HILLSBOROUGH, LEVY, MANATEE, MONROE⁷, PASCO⁷, PINELLAS M
- Project is located in one of the following counties: BAY, DIXIE, ESCAMBIA, FRANKLIN, GILCHRIST, GULF, HERNANDO, JEFFERSON, LAFAYETTE, MONROE (south of Craig Key), NASSAU, OKALOOSA, OKEECHOBEE, PUTNAM, SANTA ROSA, ST. JOHNS, SUWANNEE, TAYLOR, WAKULLA, WALTON N
- M. The number of slips does not exceed the residential dock density threshold (see Glossary) N
- The number of slips exceeds the residential dock density threshold (see Glossary) *May affect*
- N. Project impacts to submerged aquatic vegetation⁸, emergent vegetation or mangrove will have beneficial, insignificant, discountable⁹ or no effects on the manatee¹⁰ O
- Project impacts to submerged aquatic vegetation⁸, emergent vegetation or mangrove may adversely affect the manatee¹⁰ *May affect*
- O. Project proponent **elects** to follow standard manatee conditions for in-water work¹¹ and requirements, as appropriate for the proposed activity, prescribed on the maps⁴ P
- Project proponent **does not elect** to follow standard manatee conditions for in-water work¹¹ and appropriate requirements prescribed on the maps⁴ *May affect*
- P. If project is for a new or expanding⁵ multi-slip facility and is located in a county with a State-approved MPP in place **or** in Bay, Dixie, Escambia, Franklin, Gilchrist, Gulf, Hernando, Jefferson, Lafayette, Monroe (south of Craig Key), Nassau, Okaloosa, Okeechobee, Putnam, St. Johns, Santa Rosa, Suwannee, Taylor, Wakulla or Walton County, the determination of "*May affect, not likely to adversely affect*" is appropriate¹² and no further consultation with the Service is necessary.
- If project is for a new or expanding⁵ multi-slip facility and is located in Charlotte, Desoto, Flagler, Glades, Hendry, Hillsborough, Levy, Manatee, Monroe (north of Craig Key), Pasco, or Pinellas County, further consultation with the Service is necessary for "*May affect, not likely to adversely affect*" determinations.
- If project is for repair or rehabilitation of a multi-slip facility and is located in an Important Manatee Area, further consultation with the Service is necessary for "*May affect, not likely to adversely affect*" determinations. If project is for repair or rehabilitation of a multi-slip facility and: (1) is not located in an Important Manatee Area; (2) the number of slips is not increased; (3) the number of existing slips is not in question; and (4) the improvements to the existing watercraft access structures do not allow increased watercraft usage, the determination of "*May affect, not likely to adversely affect*" is appropriate¹² and no further consultation with the Service is necessary.
- If project is a residential dock facility, shoreline stabilization, or dredging, the determination of "*May affect, not likely to adversely affect*" is appropriate¹² and no further consultation with the Service is necessary. **Note:** For residential dock facilities located in a Warm Water Aggregation Area or in a No Entry area, seasonal restrictions may apply. See footnote 4 below for maps showing restrictions.
- If project is other than repair or rehabilitation of a multi-slip facility, a new⁵ multi-slip facility, residential dock facility, shoreline stabilization, or dredging, and does not provide new⁵ access for watercraft or

improve an existing access to allow increased watercraft usage, the determination of “*May affect, not likely to adversely affect*” is appropriate¹² and no further consultation with the Service is necessary.

¹ On the St. Mary’s River, this key is only applicable to those areas that are within the geographical limits of the State of Florida.

² All culverts 8 inches to 8 feet in diameter must be grated to prevent manatee entrapment. To effectively prevent manatee access, grates must be permanently fixed, spaced a maximum of 8 inches apart (may be less for culverts smaller than 16 inches in diameter) and may be installed diagonally, horizontally or vertically. For new culverts, grates must be attached prior to installation of the culverts. Culverts less than 8 inches or greater than 8 feet in diameter are exempt from this requirement. If new culverts and/or the maintenance or modification of existing culverts are grated as described above, the determination of “*May affect, not likely to adversely affect*” is appropriate¹¹ and no further consultation with the Service is necessary.

³ If the project proponent agrees to follow the standard manatee conditions for in-water work as well as any special conditions appropriate for the proposed activity, further consultation with the Service is necessary for “*May affect, not likely to adversely affect*” determinations. These special conditions may include, but are not limited to, the use of dedicated observers (see Glossary for definition of dedicated observers), dredging during specific months (warm weather months vs cold weather months), dredging during daylight hours only, adjusting the number of dredging days, does not preclude or discourage manatee egress/ingress with turbidity curtains or other barriers that span the width of the waterway, etc.

⁴ Areas of Inadequate Protection (AIPs), Important Manatee Areas (IMAs), Warm Water Aggregation Areas (WWAAs) and No Entry Areas are identified on these maps and defined in the Glossary for the purposes of this key. These maps can be viewed on the [Corps’ web page](#). If projects are located in a No Entry Area, special permits may be required from FWC in order to access these areas (please refer to Chapter 68C-22 F.A.C. for boundaries; maps are also available at [FWC’s web page](#)).

⁵ New access for watercraft is the addition or improvement of structures such as, but not limited to, docks or piers, marinas, boat ramps and associated trailer parking spaces, boat lifts, pilings, floats, floating docks, floating vessel platforms, (maintenance dredging, residential boat lifts, pilings, floating docks, and floating vessel platforms installed in existing slips are not considered new access), boat slips, dry storage, mooring buoys, new dredging, etc., that facilitates the addition of watercraft to, and/or increases watercraft usage in, waters accessible to manatees. The repair or rehabilitation of any type of currently serviceable watercraft access structure is not considered new access provided all of the following are met: (1) the number of slips is not increased; (2) the number of existing slips is not in question; and (3) the improvements to the existing watercraft access structures do not result in increased watercraft usage.

⁶ Projects proposed within the St. Johns River portion of Lake, Marion, and Seminole counties and contiguous with Volusia County shall be evaluated using the Volusia County MPP.

⁷ For projects proposed within the following areas: the Peace River in DeSoto County; all areas north of Craig Key in Monroe County, and the Anclote and Pithlachascotee Rivers in Pasco County, proceed to Couplet M. For all other locations in DeSoto, Monroe (south of Craig Key) and Pasco Counties, proceed to couplet N.

⁸ Where the presence of the referenced vegetation is confirmed within the area affected by docks and other piling-supported minor structures and the reviewer has concluded that the impacts to SAV, marsh or mangroves would not adversely affect the manatee or its critical habitat, proceed to couplet O.

Where the presence of the referenced vegetation is confirmed within the area affected by docks and other piling-supported minor structures and the reviewer has concluded that the impacts to SAV, marsh or mangroves would adversely affect the manatee or its critical habitat, the applicant can elect to avoid/minimize impacts to that vegetation. In that instance, where impacts are unavoidable and the applicant elects to abide by or employ construction techniques that exceed the criteria in the following documents, the reviewer should conclude that the impacts to SAV, marsh or mangroves would not adversely affect the manatee or its critical habitat and proceed to couplet O.

- “Construction Guidelines in Florida for Minor Piling-Supported Structures Constructed in or over Submerged Aquatic Vegetation (SAV), Marsh or Mangrove Habitat,” prepared jointly by the U.S. Army Corps of Engineers and the National Marine Fisheries Service (August 2001) [refer to the [Corps’ web page](#)], and
- “Key for Construction Conditions for Docks or Other Minor Structures Constructed in or over Johnson’s seagrass (*Halophila johnsonii*),” prepared jointly by the National Marine Fisheries Service and U.S. Army Corps of Engineers (October 2002), for those projects within the known range of Johnson’s seagrass occurrence (Sebastian Inlet to central Biscayne Bay in the lagoon systems on the east coast of Florida) [refer to the [Corps’ web page](#)],

Where the presence of the referenced vegetation is confirmed within the area affected by docks and other piling-supported minor structures and the reviewer has concluded that the impacts to SAV, marsh or mangroves would adversely affect the manatee or its critical habitat, and the applicant does not elect to follow the above Guidelines, the Corps will need to request formal consultation on the manatee with the Service as *May affect*.

For activities other than docks and other piling-supported minor structures proposed in SAV, marsh, or mangroves (*e.g.*, new dredging, placement of riprap, bulkheads, etc.), if the reviewer determines the impacts to the SAV, marsh or mangroves will not adversely affect the manatee or its critical habitat, proceed to couplet O, otherwise the Corps will need to request formal consultation on the manatee with the Service as *May affect*.

⁹ See Glossary, under “is not likely to adversely affect.”

¹⁰ Federal reviewers, when making your effects determination, consider effects to manatee designated critical habitat pursuant to section 7(a)(2) of the Endangered Species Act. State reviewers, when making your effects determination, consider effects to manatee habitat within the entire State of Florida, pursuant to Chapter 370.12(2)(b) Florida Statutes.

¹¹ See the [Corps' web page](#) for manatee construction conditions. At this time, manatee construction precautions c and f are not required in the following Florida counties: Bay, Escambia, Franklin, Gilchrist, Gulf, Jefferson, Lafayette, Okaloosa, Santa Rosa, Suwannee, and Walton.

¹² By letter dated April 25, 2013, the Corps received the Service's concurrence with “*May affect, not likely to adversely affect*” determinations made pursuant to this key for the following activities: (1) selected non-watercraft access projects; (2) watercraft-access projects that are residential dock facilities, excluding those located in the Braden River AIP; (3) launching facilities solely for kayaks and canoes, and (4) new or expanding multi-slip facilities located in Bay, Dixie, Escambia, Franklin, Gilchrist, Gulf, Hernando, Jefferson, Lafayette, Monroe (south of Craig Key), Nassau, Okaloosa, Okeechobee, Santa Rosa, Suwannee, Taylor, Wakulla or Walton County.

Additionally, in the same letter dated April 25, 2013, the Corps received the Service's concurrence for “*May affect, not likely to adversely affect*” determinations specifically made pursuant to Couplet G of the key for the repair or rehabilitation of currently serviceable multi-slip watercraft access structures provided all of the following are met: (1) the project is not located in an IMA, (2) the number of slips is not increased; (3) the number of existing slips is not in question; and (4) the improvements to the existing watercraft access structures do not allow increased watercraft usage. Upon receipt of such a programmatic concurrence, no further consultation with the Service for these projects is required.

GLOSSARY

Areas of inadequate protection (AIP) – Areas within counties as shown on the maps where the Service has determined that measures intended to protect manatees from the reasonable certainty of watercraft-related take are inadequate. Inadequate protection may be the result of the absence of manatee or other watercraft speed zones, insufficiency of existing speed zones, deficient speed zone signage, or the absence or insufficiency of speed zone enforcement.

Boat slip – A space on land or in or over the water, other than on residential land, that is intended and/or actively used to hold a stationary watercraft or its trailer, and for which intention and/or use is confirmed by legal authorization or other documentary evidence. Examples of boat slips include, but are not limited to, docks or piers, marinas, boat ramps and associated trailer parking spaces, boat lifts, floats, floating docks, pilings, boat davits, dry storage, etc.

Critical habitat – For listed species, this consists of: (1) the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the provisions of section 4 of the Endangered Species Act (ESA), on which are found those physical or biological features (constituent elements) (a) essential to the conservation of the species and (b) which may require special management considerations or protection; and (2) specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of section 4 of the ESA, upon a determination by the Secretary that such areas are essential for the conservation of the species. Designated critical habitats are described in 50 CFR 17 and 50 CFR 226.

Currently serviceable – Currently, serviceable means usable as is or with some maintenance, but not so degraded as to essentially require reconstruction.

Direct effects – The direct or immediate effects of the project on the species or its habitat.

Dredging – For the purposes of this key, the term dredging refers to all in-water work associated with dredging operations, including mobilization and demobilization activities that occur in water or require vessels.

Emergent vegetation – Rooted emergent vascular macrophytes such as, but not limited to, cordgrass (*Spartina alterniflora* and *S. patens*), needle rush (*Juncus roemerianus*), swamp sawgrass (*Cladium mariscoides*), saltwort (*Batis maritima*), saltgrass (*Distichlis spicata*), and glasswort (*Salicornia virginica*) found in coastal salt marsh-related habitats (tidal marsh, salt marsh, brackish marsh, coastal marsh, coastal wetlands, tidal wetlands).

Formal consultation – A process between the Services and a Federal agency or applicant that: (1) determines whether a proposed Federal action is likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat; (2) begins with a Federal agency's written request and submittal of a complete initiation package; and (3) concludes with the issuance of a biological opinion and incidental take statement by either of the Services. If a proposed Federal action may affect a listed species or designated critical habitat, formal consultation is required (except when the Services concur, in writing, that a proposed

action “is not likely to adversely affect” listed species or designated critical habitat). [50 CFR 402.02, 50 CFR 402.14]

Important manatee areas (IMA) – Areas within certain counties where increased densities of manatees occur due to the proximity of warm water discharges, freshwater discharges, natural springs and other habitat features that are attractive to manatees. These areas are heavily utilized for feeding, transiting, mating, calving, nursing or resting as indicated by aerial survey data, mortality data and telemetry data. Some of these areas may be federally-designated sanctuaries or state-designated “seasonal no entry” zones. Maps depicting important manatee areas and any accompanying text may contain a reference to these areas and their special requirements. Projects proposed within these areas must address their special requirements.

Indirect effects – Those effects that are caused by or will result from the proposed action and are later in time, but are still reasonably certain to occur. Examples of indirect effects include, but are not limited to, changes in water flow, water temperature, water quality (*e.g.*, salinity, pH, turbidity, nutrients, chemistry), prop dredging of seagrasses, and manatee watercraft injury and mortality. Indirect effects also include watercraft access developments in waters not currently accessible to manatees, but watercraft access can, is, or may be planned to waters accessible to manatees by the addition of a boat lift or the removal of a dike or plug.

Informal consultation – A process that includes all discussions and correspondence between the Services and a Federal agency or designated non-Federal representative, prior to formal consultation, to determine whether a proposed Federal action may affect listed species or critical habitat. This process allows the Federal agency to utilize the Services’ expertise to evaluate the agency’s assessment of potential effects or to suggest possible modifications to the proposed action which could avoid potentially adverse effects. If a proposed Federal action may affect a listed species or designated critical habitat, formal consultation is required (except when the Services concur, in writing, that a proposed action “is not likely to adversely affect” listed species or designated critical habitat). [50 CFR 402.02, 50 CFR 402.13]

In-water activity – Any type of activity used to construct/repair/replace any type of in-water structure or fill; the act of dredging.

In-water structures – watercraft access structures – Docks or piers, marinas, boat ramps, boat slips, boat lifts, floats, floating docks, pilings (depending on use), boat davits, etc.

In-water structures – other than watercraft access structures – Bulkheads, seawalls, riprap, groins, boardwalks, pilings (depending on use), etc.

Is likely to adversely affect – The appropriate finding in a biological assessment (or conclusion during informal consultation) if any adverse effect to listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions and the effect is not: discountable, insignificant, or beneficial (see definition of “is not likely to adversely affect”). An “is likely to adversely affect” determination requires the initiation of formal consultation under section 7 of the ESA.

Is not likely to adversely affect – The appropriate conclusion when effects on listed species are expected to be discountable, insignificant, or completely beneficial. **Discountable effects** are those extremely unlikely to occur. **Insignificant effects** relate to the size of the impact and should never reach the scale where take occurs. **Beneficial effects** are contemporaneous positive effects without any adverse effects to the species. Based on best judgment, a person would not (1) be able to meaningfully measure, detect, or evaluate insignificant effects or (2) expect discountable effects to occur.

Manatee Protection Plan (MPP) – A manatee protection plan (MPP) is a comprehensive planning document that addresses the long-term protection of the Florida manatee through law enforcement, education, boat facility siting, and habitat protection initiatives. Although MPPs are primarily developed by the counties, the plans are the product of extensive coordination and cooperation between the local governments, the FWC, the Service, and other interested parties.

Manatee Protection Plan thresholds – The smallest size of a multi-slip facility addressed under the purview of a Manatee Protection Plan (MPP). For most MPPs, this threshold is five slips or more. For Brevard, Clay, Citrus, and Volusia County MPPs, this threshold is three slips or more.

Mangroves – Rooted emergent trees along a shoreline that, for the purposes of this key, include red mangrove (*Rhizophora mangle*), black mangrove (*Avicennia germinans*) and white mangrove (*Laguncularia racemosa*).

May affect – The appropriate conclusion when a proposed action may pose any effects on listed species or designated critical habitat. When the Federal agency proposing the action determines that a “may affect” situation exists, then they must either request the Services to initiate formal consultation or seek written concurrence from the Services that the action “is not likely to adversely affect” listed species. For the purpose of this key, all “may affect” determinations equate to “likely to adversely affect” and Corps Project Managers should request the Service to initiate formal consultation on the manatee or designated critical habitat. **No effect** – the appropriate conclusion when the action agency determines its proposed action will not affect a listed species or designated critical habitat.

Multi-slip facility – Multi-slip facilities include commercial marinas, private multi-family docks, boat ramps and associated trailer parking spaces, dry storage facilities and any other similar structures or activities that provide access to the water for multiple (five slips or more, except in Brevard, Clay, Citrus, and Volusia counties where it is three slips or more) watercraft. In some instances, the Corps and the Service may elect to review multiple residential dock facilities as a multi-slip facility.

New access for watercraft – New dredging and the addition, expansion or improvement of structures such as, but not limited to, docks or piers, marinas, boat ramps and associated trailer parking spaces, boat lifts, pilings, floats, floating docks, floating vessel platforms, (residential boat lifts, pilings, floats, and floating vessel platforms installed in existing slips are not considered new access), boat slips, dry storage, mooring buoys, etc., that facilitates the addition of watercraft to, and/or increases watercraft usage in, waters accessible to manatees.

Observers – During dredging and other in-water operations within manatee accessible waters, the standard manatee construction conditions require all on-site project personnel to watch for manatees to ensure that those standard manatee construction conditions are met. Within important manatee areas (IMA) and under special circumstances, heightened observation is needed. **Dedicated Observers** are those having some prior experience in manatee observation, are dedicated only for this task, and must be someone other than the dredge and equipment operators/mechanics. **Approved Observers** are dedicated observers who also must be approved by the Service (if Federal permits are involved) and the FWC (if state permits are involved), prior to work commencement. Approved observers typically have significant and often project-specific observational experience. Documentation on prior experience must be submitted to these agencies for approval and must be submitted a minimum of 30 days prior to work commencement. When dedicated or approved observers are required, observers must be on site during all in-water activities, and be equipped with polarized sunglasses to aid in manatee observation. For prolonged in-water operations, multiple observers may be needed to perform observation in shifts to reduce fatigue (recommended shift length is no longer than six hours). Additional information concerning observer approval can be found at [FWC's web page](#).

Residential boat lift – A boat lift installed on a residential dock facility.

Residential dock density ratio threshold – The residential dock density ratio threshold is used in the evaluation of multi-slip projects in some counties without a State-approved Manatee Protection Plan and is consistent with 1 boat slip per 100 linear feet of shoreline (1:100) owned by the applicant.

Residential dock facility – A residential dock facility means a private residential dock which is used for private, recreational or leisure purposes for single-family or multi-family residences designed to moor no more than four vessels (except in Brevard, Clay, Citrus, and Volusia counties which allow only two vessels). This also includes normal appurtenances such as residential boat lifts, boat shelters with open sides, stairways, walkways, mooring pilings, dolphins, etc. In some instances, the Corps and the Service may elect to review multiple residential dock facilities as a multi-slip facility.

Submerged aquatic vegetation (SAV) – Rooted, submerged, aquatic plants such as, but not limited to, shoal grass (*Halodule wrightii*), paddle grass (*Halophila decipiens*), star grass (*Halophila engelmanni*), Johnson's seagrass (*Halophila johnsonii*), sago pondweed (*Potamogeton pectinatus*), clasping-leaved pondweed (*Potamogeton perfoliatus*), widgeon grass (*Ruppia maritima*), manatee grass (*Syringodium filiforme*), turtle grass (*Thalassia testudinum*), tapegrass (*Vallisneria americana*), and horned pondweed (*Zannichellia palustris*).

Warm Water Aggregation Areas (WWAAs) and No Entry Areas – Areas within certain counties where increased densities of manatees occur due to the proximity of artificial or natural warm water discharges or springs and are considered necessary for survival. Some of these areas may be federally-designated manatee sanctuaries or state-designated seasonal “no entry” manatee protection zones. Projects proposed within these areas may require consultation in order to offset expected adverse impacts. In addition, special permits may be required from the FWC in order to access these areas.

Watercraft access structures – Docks or piers, marinas, boat ramps and associated trailer parking spaces, boat slips, boat lifts, floats, floating docks, pilings, boat davits, dry storage, etc.

Waters accessible to manatees – Although most waters of the State of Florida are accessible to the manatee, there are some areas such as landlocked lakes that are not. There are also some weirs, salinity control structures and locks that may preclude manatees from accessing water bodies. If there is any question about accessibility, contact the Service or the FWC.



United States Department of the Interior

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



February 19, 2007

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

RECEIVED

FEB 23 2007

JACKSONVILLE DISTRICT
USACE

Dear Mr. Hobbie:

The Fish and Wildlife Service (Service) has reviewed your letter dated December 20, 2006, referencing the development of a revised Panther Key, which will assist the Corps project managers in their effect determinations as prescribed under Section 7(a) (2) of the Endangered Species Act of 1973 as amended (Act) (87 Stat 884 16 U S C 1531 *et seq*) and its implementing regulations at 50 CFR Section 402. The original Panther Key has been used since August 8, 2003, by the Corps to evaluate all applications for a Department of Army permit under Section 404 of the Clean Water Act for projects in the consultation area. The Florida panther consultation area was depicted in the Service's interim Standard Local Operating Procedures for Endangered Species (SLOPES) for the Florida Panther (Service 2000).

In our original 2000 evaluation we provided a consultation area map (MAP) to assist the Corps in determining which projects may have an effect of the Florida panther. The MAP was generated by the Service by overlaying existing and historical panther telemetry data on a profile of Florida and providing a connecting boundary surrounding most of these points. Since the development of the MAP, we have received more accurate and up-to-date information on Florida panther habitat usage. Specifically we have received two documents that the Service believes reflect the common panther habitat usage profiles. These documents are the publications by Kautz et al. (2006) and Thatcher et al. (2006). Based on the information in these documents, we changed the boundaries of the MAP to better reflect areas where we believe project may have an effect on the Florida panther and provided this map to you in correspondence dated December 8, 2006. Upon receipt of this information, you provided a revised Panther Key and Rationale, dated December 20, 2006, and labeled as Panther Key and Rationale-January 2007. You also requested concurrence from the Service that the utilization of the Panther Key-January 2007 may affect but is not likely to adversely affect the Florida panther.

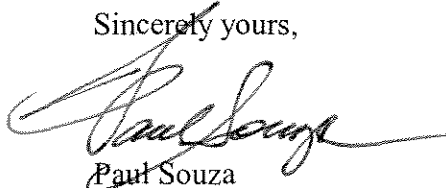
To assist the Corps in developing a Panther Key that fully reflects the Service's desire to identify those projects that may have an effect on the Florida panther and the need for consultation with the Service, we are providing a revised Panther Key and Rationale – February 19, 2007, that we believe meets this objective (enclosed).



We have used Kautz et al. (2006) and Thatcher et al. (2006) to outline a Panther Focus Area, where we believe sufficient data are present that, in most cases, warrants consultation with the Service. In addition, panther research data, including scientific publications, telemetry, photographs, tracks, prey kills, and other verifiable evidence, provide direct evidence of the presence of, and use of areas by panthers, in locations that may or may not be within the Panther Focus Area or original MAP. For example, panther mortality by vehicle interactions is a significant threat; although a proposed project may not be within the Panther Focus Area, traffic generated by the project in or adjacent to the Panther Focus Area may increase risk of panther-vehicle mortality, warranting consultation with the Service.

The key and rationale provide guidelines to help us identify when proposals may affect the panther. As always, information obtained in the future will help us refine these guidelines further, or possibly identify additional issues for consideration. As an important partner in our program to conserve and the Florida panther, your cooperation and assistance are greatly appreciated. Again, thank you for your cooperation and effort in protecting federally listed species. If you have any questions, please do not hesitate to contact either myself or Allen Webb at 772-562-3909.

Sincerely yours,

A handwritten signature in black ink, appearing to read "Paul Souza", with a stylized, flowing script.

Paul Souza

Field Supervisor

South Florida Ecological Services Office

Enclosure

cc: Noreen Walsh, ARD-Ecological Services, U.S. FWS

- Kautz, R., R. Kawula, T. Hctor, J. Comiskey, D. Jansen, D. Jennings, J. Kasbohm, F. Mazzotti, R. McBride, L. Richardson, and K. Root. 2006. How Much Is Enough? Landscape-scale Conservation for the Florida Panther. Biological Conservation.
- Thatcher, C., F.T. van Manen, and J.D. Clark. 2006. An assessment of habitat north of the Calusoahatchee River for Florida panthers. Final Report to U.S. Fish and Wildlife Service. University of Tennessee; Knoxville, Tennessee.
- U.S. Fish and Wildlife Service (Service). 2000. Florida panther final interim standard local operating procedures (SLOPES) for endangered species. Fish and Wildlife Service; Vero Beach, Florida.

Enclosure

Florida Panther Effect Determination Key
February 19, 2007

- A. Project is not within Panther Focus Area B
- Project is within Panther Focus Area..... C
- B. Project will have no increase and/or change in vehicle traffic patterns or other
identifiable effects to panthers or their habitat..... *No effect*
- Project is greater than 1 acre in size and will have a net increase and/or change in vehicle
traffic patterns or other identifiable effects to panthers or their habitat *May affect*
Consultation with the Service is requested¹
- C. Project is less than 1 acre.....*May affect, not likely to adversely affect*
- Project is greater than 1 acre.....*May affect*
Consultation with the Service is requested¹

¹ Consultation may be concluded informally or formally depending on project effects.

Rationale for the
Florida Panther Effect Determination Key
February 19, 2007

The following discussion provides background for terms used in the key and areas delineated on the accompanying map.

Panther Focus Area (see accompanying map)

The Panther Focus Area was based on results from recent panther habitat models south of the Caloosahatchee River and north of the Caloosahatchee River (Kautz et al. 2006 and Thatcher et al. 2006). In addition, marked panthers have been found throughout the delineated area.

The Kautz et al. (2006) model of landscape components important to Florida panther habitat conservation was based on an analysis of panther habitat use and forest patch size south of the Caloosahatchee River. This model was used in combination with radio-telemetry records, home range overlaps, land use/land cover data, and satellite imagery to delineate primary and secondary areas that would comprise a landscape mosaic of cover types that are especially important to support the current panther breeding population south of the Caloosahatchee River.

Thatcher et al. (2006) developed a habitat model using Florida panther home ranges in south Florida to identify landscape conditions (land-cover types, habitat patch size and configuration, road density and other human development activities, and other similar metrics) north of the Caloosahatchee River that were similar to those associated with the current panther breeding population south of the Caloosahatchee River.

The Panther Focus Area south of the Caloosahatchee River is divided into Primary, Secondary, and Dispersal Zones. North of the Caloosahatchee River it is named the Primary Dispersal/Expansion Area.

Primary Zone is currently occupied and supports the only known breeding population of Florida panthers in the world. These lands are important to the long-term viability and persistence of the panther in the wild.

Secondary Zone lands are contiguous with the Primary Zone and although these lands are used to a lesser extent by panthers, they are important to the long-term viability and persistence of the panther in the wild. Panthers use these lands in a much lower density than in the Primary Zone.

Dispersal Zone is a known corridor between the Panther Focus Area south of the Caloosahatchee River to the Panther Focus Area north of the Caloosahatchee River.

This zone is necessary to facilitate the dispersal of panthers and future panther population expansion to areas north of the Caloosahatchee River. Marked panthers have been known to use this zone.

Primary Dispersal/Expansion Area is the Fisheating Creek/Babcock-Webb Wildlife Management Area region. These are lands identified by Thatcher et al. (2006) as potential panther habitat with the shortest habitat connection to the Panther Focus Area in south Florida. Several collared and uncollared male panthers have been documented in this area since 1973, and the last female documented north of the Caloosahatchee River was found in this area.

In addition, the Thatcher Model Dispersal Pathways delineate model locations that show some areas where panthers have historically moved to areas further north.

Thatcher Model Dispersal Pathways are the most likely dispersal routes, based on Thatcher's (2006) least-cost pathways model, to potential habitats to the north. Panthers have historically been documented in this area.

Project Analysis

Projects within the Panther Focus Area can negatively affect panthers in different ways, such as loss and fragmentation of habitat, loss of available prey, increase potential for traffic related mortalities, and increase potential for human/panther interactions. In addition, projects outside the Panther Focus Area, depending on type and size, can affect panthers and habitat used by panthers in different ways such as increasing traffic within or adjacent to the Panther Focus Area, changing hydrological conditions that affect the habitats that support panther or panther prey in the Panther Focus Area, increasing potential for human/panther interactions, and modifying habitat that provides some functional value for panthers.

Net Increase in Traffic

A net increase in traffic in or adjacent to the Panther Focus Area such as an increase in the number of trips per day averaged over a week is considered a traffic increase that may lead to adverse effects for purposes of this key.

Other Identifiable Effects

Dispersing panthers are known to occur outside of the Panther Focus Area. South of the Caloosahatchee River, where the only breeding population of panthers is known to exist, a project is considered to potentially have an effect on panthers if it occurs in non-urbanized lands in areas adjacent to the Panther Focus Area (e.g., agricultural lands). Although non-urban lands outside of the Panther Focus Area do not provide the same habitat value as natural lands within the Panther Focus Area, they do provide important buffers between urban developments and the Panther Focus Area, dispersal

and travel routes between higher quality habitats, refugia areas for sub-adult males, and foraging habitat for panther prey species. Generally, areas adjacent to the Panther Focus Area south of the river are defined as areas within the Service's 2000 consultation boundary (Service 2000) where urbanization has not replaced lower intensity land uses. Areas that have become urbanized no longer have habitat that can sustain panthers, although additional traffic generated in or adjacent to the Panther Focus Area from development in these locations may affect panthers.

Two-Mile Radius Buffer

A project is also considered to potentially have an effect on panthers if there has been documented physical evidence of panther occurrence within a two-mile radius of a project within the past two years. Documented physical evidence of panther occurrence includes telemetry locations, as well as photographs, tracks, prey kills, and other verifiable evidence that may be available.

Comiskey et al (2000) in the article "Panthers and Forests in South Florida: an Ecological Perspective" referenced that the mean movement distance between sequential telemetry locations was 6.6 km (4.1 miles) for males and 3.2 km (1.99 miles) for females. If flights to monitor panther telemetry are normally three times a week, generally every other day, the travel distance between two points per day would be roughly half the distance between the two points, roughly 2 miles for the male panther. In their habitat analysis, Comiskey et al (2000) considered lands within a circle where the radius is equal to the mean movement distance between sequential telemetry locations, as panther habitat. Following this approach, we believe land alterations within a two-mile radius of a verified panther occurrence, both north and south of the Caloosahatchee River, may potentially have an effect on the panther.

Projects Less than One Acre

On an individual basis, single-family residential developments on lots no larger than one acre will not have a measurable effect on panthers. Panthers are a wide ranging species, and individually, a one acre habitat change is not likely to adversely affect panthers. However, collectively they may have an effect and therefore regular monitoring and reporting of these effects are important.

Monitoring and Reporting Effects

For the Service to monitor effects, it is important for the Corps to monitor the number of permits and provide information to the Service regarding the number of permits issued that were determined "may affect, not likely to adversely affect." It is requested that information on date, Corps identification number, project acreage, project wetland acreage, latitude and longitude in decimal degrees, and county parcel identification number of these projects be sent to the Service quarterly.

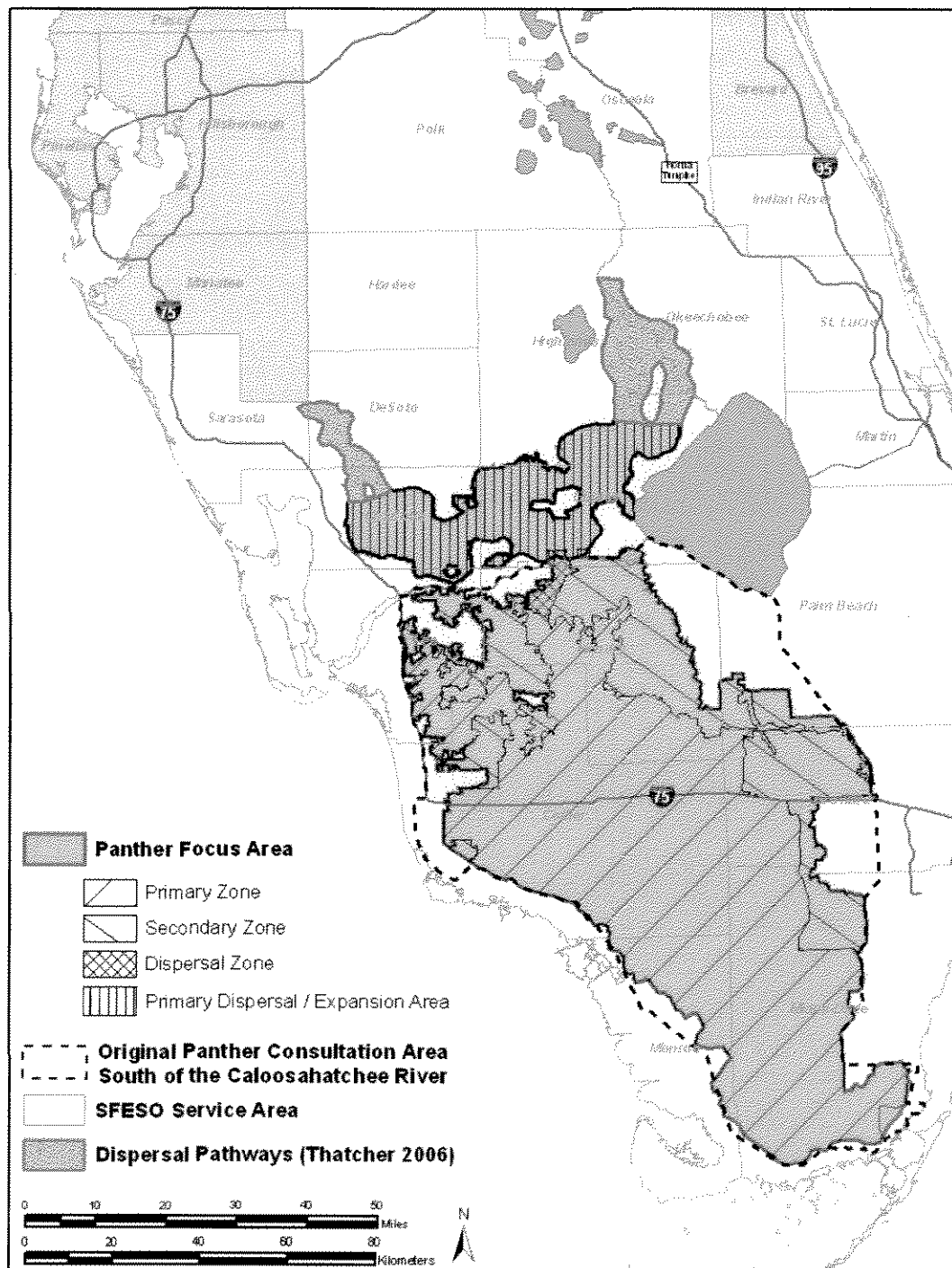
Determination

With a determination of “no effect” or “may affect, not likely to adversely affect” (“NLAA”) as outlined in this key, the requirements of section 7 of the Endangered Species Act are fulfilled and no further action is required.

A determination of “may affect” in the key may be concluded in either a “may affect, not likely to adversely affect” and written concurrence or “may adversely affect” and formal consultation with the Service is requested.

Literature Cited

- Comiskey, E. J., O. L. Bass, Jr., L. J. Gross, R. T. McBride, and R. Salinas. 2002. Panthers and forests in south Florida: an ecological perspective. *Conservation Ecology* 6:18.
- Kautz, R., R. Kawula, T. Hctor, J. Comiskey, D. Jansen, D. Jennings, J. Kasbohm, F. Mazzotti, R. McBride, L. Richardson, and K. Root. 2006. How much is enough? Landscape-scale conservation for the Florida panther. *Biological Conservation* 130:118-133.
- Thatcher, C. A., F. T. van Manen, and J. D. Clark. 2006. An assessment of habitat north of the Caloosahatchee River for Florida panthers. Leetown Science Center, Southern Appalachian Research Branch, U.S. Geological survey, Knoxville, Tennessee, USA.
- U.S. Fish and Wildlife Service (Service). 2000. Florida panther final interim standard local operating procedures (SLOPES) for endangered species. Fish and Wildlife Service; Vero Beach, Florida.



APPENDIX D

FLORIDA BONNETED BAT ACOUSTIC SURVEY REPORT



ACOUSTIC SURVEY REPORT

*FLORIDA BONNETED BAT (*Eumops floridanus*)*

FDOT Florida Highway 70 and 72 Roundabout

Report Completed for
Quest Ecology
735 Lakeview Drive
Wimauma, FL 33598

PROJECT NO.: 31405652.000
DATE: FEBRUARY 27, 2023

WSP USA INC.
6026 NW 1ST PLACE
GAINESVILLE, FLORIDA, USA 32607
+1 352 336-5600
WSP.COM



TABLE OF CONTENTS

1	INTRODUCTION	1
2	ACOUSTIC SURVEY METHODS	1
3	ACOUSTIC FILE ANALYSIS	3
4	RESULTS	5
5	CONCLUSIONS	10
6	REFERENCES	11

TABLES

TABLE 1	STATION DESCRIPTIONS.....	5
TABLE 2	RECORDING CLASSIFICATIONS.....	9

FIGURES

FIGURE 1	PROJECT LOCATION MAP
FIGURE 2	 FBB SURVEY STATION LOCATIONS
FIGURE 3	FBB SEARCH PHASE SONOGRAM
FIGURE 4	 FBB SINGLE CALL SONOGRAM
FIGURE 5	EXAMPLE NOISE SONOGRAM
FIGURE 6	EXAMPLE BIRD SONOGRAM
FIGURE 7	EXAMPLE INSECT SONOGRAM

LIST OF ATTACHMENTS

APPENDIX A	STATION PHOTOGRAPHS
APPENDIX B	WEATHER REPORTS

1 INTRODUCTION

The Florida Department of Transportation (FDOT) Highway 70 and 72 roundabout (Project) is a planned road expansion and roundabout installation for the intersection of Florida Highway 70 and 72, approximately 2 miles west of the city of Arcadia (Figure 1). The Project involves the expansion of roadways and installation of a roundabout within an approximately 0.7-mile construction area (Site), impacting areas of forested and non-forested wetlands and uplands.

The Site is within the US Fish and Wildlife Service (USFWS) consultation area for the endangered Florida bonneted bat (*Eumops floridanus*) and contains potential foraging and roosting habitat including forested uplands and forested wetlands. Neighboring properties contain a mixture of open pastureland and forested areas. Pastureland, especially improved and woodland pasture, is considered Florida bonneted (FBB) foraging habitat, and this land use type typically represents between 0.55 and 27 percent of a FBB's foraging area (Ober 2015, 2016).

In accordance with the *Florida Bonneted Bat Consultation Key* contained within the October 2019 *Florida Bonneted Bat Consultation Guidelines* (Guidelines) prepared by the USFWS South Florida Ecological Services Field Office, due to the Project's location within the consultation area and presence of potential roosting and foraging habitat, acoustic surveys are required prior to construction. Full acoustic surveys are conducted 30 minutes prior to sunset to 30 minutes after sunrise, over multiple nights, to identify potential roosting or foraging use of the Site. As described in Appendix B of the Guidelines, acoustic surveys for linear projects require a minimum of 5 detector nights per 0.6 miles. Based on the length of the Project (0.7 miles), a minimum of 6 detector nights would be needed. Two survey stations were established to collect a minimum of 6 detector nights (Figure 2).

2 ACOUSTIC SURVEY METHODS

Bats produce echolocation calls while in flight to navigate through their environment and find prey (Bohn and Gillam 2018, Marks and Marks 2006). Species presence and activity levels can be assessed with automated ultrasonic recording systems, which are particularly useful for detecting the FBB as their calls are of high intensity and at lower frequencies (typically around 14 kHz) compared to other Florida bat species (Braun de Torrez et al. 2016, Bailey et al. 2017, Bat Survey Solutions 2020). This combination of echolocation call characteristics makes the FBB easier to distinguish from other bat species, and detectable from a greater distance (lower frequencies suffer less atmospheric attenuation than higher frequencies) (Bohn and Gillam 2018).

WSP conducted the acoustic survey from February 8th until February 16th, 2023 at two survey locations (Figure 2). Echolocation calls were recorded using two AnaBat Chorus automated ultrasonic recording systems (song meters). Microphones were placed on extendable poles 16 feet above the ground surface and at an approximate angle of 90° above horizontal facing the area of potential roosting or foraging habitat (See Appendix B – Station Photographs). In accordance with the Guidelines, the song meters were programmed to start recording 30 minutes prior to sunset through 30 minutes after sunrise. Each microphone was calibrated prior to deployment and verified for accuracy upon survey completion. Recording settings were as specified in the Guidelines:

- Gain = 12 dB
- 16k High Filter = Off
- Sample Rate = 192 kHz
- Min Duration = 1.5 ms
- Max Duration = None
- Min Trigger Frequency = 6 kHz
- Trigger Level = 12 dB
- Trigger Window = 2 seconds
- Max Length = 15 seconds
- File Type = Uncompressed WAV files

If any of the following weather conditions occurred during the acoustic survey, the sampling effort was voided for that night:

- temperatures fall below 65°F (18.3°C) during the first 5 hours of survey period;
- precipitation, including rain and/or fog, that exceeds 30 minutes or continues intermittently during the first 5 hours of the survey period; and
- sustained wind speeds greater than 9 miles/hour (4 meters/second; 3 on Beaufort scale) for 30 minutes or more during the first 5 hours of the survey period.

To determine valid detector nights, hourly weather data was obtained from the nearest USFWS approved National Oceanic and Atmospheric Administration (NOAA) weather station (Punta Gorda Charlotte County Airport, FL US, Station WBAN: 12812, Lat: 26.91847°, Long: -81.99391°, Elevation: 6.1 meters). A summary of weather data during the survey period is provided in Appendix B; details on the song meter locations, recording durations, and habitat type are provided below (Table 1).

Table 1: Song Meter Location Habitat Descriptions and Sampling Dates

Recording Device*	Habitat Description	Targeted Potential FBB Habitat	Start Date (Sunset)	End Date (Sunrise)	Valid Detector Nights
Station #1	Upland forest with open areas of less dense forests	Foraging and Roosting Habitat	February 8 th , 2023	February 16 th , 2023	4*
Station #2	Bordering a freshwater wetland with a mixture of herbaceous/shrub vegetation and a perimeter of trees.				4*
Total:					8

* Lower number of valid detector nights were due to unfavorable weather.

3 ACOUSTIC FILE ANALYSIS

Bats produce a variety of calls depending on their activity. Bats can change the frequency, shape, pulse and call duration, and bandwidth of the call depending on the situation (Britzke et al 2013, Bat Survey Solutions 2020). When a bat is flying through the environment “searching” for prey or navigating it is producing search phase or commuting calls. Search phase calls are consistently spaced and usually long duration with little frequency modulation (small bandwidth) (Bat Survey Solutions 2020). These types of calls are the most species-distinctive and are the basis for identifying echolocation calls to species (Bohn and Gillam 2018). When a bat is closer to objects or foraging within a cluttered environment, it may switch to an approach call. This type of call has a high bandwidth (steep slope), and the time between pulses becomes shorter (Bat Survey Solutions 2020). If a bat detects prey (or water), it will switch to a feeding/drinking buzz, which has rapid short pulses, and a drop in frequency and intensity. The high number of pulses in a short period of time sounds like a “buzz” when played in real time. Foraging intensity can be approximated from the relative number of feeding buzzes recorded. Once the bat has consumed the prey it will usually return to a search phase call. When a bat is recorded near a roost or a high activity area (i.e. an entrance to a cave) it will produce a social/directive call. These calls are not true echolocation calls (the bat is not listening for the echo) but instead are used to communicate to other bats of the same or different species (Bat Survey Solution 2020). This includes mothers communicating with young, warnings to other bats to stay away from perceived foraging areas, etc. Social calls can be indicative of a roost nearby and can be used to help identify potential roost sites.

All acoustic files were inspected using the Sonobat Bat Call Analysis software (Sonobat 2022). Species were identified based upon call characteristics. The FBB has a search phase characteristic frequency (flattest point of the call) around 14kHz (10-19 kHz range). The calls have a variable to flat frequency modulation (bandwidth) with long calls having high intensity at the beginning and tapering off (carrot-shaped oscillogram) (Bohn and Gillam 2018, Sonobat 2017, Bat Survey Solutions 2020). FBB social calls have usually lower frequency (8 – 12 kHz) and are longer duration (greater than

30 ms) than echolocation pulses (predominantly 10 – 19 kHz, and less than 15 ms) (Bohn and Gillam 2018, Sonobat 2017, Bat Survey Solutions 2020). Calls of the Brazilian free-tailed bat (*Tadarida brasiliensis*) are most similar to the FBB, but Brazilian free-tailed bats do not typically produce search phase calls with average characteristic frequencies below 25 kHz (Range 16.6-37.4kHz) (Sonobat 2017, Bat Survey Solutions 2020).

The proximity to a roost site can be determined by the number of social calls recorded and the time of the recording. Social calls usually occur around roost sites and the FBB typically emerges from roosts between 20 minutes to 1 hour (average 40 minutes) after sunset (Bohn and Gillam 2018, Braun de Torrez et al 2016, Marks and Marks 2006), thus detecting social calls within 1 hour after sunset could indicate a roost near the song meter. Each song meter contains an internal clock and each audio file name contains the unique identification of the song meter, the date, and the time.

The raw audio files were scrubbed for background noise, each audio file was analyzed using Sonobat's species identifier, and then calls were manually vetted. Using the Sonobat software, each file is summarized (file name, date, time, latitude/longitude, recording device, etc.) within a vetting table and manually identified to species with additional categories including the presence of social or feeding calls.

4 RESULTS

Although potential foraging and roosting habitat occurs on and near the Site, no verified FBB calls were detected over the 8 detector nights (8 calendar days) of acoustic surveys. After analysis through Sonobat's auto-classification, 35 calls were identified as FBB but upon manual review all of these calls were identified as either noise (from nearby road), bird calls, or insect calls (Figures 3-7).

In order to correctly identify a bat call to species, a series of regularly spaced search phase calls within the frequency spectrum for a particular species is required. Figure 3 shows the search phase calls for a FBB recorded at Babcock-Webb Wildlife Management Area (WMA).

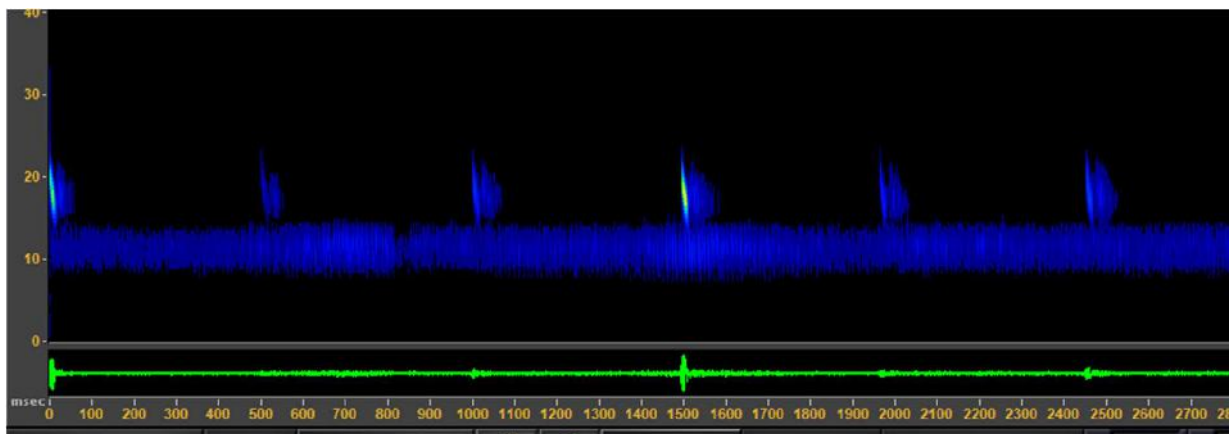


Figure 3: Screen shot of a sonogram illustrating regularly spaced search phase calls required to identify recordings to species. Time is along the x-axis in milliseconds and shows a FBB call every 500 msec. This call was recorded at the Babcock-Webb WMA by WSP in 2020.

A FBB search phase call has a characteristic frequency average between 9.8 and 19.4 kHz. The characteristic frequency is defined as the frequency of the call at its lowest slope. Figure 4 provides a sonogram of a single time expanded FBB call recorded at Babcock-Webb WMA. It shows a gentle slope from high frequency (Hif) to low frequency (Lof) with a characteristic frequency (fc) of 16.3 kHz. It also shows an oscillogram (green lines) which indicates distribution of the power in the call. FBB calls are usually power-forward with wide oscillograms near the beginning of the call and thinner oscillograms near the end of the call (Figure 4); these oscillograms are usually referred to as carrot-shaped.

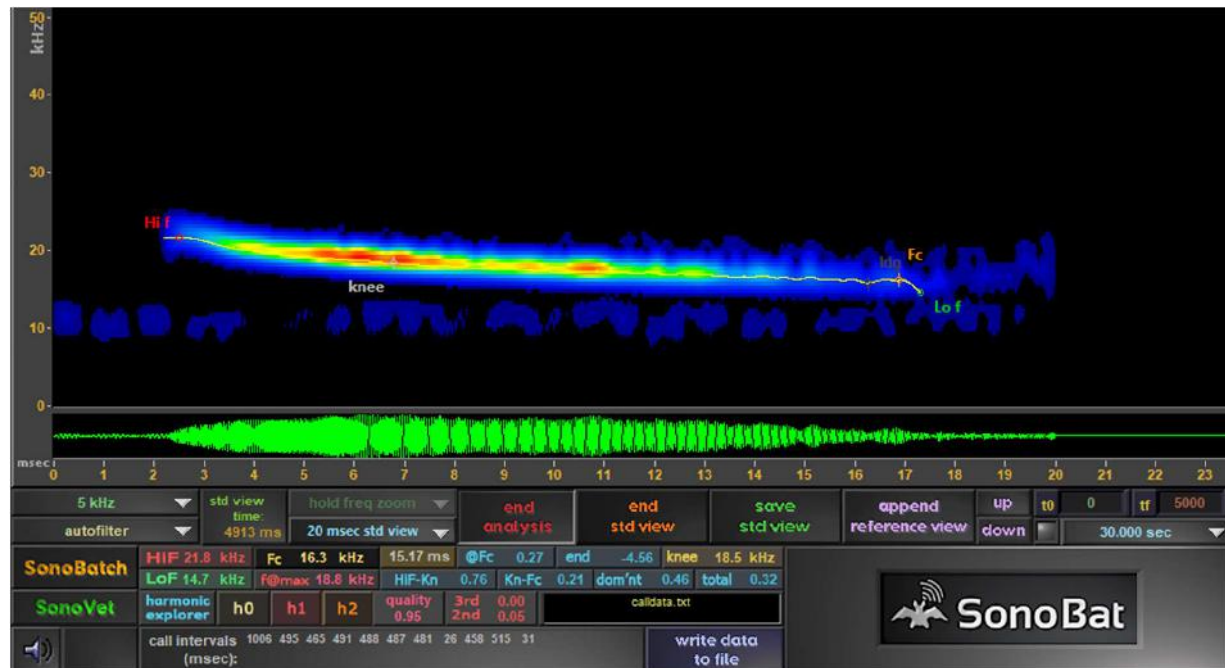


Figure 4: Time-expanded sonogram showing a FBB call recorded at the Babcock-Webb WMA in 2020. Note the characteristic frequency (fc, y-axis) of 16.3 kHz, the carrot-shaped oscillogram (green lines) and the flat slope.

Each of the calls identified as FBB from the Sonobat software's auto-classification were manually vetted as either noise (Figure 5), bird calls (Figure 6), or insect calls (Figure 7). The classifications between noise, bird, and insect calls were based on best judgement when listening to the live recordings.

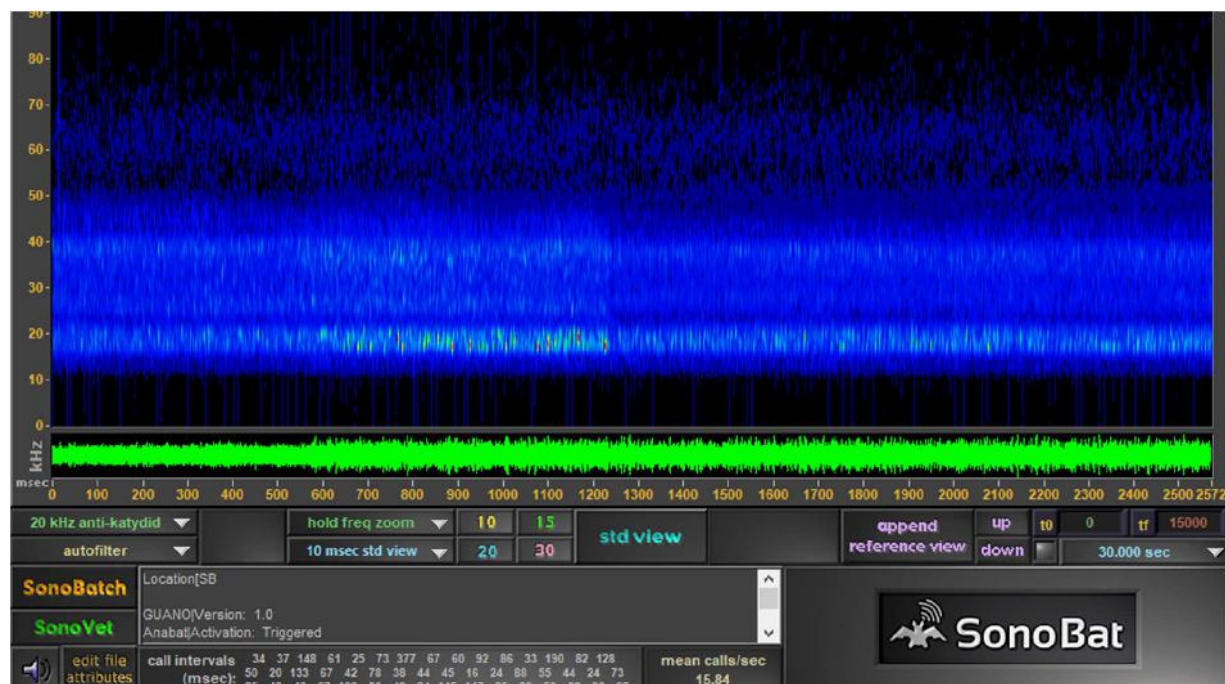


Figure 5: An example of a recording manually vetted and classified as noise. Note the absence of regularly spaced search phase calls. This recording was classified as FBB by the Sonobat auto-classification tool and recorded at Station 1.

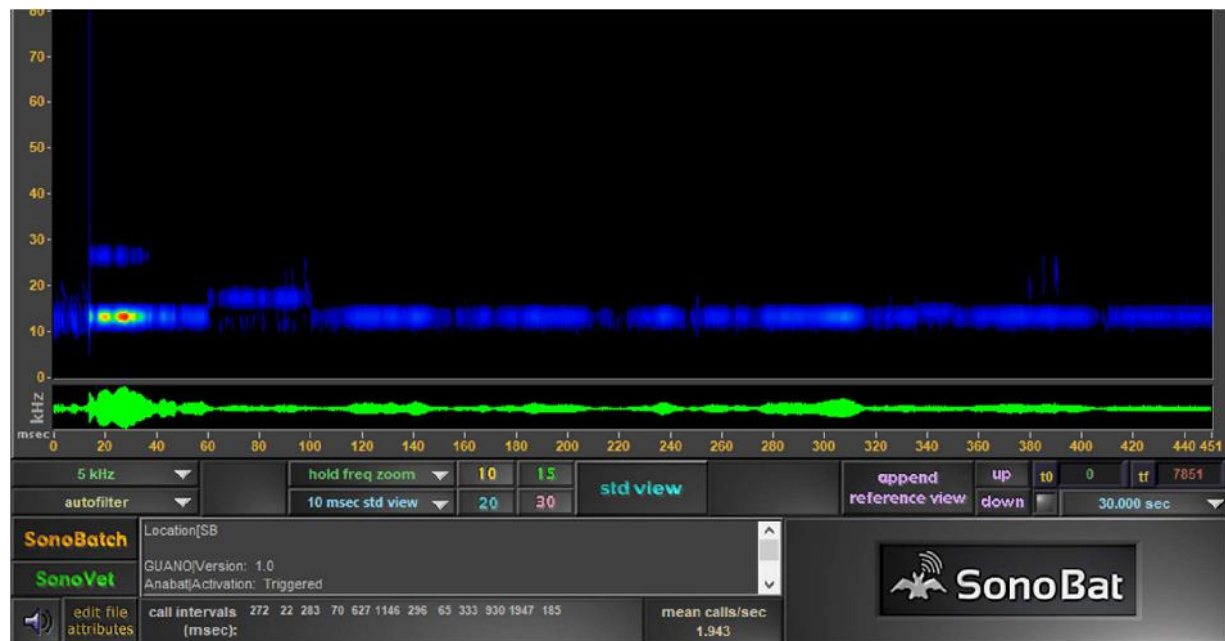


Figure 6: An example of a recording manually vetted and classified as a bird call. This recording was classified as FBB by the Sonobat auto-classification tool and recorded at Station 1. However, the call lacks regularly spaced search phase called, has a flat frequency, and clearly sounds like a bird chirping when manually listening in real-time.

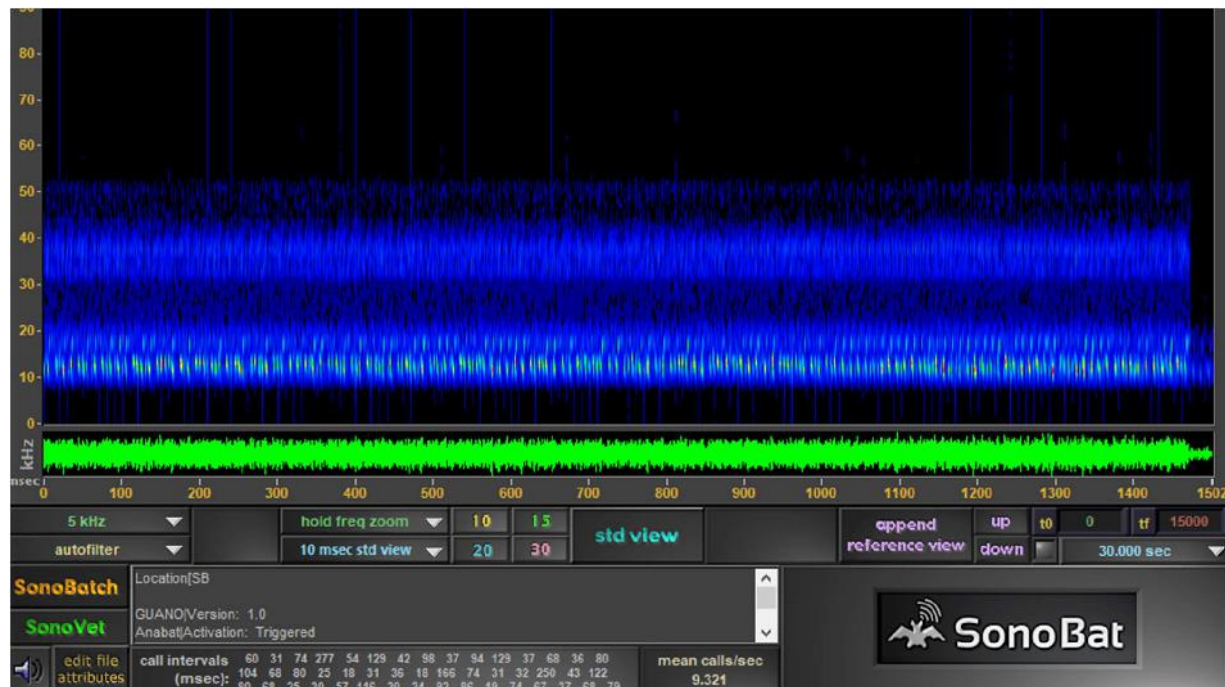


Figure 7: An example of a recording manually vetted and classified as an insect call. This recording was classified as FBB by the Sonobat auto-classification tool and recorded at Station 2. Note the absence of regularly spaced search phase calls. When listening to the call played in real-time, it becomes clear that this is a recording of an insect.

Five non-listed bat species were documented, the Brazilian free-tailed bat, the northern yellow bat (*Lasiurus intermedius*), the red bat (*Lasiurus borealis*), the evening bat (*Nycticeius humeralis*), the southeastern myotis (*Myotis austroriparius*), and the tri-colored bat (*Perimyotis subflavus*). A total of

566 bat calls were detected throughout the study period, with most calls identified as Brazilian free-tailed bats (Table 2).

Table 1: Summary of recordings identified via manual vetting during the study period displayed by bat species and recording device.

Recording Device	Florida bonneted bat (<i>Eumops floridanus</i>)	Brazilian free-tailed bat (<i>Tadarida brasiliensis</i>)	Northern yellow bat (<i>Lasiurus intermedius</i>)	Red Bat (<i>Lasiurus borealis</i>)	Evening Bat (<i>Nycticeius humeralis</i>)	Tri-Colored Bat (<i>Perimyotis subflavus</i>)	Southeastern Myotis (<i>Myotis austroriparius</i>)	Total Bat Calls Per Recording Device
Station #1	0	308	112	1	9	39	10	479
Station #2	0	54	10	0	6	15	2	87
Total:	0	362	122	1	15	54	12	566

5 CONCLUSIONS

The FDOT Highway 70 and 72 Project is a planned road expansion and roundabout installation for the intersection of Florida Highway 70 and 72 approximately 2 miles west of the city of Arcadia (Figure 1). The Project involves the expansion of roadways and installation of a road roundabout within an approximately 0.7-mile construction area, impacting areas of forested and non-forested wetlands and uplands.

The Site is within the USFWS consultation area for the endangered Florida bonneted bat and contains potential foraging and roosting habitat including forested uplands and forested wetlands. Neighboring properties contain a mixture of open pastureland and forested areas. Potential foraging and roosting habitats were surveyed for 8 detector nights during 8 calendar days resulting in the detection of six non-listed species: the Brazilian free-tailed bat, northern yellow bat, red bat, evening bat, southeastern myotis, and tri-colored bat. The Site does not appear to be utilized by the FBB. As specified in the Guidelines, all raw acoustic data will be provided to the USFWS under separate cover. Raw acoustic data will be provided as “all raw data” in digital format via secure FTP or external hard drive.

No effect to the species is anticipated as a result of construction and operation of the Project. However, WSP recommends that FDOT follow the USFWS-recommended Best Management Practices to minimize potential impacts to the FBB outlined in Appendix D of the Guidelines.

6 REFERENCES

- Bailey, A.M., H.K. Ober, A.R. Sovie, and R.A. McCleery. 2017. Impact of Land Use and Climate on the Distribution of the Endangered Florida Bonneted Bat. *Journal of Mammalogy*. 98(6): 1586-1593.
- Bat Survey Solutions. 2020. Acoustic Survey Methods Course, Punta Gorda, FL. January 10-16, 2020. Lecture material provided by Janet Tyburec, and John Chenger, <https://batsurveysolutions.com/>.
- Bohn, K.M. and E.H. Gillam. 2018. In-flight Social Calls: a Primer for Biologists and Managers Studying Echolocation. *Canadian Journal of Zoology*. 96:787-800.
- Braun de Torrez, E.C., H.K. Ober, and R.A. McCleery. 2016. Use of Multi-tactic Approach to Locate an endangered Florida Bonneted Bat Roost. *Southeastern Naturalist*. 15: 235-242.
- Britzke, E.R., E.H. Gilliam, and K.L. Murray. 2013. Current State of Understanding of Ultrasonic Detectors for the study of Bat Ecology. *Acta Theriologica* 58:109-117.
- Marks, C.S. and G.E. Marks. 2006. *Bats of Florida*. University Press of Florida.
- Ober, H. 2015. Annual report to USFWS for calendar year 2015. Permit number TE23583B-1. University of Florida, Department of Wildlife Ecology and Conservation, North Florida Research and Education Center. Quincy, Florida
- Ober, H. 2016. Annual report to USFWS for calendar year 2016. Permit number TE23583B-1. University of Florida, Department of Wildlife Ecology and Conservation, North Florida Research and Education Center. Quincy, Florida
- Sonobat. 2017. Echolocation Call Characteristics of Florida Bats – Sonobat v.4x. J.M. Szewczak, Humboldt State University Bat Lab.
- Sonobat 2022. Sonobat Bat Call Analysis Software Version 4 developed by J.M. Szewczak, Humboldt State University Bat Lab.
- Terracon 2021. Acoustic and Roost Survey for the Florida Bonneted Bat (*Eumops floridanus*) on the Highlands North Solar Site in Highlands County, Florida. USFWS Consultation # 2020-TA-0992 submitted August 31, 2021
- Titely Scientific 2022. Anabat Chorus Ultrasonic Recording device, Columba, Missouri.
- U.S. Fish and Wildlife Service. 2019. *Florida Bonneted Bat Consultation Guidelines*. Vero Beach, Florida.
- Wildlife Acoustics Inc, 2019. SM4BAT FS, MINI BAT FS, Maynard, Massachusetts.

SIGNATURE PAGE

WSP USA Inc



Joel Wixson
Environmental Scientist

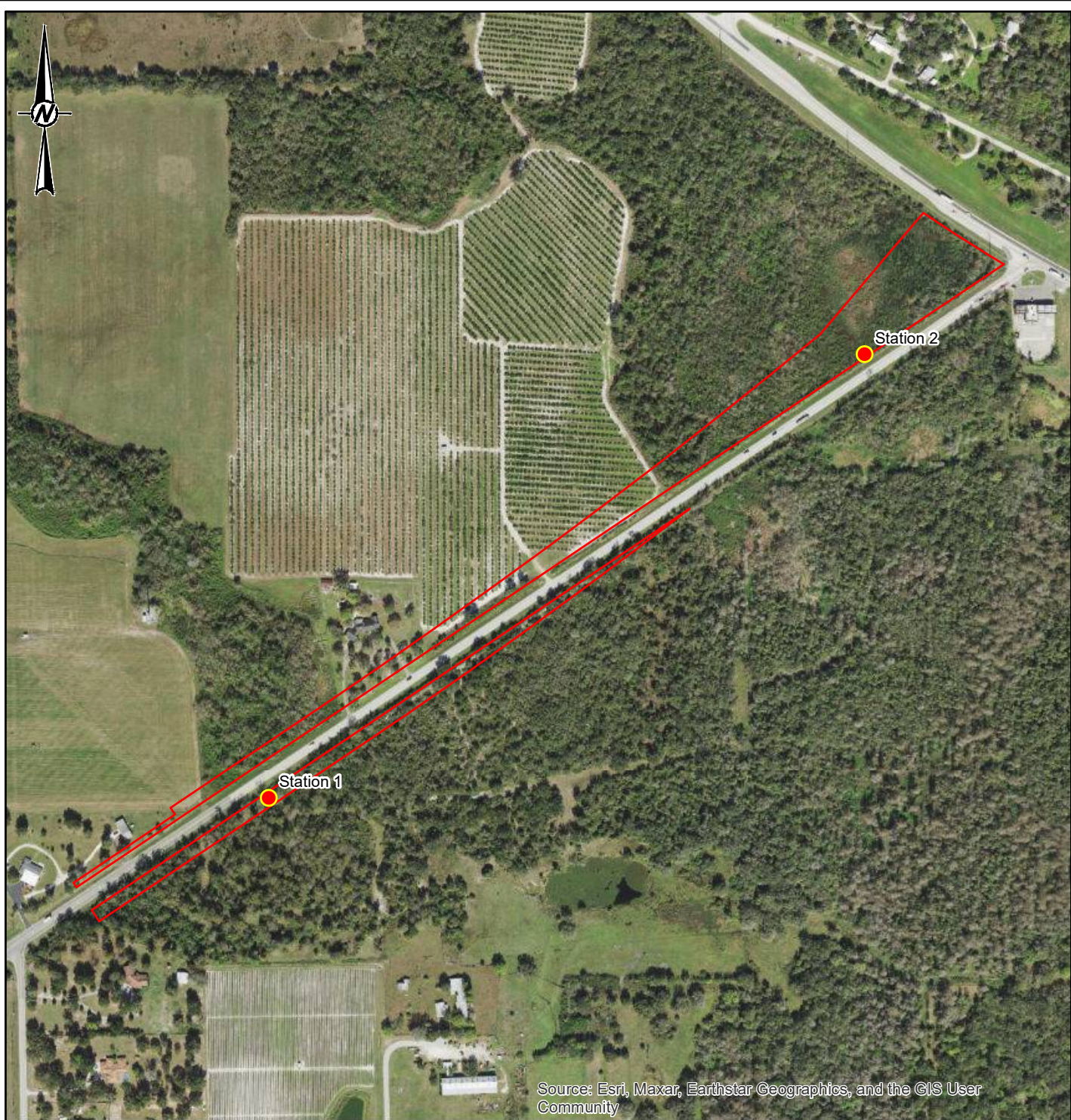


Karl Bullock
Director, Environmental Permitting

JW/KB

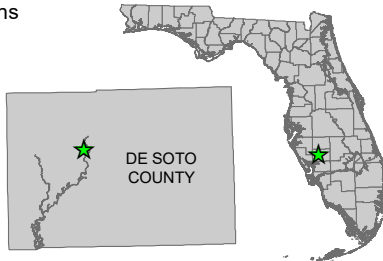
[https://golderassociates-my.sharepoint.com/personal/jwixson_golder_com/documents/desktop/draft cavendish fbb report 8-2-2021.docx](https://golderassociates-my.sharepoint.com/personal/jwixson_golder_com/documents/desktop/draft%20cavendish%20fbb%20report%208-2-2021.docx)

PATH: G:\Projects\Quest Ecology\Arcadia Roundabout\09 PROJECTS\2022\16412 FBB Surveys\A FBB Surveys\A003 SurveyStations.mxd



LEGEND

- FBB Acoustic Survey Stations
- Project Location
- Project Boundary



REFERENCE(S)

PROJECT LOCATION: WSP 2022
PROJECT BOUNDARY: QUEST ECOLOGY 2023
COORDINATE SYSTEM: NAD 1983 STATEPLANE FLORIDA NORTH FIPS 0903 FEET
PROJECTION: LAMBERT CONFORMAL CONIC
DATUM: NORTH AMERICAN 1983

CLIENT

QUEST ECOLOGY

PROJECT

SR 70 AND SR72 ROUNDABOUT INSTALATION
FLORIDA BONNETED BAT ACOUSTIC SURVEYS

TITLE

FBB SURVEY STATIONS

CONSULTANT



YYYY-MM-DD 2023-03-03

DESIGNED JGW

PREPARED JGW

REVIEWED KAB

APPROVED KAB

PROJECT NO.
202216412

CONTROL
A003

REV.
0

FIGURE
2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A



APPENDIX A – STATION PHOTOGRAPHS

Florida Bonneted Bat (*Eumops floridanus*) Acoustic Survey

FDOT Florida Highway 70 and 72 Roundabout

Station ID:
Station 1

Device Type:
AnaBat Chorus

Device ID:
AB1



Station ID:
Station 2

Device Type:
AnaBat Chorus

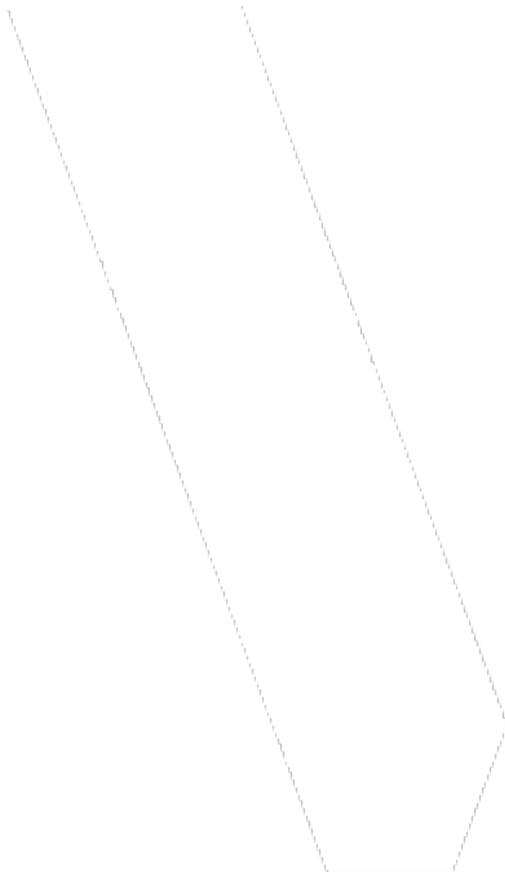
Device ID:
AB2



FDOT Florida Highway 70 and 72 Roundabout

Florida Bonneted Bat (*Eumops floridanus*) Acoustic Survey

APPENDIX B – Weather Reports



Station: **PUNTA GORDA CHARLOTTE CO AIRPORT, FL US WBAN: 72203412812 (KPGD)**

Date	Temperature (F)							Degree Days (base 65F)		Sun (LST)		Weather			Precipitation (in)			Pressure (inHg)		Wind	Maximum Wind Speed = MPH							
	Max	Min	Avg	Dep	ARH	ADP	AWB	Heat	Cool	Rise	Set	Weather Type	TLC	Snow Fall	Snow Depth	Avg Stn	Avg SL	Avg Speed	Direction = Degrees									
																			Peak Speed	Peak Dir	Sust. Speed	Sust. Dir						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23						
01	83	62	73	9.9				0	8	0714	1810	FG BR	0.00	0.0	0	30.17		3.3	17	280	12	260						
02	83	60	72	8.8				0	7	0713	1811	FG BR	0.00	0.0	0	30.14		5.3	19	250	15	240						
03	81	58	70	6.7				0	5	0713	1812	RA FG BR	0.05	0.0	0	30.09		9.6	27	030	21	030						
04	78	53	66	2.6				0	1	0712	1812		T	0.0	0	30.25		14.1	34	050	25	070						
05	82	58	70	6.5				0	5	0711	1813		0.00	0.0	0	30.14		6.4	26	100	21	100						
06	81	61	71	7.3				0	6	0711	1814		0.00	0.0	0	30.12		8.5	23	050	16	040						
07	81	55	68	4.2				0	3	0710	1814		0.00	0.0	0	30.20		9.5	25	090	21	100						
08	83	56	70	6.1				0	5	0710	1815		0.00	0.0	0	30.20		8.7	22	090	17	090						
09	87	58	73	9.0				0	8	0709	1816		0.10	0.0	0	30.14		8.2	26	160	18	140						
10	87	63	75	10.9				0	10	0708	1817	FG BR	0.00	0.0	0	30.10		8.7	24	220	18	240						
11	85	65	75	10.8				0	10	0708	1817		T	0.0	0	29.99		13.1	33	210	24	190						
12	73	63	68	3.7s				0s	3s	0707	1818	RA BR	0.01	0.0	0	29.95		17.7	42	290	31	270						
13	73	52	63	-1.5				2	0	0706	1819		0.00	0.0	0	30.03		8.5	21	290	16	290						
14	79	44*	62	-2.6				3	0	0705	1819		0.00	0.0	0	30.08		5.9	21	150	15	140						
15	84	52	68	3.3				0	3	0705	1820		0.00	0.0	0	30.12		7.3	25	180	18	160						
16	86	61	74	9.2				0	9	0704	1821		0.00	0.0	0	30.09		8.3	30	160	20	200						
17	86	62	74	9.0				0	9	0703	1821	BR	0.00	0.0	0	30.07		8.7	26	250	18	250						
18	78	60	69	3.9				0	4	0702	1822		0.00	0.0	0	30.20		11.5	26	060	18	060						
19	85	60	73	7.8				0	8	0701	1823		0.00	0.0	0	30.20		6.7	18	250	13	250						
20	82	60	71	5.6				0	6	0701	1823	FG MIFG BR	0.00	0.0	0	30.11		5.3	22	250	16	260						
21	81	61	71	5.5				0	6	0700	1824	FG BR	0.00	0.0	0	30.04		6.2	19	230	14	230						
22	88	58	73	7.4				0	8	0659	1825	FG BR HZ	0.00	0.0	0	30.09		8.0	25	190	20	180						
23	87	65	76	10.2				0	11	0658	1825	HZ	0.00	0.0	0	30.17		7.1	18	150	14	240						
24	90*	64	77	11.1				0	12	0657	1826	HZ	0.00	0.0	0	30.24		3.5	17	120	12	260						
25	87	62	75	9.0				0	10	0656	1827	HZ	0.00	0.0	0	30.21		5.4	20	280	15	280						
26	85	60	73	6.8				0	8	0655	1827	MIFG FG	0.00	0.0	0	30.11		6.1	22	240	16	250						
27	82	54	68	1.7				0	3	0654	1828	MIFG HZ FG	0.00	0.0	0	30.02		8.3	29	250	20	240						
28	83	58	71	4.6				0	6	0653	1828	FG BR HZ	0.00	0.0	0	29.99		6.9	26	290	18	230						
	82.9	58.6	70.8							Monthly Averages Totals			0.16			30.12	30.15	8.1										
	6.2	5.9	6.1	Departure from Normal (1981-2010)									-2.32s															
Degree Days										Number of days with...																		
	Monthly					Season-to-date					Temperature					Precipitation			Snow		Weather							
	Total		Departure			Total		Departure			Max		Min															
Heating	6		-77			176					>=90°		<=32°		<=32°		<=0°		>=0.01"		>=0.1"		>=1"		T-Storms		Heavy Fog	
Cooling	168		93			279					1		0		0		0		3		1		0				9	
Date of 5-sec to 3-sec wind equipment change									Sea Level Pressure						Greatest...													
N/A												Date		Time		24-Hr...					Snow Depth							
									Maximum			30.33		04		1106		Precip					Snowfall					
									Minimum			29.94		12		1608		0.10										
															09-09													
Station Augmentation																												
Name:N/A Lat: N/A Lon: N/A Elevation: N/A Distance: N/A Elements: N/A Equipment: N/A																												

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data, and Information Service

Local Climatological Data
Hourly Observations
February 2023

National Centers for Environmental Information
151 Patton Avenue
Asheville, North Carolina 28801

Current Location: Elev: 20 ft. Lat: 26.9185° N Lon: -81.9939° W
Station: PUNTA GORDA CHARLOTTE CO AIRPORT, FL US WBAN: 72203412812 (KPGD)
Generated on 02/13/2023

D a t e	Time (LST)	Sta- tion Type	Sky Conditions	Visi- bility	Weather Type (see documentation)	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Hum %	Wind Speed (MPH)	Wind Dir (Deg)	Wind Gusts (MPH)	Station Press (inHg)	Press Tend	Net 3- Hr Change (inHg)	Sea Level Press (inHg)	Report Type	Precip Total (in)	Alti- meter Setting (inHg)
					AU AW MW	(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
08	0053	7	CLR:00	10.00		60	15.6	58	14.4	57	13.9	90	5	080		30.23	8	+0.01	30.26	FM-15	0.00	30.26
08	0153	7	CLR:00	10.00		59	15.0	57	13.9	56	13.3	90	5	090		30.22			30.24	FM-15	0.00	30.25
08	0253	7	CLR:00	10.00		57	13.9	56	13.3	56	13.3	96	6	050		30.21			30.23	FM-15	0.00	30.24
08	0353	7	CLR:00	10.00		57	13.9	56	13.3	55	12.8	93	7	030		30.20	6	+0.03	30.23	FM-15	0.00	30.23
08	0453	7	CLR:00	10.00		57	13.9	56	13.3	56	13.3	96	7	080		30.19			30.21	FM-15	0.00	30.22
08	0553	7	CLR:00	10.00		57	13.9	56	13.3	55	12.8	93	6	080		30.20			30.22	FM-15	0.00	30.23
08	0653	7	CLR:00	10.00		56	13.3	55	12.8	55	12.8	97	6	050		30.21	3	-0.01	30.24	FM-15	0.00	30.24
08	0753	7	CLR:00	10.00		59	15.0	58	14.4	57	13.9	93	6	050		30.23			30.26	FM-15	0.00	30.26
08	0853	7	CLR:00	10.00		66	18.9	62	16.7	60	15.6	81	7	080		30.24			30.27	FM-15	0.00	30.27
08	0953	7	CLR:00	10.00		73	22.8	66	18.9	61	16.1	66	10	110		30.26	1	-0.05	30.28	FM-15	0.00	30.29
08	1053	7	FEW:02 30	10.00		77	25.0	66	18.9	59	15.0	54	10	120		30.26			30.29	FM-15	0.00	30.29
08	1153	7	FEW:02 40	10.00		78	25.6	66	18.9	59	15.0	52	8	100	20	30.25			30.27	FM-15	0.00	30.28
08	1253	7	CLR:00	10.00		81	27.2	68	20.0	61	16.1	51	11	110	18	30.21	8	+0.05	30.23	FM-15	0.00	30.24
08	1353	7	CLR:00	10.00		82	27.8	70	21.1	63	17.2	53	13	090	20	30.17			30.20	FM-15	0.00	30.20
08	1453	7	CLR:00	10.00		82	27.8	70	21.1	64	17.8	55	11	100	21	30.16			30.18	FM-15	0.00	30.19
08	1653	6	CLR:00	10.00		80	26.7	67	19.4	59	15.0	49	15	100	22	30.14			30.17	FM-15	0.00	30.17
08	1753	6	CLR:00	10.00		76	24.4	66	18.9	60	15.6	58	13	090		30.15			30.18	FM-15	0.00	30.18
08	1853	6	CLR:00	10.00		72	22.2	65	18.3	60	15.6	66	9	080		30.16	3	-0.01	30.19	FM-15	0.00	30.19
08	1953	6	BKN:07 50	10.00		71	21.7	64	17.8	60	15.6	68	11	090		30.19			30.22	FM-15	0.00	30.22
08	2053	6	FEW:02 50	10.00		70	21.1	64	17.8	60	15.6	71	10	110		30.20			30.23	FM-15	0.00	30.23
08	2153	6	CLR:00	10.00		67	19.4	63	17.2	60	15.6	79	7	110		30.21	1	-0.05	30.23	FM-15	0.00	30.24
08	2253	6	CLR:00	10.00		65	18.3	62	16.7	60	15.6	84	6	110		30.20			30.22	FM-15	0.00	30.23
08	2353	6	SCT:04 41	10.00		63	17.2	61	16.1	59	15.0	87	6	080		30.19			30.21	FM-15	0.00	30.22

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data, and Information Service

Local Climatological Data
Hourly Observations
February 2023

National Centers for Environmental Information
151 Patton Avenue
Asheville, North Carolina 28801

Current Location: Elev: 20 ft. Lat: 26.9185° N Lon: -81.9939° W
Station: PUNTA GORDA CHARLOTTE CO AIRPORT, FL US WBAN: 72203412812 (KPGD)
Generated on 02/15/2023

Date	Time (LST)	Station Type	Sky Conditions	Visibility	Weather Type (see documentation)	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Hum %	Wind Speed (MPH)	Wind Dir (Deg)	Wind Gusts (MPH)	Station Press (inHg)	Press Tend	Net 3-Hr Change (inHg)	Sea Level Press (inHg)	Report Type	Precip Total (in)	Alti-meter Setting (inHg)
					AU AW MW	(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
09	0053	7	FEW:02 34	10.00		62	16.7	60	15.6	59	15.0	90	7	090		30.17	8	+0.04	30.20	FM-15	0.00	30.20
09	0153	7	CLR:00	10.00		61	16.1	60	15.6	59	15.0	93	7	080		30.16			30.19	FM-15	0.00	30.19
09	0253	7	CLR:00	10.00		60	15.6	59	15.0	58	14.4	93	5	070		30.15			30.18	FM-15	0.00	30.18
09	0353	7	CLR:00	10.00		60	15.6	59	15.0	58	14.4	93	6	070		30.15	6	+0.02	30.17	FM-15	0.00	30.18
09	0453	7	CLR:00	10.00		59	15.0	58	14.4	58	14.4	96	6	090		30.15			30.17	FM-15	0.00	30.18
09	0553	7	CLR:00	10.00		59	15.0	58	14.4	58	14.4	96	5	100		30.16			30.19	FM-15	0.00	30.19
09	0653	6	FEW:02 100	10.00		60	15.6	59	15.0	58	14.4	93	5	080		30.18	3	-0.03	30.20	FM-15	0.00	30.21
09	0753	7	CLR:00	9.00		63	17.2	62	16.7	61	16.1	93	5	040		30.19			30.21	FM-15	0.00	30.22
09	0853	7	CLR:00	10.00		70	21.1	67	19.4	65	18.3	84	8	100		30.19			30.22	FM-15	0.00	30.22
09	0953	7	CLR:00	10.00		77	25.0	71	21.7	68	20.0	74	10	140		30.21	3	-0.03	30.24	FM-15	0.00	30.24
09	1053	7	SCT:04 30	10.00		81	27.2	72	22.2	67	19.4	62	17	140	23	30.20			30.22	FM-15	0.00	30.23
09	1153	7	FEW:02 32	10.00		83	28.3	72	22.2	67	19.4	59	10	160	23	30.17			30.19	FM-15	0.00	30.20
09	1253	6	FEW:02 40	10.00		86	30.0	73	22.8	67	19.4	53	14	160	21	30.14	8	+0.07	30.16	FM-15	0.00	30.17
09	1353	7	FEW:02 43 SCT:04 50	10.00		85	29.4	72	22.2	65	18.3	51	9	180		30.11			30.14	FM-15	0.00	30.14
09	1453	7	FEW:02 70	10.00		84	28.9	73	22.8	67	19.4	57	11	240		30.09			30.12	FM-15	0.00	30.12
09	1553	7	BKN:07 50 BKN:07 60	10.00		84	28.9	74	23.3	69	20.6	61	14	260		30.09	6	+0.05	30.12	FM-15	0.00	30.12
09	1653	7	FEW:02 47 BKN:07 65 OVC:08 95	10.00		81	27.2	73	22.8	69	20.6	67	11	240		30.10			30.12	FM-15	T	30.13
09	1753	7	FEW:02 48	10.00		78	25.6	71	21.7	68	20.0	71	8	250		30.11			30.13	FM-15	0.00	30.14
09	1853	7	SCT:04 50	10.00		77	25.0	71	21.7	68	20.0	74	8	210		30.11	2	-0.02	30.14	FM-15	0.00	30.14
09	1953	7	SCT:04 38 BKN:07 45	10.00		76	24.4	71	21.7	68	20.0	77	9	200		30.13			30.16	FM-15	T	30.16
09	2053	7	FEW:02 32 BKN:07 39 OVC:08 60	10.00		73	22.8	71	21.7	70	21.1	90	6	160		30.14			30.17	FM-15	0.10	30.17
09	2153	7	CLR:00	10.00		71	21.7	70	21.1	69	20.6	94	5	130		30.15	1	-0.04	30.18	FM-15	0.00	30.18
09	2253	7	CLR:00	10.00		69	20.6	68	20.0	68	20.0	96	5	110		30.15			30.18	FM-15	0.00	30.18
09	2353	7	CLR:00	10.00		69	20.6	68	20.0	67	19.4	93	5	120		30.14			30.17	FM-15	0.00	30.17

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data, and Information Service

Local Climatological Data
Hourly Observations
February 2023

National Centers for Environmental Information
151 Patton Avenue
Asheville, North Carolina 28801

Current Location: Elev: 20 ft. Lat: 26.9185° N Lon: -81.9939° W
Station: PUNTA GORDA CHARLOTTE CO AIRPORT, FL US WBAN: 72203412812 (KPGD)
Generated on 02/15/2023

Date	Time (LST)	Station Type	Sky Conditions	Visi- bility	Weather Type (see documentation)	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Hum %	Wind Speed (MPH)	Wind Dir (Deg)	Wind Gusts (MPH)	Station Press (inHg)	Press Tend	Net 3-Hr Change (inHg)	Sea Level Press (inHg)	Report Type	Precip Total (in)	Alti- meter Setting (inHg)
					AU AW MW	(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
10	0053	7	CLR:00	10.00		68	20.0	67	19.4	67	19.4	96	5	130		30.14	8	+0.01	30.16	FM-15	0.00	30.17
10	0153	7	CLR:00	10.00		67	19.4	67	19.4	67	19.4	100	6	120		30.12			30.14	FM-15	0.00	30.15
10	0253	7	CLR:00	10.00		67	19.4	66	18.9	66	18.9	97	6	130		30.11			30.14	FM-15	0.00	30.14
10	0353	7	CLR:00	10.00		67	19.4	66	18.9	66	18.9	97	6	120		30.10	6	+0.04	30.13	FM-15	0.00	30.13
10	0453	7	CLR:00	7.00		66	18.9	65	18.3	65	18.3	96	0	000		30.12			30.14	FM-15	0.00	30.15
10	0505	7	FEW:02 17	1.50	BR:1	65	18.3	65	18.3	65	18.3	100	3	060		30.12				FM-16		30.15
10	0508	7	VV:09 17	0.75	BR:1	65	18.3	64	17.8	64	17.8	97	3	060		30.12				FM-16		30.15
10	0553	7	VV:09 14	0.50	FG:2 FG	63	17.2	63	17.2	63	17.2	100	5	080		30.13			30.15	FM-15	0.00	30.16
10	0607	7	VV:09 14	1.00	BR:1	63	17.2	63	17.2	63	17.2	100	3	090		30.13				FM-16		30.16
10	0630	7	VV:09 16	1.00	BR:1	63	17.2	63	17.2	63	17.2	100	0	000		30.14				FM-16		30.17
10	0648	7	VV:09 14	0.50	FG:2 FG	63	17.2	63	17.2	63	17.2	100	5	070		30.14				FM-16		30.17
10	0651	6	VV:09 13	0.25	FG:2 FG	63	17.2	63	17.2	63	17.2	100	5	070		30.15				FM-16		30.18
10	0653	7	VV:09 13	0.50	FG:2 FG	63	17.2	63	17.2	63	17.2	100	5	090		30.15	3	-0.04	30.17	FM-15	0.00	30.18
10	0714	7	VV:09 11	0.25	FG:2 FG	63	17.2	63	17.2	63	17.2	100	5	100		30.15				FM-16		30.18
10	0726	7	VV:09 12	0.50	FG:2 FG	63	17.2	63	17.2	63	17.2	100	5	100		30.15				FM-16		30.18
10	0734	7	VV:09 9	0.25	FG:2 FG	63	17.2	63	17.2	63	17.2	100	3	110		30.15				FM-16		30.18
10	0751	6	VV:09 9	0.50	FG:2 FG	66	18.9	66	18.9	66	18.9	100	3	120		30.15				FM-16		30.18
10	0753	7	VV:09 9	0.50	FG:2 FG	66	18.9	66	18.9	66	18.9	100	3	120		30.15		30.17	FM-15	0.00	30.18	
10	0759	7	VV:09 10	1.00	BR:1	66	18.9	66	18.9	66	18.9	100	5	120		30.15				FM-16		30.18
10	0805	7	BKN:07 10	3.00	BR:1	67	19.4	67	19.4	67	19.4	100	6	120		30.15				FM-16		30.18
10	0815	7	SCT:04 11	8.00		68	20.0	68	20.0	68	20.0	100	7	130		30.15				FM-16		30.18
10	0853	7	FEW:02 34	10.00		70	21.1	69	20.6	69	20.6	97	10	150		30.15		30.18	FM-15	0.00	30.18	
10	0953	7	SCT:04 38	10.00		75	23.9	71	21.7	69	20.6	82	11	160		30.15	2	-0.01	30.18	FM-15	0.00	30.18
10	1053	7	BKN:07 48	10.00		80	26.7	72	22.2	68	20.0	67	15	160		30.14			30.17	FM-15	0.00	30.17
10	1153	7	CLR:00	10.00		82	27.8	73	22.8	68	20.0	63	13	160		30.11			30.14	FM-15	0.00	30.14
10	1253	7	FEW:02 36 SCT:04 46 BKN:07 55	10.00		84	28.9	73	22.8	68	20.0	59	13	180	23	30.08	8	+0.07	30.11	FM-15	0.00	30.11
10	1353	7	BKN:07 39 BKN:07 50	10.00		84	28.9	72	22.2	66	18.9	55	14	200		30.06			30.08	FM-15	0.00	30.09
10	1453	7	CLR:00	10.00		86	30.0	71	21.7	63	17.2	46	14	230	21	30.03			30.06	FM-15	0.00	30.06
10	1553	7	SCT:04 36	10.00		84	28.9	72	22.2	66	18.9	55	13	230		30.04	5	+0.04	30.06	FM-15	0.00	30.07
10	1653	7	BKN:07 90	10.00		80	26.7	71	21.7	67	19.4	64	16	240		30.05			30.07	FM-15	0.00	30.08
10	1753	7	BKN:07 95	10.00		78	25.6	71	21.7	67	19.4	69	14	220		30.06			30.08	FM-15	0.00	30.09
10	1853	6	CLR:00	10.00		74	23.3	69	20.6	67	19.4	79	8	200		30.05	0	-0.01	30.08	FM-15	0.00	30.08
10	1953	7	CLR:00	10.00		74	23.3	68	20.0	65	18.3	74	9	210		30.07			30.09	FM-15	0.00	30.10
10	2053	7	CLR:00	10.00		73	22.8	69	20.6	66	18.9	79	9	200		30.09			30.11	FM-15	0.00	30.12
10	2153	7	CLR:00	10.00		71	21.7	68	20.0	66	18.9	84	7	200		30.08	0	-0.03	30.11	FM-15	0.00	30.11
10	2253	7	FEW:02 80	10.00		68	20.0	66	18.9	65	18.3	90	6	150		30.08			30.11	FM-15	0.00	30.11
10	2353	7	BKN:07 80	10.00		67	19.4	66	18.9	65	18.3	93	5	160		30.08			30.11	FM-15	0.00	30.11

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data, and Information Service

Local Climatological Data
Hourly Observations
February 2023

National Centers for Environmental Information
151 Patton Avenue
Asheville, North Carolina 28801

Current Location: Elev: 20 ft. Lat: 26.9185° N Lon: -81.9939° W
Station: PUNTA GORDA CHARLOTTE CO AIRPORT, FL US WBAN: 72203412812 (KPGD)
Generated on 02/15/2023

Date	Time (LST)	Station Type	Sky Conditions	Visi- bility	Weather Type (see documentation)	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Hum %	Wind Speed (MPH)	Wind Dir (Deg)	Wind Gusts (MPH)	Station Press (inHg)	Press Tend	Net 3-Hr Change (inHg)	Sea Level Press (inHg)	Report Type	Precip Total (in)	Alti-meter Setting (inHg)
					AU AW MW	(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
11	0053	7	SCT:04 85	10.00		66	18.9	65	18.3	65	18.3	96	0	000		30.07	8	+0.01	30.10	FM-15	0.00	30.10
11	0153	7	CLR:00	10.00		65	18.3	64	17.8	64	17.8	97	3	140		30.06			30.09	FM-15	0.00	30.09
11	0253	6	CLR:00	10.00		67	19.4	66	18.9	66	18.9	97	7	150		30.04			30.06	FM-15	0.00	30.07
11	0353	7	SCT:04 47	10.00		68	20.0	67	19.4	67	19.4	96	7	150		30.02	8	+0.05	30.05	FM-15	0.00	30.05
11	0453	7	BKN:07 45 OVC:08 55	10.00		68	20.0	67	19.4	67	19.4	96	7	150		30.02			30.05	FM-15	0.00	30.05
11	0553	7	CLR:00	10.00		68	20.0	67	19.4	67	19.4	96	7	140		30.02			30.04	FM-15	0.00	30.05
11	0653	7	SCT:04 25	10.00		68	20.0	67	19.4	67	19.4	96	7	140		30.03	3	-0.01	30.06	FM-15	0.00	30.06
11	0753	6	FEW:02 60	9.00		70	21.1	69	20.6	69	20.6	97	7	140		30.04			30.07	FM-15	0.00	30.07
11	0820	7	SCT:04 60	10.00		71	21.7	70	21.1	70	21.1	96	9	140		30.05				FM-16		30.08
11	0853	7	CLR:00	10.00		74	23.3	72	22.2	71	21.7	91	13	150		30.05			30.07	FM-15	0.00	30.08
11	0953	7	CLR:00	10.00		79	26.1	74	23.3	71	21.7	77	16	170		30.05	0	-0.01	30.07	FM-15	0.00	30.08
11	1053	6	CLR:00	10.00		82	27.8	73	22.8	69	20.6	65	17	180		30.04			30.06	FM-15	0.00	30.07
11	1153	7	FEW:02 25	10.00		83	28.3	73	22.8	68	20.0	61	21	190	28	30.01			30.04	FM-15	0.00	30.04
11	1253	7	SCT:04 33	10.00		85	29.4	74	23.3	69	20.6	59	17	200	26	29.99	8	+0.06	30.01	FM-15	0.00	30.02
11	1353	7	SCT:04 31	10.00		83	28.3	73	22.8	68	20.0	61	22	200		29.96			29.98	FM-15	0.00	29.99
11	1453	6	FEW:02 30	10.00		81	27.2	73	22.8	69	20.6	67	20	190	31	29.95			29.97	FM-15	0.00	29.98
11	1551	6	BKN:07 28	10.00		82	27.8	73	22.8	68	20.0	62	23	210	32	29.93				FM-16		29.96
11	1553	7	BKN:07 28	10.00		82	27.8	73	22.8	68	20.0	63	21	200	32	29.93	6	+0.06	29.95	FM-15	0.00	29.96
11	1601	7	SCT:04 27	10.00		82	27.8	73	22.8	69	20.6	65	21	200	31	29.92				FM-16		29.95
11	1653	7	FEW:02 26	10.00		79	26.1	73	22.8	70	21.1	74	14	200	29	29.93			29.95	FM-15	0.00	29.96
11	1753	7	SCT:04 110	10.00		79	26.1	73	22.8	70	21.1	74	18	200	26	29.94			29.97	FM-15	0.00	29.97
11	1853	7	FEW:02 16	10.00		76	24.4	73	22.8	71	21.7	85	15	210	22	29.95	3	-0.02	29.97	FM-15	0.00	29.98
11	1909	7	BKN:07 16	10.00		76	24.4	73	22.8	72	22.2	88	14	210		29.95				FM-16		29.98
11	1930	6	BKN:07 14	10.00		76	24.4	73	22.8	72	22.2	88	16	210	24	29.95				FM-16		29.98
11	1953	6	BKN:07 13 OVC:08 20	10.00		76	24.4	73	22.8	72	22.2	88	15	220	22	29.96			29.98	FM-15	0.00	29.99
11	2035	7	SCT:04 12	10.00		75	23.9	73	22.8	72	22.2	90	15	210		29.96				FM-16		29.99
11	2053	7	FEW:02 12 SCT:04 18 BKN:07 55	10.00		75	23.9	72	22.2	71	21.7	88	21	240	29	29.96			29.99	FM-15	0.00	29.99
11	2153	7	SCT:04 65 BKN:07 120	10.00		73	22.8	69	20.6	67	19.4	81	11	230		29.96	0	-0.01	29.98	FM-15	T	29.99
11	2242	7	BKN:07 17 BKN:07 25 OVC:08 43	10.00		74	23.3	71	21.7	69	20.6	85	15	230	21	29.96				FM-16		29.99
11	2253	7	BKN:07 17 BKN:07 25 OVC:08 43	10.00		74	23.3	71	21.7	69	20.6	85	15	240	24	29.96			29.98	FM-15	0.00	29.99
11	2317	6	OVC:08 14	10.00		73	22.8	69	20.6	67	19.4	81	14	270		29.95				FM-16		29.98
11	2326	7	OVC:08 16	10.00		72	22.2	69	20.6	67	19.4	84	15	270	21	29.96				FM-16		29.99
11	2353	7	BKN:07 17 OVC:08 29	10.00		71	21.7	68	20.0	66	18.9	84	15	280		29.95			29.98	FM-15	0.00	29.98

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data, and Information Service

Local Climatological Data
Hourly Observations
February 2023

National Centers for Environmental Information
151 Patton Avenue
Asheville, North Carolina 28801

Current Location: Elev: 20 ft. Lat: 26.9185° N Lon: -81.9939° W
Station: PUNTA GORDA CHARLOTTE CO AIRPORT, FL US WBAN: 72203412812 (KPGD)
Generated on 02/15/2023

Date	Time (LST)	Station Type	Sky Conditions	Visi- bility	Weather Type (see documentation)	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Hum %	Wind Speed (MPH)	Wind Dir (Deg)	Wind Gusts (MPH)	Station Press (inHg)	Press Tend	Net 3-Hr Change (inHg)	Sea Level Press (inHg)	Report Type	Precip Total (in)	Alti- meter Setting (inHg)
					AU AW MW	(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
12	0041	7	BKN:07 13 OVC:08 22	10.00		70	21.1	67	19.4	66	18.9	87	13	290		29.94				FM-16		29.97
12	0051	6	FEW:02 11 OVC:08 19	10.00		70	21.1	66	18.9	64	17.8	83	17	290	23	29.94				FM-16		29.97
12	0053	7	FEW:02 11 BKN:07 16 OVC:08 21	10.00		70	21.1	66	18.9	64	17.8	82	14	280	23	29.95	6	+0.01	29.97	FM-15	0.00	29.98
12	0153	7	FEW:02 24 OVC:08 32	10.00		70	21.1	66	18.9	63	17.2	79	10	260		29.94			29.96	FM-15	0.00	29.97
12	0207	7	FEW:02 13 BKN:07 23 OVC:08 32	10.00	-RA:02 RA RA	68	20.0	66	18.9	64	17.8	87	17	280	32	29.94				FM-16	T	29.97
12	0237	7	BKN:07 8 BKN:07 14 OVC:08 19	6.00	-RA:02 BR:1 RA RA	65	18.3	64	17.8	63	17.2	93	17	280	28	29.96				FM-16	T	29.99
12	0253	7	BKN:07 6 BKN:07 13 OVC:08 20	4.00	-RA:02 BR:1 RA RA	64	17.8	63	17.2	63	17.2	96	18	280	25	29.96			29.98	FM-15	0.01	29.99
12	0307	7	SCT:04 6 BKN:07 11 OVC:08 18	5.00	-RA:02 BR:1 RA RA	64	17.8	63	17.2	62	16.7	93	15	290	28	29.96				FM-16	T	29.99
12	0344	7	SCT:04 12 SCT:04 22 OVC:08 41	10.00		64	17.8	62	16.7	60	15.6	87	20	280	26	29.96				FM-16	T	29.99
12	0353	7	FEW:02 16 OVC:08 43	10.00		64	17.8	62	16.7	60	15.6	87	14	280	26	29.96	3	-0.01	29.99	FM-15	T	29.99
12	0453	7	BKN:07 42 OVC:08 50	10.00		65	18.3	61	16.1	58	14.4	78	9	260		29.95			29.98	FM-15	0.00	29.98
12	0553	7	OVC:08 44	10.00		67	19.4	60	15.6	54	12.2	63	16	270	25	29.95			29.97	FM-15	0.00	29.98
12	0653	7	OVC:08 47	10.00		66	18.9	60	15.6	56	13.3	70	10	250		29.96	5	+0.01	29.98	FM-15	0.00	29.99
12	0753	7	SCT:04 38 OVC:08 50	10.00		68	20.0	60	15.6	55	12.8	63	16	270	26	29.96			29.99	FM-15	0.00	29.99
12	0853	7	OVC:08 60	10.00		69	20.6	59	15.0	52	11.1	55	18	280	29	29.98			30.00	FM-15	0.00	30.01
12	0953	7	FEW:02 45	10.00		72	22.2	61	16.1	52	11.1	50	26	270	34	29.98	1	-0.02	30.01	FM-15	0.00	30.01
12	1053	7	BKN:07 37 OVC:08 55	10.00		71	21.7	61	16.1	54	12.2	55	28	290	39	30.00			30.02	FM-15	0.00	30.03
12	1153	7	FEW:02 46 SCT:04 55	10.00		73	22.8	60	15.6	50	10.0	44	24	270	40	29.97			30.00	FM-15	0.00	30.00
12	1253	7	SCT:04 38 SCT:04 49 BKN:07 55	10.00		72	22.2	62	16.7	54	12.2	53	23	280	39	29.96	8	+0.02	29.99	FM-15	0.00	29.99
12	1353	7	BKN:07 40 BKN:07 55	10.00		71	21.7	61	16.1	54	12.2	55	26	290	37	29.94			29.97	FM-15	0.00	29.97
12	1453	7	SCT:04 40 BKN:07 47	10.00		70	21.1	60	15.6	52	11.1	53	23	280	34	29.93			29.96	FM-15	0.00	29.96
12	1553	7	OVC:08 40	10.00		69	20.6	59	15.0	52	11.1	55	20	280	32	29.92	6	+0.04	29.95	FM-15	0.00	29.95
12	1653	7	BKN:07 38	10.00		68	20.0	59	15.0	53	11.7	59	20	300	31	29.93			29.96	FM-15	0.00	29.96
12	1753	7	BKN:07 38	10.00		66	18.9	59	15.0	54	12.2	65	23	290	32	29.94			29.96	FM-15	0.00	29.97

12	1853	7	BKN:07 38	10.00		65	18.3	59	15.0	54	12.2	68	16	290	26	29.94	1	-0.02	29.97	FM-15	0.00	29.97
12	1953	7	OVC:08 36	10.00		65	18.3	59	15.0	54	12.2	68	17	300	25	29.96			29.99	FM-15	0.00	29.99
12	2053	7	FEW:02 30 BKN:07 37	10.00		64	17.8	58	14.4	53	11.7	68	16	300	24	29.98			30.01	FM-15	0.00	30.01
12	2153	7	BKN:07 34	10.00		63	17.2	57	13.9	53	11.7	70	14	310		29.99	1	-0.05	30.02	FM-15	0.00	30.02
12	2253	7	SCT:04 29 BKN:07 35	10.00		62	16.7	58	14.4	54	12.2	75	13	320		30.01			30.03	FM-15	0.00	30.04
12	2353	7	FEW:02 29 BKN:07 35	10.00		60	15.6	56	13.3	52	11.1	75	14	330		30.03			30.06	FM-15	0.00	30.06

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data, and Information Service

Local Climatological Data
Hourly Observations
February 2023

National Centers for Environmental Information
151 Patton Avenue
Asheville, North Carolina 28801

Current Location: Elev: 20 ft. Lat: 26.9185° N Lon: -81.9939° W

Generated on 07/25/2023

Station: PUNTA GORDA CHARLOTTE CO AIRPORT, FL US WBAN: 72203412812 (KPGD)

D a t e	Time (LST)	Sta- tion Type	Sky Conditions	Visi- bility	Weather Type (see documentation)	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Hum %	Wind Spee d (MPH)	Wind Dir (Deg)	Wind Gusts (MPH)	Station Press (inHg)	Press Tend	Net 3- Hr Change (inHg)	Sea Level Press (inHg)	Report Type	Precip Total (in)	Alti- meter Setting (inHg)
					AU AW MW	(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
13	0053	7	CLR:00	10.00		58	14.4	54	12.2	51	10.6	78	9	340		30.02	0	-0.04	30.05	FM-15	0.00	30.05
13	0153	7	CLR:00	10.00		56	13.3	53	11.7	50	10.0	81	7	360		30.01			30.04	FM-15	0.00	30.04
13	0253	7	CLR:00	10.00		55	12.8	52	11.1	50	10.0	83	5	340		30.01			30.03	FM-15	0.00	30.04
13	0353	7	BKN:07 37	10.00		57	13.9	54	12.2	51	10.6	81	6	340		30.01	5	+0.01	30.04	FM-15	0.00	30.04
13	0453	7	OVC:08 37	10.00		59	15.0	55	12.8	52	11.1	78	7	340		30.02			30.05	FM-15	0.00	30.05
13	0553	7	CLR:00	10.00		57	13.9	54	12.2	51	10.6	81	9	360		30.04			30.06	FM-15	0.00	30.07
13	0653	7	CLR:00	10.00		54	12.2	52	11.1	50	10.0	87	7	020		30.05	3	-0.04	30.08	FM-15	0.00	30.08
13	0753	7	CLR:00	10.00		55	12.8	52	11.1	50	10.0	83	5	020		30.08			30.11	FM-15	0.00	30.11
13	0853	7	CLR:00	10.00		59	15.0	53	11.7	48	8.9	67	10	360		30.10			30.12	FM-15	0.00	30.13
13	0953	7	CLR:00	10.00		63	17.2	55	12.8	49	9.4	60	9	350		30.10	1	-0.05	30.13	FM-15	0.00	30.13
13	1053	7	CLR:00	10.00		65	18.3	56	13.3	49	9.4	56	10	350	20	30.10			30.13	FM-15	0.00	30.13
13	1153	7	CLR:00	10.00		67	19.4	57	13.9	49	9.4	53	10	330		30.09			30.11	FM-15	0.00	30.12
13	1253	7	CLR:00	10.00		68	20.0	57	13.9	48	8.9	49	7	320		30.05	8	+0.05	30.08	FM-15	0.00	30.08
13	1353	7	CLR:00	10.00		71	21.7	56	13.3	43	6.1	36	9	320		30.02			30.05	FM-15	0.00	30.05
13	1453	7	CLR:00	10.00		70	21.1	55	12.8	41	5.0	35	6	320		30.01			30.03	FM-15	0.00	30.04
13	1553	7	CLR:00	9.00		70	21.1	59	15.0	50	10.0	49	14	280		30.00	6	+0.05	30.03	FM-15	0.00	30.03
13	1653	7	CLR:00	8.00		69	20.6	58	14.4	49	9.4	49	15	290		30.01			30.03	FM-15	0.00	30.04
13	1753	7	CLR:00	8.00		66	18.9	57	13.9	49	9.4	54	11	290		30.02			30.04	FM-15	0.00	30.05
13	1853	7	CLR:00	10.00		62	16.7	55	12.8	48	8.9	60	11	300		30.03	3	-0.03	30.06	FM-15	0.00	30.06
13	1953	7	CLR:00	10.00		60	15.6	54	12.2	48	8.9	65	11	320		30.05			30.07	FM-15	0.00	30.08
13	2053	7	CLR:00	10.00		58	14.4	52	11.1	47	8.3	67	10	330		30.06			30.08	FM-15	0.00	30.09
13	2153	7	CLR:00	10.00		55	12.8	50	10.0	46	7.8	72	6	330		30.06	0	-0.02	30.08	FM-15	0.00	30.09
13	2253	7	CLR:00	10.00		54	12.2	50	10.0	47	8.3	77	3	320		30.06			30.09	FM-15	0.00	30.09
13	2353	7	CLR:00	10.00		53	11.7	50	10.0	47	8.3	80	6	340		30.07			30.09	FM-15	0.00	30.10

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data, and Information Service

Local Climatological Data
Hourly Observations
February 2023

National Centers for Environmental Information
151 Patton Avenue
Asheville, North Carolina 28801

Current Location: Elev: 20 ft. Lat: 26.9185° N Lon: -81.9939° W
Station: PUNTA GORDA CHARLOTTE CO AIRPORT, FL US WBAN: 72203412812 (KPGD)

Generated on 07/25/2023

D a t e	Time (LST)	Sta- tion Type	Sky Conditions	Visi- bility	Weather Type (see documentation)	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Hum %	Wind Spee d (MPH)	Wind Dir (Deg)	Wind Gusts (MPH)	Station Press (inHg)	Press Tend	Net 3- Hr Change (inHg)	Sea Level Press (inHg)	Report Type	Precip Total (in)	Alti- meter Setting (inHg)
					AU AW MW	(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
14	0053	6	CLR:00	10.00		52	11.1	49	9.4	46	7.8	80	5	360		30.06	0	0.00	30.08	FM-15	0.00	30.09
14	0153	7	CLR:00	10.00		50	10.0	48	8.9	46	7.8	86	0	000		30.05			30.08	FM-15	0.00	30.08
14	0253	7	CLR:00	10.00		49	9.4	48	8.9	46	7.8	90	5	060		30.04			30.07	FM-15	0.00	30.07
14	0353	7	CLR:00	10.00		47	8.3	46	7.8	45	7.2	93	0	000		30.04	6	+0.02	30.06	FM-15	0.00	30.07
14	0453	7	CLR:00	10.00		46	7.8	45	7.2	44	6.7	93	3	060		30.04			30.06	FM-15	0.00	30.07
14	0553	7	CLR:00	10.00		47	8.3	46	7.8	45	7.2	93	3	110		30.06			30.09	FM-15	0.00	30.09
14	0653	7	CLR:00	10.00		44	6.7	44	6.7	43	6.1	96	5	080		30.08	3	-0.04	30.10	FM-15	0.00	30.11
14	0753	6	CLR:00	10.00		50	10.0	48	8.9	46	7.8	86	0	000		30.10			30.13	FM-15	0.00	30.13
14	0853	7	CLR:00	10.00		58	14.4	53	11.7	49	9.4	72	8	050		30.12			30.14	FM-15	0.00	30.15
14	0953	7	CLR:00	10.00		64	17.8	55	12.8	47	8.3	54	8	090		30.12			30.14	FM-15	0.00	30.15
14	1053	7	CLR:00	10.00		71	21.7	57	13.9	45	7.2	39	10	110		30.12			30.14	FM-15	0.00	30.15
14	1153	6	CLR:00	10.00		73	22.8	57	13.9	42	5.6	33	8	VRB		30.10			30.13	FM-15	0.00	30.13
14	1253	7	CLR:00	10.00		75	23.9	57	13.9	40	4.4	28	11	130	21	30.08	8	+0.04	30.10	FM-15	0.00	30.11
14	1353	7	CLR:00	10.00		78	25.6	59	15.0	42	5.6	28	10	130		30.05			30.08	FM-15	0.00	30.08
14	1453	7	CLR:00	10.00		78	25.6	59	15.0	44	6.7	30	10	VRB		30.05			30.07	FM-15	0.00	30.08
14	1553	7	CLR:00	10.00		78	25.6	60	15.6	46	7.8	32	10	260		30.04	6	+0.03	30.07	FM-15	0.00	30.07
14	1653	7	CLR:00	10.00		75	23.9	59	15.0	47	8.3	37	13	250		30.06			30.09	FM-15	0.00	30.09
14	1753	7	CLR:00	10.00		73	22.8	61	16.1	52	11.1	48	7	260		30.07			30.09	FM-15	0.00	30.10
14	1853	7	CLR:00	10.00		69	20.6	61	16.1	55	12.8	61	5	250		30.08	1	-0.04	30.10	FM-15	0.00	30.11
14	1953	7	CLR:00	10.00		61	16.1	58	14.4	56	13.3	84	0	000		30.10			30.12	FM-15	0.00	30.13
14	2053	7	CLR:00	10.00		61	16.1	58	14.4	56	13.3	84	6	110		30.11			30.13	FM-15	0.00	30.14
14	2153	7	CLR:00	10.00		58	14.4	56	13.3	54	12.2	87	5	110		30.11	1	-0.04	30.14	FM-15	0.00	30.14
14	2253	7	CLR:00	10.00		56	13.3	54	12.2	53	11.7	90	5	070		30.12			30.15	FM-15	0.00	30.15
14	2353	7	CLR:00	10.00		59	15.0	56	13.3	54	12.2	83	6	120		30.12			30.15	FM-15	0.00	30.15

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data, and Information Service

Local Climatological Data
Hourly Observations
February 2023

National Centers for Environmental Information
151 Patton Avenue
Asheville, North Carolina 28801

Current Location: Elev: 20 ft. Lat: 26.9185° N Lon: -81.9939° W

Generated on 07/25/2023

Station: PUNTA GORDA CHARLOTTE CO AIRPORT, FL US WBAN: 72203412812 (KPGD)

Date	Time (LST)	Station Type	Sky Conditions	Visibility	Weather Type (see documentation)	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Hum %	Wind Speed (MPH)	Wind Dir (Deg)	Wind Gusts (MPH)	Station Press (inHg)	Press Tend	Net 3-Hr Change (inHg)	Sea Level Press (inHg)	Report Type	Precip Total (in)	Altimeter Setting (inHg)
					AU AW MW	(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
15	0053	7	CLR:00	10.00		60	15.6	57	13.9	55	12.8	84	6	140		30.12	0	0.00	30.14	FM-15	0.00	30.15
15	0153	7	CLR:00	10.00		59	15.0	57	13.9	55	12.8	87	3	130		30.11			30.13	FM-15	0.00	30.14
15	0253	7	CLR:00	10.00		58	14.4	56	13.3	55	12.8	90	5	120		30.10			30.12	FM-15	0.00	30.13
15	0353	7	CLR:00	10.00		54	12.2	53	11.7	53	11.7	97	5	090		30.10	5	+0.01	30.13	FM-15	0.00	30.13
15	0453	7	CLR:00	8.00		52	11.1	51	10.6	51	10.6	97	5	080		30.10			30.13	FM-15	0.00	30.13
15	0553	7	CLR:00	10.00		54	12.2	53	11.7	53	11.7	97	7	080		30.12			30.14	FM-15	0.00	30.15
15	0653	7	CLR:00	10.00		54	12.2	53	11.7	53	11.7	97	5	120		30.13	3	-0.03	30.16	FM-15	0.00	30.16
15	0753	7	CLR:00	10.00		59	15.0	57	13.9	56	13.3	90	6	100		30.16			30.18	FM-15	0.00	30.19
15	0853	7	CLR:00	10.00		67	19.4	63	17.2	60	15.6	79	8	130		30.17			30.20	FM-15	0.00	30.20
15	0953	7	CLR:00	10.00		74	23.3	65	18.3	60	15.6	62	14	150		30.18	1	-0.04	30.20	FM-15	0.00	30.21
15	1053	7	FEW:02 34	10.00		77	25.0	66	18.9	60	15.6	56	18	170	25	30.19			30.21	FM-15	0.00	30.22
15	1153	7	BKN:07 42	10.00		79	26.1	67	19.4	59	15.0	50	9	150	21	30.17			30.20	FM-15	0.00	30.20
15	1253	7	SCT:04 45	10.00		81	27.2	67	19.4	58	14.4	45	11	180	23	30.14	8	+0.04	30.17	FM-15	0.00	30.17
15	1353	7	SCT:04 49	10.00		83	28.3	67	19.4	58	14.4	43	10	190		30.11			30.14	FM-15	0.00	30.14
15	1453	7	FEW:02 50	10.00		81	27.2	68	20.0	61	16.1	51	11	240		30.10			30.12	FM-15	0.00	30.13
15	1553	7	CLR:00	10.00		80	26.7	68	20.0	61	16.1	52	11	260		30.09	6	+0.05	30.11	FM-15	0.00	30.12
15	1653	7	CLR:00	10.00		79	26.1	68	20.0	62	16.7	56	11	250		30.09			30.12	FM-15	0.00	30.12
15	1753	7	CLR:00	10.00		76	24.4	67	19.4	62	16.7	62	8	270		30.10			30.13	FM-15	0.00	30.13
15	1853	7	CLR:00	10.00		73	22.8	66	18.9	62	16.7	69	5	260		30.10	1	-0.01	30.13	FM-15	0.00	30.13
15	1953	7	CLR:00	10.00		69	20.6	65	18.3	62	16.7	78	0	000		30.12			30.14	FM-15	0.00	30.15
15	2053	6	CLR:00	10.00		67	19.4	64	17.8	62	16.7	84	0	000		30.13			30.16	FM-15	0.00	30.16
15	2153	7	CLR:00	10.00		66	17.8	62	16.7	61	16.1	90	7	090		30.14	3	-0.04	30.17	FM-15	0.00	30.17
15	2253	7	CLR:00	10.00		65	17.8	62	16.7	60	15.6	87	5	100		30.15			30.18	FM-15	0.00	30.18
15	2353	7	CLR:00	10.00		65	18.3	63	17.2	61	16.1	87	6	110		30.14			30.16	FM-15	0.00	30.17

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data, and Information Service

Local Climatological Data
Hourly Observations
February 2023

National Centers for Environmental Information
151 Patton Avenue
Asheville, North Carolina 28801

Current Location: Elev: 20 ft. Lat: 26.9185° N Lon: -81.9939° W
Station: PUNTA GORDA CHARLOTTE CO AIRPORT, FL US WBAN: 72203412812 (KPGD)
Generated on 07/25/2023

D a t e	Time (LST)	Sta- tion Type	Sky Conditions	Visi- bility	Weather Type (see documentation)	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Hum %	Wind Spee d (MPH)	Wind Dir (Deg)	Wind Gusts (MPH)	Station Press (inHg)	Press Tend	Net 3- Hr Change (inHg)	Sea Level Press (inHg)	Report Type	Precip Total (in)	Alti- meter Setting (inHg)
					AU AW MW	(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
16	0053	7	CLR:00	10.00		64	17.8	62	16.7	61	16.1	90	6	120		30.12	8	+0.03	30.14	FM-15	0.00	30.15
16	0153	7	CLR:00	10.00		64	17.8	62	16.7	61	16.1	90	7	140		30.10			30.12	FM-15	0.00	30.13
16	0253	7	CLR:00	10.00		62	16.7	61	16.1	60	15.6	93	6	120		30.08			30.11	FM-15	0.00	30.11
16	0353	7	OVC:08 41	10.00		63	17.2	62	16.7	61	16.1	93	5	090		30.08	6	+0.04	30.10	FM-15	0.00	30.11
16	0453	7	FEW:02 34 FEW:02 42	10.00		62	16.7	61	16.1	60	15.6	93	5	070		30.08			30.11	FM-15	0.00	30.11
16	0553	7	OVC:08 42	10.00		64	17.8	62	16.7	61	16.1	90	7	080		30.10			30.12	FM-15	0.00	30.13
16	0653	7	BKN:07 43	10.00		63	17.2	61	16.1	60	15.6	90	6	070		30.12	3	-0.04	30.14	FM-15	0.00	30.15
16	0753	7	OVC:08 45	10.00		65	18.3	63	17.2	62	16.7	90	6	090		30.13			30.15	FM-15	0.00	30.16
16	0853	7	FEW:02 45	10.00		68	20.0	64	17.8	62	16.7	81	10	120		30.13			30.16	FM-15	0.00	30.16
16	0953	7	CLR:00	10.00		77	25.0	68	20.0	63	17.2	62	13	140		30.13	1	-0.01	30.16	FM-15	0.00	30.16
16	1053	7	FEW:02 36	10.00		80	26.7	69	20.6	63	17.2	56	17	160	23	30.12			30.15	FM-15	0.00	30.15
16	1153	7	SCT:04 43	10.00		81	27.2	68	20.0	60	15.6	49	18	200	25	30.11			30.14	FM-15	0.00	30.14
16	1253	7	BKN:07 47	10.00		83	28.3	69	20.6	61	16.1	48	15	160	22	30.09	8	+0.04	30.12	FM-15	0.00	30.12
16	1353	7	BKN:07 50	10.00		83	28.3	69	20.6	61	16.1	48	11	180		30.07			30.10	FM-15	0.00	30.10
16	1453	7	SCT:04 50	10.00		84	28.9	69	20.6	60	15.6	44	8	170		30.05			30.07	FM-15	0.00	30.08
16	1553	7	SCT:04 55	10.00		84	28.9	69	20.6	60	15.6	44	14	190		30.04	6	+0.06	30.06	FM-15	0.00	30.07
16	1653	7	CLR:00	10.00		83	28.3	67	19.4	58	14.4	43	14	210		30.04			30.06	FM-15	0.00	30.07
16	1753	7	CLR:00	10.00		80	26.7	68	20.0	61	16.1	52	9	240		30.05			30.08	FM-15	0.00	30.08
16	1853	7	CLR:00	10.00		76	24.4	68	20.0	64	17.8	67	5	240		30.06	3	-0.03	30.09	FM-15	0.00	30.09
16	1953	7	CLR:00	10.00		72	22.2	68	20.0	65	18.3	79	0	000		30.07			30.10	FM-15	0.00	30.10
16	2053	7	CLR:00	10.00		68	20.0	66	18.9	64	17.8	87	0	000		30.09			30.11	FM-15	0.00	30.12
16	2153	7	CLR:00	10.00		67	19.4	65	18.3	64	17.8	91	3	120		30.10	3	-0.03	30.12	FM-15	0.00	30.13
16	2253	7	FEW:02 35	10.00		66	18.9	64	17.8	63	17.2	90	7	130		30.09			30.12	FM-15	0.00	30.12
16	2353	7	CLR:00	10.00		70	21.1	67	19.4	65	18.3	84	9	150		30.08			30.10	FM-15	0.00	30.11

APPENDIX E

STANDARD PROTECTION MEASURES FOR THE EASTERN INDIGO SNAKE

STANDARD PROTECTION MEASURES FOR THE EASTERN INDIGO SNAKE U.S. Fish and Wildlife Service

March 23, 2021

The eastern indigo snake protection/education plan (Plan) below has been developed by the U.S. Fish and Wildlife Service (USFWS) in Florida and Georgia 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; Georgia Field Office: gaes_assistance@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 17in 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 and Georgia. Although they have a preference for uplands, they also utilize some wetlands and agricultural areas and often move seasonally between upland and lowland habitats, particularly in the northern portions of its range (North Florida and Georgia). 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. Reliance on xeric sandhill habitats throughout the northern portion of the range in northern Florida and Georgia is due to the dependence on gopher tortoise burrows for shelter during winter. Breeding occurs during October through February. 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 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 LIVE 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 applicants 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 DEAD EASTERN INDIGO SNAKE ON THE SITE:

- Cease clearing activities and immediately notify supervisor or the applicants 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

Georgia Field Office: (706) 613-9493

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 11in paper and then properly folded, is attached). Photos of eastern indigo snakes may be accessed on USFWS and/or FWC or GADNR 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 applicants 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.



ATTENTION:

THREATENED EASTERN INDIGO SNAKES MAY BE PRESENT ON THIS SITE!!!

IF YOU SEE A LIVE EASTERN INDIGO SNAKE ON THE SITE:

- Cease clearing activities and allow the 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 U.S. Fish and Wildlife Service (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 DEAD 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.

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

Killing, harming, or harassing indigo snakes is strictly prohibited and punishable under State and Federal Law.

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:	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.

APPENDIX F

REPRESENTATIVE PHOTOGRAPHS OF WETLANDS AND OTHER SURFACE WATERS



Photo 1 – view east toward Wetland 1 (FLUCCS 6150), a winding freshwater stream that overlaps the south right-of-way (ROW) of SR 72 and flows toward the Peace River.



Photo 2 – view northeast from the bank of Wetland 1. The stream consists mostly of open water, with a few springs of wetland vegetation observed in shallow areas. The banks are populated by shrubs and vines.



Photo 3 – view northeast along the edge of Wetland 2 (FLUCCS 6170), thick with shrubs and vines. A culvert under SR 72 at this location connects Wetland 2 to Wetland 3 (FLUCCS 6170), which drains to the Peace River.



Photo 4 – view northwest from the SR 72 ROW into Wetland 2, including fallen trees and shrubs.



Photo 5 – view southeast into Wetland 3 (FLUCCS 6170). Soils were saturated at the time of review. Fallen shrubs were observed all along the edge of Wetland 3, and vines were present in the subcanopy.

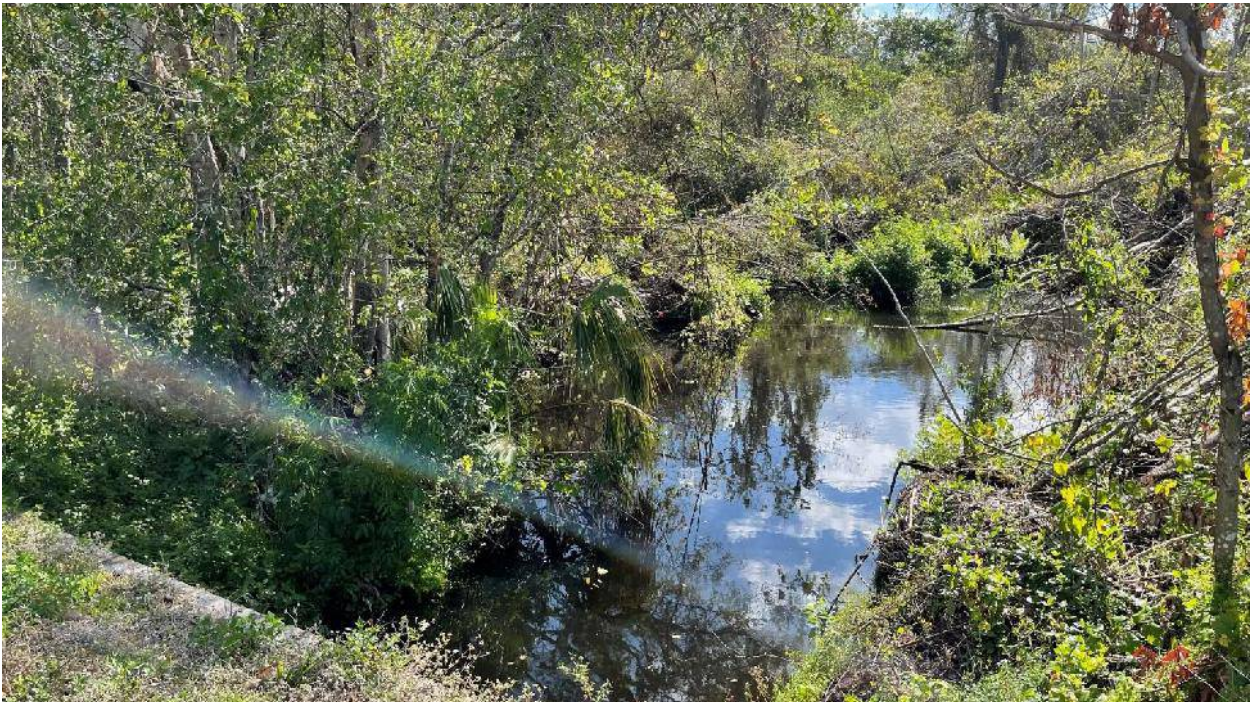


Photo 6 – view northeast into Wetland 3 including open water at the culvert under SR 72. The culvert connects Wetland 2 to Wetland 3, which drains to the Peace River



Photo 7 – view southeast into Wetland 3 including a pile of white sand just inside the wetland edge. The source of the sand was unclear. Similar piles of sand were observed in Wetland 5 and Wetland 6.



Photo 8 – view northeast toward the southwest edge of Wetland 4 (FLUCCS 6170). The canopy and subcanopy here are dominated by water oak (*Quercus nigra*) and sweet bay (*Magnolia virginiana*), draped in muscadine grapevine (*Vitis rotundifolia*).



Photo 9 – view north within the interior of Wetland 4 . Groundcover is dominated by ferns and vines are prevalent in the understory. At the time of review, soils were saturated and mucky. Many fallen shrubs and trees were observed throughout the interior.



Photo 10 – view northeast within the Wetland 4 interior. Standing water at this location supports water spangles (*Salvinia minima*). Ferns grow on hummocks and the bases of trees and shrubs here, and vines are present throughout the subcanopy.



Photo 11 – view northwest within the Wetland 4 interior including the Category I invasive species small leaf climbing fern (*Lygodium microphyllum*) covering a red maple (*Acer rubrum*) tree.



Photo 12 – view east into Wetland 5 (FLUCCS 6170) from the SR 72 ROW, including piles of sand along the wetland edge. Cypress trees (*Taxodium sp.*) visible in the wetland interior are outside of the project area.



Photo 13 – view southeast from SR 70 toward the south portion of Wetland 6 (FLUCCS 6430), a disturbed wet prairie that appears to be part of the Peace River floodplain. Groundcover is dominated by grasses including two Category I invasive species: torpedograss (*Panicum repens*) and paragrass (*Urochloa mutica*). Piles of sand were observed throughout the project area within the wetland.



Photo 14 – view northwest from the edge of Wetland 6 under SR 70, the only location where standing water was observed within Wetland 6.



Photo 15 – view northeast from SR 70 across the north portion of Wetland 6 toward the Peace River. Additional piles of sand were observed in this area.

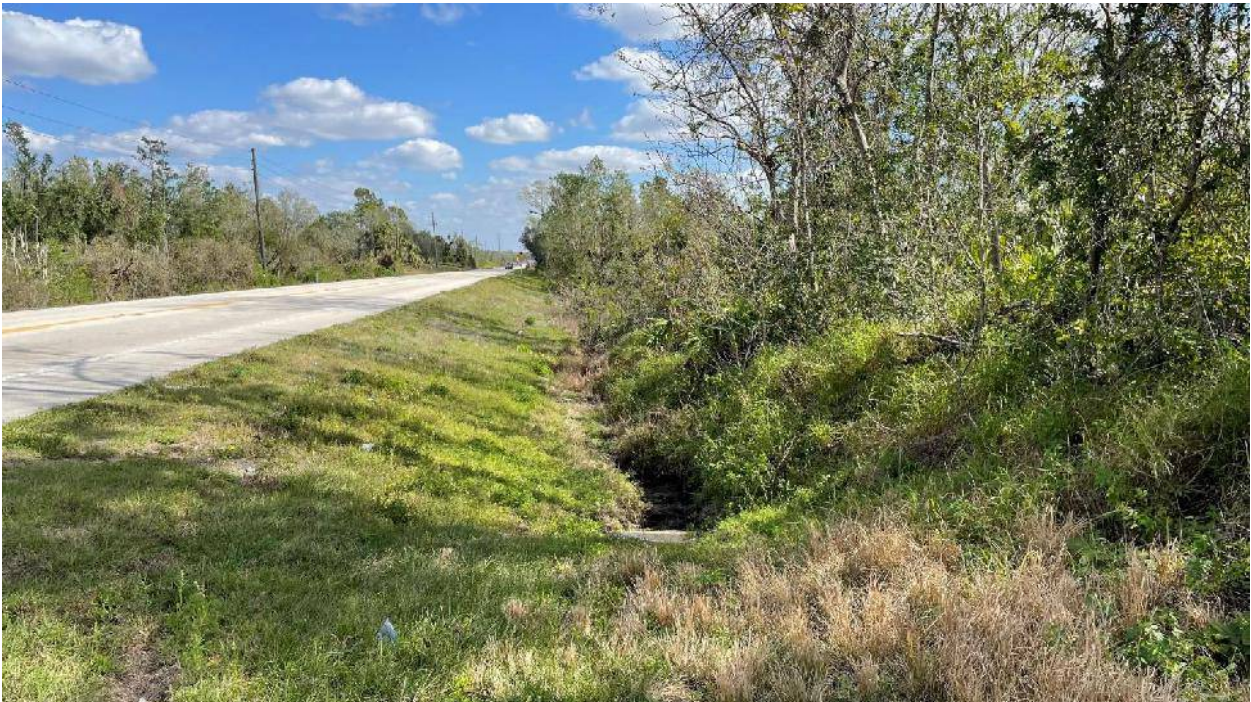


Photo 16 – view northeast along the SR 72 ROW including Other Surface Water (OSW) 1 (FLUCCS 5100), an upland cut roadside ditch connected to Wetland 3. At the time of review, soils within the ditch were saturated and had been rutted.



Photo 17 – view southwest toward OSW 2 (FLUCCS 5100), an upland cut roadside ditch in the SR 72 ROW. The ditch contained standing water and litter at the time of review.



Photo 18 – view south including OSW 3 (FLUCCS 5100) within the SR 72 ROW. At the time of review, the ditch contained moist soils.



Photo 19 – view southeast toward OSW 4 (FLUCCS 5100), an upland cut ditch in the SR 70 ROW. OSW 4 wraps around Wetland 4 (FLUCCS 6170), separated by an upland berm. Litter was observed throughout OSW 4, likely having washed off the roadway and collected against the berm during heavy rain events.



Photo 20 – view southwest including OSW 4 (FLUCCS 5100) within the SR 72 ROW. At the time of review, the ditch contained saturated soils with a few areas of standing water .



Photo 21 – view northwest including OSW 5 (FLUCCS 5100) within the SR 70 ROW. At the time of review, the ditch contained moist soils. OSW is almost entirely outside of the project area, with just the northwest end included.

APPENDIX G

UMAM FORMS

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

Site/Project Name (FPID: 443123-1) SR 72 at SR 70 PD&E Study	Application Number	Assessment Area Name or Number Wetland 1 (Primary Impact)
Impact or Mitigation Impact	Assessment conducted by: Rebecca Barkdoll	Assessment date: 2/15/2023

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

.500(6)(a) Location and Landscape Support w/o pres or current 7 with 0	The stream receives stormwater input from roadside ditches and conveys it toward the Peace River; land directly adjacent to the stream includes some forested upland containing invasive exotic species and land northwest of the forested edge includes mowed ROW and paved road, land to the southeast is residential; wildlife access is blocked from the north and west by paved road but possible from the east and south. Only a small portion of the stream falls within the project footprint.
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current 10 with 0	The stream consists of mostly open water with a few hydrologically appropriate plants. Erosion was observed on the steep banks. The stream receives stormwater runoff from a roadside ditch. Animal species were not observed; wetland plant species were observed; flowing water was observed. The stream may provide habitat for fish but the portion within the project area is shallow.
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current 7 with 0	The stream contains mostly open water with sprigs of two plant species, one of which is a Category I invasive species; the banks are forested-shrubby with a thick layer of vines

Score = sum of above scores/30 (if uplands, divide by 20)
current or w/o pres 0.8 with 0

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

For impact assessment areas
FL = delta x acres = 0.0

Delta = [with-current]
-0.8

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

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

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

Site/Project Name (FPID: 443123-1) SR 72 at SR 70 PD&E Study	Application Number	Assessment Area Name or Number Wetland 1 (Secondary Impact)
Impact or Mitigation Impact	Assessment conducted by: Rebecca Barkdoll	Assessment date: 2/15/2023

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

.500(6)(a) Location and Landscape Support w/o pres or current with 7 7	The stream receives stormwater input from roadside ditches and conveys it toward the Peace River; land directly adjacent to the stream includes some forested upland containing invasive exotic species and land to the west of the forested edge includes mowed ROW and paved road, land to the south is residential; wildlife access is blocked from the south and west by paved road but possible from the north and east. Wetland 1 is already bordered by mowed ROW and paved road to the west; secondary impacts resulting from roadway improvements will be minimal.
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current with 10 10	The stream consists of mostly open water with a few hydrologically appropriate plants. Erosion was observed on the steep banks. The stream receives stormwater runoff from a roadside ditch. Animal species were not observed; wetland plant species were observed; flowing water was observed. The stream may provide habitat for fish but the portion within the project area is shallow.
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current with 7 7	The stream contains mostly open water with sprigs of two plant species, one of which is a Category I invasive species; the banks are forested-shrubby with a thick layer of vines.

Score = sum of above scores/30 (if uplands, divide by 20)
current with
or w/o pres with
0.8 0.8

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

For impact assessment areas
FL = delta x acres = 0.0

Delta = [with-current]
0

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

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

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

Site/Project Name (FPID: 443123-1) SR 72 at SR 70 PD&E Study	Application Number	Assessment Area Name or Number Wetland 2 (Primary Impact)
Impact or Mitigation Impact	Assessment conducted by: Rebecca Barkdoll	Assessment date: 2/17/2023

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

.500(6)(a) Location and Landscape Support w/o pres or current 6 with 0	Wetland 2 is connected to Wetland 3 via a culvert under the roadway (SR 72); wildlife access is limited as the wetland is bordered by cropland (southwest), residential low denisty (northeast), and the roadway (southeast).
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current 8 with 0	Hydrology appears appropriate; the wetland likely receives runoff from bordering cropland, residential lawns, and the roadway. Wetland 2 connects to Wetland 3 via a culvert under the roadway (SR 72).
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current 8 with 0	Only the shrubby outer edge of Wetland 2 falls within the project footprint; appropriate vegetation was observed in the transition zone; Fallen trees and shrubs were observed near the culvert, most likely as a result of Hurricane Ian (September 2022).

Score = sum of above scores/30 (if uplands, divide by 20)
current or w/o pres 0.7 with 0.0

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

For impact assessment areas
FL = delta x acres = -0.4

Delta = [with-current]
-0.7

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

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

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

Site/Project Name (FPID: 443123-1) SR 72 at SR 70 PD&E Study	Application Number	Assessment Area Name or Number Wetland 2 (Secondary Impact)
Impact or Mitigation Impact	Assessment conducted by: Rebecca Barkdoll	Assessment date: 2/17/2023

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

.500(6)(a) Location and Landscape Support w/o pres or current with 6 6	Secondary impacts are unlikely to degrade the location and landscape support for Wetland 2 as it is already bordered on all sides by cropland (southwest), residential low density (northeast), and the paved roadway and mowed ROW (southeast).
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current with 8 8	Secondary impacts are unlikely to degrade the water environment. Current hydrology appears appropriate; the wetland likely receives runoff from bordering cropland and/or the roadway. Wetland 2 connects to Wetland 3 via a culvert under the roadway (SR 72).
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current with 8 7	Only the shrubby outer edge of Wetland 2 falls within the project footprint; appropriate vegetation was observed in the transition zone; Fallen trees and shrubs were observed near the culvert, most likely as a result of Hurricane Ian (September 2022). Secondary impacts may include the introduction of weedy or invasive species into the wetland interior

Score = sum of above scores/30 (if uplands, divide by 20)
current with
or w/o pres with
0.7 0.7

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

For impact assessment areas
FL = delta x acres = 0.0

Delta = [with-current]
0.0

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

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

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

Site/Project Name (FPID: 443123-1) SR 72 at SR 70 PD&E Study	Application Number	Assessment Area Name or Number Wetland 3 (Primary Impacts)
Impact or Mitigation Impact	Assessment conducted by: Rebecca Barkdoll	Assessment date: 2/15/2023

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

.500(6)(a) Location and Landscape Support w/o pres or current 8 with 0	Wetland 3 is bordered to the northwest by the mowed ROW and paved road, but is accessible to wildlife from the east, south, and southwest. A culvert under the road connects Wetland 2 to Wetland 3, which drains to the Peace River.
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current 8 with 0	Hydrology appears appropriate for this forested wetland; soils were saturated at the wetland edge and standing open water was observed at the culvert under SR 72 at the time of field review. A roadside ditch directs stormwater runoff from the roadway and ROW into Wetland 3; water coming from Wetland 2 likely contains runoff from cropland and residential areas adjacent to that wetland. Piles of sand were observed in the transition zone, maybe deposited by flooding related to Hurricane Ian (September 2022).
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current 8 with 0	Only the shrubby transition zone of Wetland 3 falls within the project footprint; appropriate vegetation was observed in the transition zone; Fallen shrubs were observed along the wetland edge, most likely as a result of Hurricane Ian (September 2022). Vines were abundant in the subcanopy

Score = sum of above scores/30 (if uplands, divide by 20)
current or w/o pres 0.8 with 0.0

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

For impact assessment areas
FL = delta x acres = -0.4

Delta = [with-current]
-0.8

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

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

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

Site/Project Name (FPID: 443123-1) SR 72 at SR 70 PD&E Study	Application Number	Assessment Area Name or Number Wetland 3 (Secondary Impacts)
Impact or Mitigation Impact	Assessment conducted by: Rebecca Barkdoll	Assessment date: 2/15/2023

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

.500(6)(a) Location and Landscape Support w/o pres or current with 8 8	Wetland 3 is bordered to the northwest by the mowed ROW and paved road, but is accessible to wildlife from the east, south, and southwest. A culvert under the road connects Wetland 2 to Wetland 3, which drains to the Peace River.
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current with 8 8	Hydrology appears appropriate for this forested wetland; soils were saturated at the wetland edge and standing open water was observed at the culvert under SR 72 at the time of field review. A roadside ditch directs stormwater runoff from the roadway and ROW into Wetland 3; water coming fro Wetland 2 likely contains runoff from cropland and residential areas adjacent to that wetland.
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current with 8 7	Only the shrubby transition zone of Wetland 3 falls within the project footprint; appropriate vegetation was observed in the transition zone; Fallen shrubs were observed along the wetland edge, most likely as a result of Hurricane Ian (September 2022). Vines were abundant in the subcanopy. Secondary impacts may include the introduction of weedy or invasive species into the wetland interior.

Score = sum of above scores/30 (if uplands, divide by 20)	
current	with
or w/o pres	
0.8	0.8

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

For impact assessment areas
FL = delta x acres = 0.0

Delta = [with-current]
0.0

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

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

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

Site/Project Name (FPID: 443123-1) SR 72 at SR 70 PD&E Study	Application Number	Assessment Area Name or Number Wetland 4 (Primary Impacts)
Impact or Mitigation Impact	Assessment conducted by: Rebecca Barkdoll	Assessment date: 2/17/2023

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

.500(6)(a) Location and Landscape Support w/o pres or current 6 with 0	Wetland 4 is bordered by mowed ROW and paved roadway to the northeast and southeast, limiting wildlife access. It is adjacent to an orange grove to the southwest and upland forest to the northwest.
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current 8 with 0	Appropriate hydrology was observed at the time of field review with dry to moist soil at the edges and transition zone and saturated soil and standing water in the interior. Wetland 4 receives stormwater runoff from the adjacent roadways and cropland. Trash was observed throughout the transition zone, having apparently washed in from the roadway and ROW.
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current 8 with 0	Appropriate vegetation was observed in each zone of Wetland 4. Vines were abundant in the interior subcanopy and canopy, including the Category I invasive species small leaf climbing fern. Fallen shrubs and trees were observed throughout the wetland, most likely as a result of Hurricane Ian (September 2022).

Score = sum of above scores/30 (if uplands, divide by 20)
current or w/o pres 0.7 with 0.0

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

For impact assessment areas
FL = delta x acres = -4.1

Delta = [with-current]
-0.7

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

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

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

Site/Project Name (FPID: 443123-1) SR 72 at SR 70 PD&E Study	Application Number	Assessment Area Name or Number Wetland 4 (Secondary Impacts)
Impact or Mitigation Impact	Assessment conducted by: Rebecca Barkdoll	Assessment date: 2/17/2023

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

.500(6)(a) Location and Landscape Support w/o pres or current with 6 6	Wetland 4 is bordered by mowed ROW and paved roadway to the northeast and southeast, limiting wildlife access. It is adjacent to an orange grove to the southwest and upland forest to the northwest. The project will result in less wetland area overall, but will have little to no secondary impact on the overall location and landscape.
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current with 8 7	Appropriate hydrology was observed at the time of field review with dry to moist soil at the edges and transition zone and saturated soil and standing water in the interior. Wetland 4 receives stormwater runoff from the adjacent roadways and cropland. Trash was observed throughout the transition zone, having apparently washed in from the roadway and ROW.
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current with 8 7	Appropriate vegetation was observed in each zone of Wetland 4. Vines were abundant in the interior subcanopy and canopy, including the Category I invasive species small leaf climbing fern. Fallen shrubs and trees were observed throughout the wetland, most likely as a result of Hurricane Ian (September 2022).

Score = sum of above scores/30 (if uplands, divide by 20)	
current	with
or w/o pres	
0.7	0.7

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

For impact assessment areas
FL = delta x acres = -0.1

Delta = [with-current]
-0.1

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

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

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

Site/Project Name (FPID: 443123-1) SR 72 at SR 70 PD&E Study	Application Number	Assessment Area Name or Number Wetland 5 (Primary Impacts)
Impact or Mitigation Impact	Assessment conducted by: Rebecca Barkdoll	Assessment date: 2/15/2023

Scoring Guidance
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed

Optimal (10)	Moderate(7)	Minimal (4)	Not Present (0)
Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current 7 with 0	Wildlife access is limited by the roadway to the northwest and a gas station and parking lot to the northeast. Forested uplands and wetlands are adjacent to the southwest and southeast.
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current 8 with 0	Only the edge of Wetland 5 is included in the project footprint. Piles of sand were observed at the edges and in the transition zone, likely deposited by flooding related to Hurricane Ian (September 2022). Hydrology otherwise seemed appropriate with dry to moist soils at the time of field review. A roadside ditch directs stormwater runoff from the roadway and ROW into Wetland 5 and a few pieces of trash were observed along the wetland edge.
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current 8 with 0	Category I invasive species Peruvian primrosewillow was observed in Wetland 5 beyond the project area and caesarweed was observed in the transition zone. Other canopy, subcanopy, and groundcover species are appropriate for the wetland zonation.

Score = sum of above scores/30 (if uplands, divide by 20)
current or w/o pres 0.8 with 0.0

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

For impact assessment areas
FL = delta x acres = -0.3

Delta = [with-current]
-0.8

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

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

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

Site/Project Name (FPID: 443123-1) SR 72 at SR 70 PD&E Study	Application Number	Assessment Area Name or Number Wetland 5 (Secondary Impacts)
Impact or Mitigation Impact	Assessment conducted by: Rebecca Barkdoll	Assessment date: 2/15/2023

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

.500(6)(a) Location and Landscape Support w/o pres or current 7 with 7	Wildlife access is limited by the roadway to the northwest and a gas station and parking lot to the northeast. Forested uplands and wetlands are adjacent to the southwest and southeast. The project will have little to no secondary impact on the overall location and landscape.
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current 8 with 8	Only the edge of Wetland 5 is included in the project footprint. Piles of sand were observed at the edges and in the transition zone, likely deposited by flooding related to Hurricane Ian (September 2022). Hydrology otherwise seemed appropriate with dry to moist soils at the time of field review. A roadside ditch directs stormwater runoff from the roadway and ROW into Wetland 5 and a few pieces of trash were observed along the wetland edge. The project will have little to no secondary impact on the water environment.
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current 8 with 7	Category I invasive species Peruvian primrosewillow was observed in Wetland 5 beyond the project area and caesarweed was observed in the transition zone. Other canopy, subcanopy, and groundcover species are appropriate for the wetland zonation. Secondary impacts may include movement of invasive species into the wetland interior due to edge effect.

Score = sum of above scores/30 (if uplands, divide by 20)
current or w/o pres 0.8 with 0.7

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

For impact assessment areas
FL = delta x acres = 0.0

Delta = [with-current]
0.0

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

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

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

Site/Project Name (FPID: 443123-1) SR 72 at SR 70 PD&E Study	Application Number	Assessment Area Name or Number Wetland 6 (Primary Impacts)
Impact or Mitigation Impact	Assessment conducted by: Rebecca Barkdoll	Assessment date: 2/15/2023

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

.500(6)(a) Location and Landscape Support w/o pres or current 8 with 0	SR 70 crosses over Wetland 6, which is bordered by open land, upland forest, and a gun range. Wildlife can access Wetland 6 from all sides but are likely deterred by noise from the gun range (to the east) and roadway.
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current 8 with 0	Wetland 6 is part of the Peace River floodplain. Piles of white sand were observed throughout the project area, possibly as a result of Hurricane Ian (September 2022). Standing water was only observed directly under the SR 70 bridge and soils were moist elsewhere at the time of field review.
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current 4 with 0	Wetland 6 is dominated by two Category I invasive species (torpedograss and paragrass). Carolina willow shrubs grow along the edges and a few individuals have established in the interior.

Score = sum of above scores/30 (if uplands, divide by 20)
current or w/o pres 0.7 with 0.0

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

For impact assessment areas
FL = delta x acres = -1.1

Delta = [with-current]
-0.7

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

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

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

Site/Project Name (FPID: 443123-1) SR 72 at SR 70 PD&E Study	Application Number	Assessment Area Name or Number Wetland 6 (Secondary Impacts)
Impact or Mitigation Impact	Assessment conducted by: Rebecca Barkdoll	Assessment date: 2/15/2023

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

.500(6)(a) Location and Landscape Support w/o pres or current 8 with 8	SR 70 crosses over Wetland 6, which is bordered by open land, upland forest, and a gun range. Wildlife can access Wetland 6 from all sides but are likely deterred by noise from the gun range (to the east) and roadway.
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current 8 with 6	Wetland 6 is part of the Peace River floodplain. Piles of white sand were observed throughout the project area, possibly as a result of Hurricane Ian (September 2022). Standing water was only observed directly under the SR 70 bridge and soils were moist elsewhere at the time of field review.
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current 4 with 4	The project will have little to no secondary impact on Wetland 6, which is dominated by two Category I invasive species (torpedograss and paragrass).

Score = sum of above scores/30 (if uplands, divide by 20)
current or w/o pres 0.7 with 0.6

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

For impact assessment areas
FL = delta x acres = 0.0

Delta = [with-current]
-0.1

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

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