DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P.O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

Regulatory Division August 17, 2018

DEPARTMENT OF THE ARMY PERMIT

PROGRAMMATIC GENERAL PERMIT (PGP) SAJ-80
SAJ-2006-05479 (PGP-DEB)

RESIDENTIAL, COMMERCIAL, INSTITUTIONAL, AND INFRASTRUCTURE-RELATED ACTIVITIES ON THE MICCOSUKEE TRIBE OF INDIANS OF FLORIDA RESERVATIONS

Upon recommendation of the Chief of Engineers, and pursuant to Section 404 of the Clean Water Act (33 U.S.C. §1344) and Section 10 of the Rivers and Harbors Act (33 U.S.C. § 403), the Miccosukee Tribe of Indians of Florida (Tribe), under the provisions of PGP SAJ-80 and the corresponding Coordination Agreement between the Tribe and the U.S. Army Corps of Engineers (Corps), has been delegated to verify that the following activities comply with the terms and all conditions of this PGP:

Table 1. List of Activities Authorized under PGP SAJ-80:

Activity	Fill (acres) Allowed in Waters of the U.S.	Activity Description
1. SINGLE FAMILY HOME SITES	1.0	Discharges of dredged or fill material in non-tidal waters of the U.S. including non-tidal wetlands, for the construction or expansion of traditional home sites that would include houses, access roads, driveways, chickees for various practices (sewing, cooking, religious practices, and other similar practices), bathhouses, and septic systems with drain fields which meet applicable set-backs.
2.UTILITY LINES	1.0	Discharges of dredged or fill material for the construction, maintenance or repair of utility lines, including intake/outfall structures, and the associated excavation, backfilling or bedding, utility line substations, foundations for overhead utility line towers, cell towers, poles, and anchors, and access roads for the construction and maintenance of utility lines, including overhead power lines and utility line substations.

3.RECREATIONAL FACILITIES	1.5	Discharges of dredged or fill material in non-tidal waters of the U.S. including non-tidal wetlands for both passive and non-passive recreation use to include, but not limited to, campgrounds, recreational trails, swimming pools, playing fields (e.g., baseball, soccer, football, etc.), basketball, tennis courts, and access roads. Also authorized are small support facilities, such as maintenance and storage buildings, restrooms and associated parking areas that are directly related to the recreational activity.
4.BOATING	0.25	Boat launching facility (ramps), parking for vehicles/trailers, associated structures-bulkheads, rub-rails, tie-up piers, and walkways.
5.AGRICULTURAL USE	1.0	Discharges of dredged or fill material for clearing, building pads, new ditches and/or dikes, side casting from ditch construction, associated with agricultural uses. Ditches will be constructed to control both surface and ground water.
6.COMMERCIAL USE	1.5	Discharges of dredged or fill material for small business development to include buildings, parking areas, septic systems with drain fields and access roads. W hen commercial development is associated with an existing single-family home site, both the existing (i.e., homesite) and proposed commercial fill impacts will not exceed 1.5 acres.
7.INSTITUTIONAL/ GOVERNMENT FACILITIES	2.0	Discharges of dredged or fill material to include new, or additions to existing, facilities such as schools, government buildings, research and medical facilities, associated parking areas, public works infrastructure, access roads, and other similar facilities.
8. WATER CONTROL ACTIVITIES	1.0	Discharges of dredged or fill material for the construction of stormwater management facilities including excavation of stormwater ponds, the installation and maintenance of water control structures, outfall structures, and emergency spillways, including secondary impacts associated with the excavation of stormwater ponds. Also for the construction and maintenance of ditches, which includes re-shaping of existing ditches and modification of the cross-sectional configuration of currently serviceable ditches.
9.DITCH MAINTENANCE	No Limit	Discharges of dredged or fill material for the maintenance of existing functional ditches. Dredge is limited to pre-existing and/or historic design. Work would be restricted to ditches located on existing farm fields, agriculture lands, and other tribal lands.
10. ROADS	1.5	Discharges of dredged or fill material for the construction, expansion, modification, or improvement of linear transportation crossings (roadways) other than those included in Activities. Includes the widening of existing road shoulders or construction of new shoulders along existing roadways, and construction of new access drives to existing facilities.

Project Area:

The authorized activities would occur within seven (7) of the Tribe's reservations, including the Miccosukee Reserved Area (MRA)/Tamiami Reservation, Alligator Alley

Reservation, Krome Reservation (which includes the SEMA, Coral Way and Lambick properties), and Sherrod Ranch, in Hendry, Broward, and Miami-Dade Counties, as shown in Attachment 1, and located by the following geographic coordinates:

Project Area	**Latitude**	**Longitude**
Miccosukee Reserved Area (MRA)/Tamiami Reservation	25° 45' 32.52" N	80° 48' 44.95" W
Alligator Alley Reservation	26° 04' 36.71" N	80° 49' 38.54" W
Krome Reservation, SEMA, Coral Way, and Lambick	25° 45' 29.76" N	80° 28' 49.37" W
Sherrod Ranch	28° 18' 50.86" N	81° 05' 11.56" W

Mitigation for the above activities will occur through enhancement, restoration, and establishment of wetlands and waters on the 2,434-acre Sherrod Ranch mitigation area within southern Hendry County, just north of the Seminole Tribe of Florida's Big Cypress Reservation 'native area" and their Advanced Mitigation Program area as shown in Attachment 2.

The term "general permit" means a Department of the Army authorization that is issued on a nationwide or regional (District) basis for a category of activities when: those activities are substantially similar in nature and cause only minimal individual and cumulative impacts. General permits are a way to reduce the burden of the regulatory program on the public and ensure timely issuance of permits while effectively administering the laws and regulations which establish and govern the program. General permits are reviewed every five years. After five years general permits may be re-issued, suspended, or revoked.

An assessment of the cumulative impacts of work authorized under a general permit is performed prior to authorization. In most instances, projects which comply with the conditions of a general permit can receive project specific authorization. Projects that do not comply with the conditions of a general permit may still receive authorization via a "standard permit", but the application must be individually evaluated and coordinated with third parties, including the Federal and State resource agencies. Review of an application for a "standard permit" takes additional time to complete as conflict resolution may be required.

PERMIT SPECIAL CONDITIONS:

1. Fill Material: The Tribe shall use only clean fill material for this project. The fill material shall be free from items such as trash, debris, automotive parts, asphalt, construction materials, concrete block with exposed reinforcement bars, and soils contaminated with any toxic substance, in toxic amounts in accordance with Section 307 of the Clean Water Act.

2. Specific Use: Regulated activities subject to verification under this PGP are limited to the list of activities described in the above table, and at the discretion of the District Engineer.

3. Fill Limits: This permit does not authorize any proposed work that would require a discharge of fill material in waters of the United States that exceeds the thresholds defined for each activity. This permit does not authorize any loss of waters of the U.S., including wetlands, that exceeds the 115.17 acres authorized. Projects, which would result in total impacts that exceed the thresholds established by this PGP are not authorized and shall be evaluated for review under an appropriate permit category at the discretion of the District Engineer.

4. Erosion Control: Prior to the initiation of any work authorized by this PGP, the permittee shall install erosion control measures along the perimeter of all work areas to prevent the displacement of fill material. Immediately after completion of the final grading of the land surface, all slopes, land surfaces, and filled areas adjacent to wetlands shall be stabilized using sod, degradable mats, or a combination of similar stabilizing materials to prevent erosion. For dredging activities, all dredged or excavated materials will be deposited and retained in an area that is not a water of the United States unless specifically approved by the Corps under a separate authorization and proper siltation controls must be used. The erosion and siltation control measures shall remain in place and be maintained until all authorized work has been completed and the site has been stabilized.

5. Access Roads: Access roads must be constructed so that the length of the road minimizes the adverse effects on waters of the U.S. and as near as possible to preconstruction contours and elevations (e.g., at grade corduroy roads or geotextile/gravel roads). Access roads constructed above preconstruction contours and elevations in waters of the United States must be properly bridged or culverted to maintain surface flows. Access roads used solely for construction of the overhead power line must be removed upon completion of the work and the area restored to preconstruction contours, elevations, and wetland conditions.

6. Pre-Construction Notification (PCN) Requirements: Before any activities may be conducted pursuant to this authorization, each applicant must submit a completed PGP SAJ-80 PCN (Attachment 3) Form to the Tribe. Each PCN shall include the following information:

a. Data Forms and supporting information which clearly documents Federally jurisdictional wetlands consistent with the 1987 Corps of Engineers Wetland Delineation Manual, as modified by the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0, November 2010, or most recent version), as well as other jurisdictional waters of the U.S. For wetlands, a minimum of two sets of wetland data forms shall be submitted for each wetland.

b. Exhibits, maps, and other supporting documentation of the proposed work and wetland impact areas (including Uniform Mitigation Assessment Method analysis);

analysis of impacts to Federally listed wildlife species; analysis of direct and secondary wetland impacts; and an updated version of the Sherrod Ranch Mitigation Plan Ledger.

The Tribe will forward a copy of all PCN's to the Corps. Furthermore, the Tribe shall report on compliance with the conditions of this PGP (see Condition #21, below), on at least an annual basis. All PCNs shall be complete, and signed by the applicant.

7. Compensatory Mitigation: The Tribe shall enhance wetlands and/or other waters of the U.S. on the Sherrod Ranch, including the eradication of exotic/invasive species such as melaleuca *(Melaleuca quinquenervia),* Brazilian pepper *(Schinus terebinthifolius),* and old world climbing fern *(Lygodium microphyllum),* and continuing maintenance, in accordance with the approved Sherrod Ranch Mitigation Plan, April 2018. Work shall begin on the Sherrod Ranch mitigation area in advance of work on each project site. The mitigation plan must include a temporal lag factor to ensure that the wetlands provided as compensation adequately replace wetland functions lost due to the project. Mitigation credit and debits associated with this PGP shall be assessed using the Uniform Mitigation Assessment Method (UMAM). All mitigation areas will be maintained in their enhanced, and/or restored state in perpetuity including exotic/invasive species eradication and/or control.

8. Threatened and Endangered Species: This permit does not apply to any activity that "may affect" a listed species identified under the Endangered Species Act, or destroy or adversely modify the critical habitat of such species.

9. Florida Bonneted Bat (FBB): The Permittee will implement the following conservation measures to reduce or avoid impacts to FBB:

a. Pre-authorization wildlife surveys will include acoustic and/or roost surveys (Attachments 4 and 5) for all project sites containing potentially suitable roosting trees. Roost surveys will include a visual inspection of each potentially suitable tree or other potential roost structure *(e.g.* existing structure, bridge, etc.) within the survey footprint to identify potential roosting opportunities *(e.g.,* hollows, woodpecker cavities, crevices, etc.). Any cavities will be inspected for signs of use by bats such as staining, guano, and auditory chirping. Where necessary cavities will be further inspected using an IBWO wireless camera mounted on a 35-foot tall survey rod with a proprietary remote-controlled mount allowing the operator to see the back, bottom, and top of each cavity. Each potential roosting structure/cavity tree will be given an identification number, will be OPS-located, identified to species, and cavity height and orientation will be documented. This information will be included in the pre-authorization survey form.

b. Construction activities will be minimized or avoided during the time of day when FBB are active *(i.e.,* dusk and dawn). In areas where potential roosts are present, the use of artificial lighting will be minimized.

c. Each project will be evaluated using the latest *FBB Effects Determination*

Key (Attachment 6) developed by the U.S. Fish and Wildlife Service as guidance when making effect determinations.

10. Florida panther: The permittee shall implement their Standard Wildlife Education Measures (Attachment 7) and utilize the latest U.S. Fish and Wildlife Service's panther determination key and consultation area (Attachment 8 and 9) on each project. The permittee shall compensate for loss of panther habitat through habitat restoration on the Sherrod Ranch, which is located within the panther Primary Zone.

11. Eastern Indigo Snake Protection Measures: The Tribe shall comply with U.S. Fish and Wildlife Service's Standard Protection Measures for the Eastern Indigo Snake" dated August 12, 2013 (Attachment 10).

12. Audubon's Crested Caracara: To minimize potential impacts to the caracara, the permittee has agreed to implement caracara protection measures. The following protection measures include a response plan in the event that Caracaras are found in the area covered by this PGP:

a. The Tribe has developed Standard Wildlife Education Measures which include a mandatory wildlife workshop for all construction personnel involved in earthwork within tribal lands. Construction personnel are required to be able to identify all federally listed wildlife that may occur within a project area. If any listed wildlife is observed, construction must cease until the animal has left the site on its own accord. Additionally, construction personnel must report all sightings.

b. If active caracara nests are located onsite, the Service will be notified, a 985-ft (300 meter) buffer zone will be established around the nest, and all construction activities within the buffer will be halted during the nesting season. All efforts will be made to perform construction activities outside of the buffer area throughout nesting season. However, if construction must take place within the buffer zone during nesting season, construction will only continue after the Applicants have met with the Service to identify and implement appropriate conservation practices. Development within the caracara's nest territory (4,920 feet) will not exceed the "Accumulative Loss Threshold."

13. Everglades Snail Kite: To minimize potential impacts to the Everglades snail kite, the permittee must comply with the following conditions:

a. The Applicants will conduct a pre-construction snail kite nest survey of the PGP-covered sites and surrounding marsh within 1,640 feet of the site.

b. No work will occur within 1,640 feet of any snail kite nests, if found. The active nest will be monitored, and work will not resume within 1,640 feet (500 meters) of the nest until: 1) the nestlings have been observed to fledge; or 2) the

nest has failed and the adults are observed to leave the area.

14. American Wood Stork: The permittee shall implement the Tribe's Standard Wildlife Education Measures and utilize the U.S. Fish and Wildlife Service's latest *Wood Stork Programmatic Effects Determination Key* (Attachment 11) on each project. Compensation for loss of wood stork habitat shall be based on the Service's most recent *Wood Stork Habitat Assessment Methodology* (Attachment 11). Wood stork biomass impacts for each project will be noted in the PGP ledger and will be deducted from the overall Sherrod Ranch Mitigation Ledger.

15. Miccosukee Reserve Area Act: The Tribe shall ensure all actions authorized under this permit are consistent with the Miccosukee Reserve Area Act.

16. Cultural Resources/Historic Properties: No structure or work shall adversely affect, impact or disturb properties listed in the National Register of Historic Places (NRHP) or those eligible for inclusion in the NRHP.

a. If, during the ground disturbing activities and construction work within the permit area, there are archaeological/cultural materials encountered which were not the subject of a previous cultural resources assessment survey or for which a plan for their treatment has not already been agreed upon (and which shall include, but not be limited to: pottery, modified shell, flora, fauna, human remains, ceramics, stone tools or metal implements, dugout canoes, evidence of structures or any other physical remains that could be associated with Native American cultures or early colonial or American settlement), the Permittee shall immediately stop all work in the vicinity and notify the Corps, Florida State Historic Preservation Officer (SHPO), and the appropriate Tribal Historic Preservation Officer(s) (THPO(s)) to assess the significance of the discovery and devise appropriate actions.

b. A cultural resources assessment may be required of the permit area, if deemed necessary by the SHPO, THPO(s), or Corps, in accordance with 36 CFR 800 or 33 CFR 325, Appendix C (5). Based on the circumstances of the discovery, equity to all parties, and considerations of the public interest, the Corps may modify, suspend or revoke the permit in accordance with 33 CFR Part 325.7. Such activity shall not resume on non-federal lands without written authorization from the SHPO and the Corps.

c. In the unlikely event that unmarked human remains are identified on non-federal lands, they will be treated in accordance with Section 872.05; Florida Statutes. All work in the vicinity shall immediately cease and the permittee shall immediately notify the medical examiner, Corps, and State Archeologist. The Corps shall then notify the appropriate SHPO and THPO(s). Based, on the circumstances of the discovery, equity to all parties, and considerations of the public interest, the Corps may modify, suspend or revoke the permit in accordance with 33 CFR Part 325.7. Such activity shall

not resume without written authorization from the State Archeologist, SHPO and the Corps.

d. In the unlikely event that human remains are encountered on Federal or tribal lands, or in situations where Archaeological Resources Protection Act of 1979, or Native American Graves Protection Repatriation Act of 1990 applies, all work in the vicinity shall immediately cease and the Permittee immediately notify the Corps. The Corps shall then notify the appropriate THPO(s) and SHPO. Based, on the circumstances of the discovery, equity to all parties, and considerations of the public interest, the Corps may modify, suspend or revoke the permit in accordance with 33 CFR Part 325.7. After such notification, project activities on Federal lands shall not resume without written authorization from the Corps, and/or appropriate THPO(s), SHPO, and Federal manager. After such notification, project activities on tribal lands shall not resume without written authorization from the THPO(s) and the Corps.

17. Utility Lines: Aerial transmission lines shall meet the Corps clearance criteria as described in 33 CFR, Part 322.5(i)(1), (2), (3), and (4). This clearance does not apply in the case of a lift bridge. Minimum clearance for lift bridges will be determined on a case-by-case basis.

a. The minimum clearance* (see NOTE in b.) for aerial communication lines, or any lines not transmitting electrical power, will be ten (10) feet above the clearance required for nearby stationary bridges as established by the U.S. Coast Guard. In the event the U.S. Coast Guard has not established a bridge clearance, minimum vertical clearances for power and aerial lines will not be less than required by Section 23, Rule 232, of the latest revision of the National Electrical Safety Code (ANSI C2). Clearances will not be less than shown in Table 232-1, Item 7, ANSI C2.

b. The minimum clearance* for an aerial line, transmitting electrical power, is based on the low point of the line under conditions that produce the greatest sag, taking into consideration temperature, load, wind, length or span and the type of supports. The minimum clearance for an aerial electrical power transmission line crossing navigable waters of the US shall be governed by the system voltage, as indicated below:

Table 2. Aerial Transmission Line Clearance Requirements:

Nominal System Voltage (Kilovolts)	Minimum Clearance (Above Bridge Clearance as Required by U.S. Coast Guard) (ft)
115 and below	20
138	22
161	24
230	26
350	30
500	35
700	42
750-765	45

*NOTE: Minimum clearance is the distance measured between the lowest point of a stationary bridge, including any infrastructure attached to underside of the bridge, and the Mean High Water (MHW) of the navigable waters of the US beneath the bridge.

c. On navigable waters of the US, including all federal navigation projects, where there is no bridge for reference for minimum clearance, the proposed project will need to be reviewed by the Corps in order to determine the minimum clearance between the line and MHW necessary to protect navigational interests.

18. Notification: Where the proposed aerial transmission line is to be installed in navigable waters of the United States, at least two weeks prior to the start of the authorized work, the Permittee must notify the National Oceanic Atmospheric Administration (NOAA) and the Corps' office in writing that the work is commencing, and again upon completion of the work. The Permittee shall notify the District Engineer at saj-rd-enforcement@usace.army.mil , or the above letterhead address, attention Regulatory Division, and NOAA, at Nautical Data Branch N/CS26, Station 7317, 1315 East-West Highway, Silver Spring, MD 20910-3282, or by e-mail to ocs.ndb@noaa.gov. This notification will include "As-Built plans," signed and sealed by a registered surveyor/engineer licensed in the State of Florida, that certify the project is constructed as authorized, and must include an accurate (within plus or minus 1 foot) depiction of the location and configuration of the completed activity in relation to the mean high water of the navigable water.

19. Modification of a Federal Project: Any proposed regulatory action that modifies, alters, or is built upon or adjacent to an existing federal project, does not meet the required Setback Guidance or is constructed within a federal project right-of-way may require permission under Section 14 of the RHA 33 USC 408 (Section 408) and may require coordination with the Engineering Division. Any structure within 62.5 feet of a federal navigation structure (with the exception of single-family docking structures) shall require coordination under Section 408. Any degradation, relocation, penetration, or work under a Corps levee, dike, dam, or water retaining structure and any proposed work within 15 feet of a federal canal top of bank (such as the Okeechobee Waterway or the Central and South Florida Flood Control Canals), within two feet of the top edge of slope of a federal navigation channel or within 50 feet of a Corps dam requires coordination under Section 408.

20. Self-Certification: Within 60 days of completion of the authorized work, and any mitigation required, a *Self-Certification Statement of Compliance* (Attachment 10) must be completed and submitted to the Tribe. The form must reference the site specific Department of the Army permit number associated with the work.

21. Compliance and Mitigation Ledger Update Reporting: The Tribe shall update and maintain an accurate ledger (attached) of permit impacts and mitigation activities, as well as a summary of compliance inspections on at least 10% of all verifications issued under this PGP. Reports shall be submitted within 90 days following the end of each year, with each year ending exactly one year from the date or anniversary of this

PGPs issuance. The compliance inspection report shall be updated and maintained to include, at a minimum, the following information:

Table 3. Minimum Compliance Inspection Reporting Items

Date Permit Verified	Permittee Name	Type Activity (residential, institutional, etc.)	Centroid Location Coordinates	Area of Waters Impacted (acres))	UMAM Credits Required to Offset Project Impacts	Date of Permit Compliance Inspection	Date UMAM Credits Obtained to Offset Impacts	Project is in Compliance with All conditions of the PGP (Yes/No))	List Permit Conditions Not Complied With (i.e., #1, 2, etc.)	Describe Actions Taken to Bring project Into Compliance (i.e., Enforcement action, permit modification, etc.)	Date Project Determined to be in Compliance	Comments/Remarks

22. Reporting Address: All reports, including annual reporting, documentation and correspondence required by the conditions of this permit shall be submitted to the following mailbox: saj-rd-enforcement@usace.army.mil or address as follows: U.S. Army Corps of Engineers, Regulatory Division, Enforcement Section (CESAJ-RD), P.O. Box 4970, Jacksonville, Florida 32232-0019. The Tribe shall reference permit number **SAJ-2006-05479(PGP-DEB)** on all submittals.

23. Permit Expiration: This PGP will be valid for one year from the date of authorization unless suspended or revoked by issuance of a public notice by the District Engineer. The expiration date may be extended 4 more times by the Corps in 1 year increments (i.e., to August 17, 2020 and potentially to August 17, 2023). The Corps, in conjunction with the Federal resource agencies, will conduct periodic reviews to ensure that continuation of the permit is not contrary to the public interest. This PGP will not be extended beyond August 17, 2023, but may be replaced by a new PGP. If revocation occurs, all future applications for activities covered by this PGP will be evaluated by the Corps. If this PGP expires or is revoked prior to completion of the authorized work, authorization of activities that have commenced or are under contract to commence in reliance on this PGP will remain in effect provided the activity is completed within 12 months of the date this PGP expired or was revoked; and that such activities are conducted in compliance with this PGP and any lease agreement terms or conditions.

BY AUTHORITY OF THE SECRETARY OF THE ARMY:

Shawn Zinszer

Jason A. Kirk
Colonel, U.S. Army
District Commander

GENERAL CONDITIONS FOR DEPARTMENT OF THE ARMY GENERAL PERMITS:

1. The time limit for completing the work authorized by this permit ends five (5) years from the date of authorization.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and State coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature and mailing address of the new owner in the space provided below and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit.

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Further Information:

1. Limits of this authorization.

    a. This permit does not obviate the need to obtain other Federal, State, or local authorizations required by law.

    b. This permit does not grant any property rights or exclusive privileges.

    c. This permit does not authorize any injury to the property or rights of others.

    d. This permit does not authorize interference with any existing or proposed Federal projects.

2. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

    a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

    b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

    c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

    d. Design or Construction deficiencies associated with the permitted work.

    e. Damage claims associated with any future modification, suspension, or revocation of this permit.

3. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

4. Reevaluation of Permit Decision: This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

    a. You fail to comply with the terms and conditions of this permit.

    b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (see 3 above).

    c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

5. Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CER 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

_____ _____

(TRANSFEREE-SIGNATURE) (DATE)

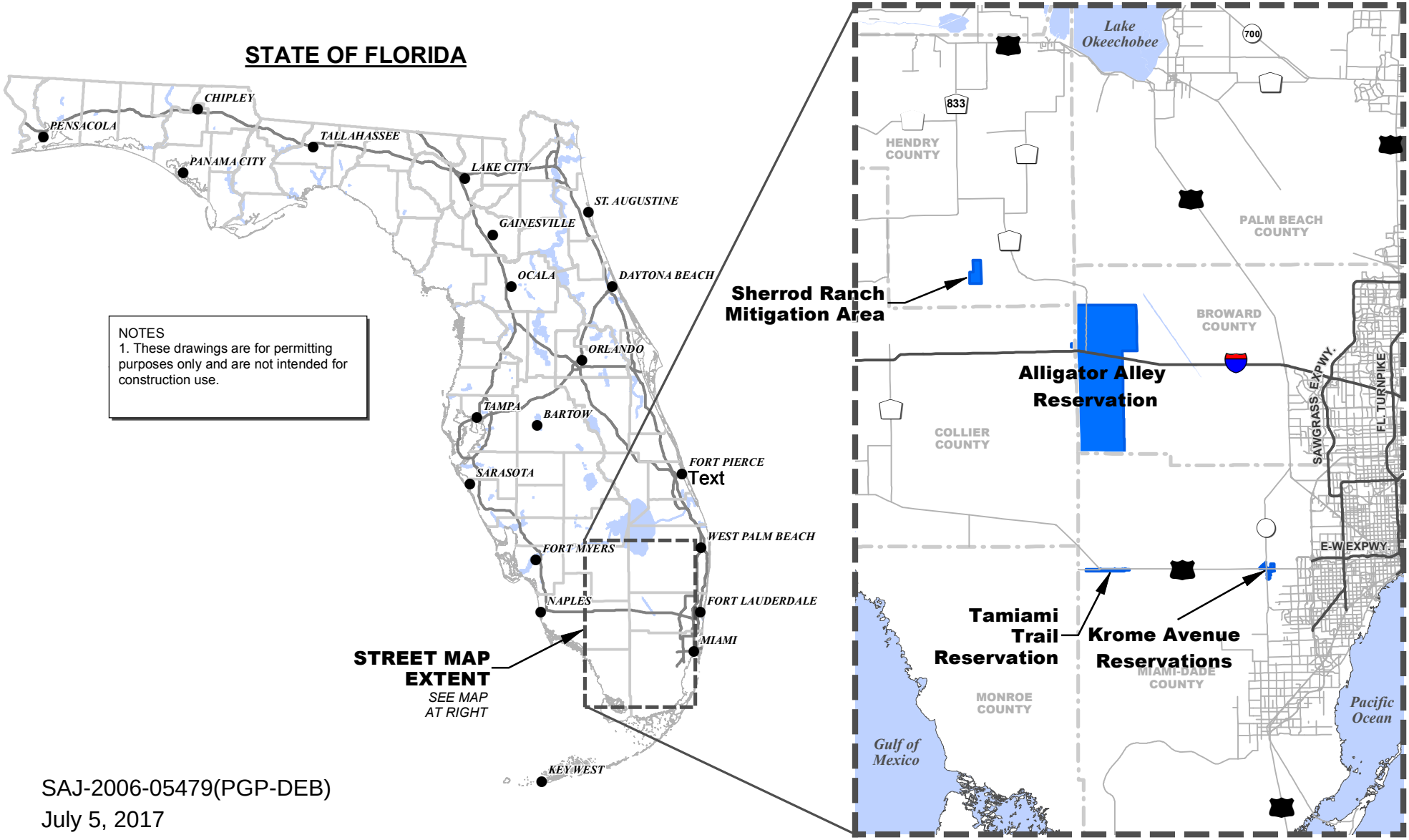
_____

(NAME-PRINTED)

_____

(ADDRESS)

Attachment 1.A PGP SAJ-80 Project Area -



SAJ-2006-05479(PGP-DEB)
July 5, 2017
Exhibit 1/20

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Miccosukee Tribe
Hendry, Broward and
Miami-Dade Counties, Florida

JOHNSON ENGINEERING

JOHNSON ENGINEERING, INC.
6941 SW 196TH AVENUE
SUITE 32
PEMBROKE PINES, FL 3332
PHONE (954) 626-0123
E.B. #642 & L.B. #642

PGP Included Trust Lands
Location Map

DATE	PROJECT NO.	FILE NO.	SCALE	SHEET
March 2017	20139363-015		N/A	1

Figure 2. Tamiami Trail Reservation designated lands (note, the larger boundary is considered Tribal Lands and supports Tribal housing and other development; however, the pink line shows the Congressionally designated trust lands.

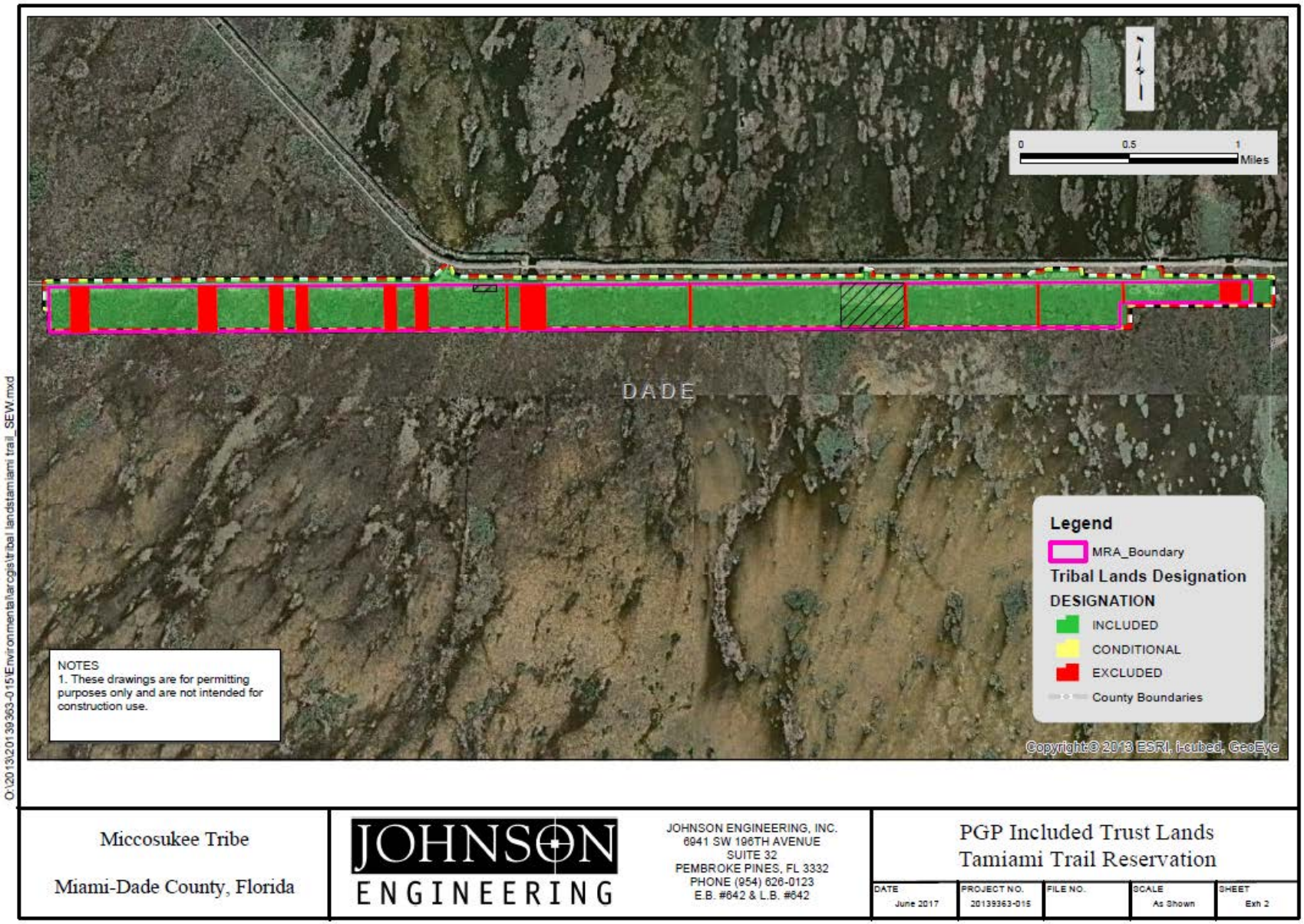


Figure 3. Krome and Tamiami parcels designated lands

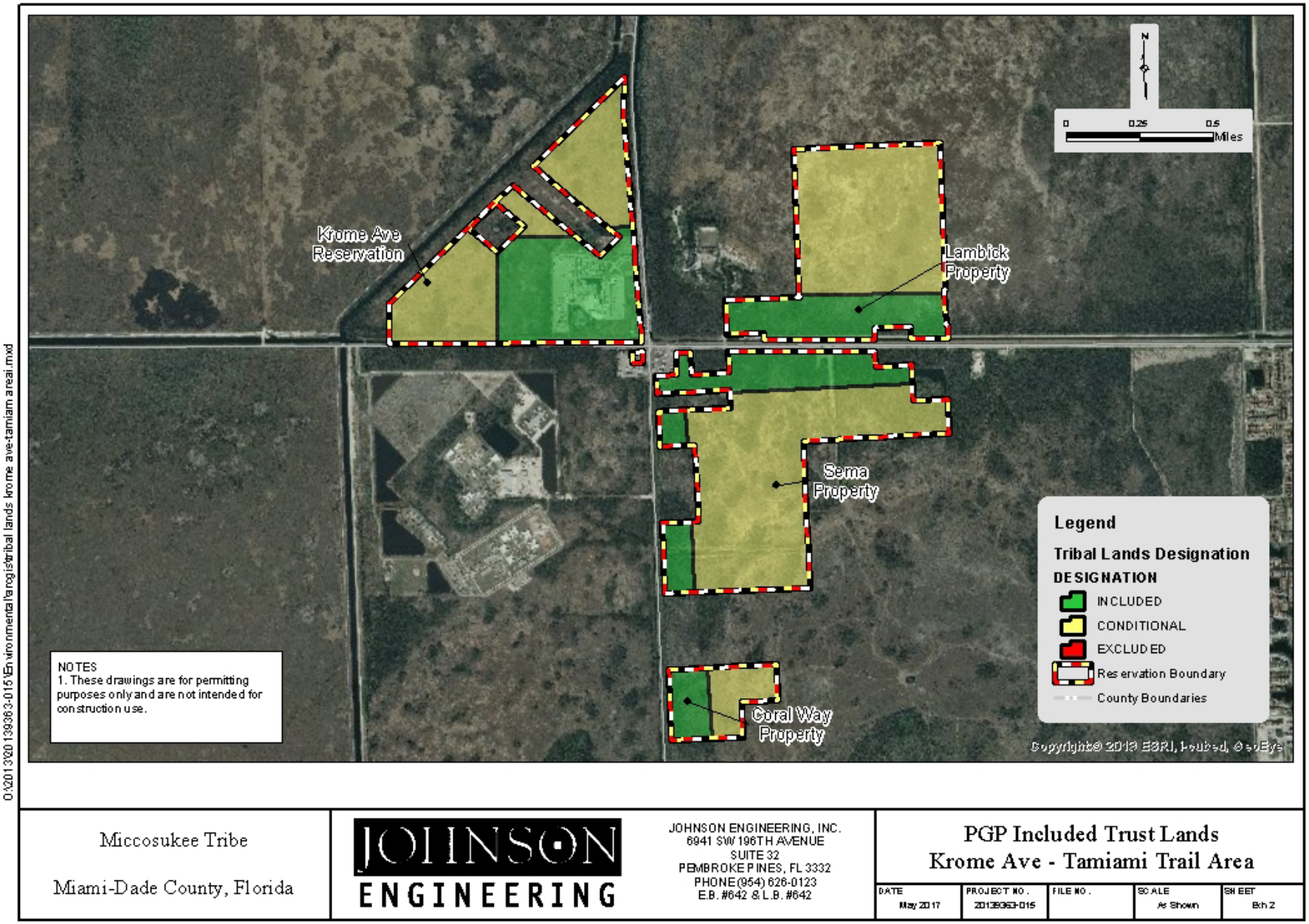


Figure 4. Alligator Alley Reservation designated lands

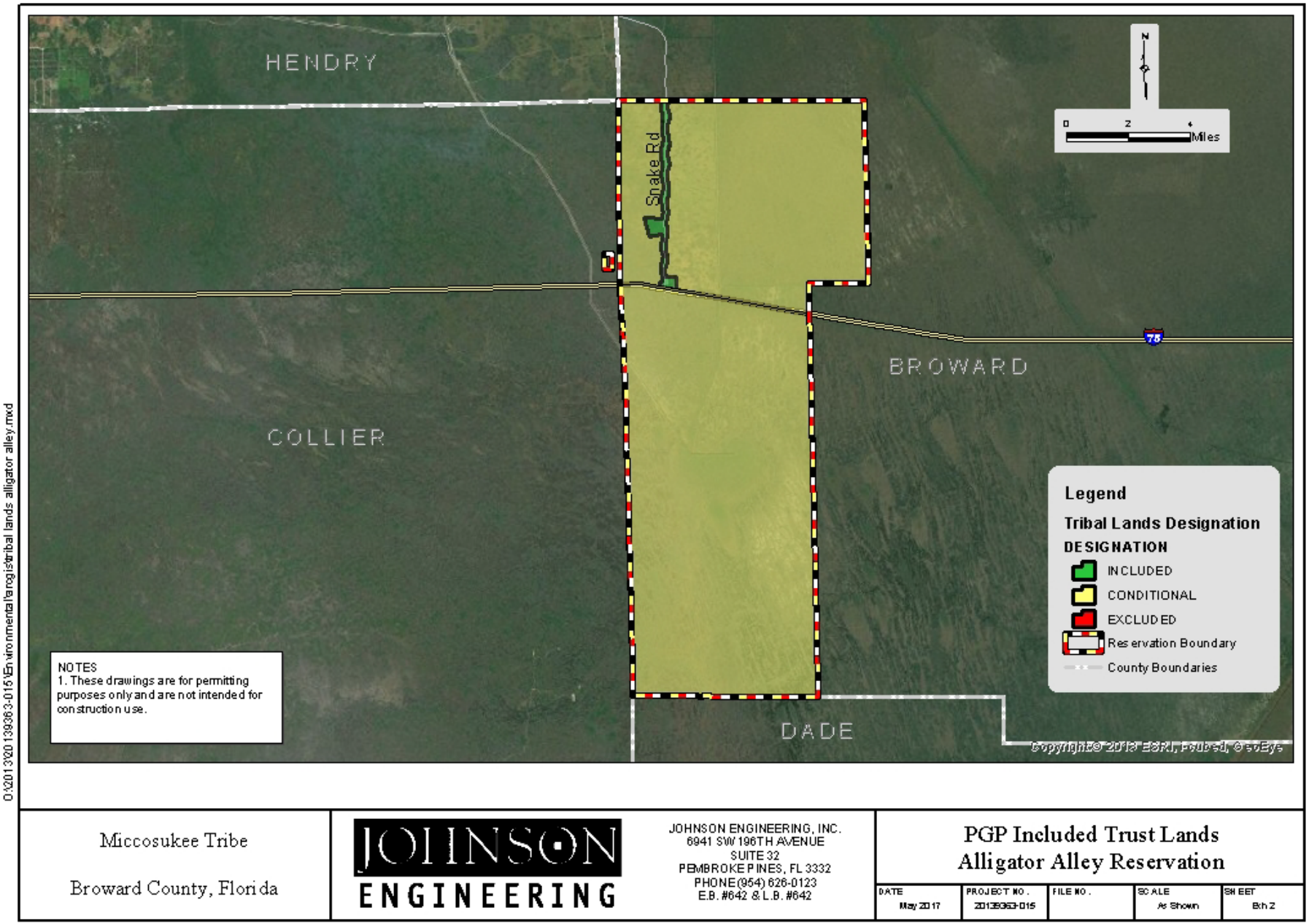
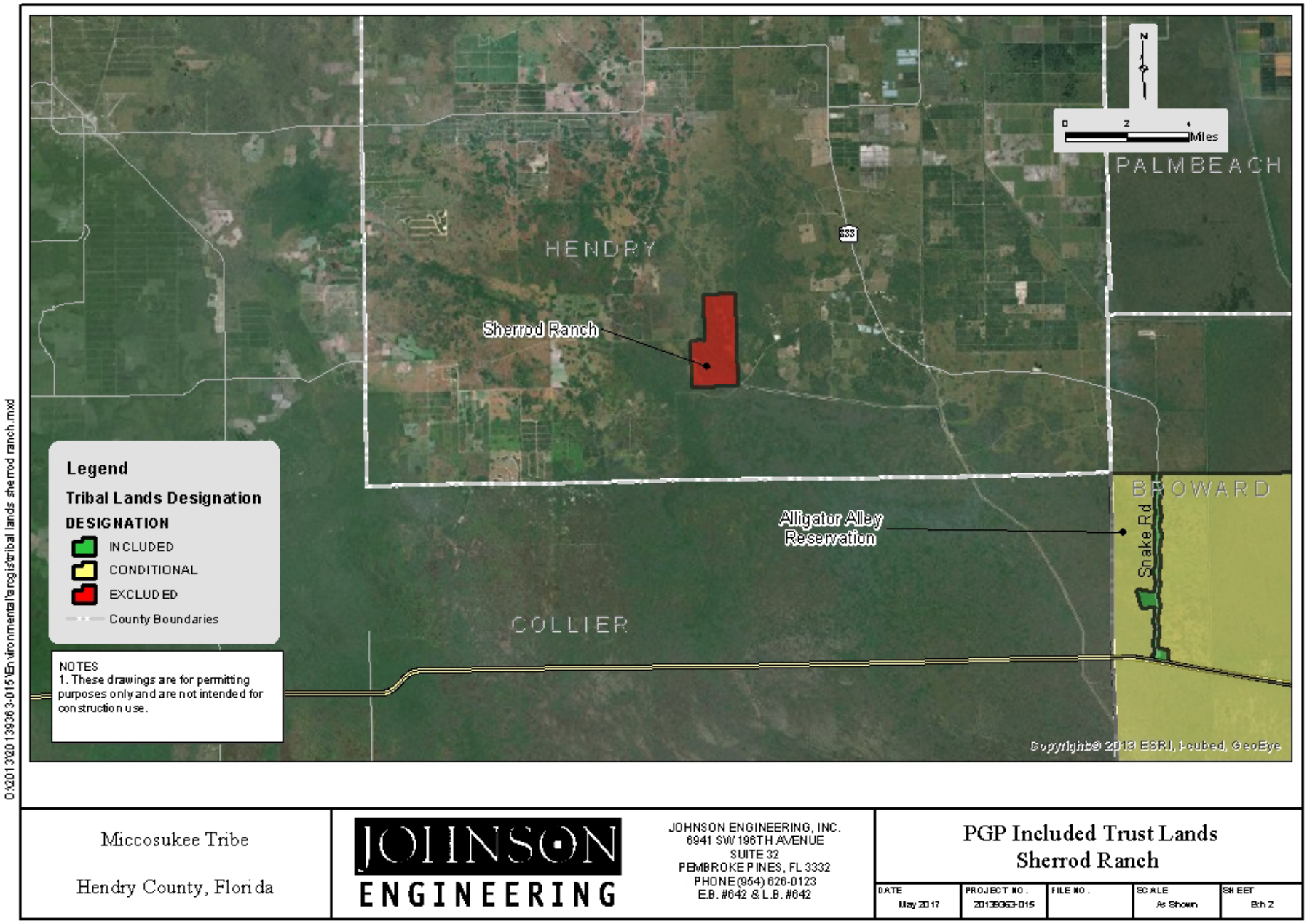
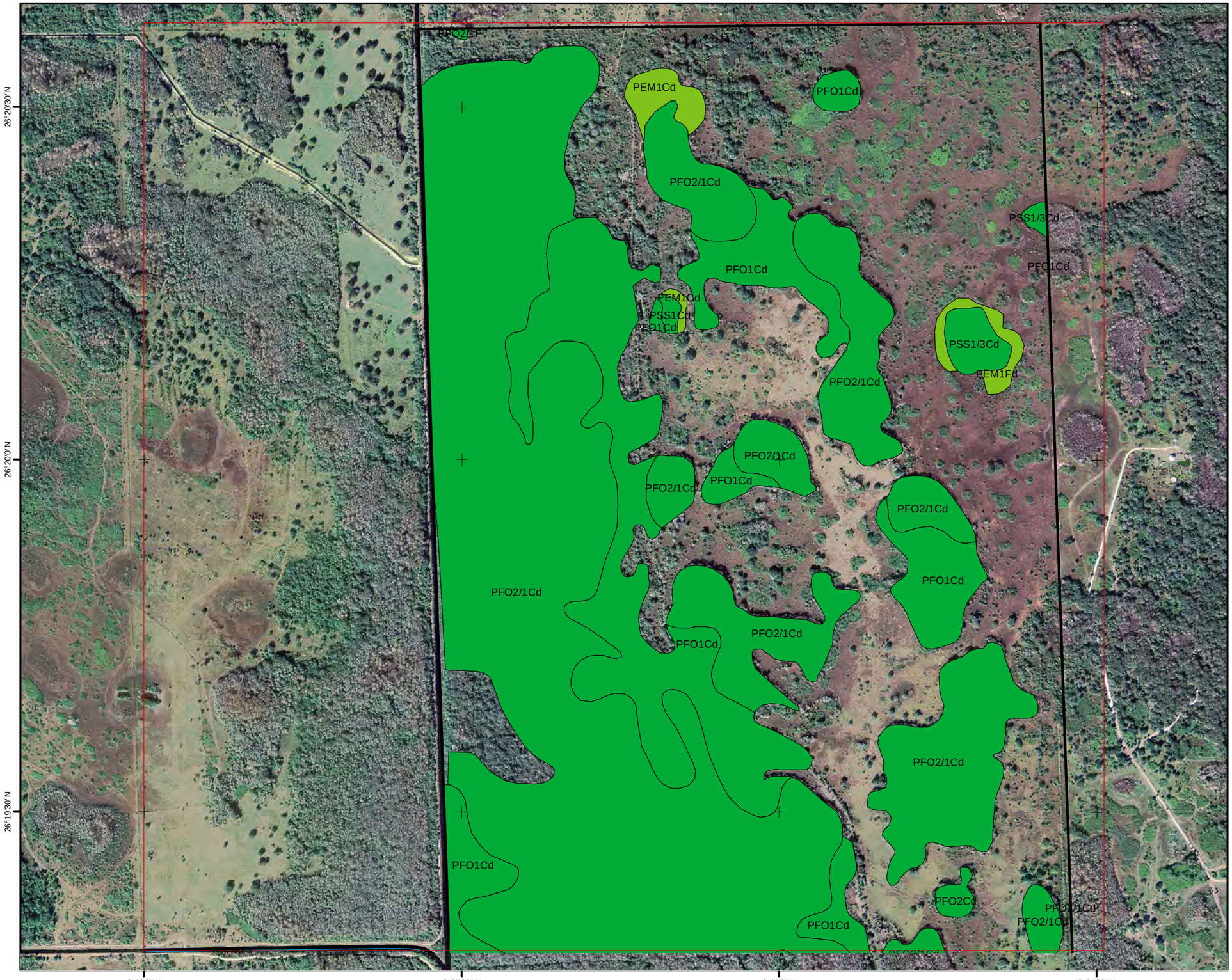


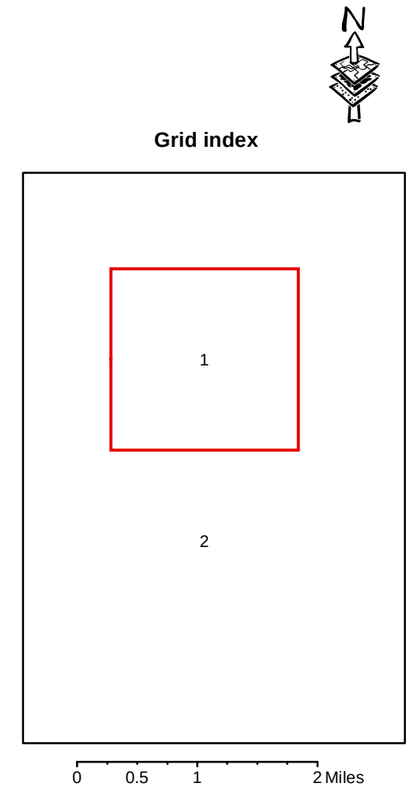
Figure 5. Sherrod Ranch designated lands



TYPES OF WETLANDS (SHERROD RANCH)

Attachment 2.B Sherrod Ranch Wetland Area





Legend

Property boundary

Wetland type

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Riverine

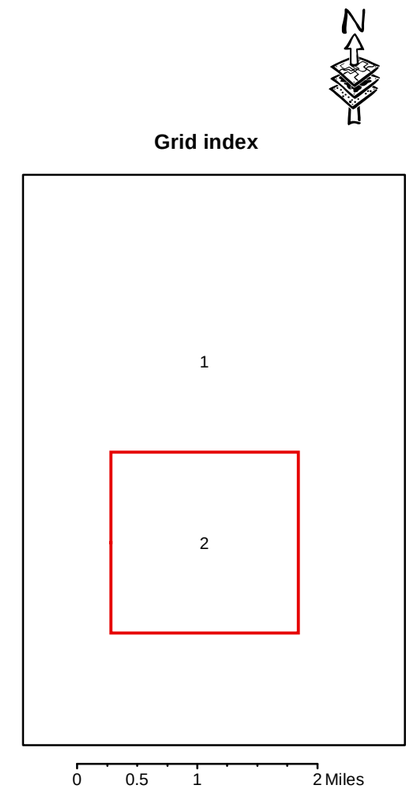
Codes described in Annex 1: Wetlands and Deepwater Habitats Classification Hierarchy (Cowarding et al. 1979)

0 0.125 0.25 0.5 Miles

Edited by the Water Resources Department
Source: National Wetland Inventory
U.S. Fish and Wildlife Service
https://www.fws.gov/wetlands/Data/Mapper.html

TYPES OF WETLANDS (SHERROD RANCH)

Attachment 2.C Sherrod Ranch Wetland Area (cont.) -



Legend

Property boundary

Wetland type

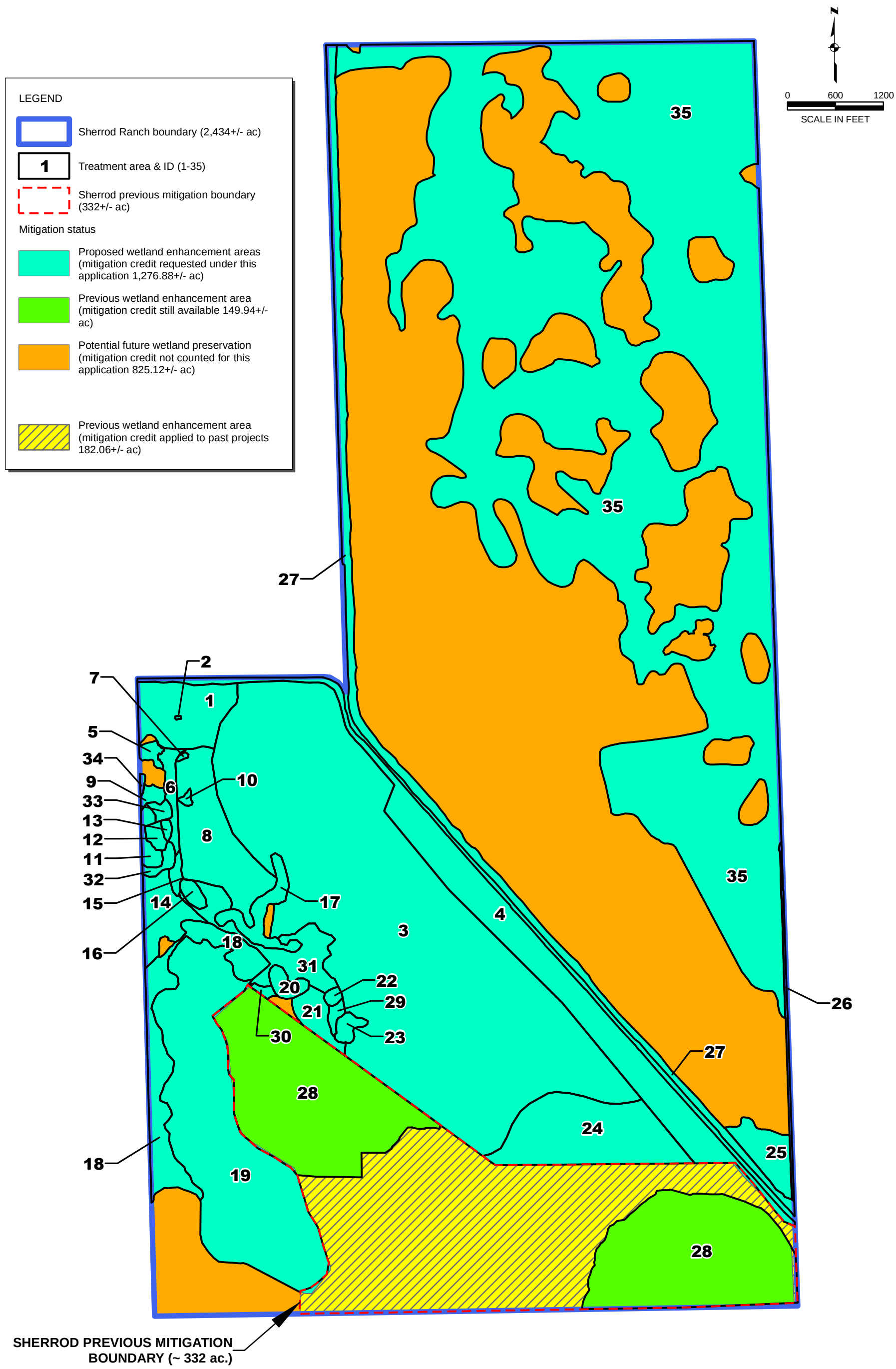
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Riverine

Codes described in Annex 1: Wetlands and Deepwater Habitats Classification Hierarchy (Cowarding et al. 1979)

0 0.125 0.25 0.5 Miles

Edited by the Water Resources Department
Source: National Wetland Inventory
U.S. Fish and Wildlife Service
https://www.fws.gov/wetlands/Data/Mapper.html

Attachment 2.D Sherrod Ranch Mitigation Enhancement Areas -



\\ftms01\drawings\2013\20139363-015\Environmental\arcgis\unused mitigation calcs July 2018\mitigation status July 2018.mxd

Miccosukee Tribe -
Sherrod Ranch
Hendry County, Florida

JOHNSON ENGINEERING

JOHNSON ENGINEERING, INC.
1031 IVES DAIRY ROAD
SUITE 239
MIAMI, FLORIDA 33179
PHONE (954) 626-0123
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E.B. #642 & L.B. #642

Mitigation Area Summary Map

DATE	PROJECT NO.	FILE NO.	SCALE	SHEET
July 2018	20139363-015	--	As Shown	Exhibit 1

Attachment 3. PGP SAJ-80 PCN Form

PGP SAJ-80 Pre-Construction Notification (PCN) Form

CESAJ-RD

Notification Submittal Date:

I. Applicant Information/ Name and Address:

II. Applicant Contact Information:

Tel:	E-mail:

III. Location of Work:

The project/work area is located , in Section , Township , Range , _____, _____, Florida. Near Waterway:
Project Site Street Address: _____ Project Site Area: acre(s)
Latitude:
Longitude:

IV. Project Activity Description (i.e., Activities #1 - 10)

V. Compensatory Mitigation to Offset Unavoidable Losses of Aquatic Resources:

- **A Delineation of Wetlands and Waters has been provided:** ☐ Yes ☐ No
- **Wetlands and Waters have been avoided to maximum Extent Possible:** ☐ Yes ☐ No
- **Proposed Wetland Impacts: acre(s)**
- **Proposed (Other) Waters Impacts: acre(s)**
- **Required Mitigation Credits: unit(s)**
- **Proposed Mitigation Plan: Purchase of unit(s)** at Sherrod Ranch Mitigation Site

VI. Compliance with T&E species keys, protection measures and conditions: ☐ Yes ☐ No
If No, separate consultation with the USFWS will be required for impacts to those species and/or critical habitat not addressed by this PGP prior to DA permit and/or commencement of work. Please contact the USFWS and/.or Corps if separate consultation is needed.

VII. Will the proposed work cause adverse impacts to historical properties listed in or eligible for listing in the National Register of Historical Places? ☐ Yes ☐ No
If yes, please contact the Corps and the SHPO. Additional coordination will be required with the SHPO.

VIII. All Conditions of this Have Been Satisfied: ☐ Yes ☐ No
If No, Please Describe and Explain how these conditions will be addressed:

IX. Confirmation That I have Read and Agree to Comply with All Terms and Conditions of the PGP SAJ-80:

Applicant: _____Date:_____

X. Disclaimer: The Corps reserves the right to re-visit the terms and conditions of this PGP at any time and may rescind, revoke, or modify this PGP or any verification. Questions regarding this PCN form should be directed to the Jacksonville District Regulatory Division, Programs Manager, c/o Mr. Dale Beter, at:

Regulatory Division
Jacksonville District
P.O. Box 4970
Jacksonville, FL 32232-0019
O: 904.232.1361
C: 904.402.2975 Dale.e.beter@usace.army.mil

Draft Acoustic Survey Protocol for the Florida Bonneted Bat **August 2014**

The purpose of this survey is to document if Florida bonneted bats have a reasonable likelihood of using a proposed project site. The results of the surveys will provide information that can help guide the consultation process and appropriate conservation measures. Because of the difficulty in detecting this species, negative survey results will not equate to species absence. This protocol is designed to be implemented prior to potential impacts from construction or development projects. Because the Florida bonneted bat Consultation and Focal Area (Appendix A) was developed around confirmed Florida bonneted bat detections, an agency or applicant may choose to assume presence of Florida bonneted bats rather than implement acoustic surveys. Acoustical methods have been selected over mist netting as the primary survey methodology because this species flies and primarily forages at heights of 9 m (30 ft) or more; for this reason the species can be difficult to capture in mist nets.

The South Florida Ecological Services Field Office (Service) is available to review survey plans for the Florida bonneted bat and can provide recommendations on appropriate placement of bat detectors. Survey plans should include a map/aerial photo identifying the proposed project area boundaries, suitable bat habitat and acreages within the proposed project area, and the proposed number and tentative locations of acoustic monitoring sites.

TIMING:
Year-round: Acoustic surveys can be conducted in all months of the year, provided the minimum temperature stays above 60 degrees throughout the night.

SURVEY PERIOD:
Sunset-Sunrise - The acoustic sampling period for each sampling night begins at sunset and ends at sunrise for each detector. Sunset tables for the location of survey can be found at:
http://aa.usno.navy.mil/data/docs/RS_OneYear.php

SURVEY EFFORT: The following will be considered the minimum level of survey effort.

- To determine the acoustic survey effort, quantify the amount of suitable habitat[1] within the proposed project area.
- The number of acoustic survey sites required for a project will be dependent upon the overall acreage of suitable habitat in the proposed project site.
- Detectors should be placed adjacent to features known to attract bats, such as water features, or within active or historic red-cockaded woodpecker clusters.
- Once a Florida bonneted bat has been detected, surveys of the proposed project area can be discontinued because presence of the species has been established.

[1] ***Roosting habitat*** includes forest and other areas with large or mature trees or other areas with suitable roost structures. Natural roosting structure primarily includes mature or large live or dead trees, tree snags, and trees with cavities, hollows, or crevices. Forest is defined as all types (all age classes) including: pine flatwoods, scrubby flatwoods, pine rocklands, royal palm hammocks, mixed or hardwood hammocks, cypress, sand pine scrub, or other forest types. ***Foraging habitat*** includes open fresh water and permanent or seasonal freshwater wetlands (which provide sources of drinking water and prey), wetland and upland forests, open freshwater wetlands, wetland and upland shrub (which provide a prey base and suitable foraging conditions [i.e., open habitat structure]). Natural or semi-natural habitat patches in urban or residential areas may also provide foraging habitat.

Linear projects: Linear projects are defined as roadways, transmission lines, etc. 5 detector nights per km (0.6 miles) of suitable habitat are required. Detectors should be distributed along the linear feature. Detectors can be moved to multiple locations within each kilometer surveyed but must remain in a single location throughout any given night. Detectors should not be placed closer than 200 meters apart.

Non-linear projects: A minimum of 16 detector nights per 20 acres of suitable habitat are required. If multiple detectors are used they should be placed a minimum of 200 meters apart. Projects less than 20 acres should still sample for a minimum of 16 nights

DETECTOR TYPE

Detectors suitable for use in this survey protocol include:

- Full-spectrum and/or zero-crossing detectors.
- Directional and omni-directional microphones.
- Microphones attached to detectors via a cable permitting that the cable length does not exceed manufacturer recommendations.
- Microphones should be mounted on grounded or metal poles to avoid build-up of electrostatic charges that may interfere with acoustic sampling.

DETECTOR PLACEMENT

Detector/Microphone placement is critical to the successful isolation of high-quality bat call sequences for later analysis. Accurate GPS coordinates must be generated and reported for each acoustic survey site. We recommend selecting deployment locations in consultation with the Service.

The following locations are likely to be suitable sites for detectors/microphones, including, but not limited to:

- forest-canopy openings
- near open water or vegetated wetlands
- wooded fence lines that are adjacent to large openings or connect two larger blocks of suitable habitat
- blocks of recently logged forest where some potential roost trees remain
- road and/or stream corridors with open tree canopies or canopy height of more than 10 m (33 ft)
- forest edges (Britzke et al. 2010)

<u>Detectors/Microphones Deployment</u>

The following considerations address microphone height and directionality:

- at a minimum height of 5 m (16.4 ft); consider using vertical structures, when present, to establish greater height in detector/microphone placement;
- a minimum of 1.5 m (5 ft) in any direction from vegetation or other obstructions, and not under a tree canopy (Hayes 2000; Weller and Zabel 2002);
- in areas without, or with minimal[2], vegetation within 10 m (33 ft) in front of the

[2] If necessary, surveyors can remove small amounts of vegetation (e.g., small limbs, saplings) from the estimated

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microphone; and
- spaced a minimum of 200 m (656 ft) apart.

Orientation
Detectors with directional microphones should be aimed 90 degrees above horizontal.

Weather Conditions
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.

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.

- temperatures fall below 60°F during the night;
- precipitation, including rain and/or fog, that exceeds 30 minutes or continues intermittently during the night; and
- sustained wind speeds greater than 9 miles/hour (4 meters/second; 3 on Beaufort scale) during the night.

Verification of Proper Functioning
Ensure acoustic detectors are functioning properly and conduct tests on microphone sensitivity to factory specifications before and after deployment, at a minimum. It is recommended that tests be conducted throughout the survey period.

SUBMISSION OF ACOUSTIC SURVEY RESULTS
Results of the acoustic surveys should be submitted to the Service using the data sheets and excel table provided, along with all raw data (i.e., zero crossing files, wave files and sonograms). In addition to the excel table, data sheets, and raw files, each acoustic survey report should include the following:

1. Description of the habitat within the proposed project area. Use Florida Land Use Cover and Forms Classification System descriptions of habitat types.

2. Photographs of each acoustic site documenting: 1) the habitat in which the acoustic units were deployed; 2) the deployment location/position of the acoustic unit; 3) the orientation of the microphone at deployment.

3. Map identifying acoustic monitoring locations and a corresponding GPS coordinates.

4. Full names of all personnel conducting acoustic surveys, including those that selected acoustic sites and deployed detectors.

5. Description of acoustic detector brand(s) and model(s) used, microphone type, use of weatherproofing, acoustic monitoring equipment settings (e.g., sensitivity, audio and data

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detection cone at a site. Deployment of detectors/microphones in closed-canopy locations are acceptable as long as the area sampled below the canopy does not restrict the ability of the equipment's detection cone to record high-quality calls (i.e., the vegetation is outside of the detection cone).

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division ratios).

6. A description of how proper functioning of bat detectors was verified.

ADDITIONAL CONSIDERATIONS

Placement and Microphone Orientation

Many features (e.g., vegetation, water, wind turbines, high-tensile power-lines, micro-wave towers) can reduce the quality of call sequences recorded in the field and impact the surveyor's ability to record high-quality bat call sequences by causing calls to reflect off of these surfaces.

It is important to assess the volume and area of highest sensitivity within the zone of detection around the microphone to ensure the best detector/microphone placement and orientation. If detectors/microphones are placed in unsuitable locations, effective data analysis may be impossible, and the results of the sampling effort will likely be invalid.

Selection of acoustic sites is also important. Suitable set-up of the equipment should result in high-quality call sequences that are adequate for species identification. Modifications of the equipment (e.g., changing the orientation) at the same location on subsequent nights may improve quantity and quality of call sequences recorded, which can be determined through daily data downloads. If modifications of the equipment do not improve call identification, then the detectors will need to be moved to a new location.

Field Tests

It is required to ensure equipment is working during set-up in the field. This can be done simply by producing ultrasound (e.g., finger rubs, calibrator, or follow the equipment manufacturer's testing recommendations) in front of the microphone at survey start and survey finish. This documents that the equipment was working when deployed and when picked up (and by assumption throughout the entire period). Detector field settings (e.g., sensitivity, frequency, etc.) should follow the recommendations provided by the manufacturer. Surveyors should also save files produced by detectors (e.g., log files, status files, sensor files) as an excellent way to provide documentation when equipment was functioning within the survey period. Many types of detectors allow for setting timers that initiate and end recording sessions. This saves battery life as well as reducing the number of extraneous noise files recorded. However, if the units are visited when the timer is off, the surveyor cannot verify that the unit is functioning properly. This is particularly important in areas where no bat activity is recorded for the entire night or during the last portion of the night. In these cases, if the surveyor cannot demonstrate that the detector was indeed functioning properly throughout the survey period, then the site will need to be re-sampled unless adequate justification can be provided to the Service.

PERSONNEL

Acoustic surveyors should have either completed one or more of the available acoustic courses/workshops (e.g., Bat Conservation International, Bat Conservation and Management, AnaBat™) or be able to show similar on-the-job or academic experience. The proceeding workshops and course are all independently conducted and should be contacted directly; the Service is not

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affiliated with any of the workshops or courses and does not have additional information.

Acoustic surveyors should have a working knowledge of the acoustic equipment and Florida bonneted bat ecology. Surveyors should be able to identify appropriate detector placement sites and establish those sites in the areas that are most suitable for recording high-quality Florida bonneted bat calls. Thus, it is highly recommended that all potential acoustic surveyors attend appropriate training and have experience in the proper placement of their field equipment.

Individuals qualified to conduct qualitative analysis of acoustic bat calls typically have experience: (1) gathering known calls. This provides a valuable resource in understanding how bat calls change and the variation present in them; (2) identifying bat calls recorded in numerous habitat types; (3) familiarity with the species likely to be encountered within the project area; and (4) individuals must have multiple years of experience and must have stayed current with qualitative ID skills. A resume (or similar documentation) will be required to be submitted along with final survey reports for anyone making final qualitative identifications.

REFERENCES

Britzke, E.R, B.A. Slack, M.P. Armstrong, and S.C. Loeb. 2010. Effects of orientation and weatherproofing on the detection of bat echolocation calls. Journal of Fish and Wildlife Management 1(2):136-141.

Hayes, J. P. 2000. Assumption and practical considerations in the design and interpretation of echolocation-monitoring studies. Acta Chiropterologica 2:225-236.

Weller, T. J., and C. J. Zabel. 2002. Variation in bat detections due to detector orientation in a forest. Wildlife Society Bulletin 30:922-930.

Addendum

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Draft Protocol for Florida Bonneted Bat Roost Surveys – February 3, 2015

The protocols below are draft guidance. Prior to any implementation the U.S. Fish and Wildlife Service should be contacted to ensure proper use of the most recent protocols. Implementation of out of date protocols may invalidate results.

This protocol is designed to be implemented prior to potential impacts from construction or development projects and should be performed by personnel experienced in management and monitoring of bat species. The purpose of this roost survey protocol is to identify potential roosts and determine if they are currently occupied by the Florida bonneted bat.

Roosting habitat includes forest and other areas with large or mature trees or other areas with suitable roost structures. Florida bonneted bats are known to roost in both natural and artificial structures. Natural roosting structure primarily includes mature or large live or dead trees, tree snags, and trees with cavities, hollows, and crevices but may include rock crevices and other structure, as well. Forest is defined as all types (all age classes) including: pine flatwoods, scrubby flatwoods, pine rocklands, royal palm hammocks, mixed or hardwood hammocks, cypress, sand pine scrub, or other forest types. Artificial roost structures include buildings, bridges, and bat houses.

Roost usage and dynamics are not well understood. Although the Florida bonneted bat has exhibited high site fidelity, roost switching is also suspected. Roosting habitat may include sites for day and night roosts to support colonies (e.g., harem, maternity, bachelor, and potential seasonal changes).

Because of the difficulty in detecting the Florida bonneted bat and other bat species, negative roost survey results will not equate to a determination that the species is absent from the site. Instead, the results of the surveys will provide information that can help guide the consultation process and appropriate conservation measures.

SURVEYING NATURAL STRUCTURES (live trees, snags, rock crevices)

Areas that contain potential natural roosting structures (e.g., hollows, woodpecker cavities, loose / exfoliating bark, rock crevices) should be surveyed following similar methodology as transects used for red-cockaded woodpeckers (RCW) (Service 2004).

Conduct systematic roost searches[1] in suitable Florida bonneted bat habitat (see above) using the methodology listed below:

- Run line transects through roosting habitat, visually inspecting all trees and snags for evidence of cavities.

[1] Projects within the RCW consultation area must identify all active RCW cavity trees prior to conducting bat roost surveys. Any biologist conducting visual inspections of RCW cavity trees must have a current USFWS 10(a)(1)(A) permit that authorizes such activities for the RCW. All active RCW cavity trees will be avoided during bat roost surveys.

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- Transects must be spaced so that all trees and snags are 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 midstory.
- Transects should be oriented north to south, to optimize cavity detectability.
- When cavities, hollows, or other suitable structure are found, record their locations in the field using a Global Positioning System (GPS) unit.
- Visually inspect all cavities, hollows, or other suitable structure (except cavities in active RCW trees) using a video camera probe (peeper) and assess the cavity contents. The camera should be oriented in such a way as to obtain views of both the top and bottom portions of the cavity.
- If bats are suspected or if contents cannot be determined, follow methods to *Determine Roost Usage* (below) within 2 days of identification/peeping. If the agency or applicant does not wish to conduct acoustic roost surveys, an assumption of presence of Florida bonneted bats can be made.
- Record tree species or type of roosting structure, tree diameter and height, cavity height, cavity orientation, and cavity contents.

SURVEYING ARTIFICIAL STRUCTURES

To assess artificial structures (including barrel tile roofs) for roosting potential:

- Conduct a visual and auditory inspection for evidence of bats including the following: cavities, crevices, staining at the entrance to a cavity or crevice, guano, or auditory chirping sounds.
- If roosting structures or evidence of bats are identified during visual surveys, conduct acoustic surveys, following methods to *Determining Roost Usage with Acoustic Equipment* to confirm species of bat present.
- Positive detection of Florida bonneted bats precludes the need to continue additional surveys.[2]

SURVEYING PALM TREES

Florida bonneted bats have been found in the shafts of palm fronds (Belwood 1992). Currently, the Service has limited information on how the Florida bonneted bat is using palm frond roosts and whether they are providing only short-term roosting habitat, which would not be conducive to long-term, colony, or maternity roosting. Until additional information is collected on the

[2] However, state regulation for removal of bat roosts may apply. F.A.C. chapter 68A– 9.010; and consistent with protective provisions specified in F.A.C. chapter 68A–27 (68A–27.0011 and 68A–27.003)

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value of palm frond roosts, the Service is not recommending roost surveys for palm habitat, UNLESS the palm tree contains a cavity. In that case, follow the protocol described for natural cavities.

SURVEYING OTHER STRUCTURES

Other unique roosting opportunities will be handled on a case-by-case basis through coordination with the South Florida Ecological Services Office.

DETERMINING ROOST USAGE WITH ACOUSTIC EQUIPMENT

Deploy detector/microphones 15 m (49 ft) from the suspected roost with the microphone orientated in the direction of the suspected roost. Potential roost cavities that are ≤ 15 m (49 ft) apart can be simultaneously sampled if microphones can be appropriately placed to capture any vocalizations of bats departing from both locations. Record all bat echolocations for four nights (sunset to sunrise). Follow the equipment and weather parameters identified below.

- Observation of the potential roost at sunset, using a human observer with a detector, could also be used to confirm species.
- Detection of Florida bonneted bats on any night precludes the need to continue additional surveys at that potential roost site.

Equipment

Detectors and microphones suitable for use in this survey protocol include:

- Full-spectrum and/or zero-crossing detectors.
- Directional and omni-directional microphones.
- Microphones attached to detectors via a cable permitting that the cable length does not exceed manufacturer recommendations.

Microphones should be mounted on grounded or metal poles to avoid build-up of electrostatic charges that may interfere with acoustic sampling. Ensure acoustic detectors are functioning properly and conduct tests on microphone sensitivity to factory specifications before and after deployment, at a minimum. It is recommended that tests be conducted throughout the survey period.

Weather Conditions

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.

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 on a different night with suitable weather conditions.

- temperatures fall below 60°F during the night;
- precipitation, including rain and/or fog, that exceeds 30 minutes or continues intermittently during the night; and
- sustained wind speeds greater than 9 miles/hour (4 meters/second; 3 on Beaufort scale) during the night.

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REPORTING REQUIREMENTS

Submit survey results to the Service well in advance of clearing and/or construction. Contact the Service immediately upon locating a roost site occupied by Florida bonneted bats. At a minimum, survey results should include the following: aerial maps of area examined, locations of transect lines, survey results (dates and times of surveys, weather conditions, roosting structures identified, equipment verification information, etc.), GPS locations, physical characteristics, and photographs of roosting structures found, copies of all echolocation files with Florida bonneted bat calls specifically tagged, and names and qualifications of surveyors.

LITERATURE CITED

Belwood, J. J. 1992. Florida mastiff bat *Eumops glaucinus floridanus*. Pages 216-223 *in* S. R. Humphrey, editor. Rare and endangered biota of Florida. Vol. I. Mammals. University Press of Florida, Gainesville.

U.S. Fish and Wildlife Service. 2004. Draft Species Conservation Guidelines South Florida Red-cockaded Woodpecker. South Florida Ecological Services Office; Vero Beach, Florida.

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Attachment 6. FL Bonneted Bat Consultation Guidance -

Please use the following guidelines for making effect determinations for the endangered Florida bonneted bat (FBB) within the FBB consultation area.

1. Projects that fall within the hatched "FBB Focal Areas" .....…**May Affect**

2. Projects outside of the hatched "FBB Focal Areas", but within the overall "FBB Consultation Area":

   a. If the project site is less than 5 acres* **and does not include** potential roost sites (*e.g.*, large cavity trees or trees with hollows, snags, abandoned buildings, bridges and overpasses)…….…..**MANLAA**

   b. If the project site is less than 5 acres* **and includes** potential roost sites (*e.g.*, large cavity trees or trees with hollows, snags, abandoned buildings, bridges and overpasses)…….…..**May Affect**

   c. If the project site is 5 acres or greater and **includes** more than 1 acre (alone or combined) of the following FBB habitat types: upland or wetland forest; upland or wetland shrub; open freshwater wetlands; or open water (*e.g.*, lakes, ponds, canals, streams, rivers).....…….**May Affect**

   d. If the project site is 5 acres or greater and **does not include** more than 1 acre (alone or combined) of FBB habitat types (upland or wetland forest; upland or wetland shrub; open freshwater wetlands; or open water) **and does not include** potential roost sites (*e.g.*, large cavity trees or trees with hollows, snags, abandoned buildings, bridges and overpasses)……..……....……..**MANLAA**

   e. If the project site is 5 acres or greater and **does not include** more than 1 acre (alone or combined) of FBB habitat types (upland or wetland forest; upland or wetland shrub; open freshwater wetlands; or open water) but **does include** potential roost sites (*e.g.*, large cavity trees or trees with hollows, snags, abandoned buildings, bridges and overpasses)……..**May Affect**

*In eastern Miami-Dade County, there are known occurrences of FBB within highly urbanized landscapes. For projects in urban Miami-Dade County that include natural or semi-natural habitat, please verify with the Service whether Florida bonneted bats are known to be present in the area.

MICCOSUKEE TRIBE OF INDIANS OF FLORIDA
Fish and Wildlife Department
Phone number: 305 223 8380 ext. 2217

Listed Species

Everglade snail kite

Rostrhamus sociabilis plumbeus

Listing Status: Endangered.

Image: http://www.audubon.org/field-guide/bird/snail-kite

Physical Description

The Everglade snail kite is a mid-sized raptor that can reach a length of 15.4 inches. Males are slate gray with red eyes and orange legs, which turn more reddish during breeding season. Females are brown with red eyes and yellow to orange legs, with varying amounts of white streaking on the face, neck, and chest. Young snail kites are similar in appearance to females except with more cinnamon or buff-colored streaks instead of white. Snail kites have a unique curved bill which is used to pluck snails out of their shells.

Image: http://www.fredmiranda.com/forum/topic/565662

Habitat

Everglade snail kites inhabit shallow freshwater marshes and shallow grassy shorelines of lakes.

Threats

The main threat to the Everglade snail kite in Florida is the loss and degradation of wetlands. The excessive drainage of the Everglades and the increased development of Miami-Dade, Palm Beach, and Broward counties have reduced snail kite habitat over time.

Pre-construction activities

Prior to the onset of construction activities, a Miccosukee biologist will discuss the identification of the snail kite and all the information included in the poster with all construction staff.

IMPORTANT NOTICE

Don't work around a tree where a snail kite is perched.

If this species is observed in the project area, please contact Miccosukee Fish and Wildlife Department before proceeding with any alteration its habitat.

MICCOSUKEE TRIBE OF INDIANS OF FLORIDA
Fish and Wildlife Department
Phone number: 305 223 8380 ext. 2217

Listed Species

Florida Panther

Puma concolor

Listing Status: Endangered.

Image: Miccosukee Fish and Wildlife Department.

Physical Description

There are currently only 100-160 Florida panthers left in the wild. Adult males can reach a length of seven feet with a shoulder height between 24-28 inches, and an average weight of 116 pounds. Adult Florida panthers have a reddish-brown back, dark tan sides, and a pale gray belly. Kittens have a gray colored body, with black or brown spots, and five stripes that go around the tail.

Image: http://keywordsuggest.org/gallery/334583.html

Habitat

Florida panthers inhabit large forested communities and wetlands.

Threats

During the 1800's and early 1900's, habitat loss and hunting led to the panther's near extinction. Panthers were hunted and killed by settlers for sport or to protect livestock. A plan to restore the genetic health of Florida panthers was implemented starting in 1995.

Pre-construction activities

Prior to the onset of construction activities, a Miccosukee biologist will discuss all the information included in the poster with all construction staff.

IMPORTANT NOTICE

If you see any panther on the site you should:

- **Cease clearing activities and allow the panther sufficient time to move away from the site without interference.**
- **Personnel must NOT attempt to reach the panther due to protected status.**

Immediately notify supervisor and contact the Miccosukee Fish and Wildlife Department with the location information and the condition of the panther.

MICCOSUKEE TRIBE OF INDIANS OF FLORIDA
Fish and Wildlife Department
Phone number: 305 223 8380 ext. 2217

Listed Species

Eastern indigo snake

Drymarchon couperi

Listing Status: Threatened.

Image: https://www.truesouth.com/61417-eastern-indigo-snake/

Physical Description

The Eastern indigo snake is one of the largest non-venomous snakes in North America. It is bluish-black colored and can reach lengths of eight feet (2.4 meters). Its chin, cheek, and throat are mostly red or brown, but can also be white or black. When approached, the Eastern indigo snake shows no aggression. Though, they should not be handled.

Black racer

Image: http://www.virginiaherpetologicalsociety.com

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 and thinner bodies.

Habitat

Eastern indigo snakes inhabit pine flatwoods, hardwood forests, moist hammocks, and areas that surround cypress swamps.

Threats

The main threats facing the Eastern indigo snake is habitat destruction, fragmentation, and degradation. Habitat destruction is caused mainly by the extension of urban development in their habitat.

Pre-construction activities

Prior to the onset of construction activities, a Miccosukee biologist will discuss the identification of the snake and all the information included in the poster with all construction staff.

IMPORTANT NOTICE

If you see any Indigo snake on the site you should:

- **Cease clearing activities and allow the 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.**

Immediately notify supervisor and contact the Miccosukee Fish and Wildlife Department with the location information and the condition of the snake.

Attachment 8. FL Panther Effect Determination Key -

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).

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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,

Paul Souza
Field Supervisor
South Florida Ecological Services Office

Enclosure

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

Kautz, R., R. Kawula, T. Hoctor, J. Comiskey, D. Jansen, D. Jennings, J. Kasbohm, F. Mazzotti, R. McBride, L. Richardson, and K. Root. 2006. How Much Is Enough? Landscape-scale Conservation for the Florida Panther. Biological Conservation.

Thatcher, C., F.T. van Manen, and J.D. Clark. 2006. An assessment of habitat north of the Calssoahatchee 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 requested[1]

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 requested[1]

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.

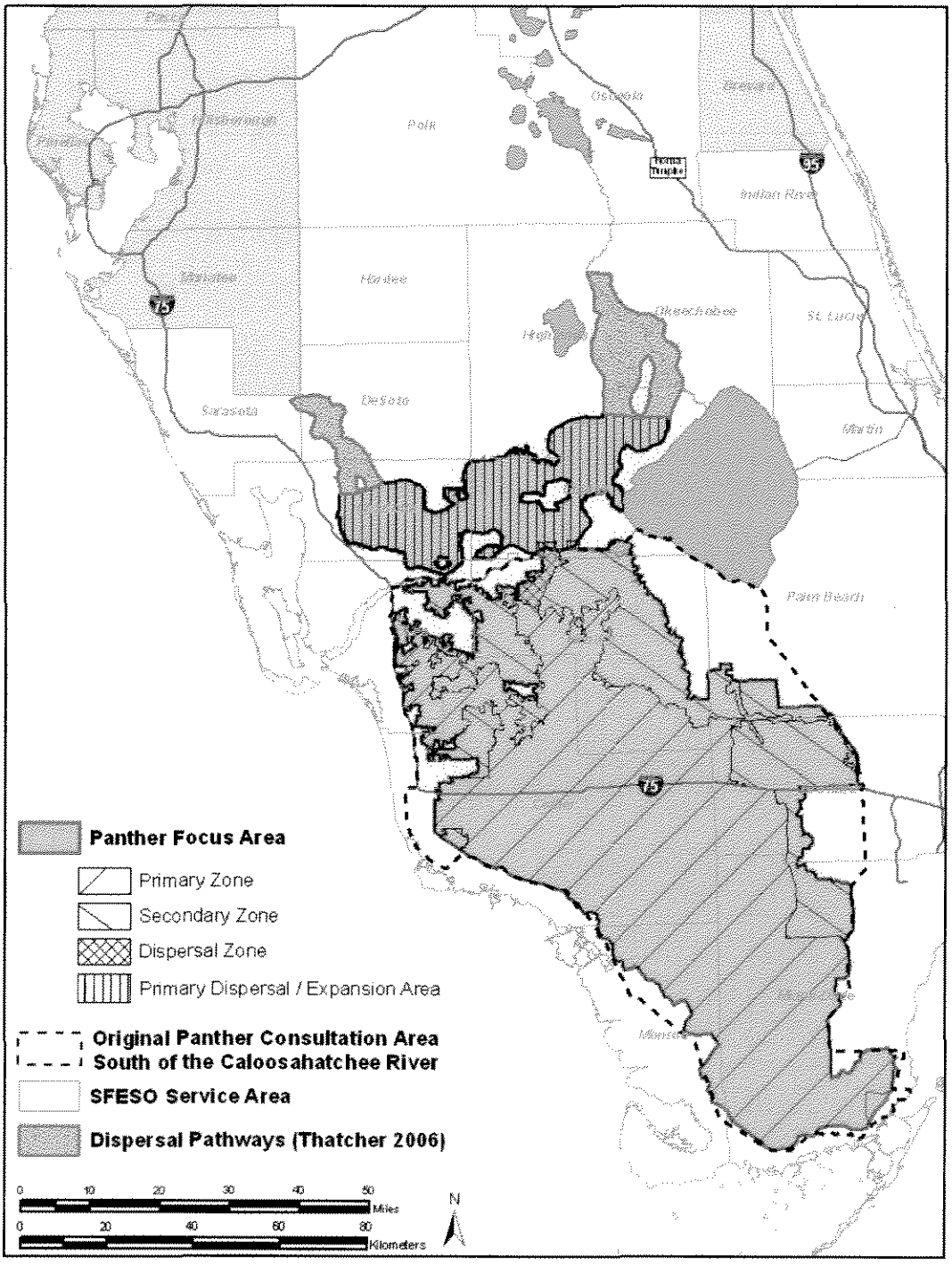
Literature Cited

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.

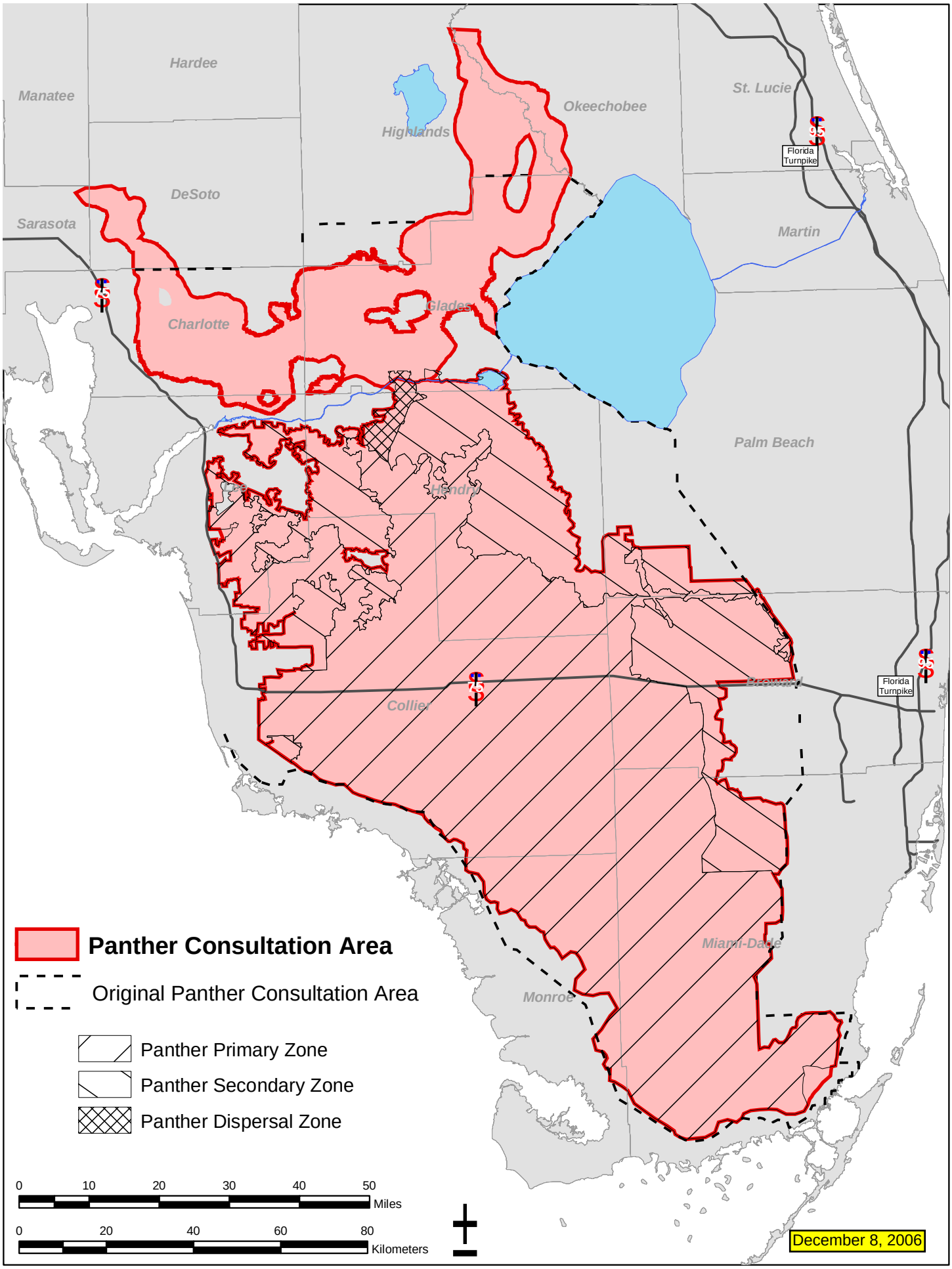
Kautz, R., R. Kawula, T. Hoctor, J. Comiskey, D. Jansen, D. Jennings, J. Kasbohm, F. Mazzotti, R. McBride, L. Richardson, and K. Root. 2006. How much is enough? Landscape-scale conservation for the Florida panther. Biological Conservation 130:118-133.

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

U.S. Fish and Wildlife Service (Service). 2000. Florida panther final interim standard local operating procedures (SLOPES) for endangered species. Fish and Wildlife Service; Vero Beach, Florida.


Polk
Hardee
Desoto
Sarasota
Indian River
St. Lucie
Martin
Palm Beach
Monroe
Panther Focus Area
Primary Zone
Secondary Zone
Dispersal Zone
Primary Dispersal / Expansion Area
Original Panther Consultation Area South of the Caloosahatchee River
SFESO Service Area
Dispersal Pathways (Thatcher 2006)
0 10 20 30 40 50 Miles
0 20 40 60 80 Kilometers
N

Attachmennt 9. FL Panther Consultation Area -



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

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

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

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

POSTER INFORMATION

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

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

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

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

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

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

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

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

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

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

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

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

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

PRE-CONSTRUCTION ACTIVITIES

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

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

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

DURING CONSTRUCTION ACTIVITIES

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

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

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

POST CONSTRUCTION ACTIVITIES

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

United States Department of the Interior

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

January 25, 2010

David S. Hobbie
Chief, Regulatory Division
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. Hobbie:

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 improve 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

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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) (Appendix 1) (HMG) in project evaluation. The HMG is currently under review and once final will replace the enclosed HGM. 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. Appendix 2 (to be updated as necessary) provides locations of colonies and their CFAs in south Florida that have been documented as active within the last 10 years. The Service believes loss of suitable wetlands within these CFAs may reduce foraging opportunities for the wood stork. To minimize adverse effects to the wood stork, we recommend compensation be provided for impacts to foraging habitat. The compensation should consider wetland type, location, function, and value (hydrology, vegetation, prey utilization) to ensure that wetland functions lost due to the project are adequately offset. Wetlands offered as compensation should be of the same hydroperiod and located within the CFAs of the affected wood stork colonies. The Service may accept, under special circumstances, wetland compensation located outside the CFAs of the affected wood stork nesting colonies. On occasion, wetland credits purchased from a "Service Approved" mitigation bank located outside the CFAs could be acceptable to the Service, depending on location of impacted wetlands relative to the permitted service area of the bank, and whether or not the bank has wetlands having the same hydroperiod as the impacted wetland.

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

The Key is as follows:

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

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

Project does not affect SFH[5]..... "*no effect*[1]".

---

[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) are wetlands that typically have shallow-open water areas that are relatively calm and having 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

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

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

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

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

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

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

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

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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.

[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) that short 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 Appendix 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.

matching the hydroperiod[6] of the wetlands affected, and provides foraging value similar to, or higher than, that of impacted wetlands. See Appendix 3 for a detailed discussion of the hydroperiod foraging values, an example, and further guidance[8]..... *"NLAA[1]"*

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

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

Monitoring and Reporting Effects

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

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

Sincerely yours,

Paul Souza
Field Supervisor
South Florida Ecological Services Office

Appendices

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

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Appendix 1

HABITAT MANAGEMENT GUIDELINES FOR THE WOOD STORK IN THE SOUTHEAST REGION

HABITAT MANAGEMENT GUIDELINES FOR THE WOOD STORK IN THE SOUTHEAST REGION

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HABITAT MANAGEMENT GUIDELINES FOR THE WOOD STORK IN THE SOUTHEAST REGION

Introduction

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

General

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

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

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

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

I. Feeding habitat.

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

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

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

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

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

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

II. Nesting habitat.

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

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

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

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

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

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

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

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

III. Roosting habitat.

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

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

IV. Management zones and guidelines for feeding sites.

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

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

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

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

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

V. Management zones and guidelines for nesting colonies.

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

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

2. Recommended Restrictions:

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

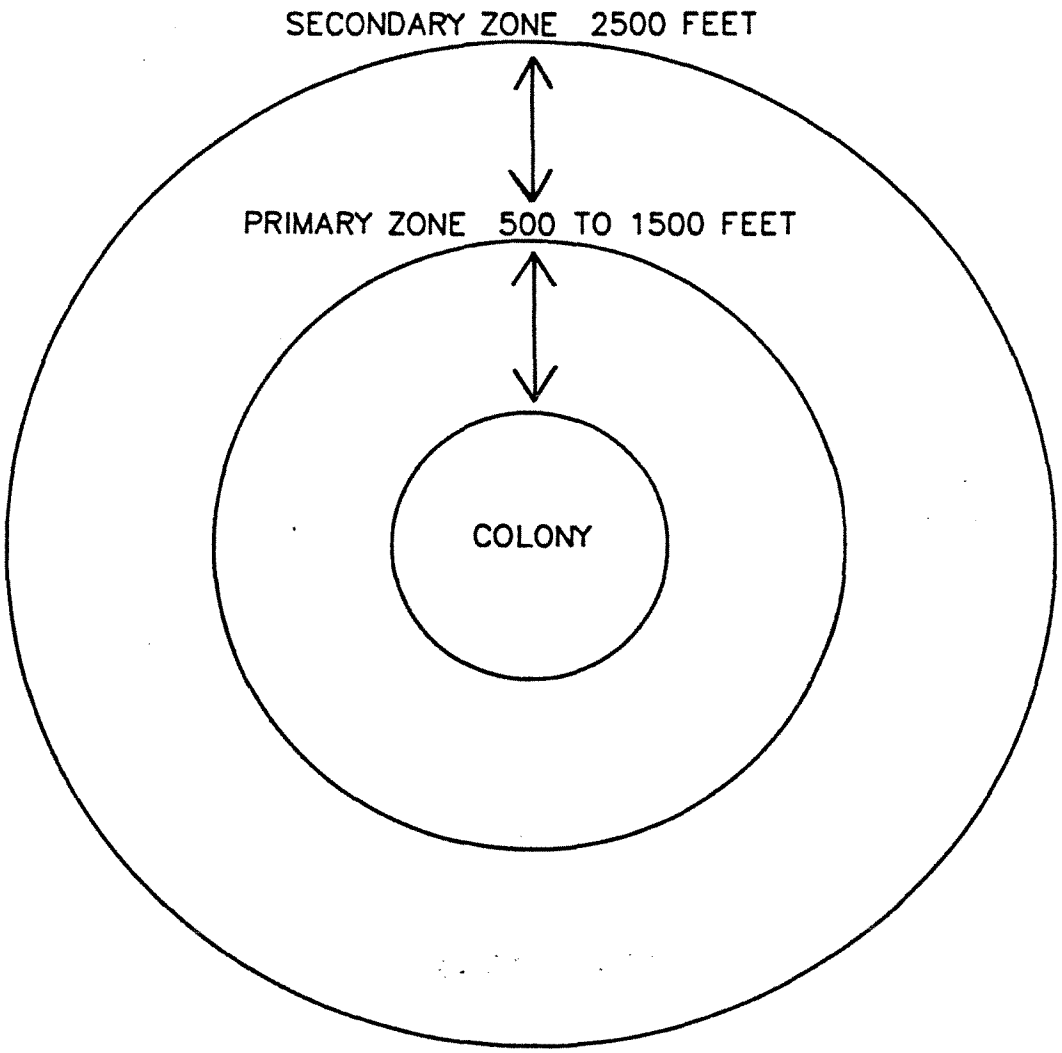
(1) Any lumbering or other removal of vegetation, and

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

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

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

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


SECONDARY ZONE 2500 FEET
PRIMARY ZONE 500 TO 1500 FEET
COLONY

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

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

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

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

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

2. Recommended Restrictions:

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

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

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

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

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

VI. Roosting site guidelines.

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

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

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

VII. Legal Considerations.

A. Federal Statutes

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

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

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

B. State Statutes

1. State of Alabama

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

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

2. State of Florida

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

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

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

3. State of Georgia

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

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

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

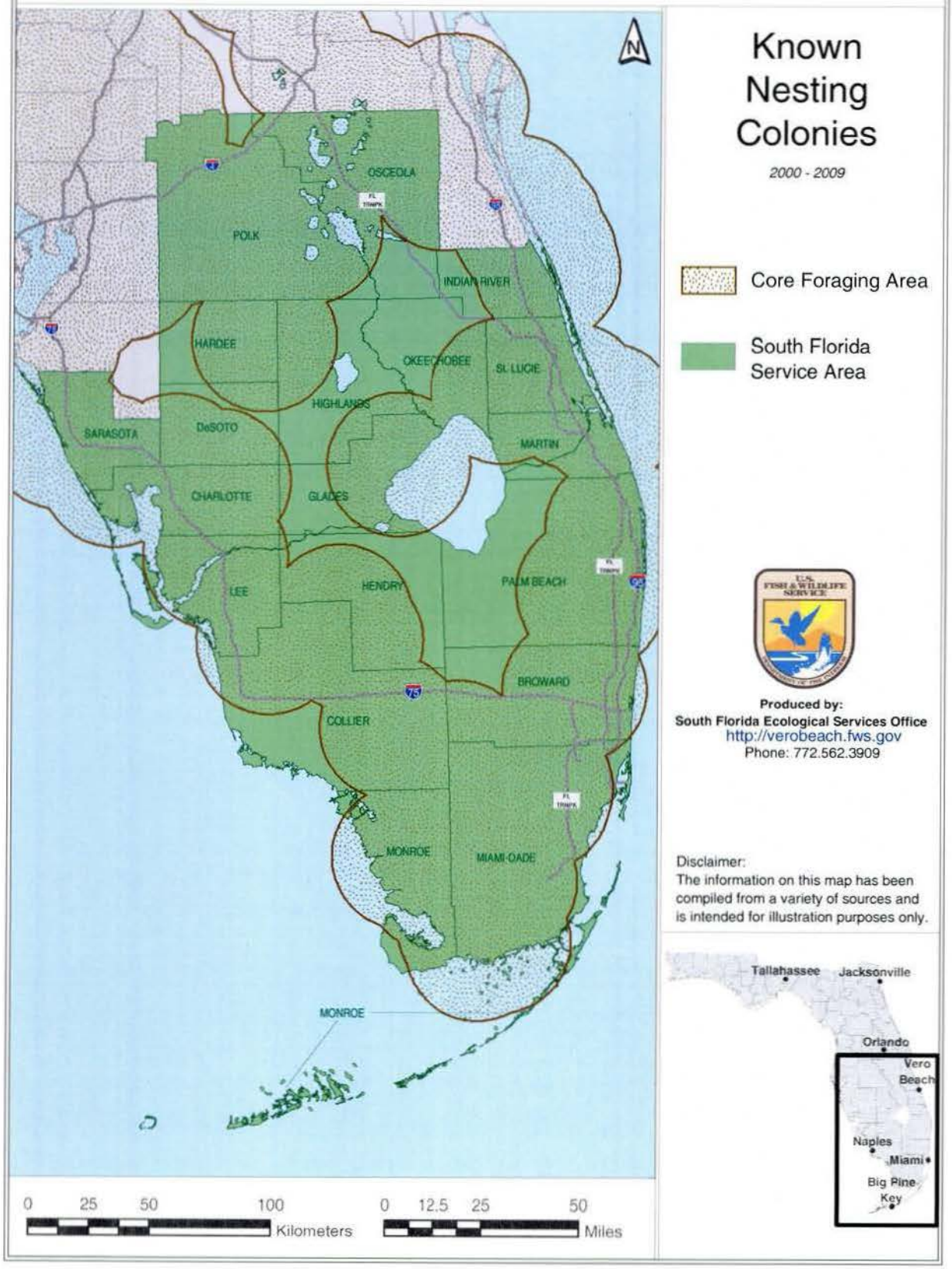
The wood stork is listed as endangered pursuant to the Endangered Wildlife Act of 1973 (Section 27-3-130 of the Code). Section 391-4-13-.06 of the Rules and Regulations of the Georgia Department of Natural Resources prohibits harassment, capture, sale, killing, or other actions which directly cause the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

4. State of South Carolina

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

Appendix 2

Wood Stork


Known Nesting Colonies
2000 - 2009
Core Foraging Area
South Florida Service Area
OSCEOLA
POLK
INDIAN RIVER
HARDEE
OKEECHOBEE
ST. LUCIE
HIGHLANDS
SARASOTA
DeSOTO
MARTIN
CHARLOTTE
GLADES
LEE
HENDRY
PALM BEACH
BROWARD
COLLIER
MONROE
MIAMI-DADE
MONROE
Produced by:
South Florida Ecological Services Office
http://verobeach.fws.gov
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Disclaimer:
The information on this map has been compiled from a variety of sources and is intended for illustration purposes only.
Tallahassee
Jacksonville
Orlando
Vero Beach
Naples
Miami
Big Pine Key
0 25 50 100 Kilometers
0 12.5 25 50 Miles

Appendix 3

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

Foraging Habitat

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

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

Melaleuca-infested Wetlands: As discussed previously, wetland suitability for wood stork foraging is partially dependent on vegetation density. Melaleuca is a dense-stand growth plant species, effectively producing a closed canopy and dense understory growth pattern that generally limits a site's accessibility to foraging by wading birds. However, O'Hare and Dalrymple (1997) suggest moderate infestations of melaleuca may have little effect on some species' productivity (*i.e.*, amphibians and reptiles) as long as critical abiotic factors such as hydrology remain. They also note as the levels of infestation increase, usage by wetland dependent species decreases. Their studies also showed that the number of fish species present in a wetland system remain stable at certain levels of melaleuca. However, the availability of the prey base for wood storks and other foraging wading birds is reduced by the restriction of access caused from dense and thick exotic vegetation. Wood storks and other wading birds can forage in these systems in open area pockets (*e.g.*, wind blow-downs), provided multiple conditions are optimal (*e.g.*, water depth, prey density). In O'Hare and Dalrmyple's study (1997), they identify five cover types (Table 1) and provide information on the number of wetland dependent bird species and the number of individuals observed within each of these vegetation classes (Table 2).

Table 1: Vegetation classes

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

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

Table 2: Habitat Foraging Suitability

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

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

Table 3. Foraging Suitability Percentages

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

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

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

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

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

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

Table 4. SFWMD Hydroperiod Classes – Everglades Protection Area

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

Fish Density per Hydroperiod: In the Service's assessment of project related impacts to wood storks, the importance of fish data specific to individual hydroperiods is the principle basis of our assessment. In order to determine the fish density per individual hydroperiod, the Service relied on the number of fish per hydroperiod developed from throw-trap data in Trexler et al.'s (2002) study and did not use the electrofishing data also presented in Trexler et al.'s study that defined fish densities in catch per unit effort, which is not hydroperiod specific. Although the throw-trap sampling generally only samples fish 8 cm or less, the Service believe the data can be used as a surragate 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, frequeny, and species compositional data should be interpreted with caution. Chick et al (2004) also noted that electrofishing data for large fish (> 8cm) provided a positive correlation of the number of fish per unit effort (abundance) per changes in hydropeiod. The data in general shows 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 imperical 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 the 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/m^2. In these studies, the data was provided in g/ m^2 dry-weight and was converted to g/ m^2 wet-weight following the procedures referenced in Kushlan et al (1986) and also referenced in Turner et al (1999). The fish density data provided in Turner et al (1999) included both data from samples representing fish 8 cm or smaller and fish larger than 8 cm and included summaries of Turner and Trexler (1997) data, Carlson and Duever (1979) data, and Loftus and Eklund (1994) data. These data sets also reflected a 0.6 g/ m^2 dry-weight correction estimate for fish greater than 8 cm based on Turner et al's (1999) block-net rotenone samples.

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

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

Table 7. Extrapolated Mean Annual Fish Biomass for SFWMD Hydroperiods

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

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

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

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

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

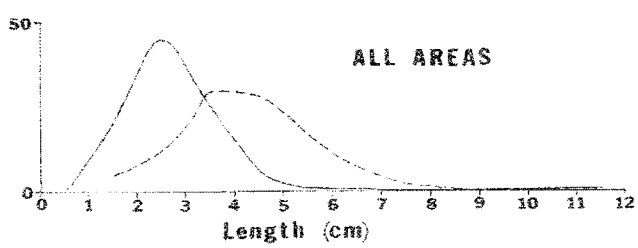

FIGURE 4. Length frequency distribution of fish available to and consumed by Wood Storks in different habitats.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Table 10 Actual Biomass Consumed by Wood Storks

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

Sample Project of Biomass Calculations and Corresponding Concurrence Determination

Example 1:

An applicant is proposing to construct a residential development with unavoidable impacts to 5 acres of wetlands and is proposing to restore and preserve 3 acres of wetlands onsite. Data on the onsite wetlands classified these systems as exotic impacted wetlands with greater than 50 percent but less than 75 percent exotics (Table 3) with an average hydroperiod of 120-180 days of inundation.

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

Biomass lost (5*4,047*0.39 (Table 10)*.37 (Table 3)=2,919.9 grams or 2.92 kg)

In the example provided, the 5 acres of wetlands, converted to square-meters (1 acre= 4,047 m^2) would provide 2.9 kg of biomass (5*4,047*0.39 (Table 10)*.37 (Table 3)= 2,919.9 grams or 2.9 kg), which would be lost from development.

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

Biomass Pre: (3*4,047*0.39(Table 9)*.37 (Table 3)=1,751.95grams or 1.75 kg)

Biomass Post: (3*4,047*0.39 (Table 9)*1(Table 3)=4,734.99 grams or 4.74 kg)

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

Project Site Balance 2.98 kg- 2.92 kg = 0.07kg

The compensation proposed is 3 acres, which is within the same hydroperiod and has the same level of exotics. Following the calculations for the 5 acres, the 3 acres in its current habitat state, provides 1.75 kg (3*4,047*0.39(Table 10)*.37 (Table 3)=1,751.95grams or 1.75 kg) and following restoration provides 4.74 kg (3*4,047*0.39 (Table 10)*1(Table 3)=4,734.99 grams or 4.74 kg), a net increase in biomass of 2.98 kg (4.74-1.75=2.98).

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

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

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

Example 2:

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

Biomass lost: (5*4,047*0.39 (Table 10)*.37 (Table 3)=2,919.9 grams or 2.92 kg)

The current habitat state of the preserve provides 3.19 kg (3*4,047*1.16(Table 10)*.37 (Table 3)=3,189.44 grams or 3.19 kg) and following restoration the preserve provides 8.62 kg (3*4,047*0.71 (Table 10)*1(Table 3)= 8,620.11 grams or 8.62 kg, thus providing a net increase in class 4 hydroperiod biomass of 5.43 kg (8.62-3.19=5.43).

Biomass Pre: (3*4,047*0.71(Table 10)*.37 (Table 3) = 3,189.44 grams or 3.19 kg)

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

Net increase: 8.62 kg-3.19 kg = 5.43 kg

Project Site Balance 5.43 kg- 2.92 kg = 2.51kg

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

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

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

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