Appendix J
Consultation/Coordination Letters

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Appendix J - Consultation/Coordination Letters

ID	Date	From	To	Subject
J1	April 13, 2009	NPS ENP	Multiple Agencies	Request for Participation in the Project Delivery Team
J2	No Date	NPS ENP	USFWS	Section 7 Consultation
J3	April 21, 2009	NPS ENP	Miccosukee Tribe of Indians of Florida and Seminole Tribe of Florida	Agency Coordination / Section 106 Consultation
J4	No Date	NPS ENP	Miccosukee Tribe of Indians of Florida	Notice of PDT Meeting
J5	May 19, 2009	NPS ENP	FDOT	DHW Issues
J6	June 10, 2009	FDOT	NPS ENP	DHW Issues
J7	June 10, 2009	NPS ENP	Miccosukee Tribe of Indians of Florida	Agency Coordination
J8	June 11, 2009	NPS ENP	Miccosukee Tribe of Indians of Florida	Agency Coordination / Agency Scoping Meeting
J9	June 12, 2009	Miami-Dade DERM	NPS ENP	Scoping Comments
J10	June 26, 2009	Miccosukee Tribe of Indians of Florida (via Lehtinen Riedi Brooks Moncarz)	NPS ENP	Scoping Comments
J11	July 27, 2009	FDOT	NPS ENP	FDOT Project Involvement
J12	No Date	NPS ENP	Miccosukee Tribe of Indians of Florida	Draft Cultural Resource Survey / Meeting Confirmation
J13	December 11, 2009	NPS ENP	Miccosukee Tribe of Indians of Florida	Meeting Summary
J14	February 25, 2010	USFWS	NPS ENP	Biological Opinion Amendment
J15	March 22, 2010	Miccosukee Tribe of Indians of Florida	NPS ENP	Preliminary DEIS Comments
J16	April 20, 2010	NPS ENP	SHPO	Notice of Draft EIS Availability
J17	April 20, 2010	NPS ENP	Florida State Clearinghouse	Notice of Draft EIS Availability
J18	April 20, 2010	NPS ENP	Miccosukee Tribe of Indians of Florida	Notice of Draft EIS Availability
J19	April 20, 2010	NPS ENP	Public	Notice of Draft EIS Availability
J20	April 20, 2010	NPS ENP	USFWS	Notice of Draft EIS Availability
J21	April 20, 2010	NPS ENP	Seminole Tribe of Florida	Notice of Draft EIS Availability
J22	April 21, 2010	SHPO	NPS ENP	SHPO Concurrence / Memorandum of Agreement
J23	May 11, 2010	NPS ENP	USFWS	Interagency Section 7 Biological Evaluation
J24	July 15, 2010	SHPO	NPS ENP	SHPO Concurrence
J25	July 19, 2010	USEPA	NPS ENP	Draft EIS Comments
J26	July 19, 2010	FDEP	NPS ENP	Draft EIS Comments
J27	July 20, 2010	FFWCC	NPS ENP	Draft EIS Comments
J28	July 22, 2010	Seminole Tribe of Florida	NPS ENP	Draft EIS Comments
J29	July 26, 2010	Miccosukee Tribe of Indians of Florida	NPS ENP	Draft EIS Comments
J30	July 26, 2010	SFWMD	NPS ENP	Draft EIS Comments
J31	July 27, 2010	Miami-Dade DERM	NPS ENP	Draft EIS Comments
J32	July 27, 2010	FDOT	NPS ENP	Draft EIS Comments
J33	August 2, 2010	Florida State Clearinghouse	NPS ENP	Draft EIS Comments
J34	October 18, 2010	USFWS	NPS ENP	Biological Opinion

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United States Department of the Interior
NATIONAL PARK SERVICE

Everglades and Dry Tortugas National Parks
40001 State Road 9336
Homestead, Florida 33034

In Reply Refer to:
L76

April 13, 2009

Dear Interested Party:

The National Park Service, as the lead agency under the National Environmental Policy Act, is preparing a Feasibility Study/Environmental Impact Statement (FS/EIS) for modifications to the Tamiami Trail. The U.S. Army Corps of Engineers (Corps) and the Federal Highway Administration have been invited to be cooperating agencies. This federal action is authorized by the 2009 Omnibus Appropriations Act, signed into law on March 11, 2009. The study area begins just east of the S-333 structure on the L-67A Canal and ends at or near the S-334 structure on Tamiami Trail, Miami-Dade County, Florida.

Everglades National Park invites your organization to participate on the Project Delivery Team (PDT) that will develop the FS/EIS. The PDT will start meeting in late May of this year and complete a report by March 11, 2010 as directed by the authorizing legislation. Please note that participation on the project team will be the financial responsibility of the participating organization and that meetings will be scheduled as needed. We intend to have an open and public process during development of the FS/EIS. Your agency's involvement, combined with other organizations, will provide the skills, knowledge and experience vital for successful project development. It will also facilitate the flow of information and help achieve concurrence and ownership by key organizational stakeholders.

Please identify the person(s) that will represent your organization on the Tamiami Trail FS/EIS Team by May 14, 2009. If you have any questions, please contact the ENP Project Manager, Bruce Boler at his email address bruce_boler@nps.gov, or by phone at 305-224-4234.

Sincerely,

Dan B. Kimball

Dan B. Kimball
Superintendent

EVER:BBOLER:LJI:041409\C:\MYDOCS\PDT INVITATION LETTER.DOC

ADDRESSEES:

Richard Bowers, Tribal President, Seminole Tribe of Florida, 6300 Stirling Road Suite 109 Hollywood, Florida 33024

Billy Cypress, Tribal Chairman, Miccosukee Tribe of Indians of Florida, Post Office Box, 440021Tamiami Station, Miami, Florida 33144

Antonio Cotarelo, Professional Engineer, Water Management Division, Miami-Dade County Department of Environmental Resources Management, 33 South West 2"' Avenue Suite 200 Miami, Florida 33130-1540

Susan Markley, Ph.D., Miami-Dade County Department of Environmental Resources Management, 33 South West 2nd Avenue Suite 300, Miami, Florida 33010-1540

George M. Burgess, County Manager, Miami-Dade County, 111 N.W. 1st Street, Suite 2910, Miami, Florida 33128

Donna Fries, Water Resources Coordinator, Miami-Dade County Water and Sewer Department, 3071 South West 38th Avenue Room 544-11, Miami, Florida 33146

Carol Wehle, Executive Director, South Florida Water Management District, 3301 Gun Club Road West Palm Beach, Florida 33406

Mary Ann Poole, Policy and Stakeholder Coordination, Florida Fish and Wildlife Conservation Commission, 620 South Meridian Street, Tallahassee, FL 32399-1600

Ernie Marks, Environmental Administrator, Restoration Planning and Permitting Section, 2600 Blair Stone Road, MS 3560 Tallahassee, Fl. 32399-2400

Marjorie Bixby, Florida Department of Transportation, 1000 North West 111th Avenue, Room 6109, Miami, Florida 33172

U. S. Department of Agriculture Natural Resource Conservation Service, 6191 Orange Drive Suite 61830, Davie, Florida 33314-3457

Barry Rosen, Ph. D., Director, U.S. Geological Survey, Florida Integrated Science Center, 12703 Research Parkway, Orlando, FL 32826

Paul Souza, U. S. Department of the Interior, Fish and Wildlife Service, South Florida Ecological Services Office, 1339 20th Street Vero Beach, Florida 32960

Heinz Mueller, U. S. Environmental Protection Agency, 61 Forsyth St. SW, Atlanta, GA 30303-8960

CC:
Pamela Telis, U.S. Geological Survey, CESAJ-PD-PR, P.O. Box 4970, Jacksonville, Florida 32232-0019

Eric Hughes, U. S. Environmental Protection Agency, CESAJ-PD-PR, P.O. Box 4970, Jacksonville, Florida 32232-0019

Gene Duncan, Water Resources Director, Miccosukee Tribe of Indians of Florida, Post Office Box, 440021 Tamiami, Station Miami, Florida 33144

Steve Terry, Land Resources Manager, Miccosukee Tribe of Indians of Florida, Post Office Box, 440021 Tamiami, Station Miami, Florida 33144

Craig Tepper, Seminole Tribe of Florida, 6300 Stirling Road Suite 109, Hollywood, Florida 3302

United States Department of the Interior
NATIONAL PARK SERVICE

Everglades and Dry Tortugas National Parks
40001 State Road 9336
Homestead, Florida 33034

In Reply Refer to:

Mr. Paul Souza, Field Supervisor
U.S. Fish & Wildlife Service
1339 20th Street
Vero Beach, FL 32960-3559

Dear Mr. Souza:

The National Park Service (NPS) is preparing an Environmental Impact Statement (EIS) of proposed modifications to the Tamiami Trail to restore flows and ecological conditions and enable restoration of Northeast Shark River Slough in Everglades National Park. The purpose of this correspondence is to initiate informal consultation with your agency pursuant to the requirements of the 1973 Endangered Species Act and provide some background information about this project. The NPS is also requesting confirmation of species or their critical habitat either listed or proposed for listing that may be present in the referenced study area.

The 2009 Omnibus Appropriations Act directed the Secretary of the Interior, acting through the National Park Service, to immediately evaluate the feasibility of additional bridge length, beyond that to be constructed pursuant to the Modified Water Deliveries Project, including a continuous bridge, or additional bridges or some combination thereof, for the Tamiami Trail to restore more natural water flow to Everglades National Park and Florida Bay and for the purpose of restoring habitat within the Park and the ecological connectivity between the Park and the Water Conservation Areas.

The following list of threatened and endangered species was developed in coordination with your agency. Federally listed species that may be present in the study area are: the Everglade snail kite (*Rostrhamus sociablis*), the American crocodile (*Crocodylus acutus*), the West Indian manatee (*Trichechus manatus*), the wood stork (*Mycteria americana*), the Cape Sable seaside sparrow (*Ammodramus maritimus*), the Florida panther (*Puma concolor coryi*), and the eastern indigo snake (*Drymarchon corais couperi*). While no critical habitat is located in the project footprint, the project is located near critical habitat for both the Cape Sable seaside sparrow and the American crocodile. The Corps will consider project effects on these critical habitats in the draft EIS.

If you have questions, need any additional information or would like to arrange a time to meet and discuss the project, please do not hesitate to contact me at ///number or ////POC of my staff at ///.

Sincerely,

Dan B. Kimball

Dan B. Kimball
Superintendent

Enclosures: Newsletter—I can provide you a copy once it is cleared to print

United States Department of the Interior
NATIONAL PARK SERVICE

Everglades and Dry Tortugas National Parks
40001 State Road 9336
Homestead, Florida 33034

In Reply Refer to:
L5403

April 21, 2009

Mr. Steve Terry, Tribal Representative
Miccosukee Tribe of Indians of Florida
Tamiami Station
P.O. Box 440021
Miami, Florida 33144

Mr. Fred Dayhoff, Tribal Representative
Miccosukee Tribe of Indians of Florida
Tamiami Station
P.O. Box 440021
Miami, Florida 33144

Dear Mr. Terry and Mr. Dayhoff:

The National Park Service (NPS) and the U.S. Army Corps of Engineers (Corps), as a cooperating agency, are preparing a Feasibility Study/Environmental Impact Statement (FS/EIS) for modifications to the Tamiami Trail, as directed in the 2009 Omnibus Appropriations Act. The proposed modifications will begin just east of the S-333 structure on the L-67A Canal and end at or near the S-334 structure on the trail. Everglades National Park and the Corps would like to initiate government to government consultation with the Miccosukee Tribe on this project and invite you to participate on a Project Delivery Team (PDT) that will start meeting in late May of this year.

From previous consultation with Everglades National Park, as well as the U.S. Army Corps of Engineers, we know that Section 106 compliance has been delegated to you by Chairman Cypress. Therefore, your participation would be a valuable asset to this effort.

This consultation would also provide an opportunity to update you on the status of several other restoration efforts that may affect Tribal lands and cultural resources in the near future. These include (1) the Old Tamiami Trail Removal Project (east of S-12D), (2) the Vista Clearing Project, (3) the Swales Pilot Project, and (4) remaining components of the Modified Water Deliveries Project.

The first PDT meeting for the FS/EIS is scheduled for May 18, 2009. Ideally, we would hope to consult on this new project prior to this first PDT meeting. Please provide me with a date and time most convenient for you. If you would like any further information, please contact me by email: dan_kimball@nps.gov, or telephone 305-242-7712, or Bruce Boler by email bruce_boler@nps.gov or telephone 305-224-4234. Thank you for your assistance in this matter.

Sincerely,

Dan B. Kimball

Dan B. Kimball
Superintendent

cc: Stuart Applebaum, Deputy for Restoration Program Management, COE

United States Department of the Interior
NATIONAL PARK SERVICE

Everglades and Dry Tortugas National Parks
40001 State Road 9336
Homestead, Florida 33034

In Reply Refer to:

Mr. Steve Terry, Tribal Representative
Miccosukee Tribe of Indians of Florida
Tamiami Station
P.O. Box 440021
Miami, FL 33144

Mr. Fred Dayhoff, Tribal Representative
Miccosukee Tribe of Indians of Florida
Tamiami Station
P.O. Box 440021
Miami, FL 33144

The National Park Service (NPS) and the U.S. Army Corps of Engineers (Corps), as a cooperating agency, are preparing a Feasibility Study/Environmental Impact Statement (FS/EIS) for modifications to the Tamiami Trail, as directed in the 2009 Omnibus Appropriations Act. The proposed modifications will begin just east of the S-333 structure on the L-67A Canal and end at or near the S-334 structure on the trail. Everglades National Park and the Corps would like to initiate government to government consultation with the Miccosukee Tribe on this project and invite you to participate on a Project Delivery Team (PDT) that will start meeting in late May of this year.

From previous consultation with Everglades National Park, as well as the U.S. Army Corps of Engineers, we know that Section 106 compliance has been delegated to you by Chairman Cypress. Therefore, your participation would be a valuable asset to this effort.

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Sincerely,

Dan B. Kimball

Dan B. Kimball
Superintendent
Everglades and Dry Tortugas National Parks

United States Department of the Interior
NATIONAL PARK SERVICE

Everglades and Dry Tortugas National Parks
40001 State Road 9336
Homestead, Florida 33034-6733

Alice
pls review
& develop a
response
Gus

In Reply Refer to:

MAY 19 2009

L54

RECEIVED
FDOT-D6
MAY 22 2009
DIST. SECRETARY'S OFFICE
MIAMI, FL

Gus Pego, P.E.
District Secretary
Florida Department of Transportation, District Six
1000 NW 111th Avenue
Miami, Florida 33172-5800

Dear ~~Mr.~~ Gus Pego:

This letter is a follow-up to the meeting held in the Florida Department of Transportation (FDOT), District 6, offices on April 21, 2009 which included representatives from FDOT, the U.S Army Corps of Engineers (COE), and members of my staff from Everglades National Park (ENP). The purpose of this meeting was to discuss the proposed Tamiami Trail modifications authorized by the 2009 Omnibus Appropriations Act. The intent of this project is to implement modifications to Tamiami Trail to allow for unconstrained flow to the Northeast Shark Slough portion of ENP consistent with the Act. The intent of this letter is to summarize the results of the meeting and to seek FDOT concurrence on the meeting outcome pertaining to the project design high water (DHW) and pavement overtopping criterion.

Much of the discussion during the meeting focused on the DHW needed to meet the project objective of unconstrained flow described above. These discussions were summarized in meeting minutes provided to your agency by the COE on April 28, 2009 and are also attached to this letter. To summarize, the DHW calculations provided by the COE in 2005 and the more recent modeling results provided by ENP both result in similar DHW calculations. The 2005 COE calculations that resulted in the 9.7 ft DHW were based on a methodology different than the calculations traditionally used by the FDOT; however, FDOT endorsed the use of this DHW based on FDOT review of the calculations and the modeling.

More recent modeling was also conducted by ENP to improve model simulations of the future hydrologic conditions. These model data were also subject to an analysis by ENP staff using the FDOT methodology for the calculation of the DHW and resulted in similar results as those attained by the COE in 2005. The values that were derived from the ENP modeling and FDOT calculations produced a DHW of 9.77 ft. Since this result was similar to the COE calculated DHW, within the error of the model, and that FDOT had previously endorsed the COE methodology, the meeting participants agreed to adhere to the COE calculations for using a DHW of 9.7 ft. for the project. All elevations are in reference to 1929 NGVD. Specifically, it is our understanding that this decision was endorsed by Mr. Ricardo Salazar of your staff.

As was done for the DHW, the overtopping criterion was calculated using two methods. The 2005 COE method produced a stage of 10.1 feet. The more recent ENP modeling and calculations, using FDOT methodology produced a stage of 10.05 feet. Since the results were similar, the meeting participants agreed to use the previously endorsed by FDOT and more conservative COE overtopping criterion of 10.1 feet.

We appreciate the time and effort of FDOT staff in reviewing the information provided by ENP and the COE. We would also appreciate your response to this letter reaffirming the use of the 9.7 ft DHW and the 2005 COE calculations for this project and the resultant unconstrained flow. Additionally, we have invited the Federal Highway Administration (FHWA) to serve as a cooperating agency on this project in order to better meet the transportation requirements of the project. Since it is our understanding that FHWA cooperating agency status would facilitate the involvement of FDOT personnel on the project, I also want to encourage active participation of the FDOT staff in the project delivery team activities to ensure that the selected plan would be consistent with the requirements of your agency. A project management plan, including a project schedule, will be sent in separate correspondence to you. We would appreciate your distributing this plan and schedule to staff you feel are most qualified to assist us in these evaluations.

We look forward to working with FDOT collaboratively on this important project, which has the potential to provide consider restoration benefits to the natural resources of Everglades National Park. Should you have any questions about this project, the role of the National Park Service, or our request for technical concurrence, please do not hesitate to contact the project manager from ENP, Bruce Boler, at (305) 224-4234, or me at (305) 242-7710.

Sincerely,

Dan B. Kimball

Dan B. Kimball
Superintendent

Enclosure

cc:
Alice Bravo, FDOT
Barbara Culhane, FDOT
Maria Teresita Vilches-Landa, FDOT
Ricardo Salazar, FDOT
Clara Sidan, FDOT
Bruce Boler, ENP
David Sikkema, ENP
Brad Foster, COE
Ernie Clarke, COE
Gwen Nelson, COE

PROJECTS
Tamiami Trail 2 Feasibility Study
Meeting Summary

21 April 2009 10AM-12PM

To: Attendees

From: Everglades Partners Joint Venture (EPJV)

Subject: **Agreement of Design High Water Determination and Study Timeline**

Attendees:

Pablo Alonso, FDOT
Bruce Boler, ENP
Aileen Boucle, FDOT
Barbara Culhane, FDOT
Mike Christofidis, USACE
Brad Foster, USACE
Gwen Nelson, USACE
Steve Nguyen, USACE
Clara Sidan, FDOT
Ricardo Salazar, FDOT
Dave Sikkema, ENP
Amy Swiecichowski, EPJV
Mary Tery Vilches, FDOT
Russ Weeks, USACE (phone)
Alex Yi, FDOT

The attendees listed above met at the Florida Department of Transportation (FDOT) District 6 offices in Miami to discuss the design high water determination for the Tamiami Trail and the new study's timeline. Attendees introduced themselves and indicated their agency affiliation and role.

Design High Water

In 2005, the US Army Corps of Engineers (USACE) used the Natural System Model (NSM) over a 36-year period of record to establish a stage frequency curve for Tamiami Trail (see embedded figure 6 from 2005 RGRR). Stages were extrapolated from the curve for particular frequencies to determine the design high water (DHW) and the peak stage for the overtopping criteria. Using the 20-year frequency, the 24-hour stage or DHW for pavement design was 9.7 feet NGVD. 9.7 feet was also viewed as the unconstrained flow (20-year, 24-hour stage) and that L-29 Canal would not have a control level. Pavement designs must provide minimum base clearances. The 100-year stage from the curve and peak stage used for the overtopping criteria was 10.1 feet. The road design should prevent overtopping. 8.75 feet was the mean high water stage over the 36-year period of record and the control water elevation (CWE) used to determine the required low chord elevation for bridging. The stage exceeded 8.75 feet 12.5% of the time over the 36-year period of record. The design should be able to handle any flows that MWD and CERP could send. An operational plan will also be developed for the completed MWD and C-111 South Dade projects.

Like in 2005, this study intends to generate a design that will allow unconstrained flows across Tamiami Trail.

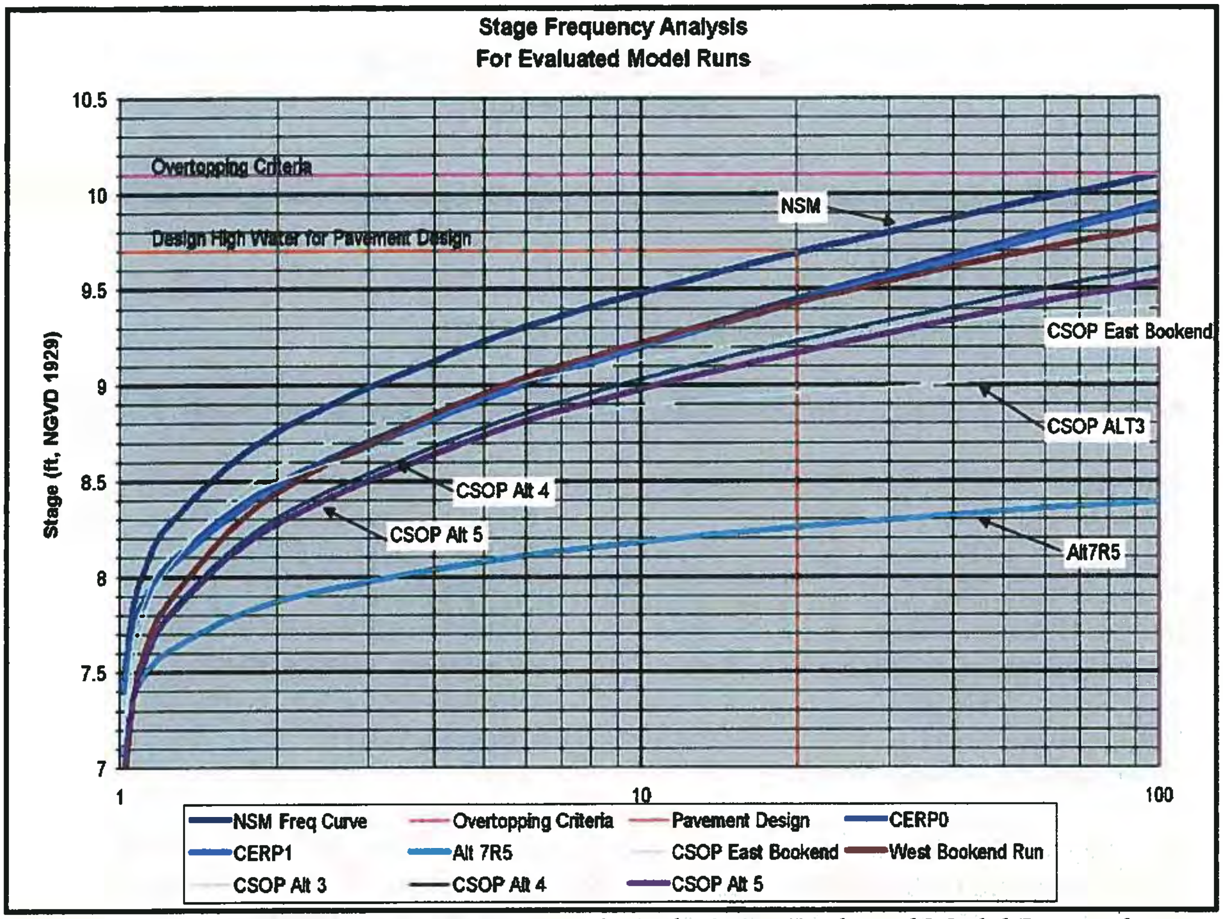


Figure 6 - Stage Frequency Analysis Comparisons between Evaluated Model Runs, taken from 2005 TTM RGRR/SEIS Engineering Appendix. NSM values were used as most conservative approach and viewed as unconstrained flow.

The 9.7 feet DHW was confirmed by FDOT in a letter dated June 20, 2005. Ricardo Salazar traveled to Jacksonville to review the NSM and its assumptions. He reiterated during this meeting that he accepted the model upon reviewing it. He was convinced that the modeling was well thought and inclusive of the system. Dr. Atkinson also looked at the model and thought is was adequate to predict the high water levels.

The DHW for a project is typically based on water elevations of a controlled canal that are operated by South Florida Water Management District (SFWMD) or Miami-Dade Department of Environmental Resource Management. If the project area is tidal, existing data is used to calculate the mean October water elevation. Storm events are then added to the mean October water elevation to calculate the DHW per the FDOT procedure.

Using the NSM model data, the October average stage was 8.47 feet. When the 20-year, 24-hour storm event (9.8 inches or 0.82 feet) was added, the highest October stage that could be achieved was 9.27 feet. The 100-year storm equates to 13.2 inches or 1.1 feet of rain which when added to the mean October stage is 9.55 feet. These values indicate that the 2005 analyses were conservative estimates.

With the River of Grass initiative, the state intends to acquire ~72000 acres of land south of Lake Okeechobee. ENP hydrologist, Robert Fennema looked at similar situations with slightly more water introduced into the Water Conservation Areas. He ran the ENP model which initially included higher ground surface elevations anticipating restoration or peat accretion in the area. The problem with this assumption was that ground surface elevation will not change in design lifetimes. It will take time more on the order of geologic timescale to achieve the increased higher ground surface elevations. The ground surface elevations were returned to existing conditions and the model was rerun. 9.7 feet was reaffirmed as the DHW using ENP Model 5.1.

The summary of the analyses follows:

NSM Stage Frequency Curve Analysis (2005 accepted values):
DHW (20-year, 24-hour) = 9.7 feet NGVD
Overtopping Criteria (100-year) = 10.1 feet NGVD
CWE = 8.75 feet NGVD

NSM Mean October + Storm Events Method:
October Mean Stage = 8.47 feet NGVD
20 year, 24-hour storm = 0.82 feet
100 year storm = 1.1 feet
DHW = 8.47 feet + 0.82 feet = 9.29 feet NGVD
Overtopping Criteria = 8.47 feet + 1.1 feet = 9.57 feet NGVD
CWE = 8.75 feet NGVD

ENP Mean October + Storm Events Method:
October Mean Stage = 8.95 feet NGVD
20 year, 24-hour storm = 0.82 feet
100 year storm = 1.1 feet
DHW = 8.95 feet + 0.82 feet = 9.77 feet NGVD
Overtopping Criteria = 8.95 feet + 1.1 feet = 10.05 feet NGVD
CWE = feet NGVD

Any time the predicted water level increases, the design has to change to accommodate the flows. However using two different methodologies, the DHW predictions were within 0.07 feet of each other using both the 2005 analysis and the ENP model. The 0.07 feet difference was thought to be within the error of the model.

In 2005, 9.7 feet was established as the design high water for the road pavement design and 10.1 feet was the 1 in 100 year storm event used as the overtopping criteria. The Everglades National Park (ENP) and the US Army Corps of Engineers (USACE) would like to coordinate with FDOT and formally adopt 9.7 feet (20 year, 24-hour storm) as the DHW for this study. Effectively the same results are being achieved using the ENP model.

ACTION: Share with the FDOT the summary of comparisons and the data sets used in a formal letter – gain concurrence and acceptance – Dave Sikkema

The 2008 LRR was driven by available monies. A control level was needed because monetary constraints prevented a design necessary to achieve unconstrained flow. This study does not have these monetary constraints. However cost effectiveness will still be evaluated.

Several items to be kept in mind for the design are:

- Miami-Dade County is highly transmissive area
- Pavement design is based on 1 foot clearance from design high water to base Water elevations will have to be monitored. Do not want to expose the base to high water for long periods of time.
- Some portion of the Tamiami Trail will not be bridged
- Hurricanes and other named storm may need … pre-storm operations – do not want to cause flooding to the east

Integrated Feasibility Study Report and NEPA

Hope to use a significant portion of the 2005 study and design.

Section 4f requirements remain a concern. Section 4f analyses are an intense engineering exercise. Everything along this linear facility is historic or natural. Tamiami Trail is nationally historic and national register eligible. Tamiami Trail has so many resources… the analyses will need to engineer all the alternatives even the extremes necessary to avoid the resources. Lengthy descriptions will be needed to justify why that extreme solution is not feasible. Is there any opportunity that *de minimis* can be used?

Steve Wright from the National Park Service's (NPS's) Regional office in Atlanta was selected to work directly with FHWA persons in Tallahassee on this project. He has worked with Section 4f and transportation projects for the NPS.

Timelines – feasibility report… will accept feasibility report and draft NEPA document one year to the date from the signing of Omnibus Act – 19MAR09 to 19MAR10. Much of the information prepared in 2005 can be used. Some sections of the LRR design should provide additional useful information.

- Geotechnical reports were finalized for the 9.7 feet.
- To achieve the full 9.7 feet, have to widen the road
- If bridge, assume offset of 50 feet south.
- Review alternatives from 2005 RGRR and move the reasonable ones forward.
- Pavement design will use the generic designs already developed.
- 1989 Act already authorized acquisition of real estate. Want and need plan to implement

Engineering appendix, hydraulic annex and cost annex. How far do you intend to take the engineering? Design development of a concept to 15-20% is acceptable. What NEPA and engineering documentation is needed? DOT would have never been allowed to complete an EIS without complete resolution of cultural resources, noise, and endangered species. Need to engineer avoidance of cultural resources.

FHWA check sheet (e.g., relocation of signs, businesses, parking, etc; environmental; socio-economic; wetlands) can be found in the Project Design & Environment Manual (http://www.dot.state.fl.us/emo/pubs/pdeman/pdeman.htm).

FHWA site has links to current EISs which may provide the best examples of section 4f analysis.

Future Dates
ENP hopes to award NEPA contract by **6 May 2009**
Internal scoping **19-20 May 2009** (19 May field day); contractor will be on board
Public scoping **~2 June 2009**
19 March 2010 – integrated feasibility report and draft NEPA document due

RECEIVED JUN 17 2009

Florida Department of Transportation

CHARLIE CRIST
GOVERNOR

1000 NW 111 Avenue
Miami, Florida 33172-5800

STEPHANIE C. KOPELOUSOS
SECRETARY

June 10, 2009

Mr. Dan B. Kimball, Superintendent
U.S. Department of the Interior National Park Service
Everglades and Dry Tortugas National Parks
40001 State Road 9336
Homestead, Florida 33034-6733

Dear Mr. ~~Kimball~~: DAN

This letter is in response to your letter dated May 19, 2009 concerning the meeting held April 21, 2009 to discuss the proposed Tamiami Trail modifications authorized by the 2009 Omnibus Appropriations Act.

As stated in your letter, the Department concurs with the U.S. Army Corps of Engineers (COE) calculations resulting in a Design High Water (DHW) of 9.7 feet and an overtopping stage of 10.1 feet for this project on Tamiami Trail involving unconstrained flows. These values are compatible with the information that our District Drainage Engineer, Ricardo Salazar received at a meeting with COE hydrologists in Jacksonville on June 20, 2005. At this meeting, the COE provided background information regarding the development of the hydrologic model. We anticipate that should future modeling yield different results, the COE will once again coordinate with the Department's Drainage Engineer to established revised DHW and overtopping design parameters.

The Department concurs with the Minutes for the meeting held on April 21, 2009 with the following additions:

1. Recognizing that only some portions of Tamiami Trail will be bridged and that roadway segments will be required for the project, it is important that the pavement design abide by the FDOT Flexible Pavement Design Manual and the Plans Preparation Manual (PPM). Since the drawdown rates for water elevations in the Everglades after a heavy storm are relatively slow compared to that of a traditional roadway bounded by swales, it is imperative that the COE's design provide two feet of base clearance. This will serve as a safety factor as it relates to drawdown rates and anticipated extended duration of the roadway base to wet conditions.

2. Transmissivity in the region is also a very important design parameter. The differential between the higher proposed elevations of the Tamiami Canal west of Krome Avenue compared to the lower existing elevations of the canal east of Krome Avenue may impact and modify existing underground water movement (transmissivity rate). As a result, the water elevation of the canal east of Krome Avenue may increase if high stages in the canal west of Krome Avenue are maintained for a long period of time. This may negatively affect the drainage within the cities of Sweetwater and Doral.

Tamiami Trail is part of the State Highway System (SHS). As with any SHS roadway, any major improvements/modifications that the Department undertakes result from needs that are identified in the local Long Range Transportation Plan (LRTP) which establishes the priority of major transportation improvements for a 20-Year time horizon. At this time no major transportation related needs are identified for Tamiami Trail in the Miami-Dade LRTP, as such, the Department's Work Program only reflects pavement restoration activities via periodic maintenance/resurfacing projects.

In terms of restoration goals in the area, the Department understands the Congressional direction to the Department of Interior to restore more natural water flow to Everglades National Park and Florida Bay, and for the purposes of restoring habitat within the Park, and the ecological connectivity between the Park and the Water Conservation Areas. The Department stands ready to coordinate with your agency to accomplish this goal.

Though the Federal Highway Administration (FWHA) has declined to be a cooperating agency, this in no way diminishes the FDOT's involvement with this project or our ability to coordinate with the National Park Service through the Project Delivery Team. We realize the importance of this project and the restoration goals in this area, and will continue to work closely with project staff, as we have done in the past, to provide any needed assistance, technical reviews and other information as the project proceeds.

Should you require additional information, please contact Alice Bravo at (305) 470-5464 or by email at alice.bravo@dot.state.fl.us.

Sincerely,

Gus Pego, P.E.
District Secretary

cc: Bruce Boler, ENP
David Sikkema, ENP
Brad Foster, USACOE
Ernie Clarke, USACOE
Gwen Nelson, USACOE
Alice Bravo, FDOT
Barbara Culhane, FDOT
Mary Teresita Vilches, FDOT
Ricardo Salazar, FDOT
Clara Sidan, FDOT

United States Department of the Interior
NATIONAL PARK SERVICE

Everglades and Dry Tortugas National Parks
40001 State Road 9336
Homestead, Florida 33034

In Reply Refer to:
L5403

June 10, 2009

Mr. Fred Dayhoff, Tribal Representative
Miccosukee Tribe of Indians of Florida
Tamiami Station
P.O. Box 440021
Miami, Florida 33144

Dear Mr. Dayhoff:

The National Park Service (NPS) and the U.S. Army Corps of Engineers (Corps), as collaborating agencies, are preparing a Feasibility Study/Environmental Impact Statement (FS/EIS) for modifications to the Tamiami Trail, as directed in the 2009 Omnibus Appropriations Act. These modifications have the potential to impact historic and cultural resources located along the trail. Since Everglades National Park will be the lead agency on this project, we are responsible for compliance with the National Environmental Policy Act (NEPA) that stipulates specific actions that must be taken to address historic and cultural resources within project areas. It is my understanding that the Osceola Camp may contain traditional cultural resources that could be impacted by any proposed modifications to the trail. If this is indeed the case, Everglades National Park is very interested in meeting with you as soon as possible to discuss eligible properties and structures as well as making arrangements to gain entrance to the property for purposes of conducting any needed surveys. I believe the following questions are pertinent to the NEPA process for this project:

- What are the traditional cultural properties you believe are located on the Camp and how might they be impacted by this project?
- Does the Tribe wish to conduct their own cultural resource assessment per the provisions in the Special Use Permit?
- Are there any structures on the property which are older than 50 years old and may now be eligible for historic designation?
- Has a topographic survey been conducted recently that can verify the elevations of the recent fill added to the property and the additional structures built over the fill? This may be required for NEPA compliance and also may be needed for proposed legislation to allow for permanent residency status and reimbursement for the fill costs.

Congressional language contained in the 2009 Omnibus Bill directs the National Park Service (Everglades National Park) to complete this project by March 10, 2010 (one year). To meet this challenging schedule, ENP needs to ensure that all National Register properties, or potential NR properties, are appropriately surveyed within the next few months. This letter is to inform you of our sincere interest in meeting with you to discuss this project. I will follow up this letter with a personal telephone call in the next couple of weeks. If you wish to review more information on this project, please contact me or have your staff contact Bruce Boler by email bruce_boler@nps.gov or telephone 305-224-4234. Thank you for your assistance in this matter.

Sincerely,

Dan B. Kimball

Dan B. Kimball
Superintendent

United States Department of the Interior
NATIONAL PARK SERVICE

Everglades and Dry Tortugas National Parks
40001 State Road 9336
Homestead, Florida 33034

In Reply Refer to:
L5403

June 11, 2009

Chairman Billy Cypress
Miccosukee Tribe of Indians of Florida
P.O. Box 440021
Tamiami Station
Miami, Florida 33144

Dear Chairman Cypress:

In a letter to you dated April 16, Everglades National Park requested consultation with you on a project authorized by the 2009 Omnibus Appropriations Act. In a separate letter dated April 22, the park requested your participation in an inter-agency/tribal meeting to discuss any issues, concerns, problems or opportunities you may have with this same project. In e-mails dated May 11 and May 16, the park requested your participation in this project's initial kick-off meetings on May 19, 20. The park informed you that these meetings were to document any concerns, issues, or problems you may have with the proposed purpose, objectives, scope, and potential impacts of this project. At these meetings the agencies who did participate expressed concern with your absence. On June 2, 2009 a public scoping meeting took place to receive public input on this project. It was well attended; however, once again stakeholders expressed concern with your absence and recommended that we try harder to communicate with you. This letter is an attempt to continue to seek your participation in this project.

While the agency/tribal scoping meeting and the public meeting for this project are concluded, there is still the opportunity for you to document any concerns you have with this project; however, public comments must be received by June 29, 2009. Also, there is an inter-agency/tribal meeting scheduled for June 17, 2009 to further refine the project objectives, alternatives, and performance measures. As the lead agency on this project, we wish to assure you that we will continue to seek your participation. If you would like any further information, please contact me at 305-242-7712 or have your staff contact Bruce Boler by email bruce_boler@nps.gov or telephone 305-224-4234. Thank you for your assistance in this matter.

Sincerely,

Dan B. Kimball

Dan B. Kimball
Superintendent

cc:
Steve Terry, Land Resources Manager
Gene Duncan, Water Resources Director

MIAMI-DADE COUNTY
Carlos Alvarez, Mayor

Department of Environmental Resources Management
Office of the Director
701 NW 1st Court, 4th Floor
Miami, Florida 33136-3912
T 305-372-6754 F 305-372-6739

miamidade.gov

June 12, 2009

Mr. Pat Kenney
National Park Service
Denver Service Center, Planning Division
PO Box 25287
Denver, CO 80225

Dear Mr. Kenney:

This letter is a response to your requests for scoping comments on the Draft Environmental Impact Statement (EIS) that is to be prepared in connection with modifications to the Tamiami Trail to restore flow to Everglades National Park.

Miami-Dade County staff has participated on a variety of technical teams involved in the development of the Modified Water Delivery Project elements and Comprehensive Everglades Restoration. The County recognizes that improvements to the Tamiami Trail are part of a critical step in achieving more natural flow of water from the Water Conservation Areas (WCA) to northeast Shark River Slough and Everglades National Park (ENP). The 2009 Omnibus Appropriations Act provides an opportunity to move forward on this key component of south Florida ecosystem restoration. Miami-Dade County expects that improved flow will not only benefit hydrology and the ecosystem in ENP, but will also help to relieve unnaturally high water levels in portions of the WCAs, benefit fish and wildlife species (including listed species) in marshes and downstream areas, and enhance water quality and potential for water deliveries for human water supply. However, increased stages in eastern portions of the WCA and ENP and in certain canals may affect seepage and flood protection level of service to the east. The EIS should include evaluation of ecological and hydrological benefits, including effects on fish, birds, and other wildlife in WCA3a and WCA3b, as well as ENP. It should also evaluate water quality and quantity effects on the natural system and regional wellfields. The EIS should evaluate flood protection, including operational criteria for S-357 and other seepage features under various canal stages and high water conditions.

The Miami-Dade Department of Environmental Resources Management (DERM) conducts surface and groundwater monitoring programs in Miami-Dade County, and has extensive experience in stormwater management master planning and wellfield protection. DERM may have water quality data or surface and groundwater modeling information that would be of assistance in the development of your EIS.

Should you require any additional information or assistance, please contact Ms. Susan Markley of my staff at (305) 372-6863 or by email at markls@miamidade.gov .

Sincerely,

Carlos Espinosa, P.E.
Director

c: George M. Burgess, County Manager
Alex Munoz, Assistant County Manager

Delivering Excellence Every Day

From the desk of

MIAMI-DADE COUNTY

Delivering Excellence Every Day

Alex Muñoz
Assistant County Manager

6/5/09

Carlos\ Marc:

Do you have someone running point on this? If so who? Also - pls note the comment request and deadline of June 12. Please provide comments. thru me for now - I'll transmit.

TX

AM

CC: Doug Yoder, WASD
A.B.

Everglades National Park
Florida

National Park Service
U.S. Department of the Interior

Dear Friends,

The National Park Service (NPS), in compliance with the National Environmental Policy Act of 1969 (NEPA), plans to prepare an environmental impact statement (EIS) for modifications to the Tamiami Trail (U.S. Highway 41) to restore flows and ecological conditions in Northeast Shark River Slough in Everglades National Park (the park).

The 2009 Omnibus Appropriations Act directed the secretary of the Department of the Interior, acting through the National Park Service, to immediately evaluate the feasibility of additional bridge length, beyond that to be constructed pursuant to the Modified Water Deliveries Project. Modifications to the Tamiami Trail could include a continuous bridge, additional bridges, or some combination of bridge and road elevation. The purpose of the modifications would be to restore more natural water flow to Everglades National Park and Florida Bay and restore habitat in the park and the ecological connectivity between the park and the Water Conservation Areas. This project is intended to ensure that future Comprehensive Everglades Restoration Plan *projects, such as the "river of grass" effort, will not require additional modifications to the trail.*

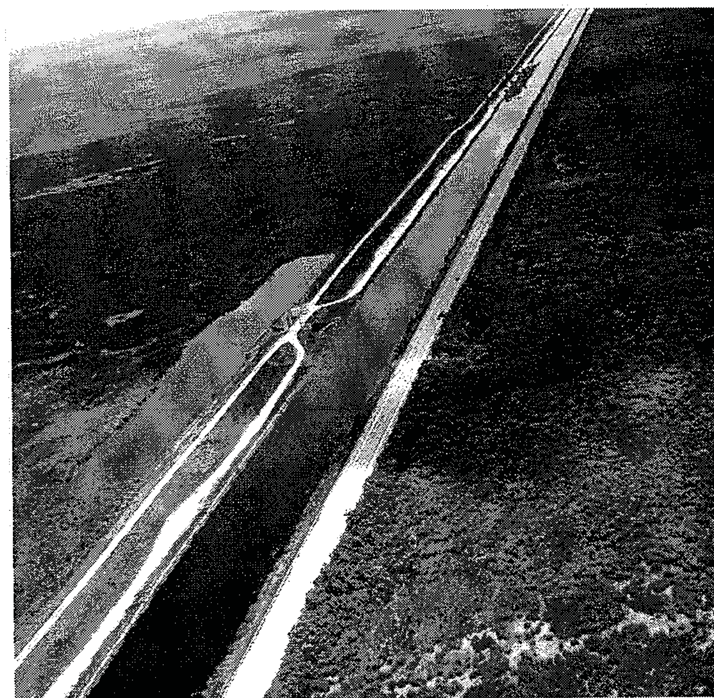
The National Park Service is the lead agency for this Northeast Shark River Slough Restoration Project; however, the National Park Service has requested the U.S. Army Corps of Engineers and the Federal Highway Administration to be cooperating agencies on this effort. The National Park Service will also seek input from other federal, state, and local agencies and stakeholders, including you.

The purpose of this newsletter is not only to provide you with information about the project and related issues, but to ask for your help. This project is critically important to the future of Everglades National Park, and your input is invaluable. We are seeking your input on the proposed project and the alternatives and issues to be included in the environmental impact statement. Please plan to attend a public meeting to be held at the South-Dade Regional Library (1st floor) on June 2, 2009, from 5:00 to 8:00 p.m. You will have the opportunity to speak with park staff, ask questions, and comment on this project. If you cannot attend the meeting, you may also submit comments electronically, or by mail (see page 3).

Please provide your input on or before June 12, 2009. We look forward to hearing from you.

Sincerely,

Dan B. Kimball
Superintendent, Everglades National Park



Aerial view of the Tamiami Trail.

Project Background

In December 1989 the Everglades National Park Protection and Expansion Act authorized the secretary of the army to improve water deliveries to Everglades National Park and to take steps to restore natural hydrologic conditions to the extent practicable. Alternative means for restoring more natural hydrologic conditions have been evaluated several times, beginning in 2003, under the auspices of the Modified Water Deliveries Project authorized by the 1989 act. Concerns about probable damage to the Tamiami Trail resulted in the development of the "Revised General Reevaluation Report" (2005 report) that examined alternatives to improve the conveyance of water from Water Conservation Area 3B to Northeast Shark River Slough (the slough) in the park.

You are invited to attend a public meeting on

June 2, 2009
South-Dade Regional Library
1st Floor
10750 SW 211th Street
Cutler Bay, FL 33189

5:00 – 8:00 p.m.

The first hour of the meeting will be an open house and NPS staff wil be available to discuss the project, answer questions, and record public comments. At 6:00 p.m. there will be a brief presentation on the project, followed by a public comment session.

The preferred alternative in the 2005 report included additional bridging and road elevation, but by 2007 when Congress was considering funding for the project the original cost estimate had increased substantially. Congress requested reevaluation of the 2005 report and asked for the development of less costly alternatives. The result was the "2008 Limited Reevaluation Report" (2008 report). Although the recommended alternative in the 2008 report would likely improve environmental conditions in the slough, it would not provide the full level of water flow and ecological connectivity needed to accomplish restoration of the slough.

As a result of the limited environmental benefits that the 2008 report recommendations would provide to the park, Congress included language in the 2009 Omnibus Appropriations Act that directs the National Park Service to evaluate additional bridge length and raising the Tamiami Trail to restore more natural water flow to Everglades National Park and Florida Bay. The direction to evaluate the feasibility of additional bridging and improving ecological connectivity in the Omnibus Act is a congressional acknowledgment that the modifications to the Tamiami Trail contained in the 2008 report are not sufficient to restore more natural flows or restore ecological conditions in Everglades National Park. Although the 2008 report modifications would begin the process of improving flows to and ecological conditions in the park, this new evaluation will identify modifications needed to meet the flow and connectivity targets associated with full restoration.

Purpose and Need of Project

The National Park Service has been directed by the 2009 Omnibus Appropriations Act to restore more natural water flow to Everglades National Park and Florida Bay for the purpose of restoring habitat within the park and restoring ecological connectivity between the park and Water Conservation Area 3B (see below). Specifically, the 2009 Appropriations Act directs the National Park Service to immediately evaluate the feasibility of additional bridge length and modifications of the eastern section (10.7 miles) of the Tamiami Trail, also known as U.S. Highway 41, beyond that proposed in the 2008 report, to restore the natural resources and physical processes in the Northeast Shark River Slough.

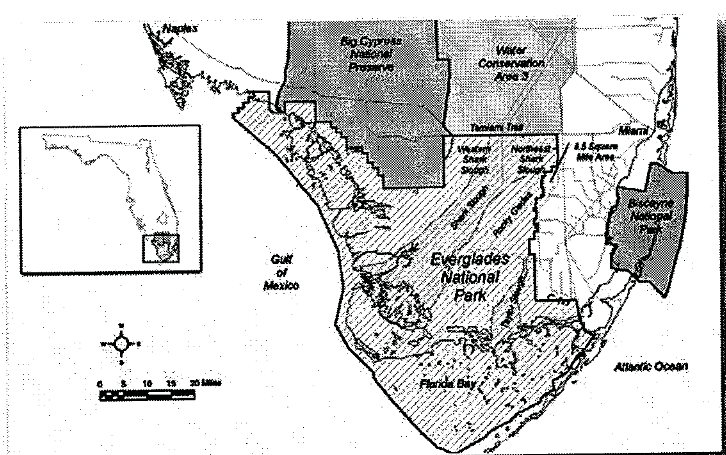


Figure 1. Water Conservation Area 3B.

Proposed Action and Alternatives

The environmental impact statement will evaluate the potential environmental effects of modifying the Tamiami Trail and reevaluate and modify the alternatives in the 2005 report. In addition, the environmental, engineering, real estate, and cost estimates will be revised. A range of alternatives will be considered, including a no-action alternative. At the conclusion of the process, the National Park Service will make a decision about modifying the Tamiami Trail pursuant to the 2009 Omnibus Appropriations Act.

Proposed Project Objectives

Restore Natural Water Flow to Everglades National Park
- Construct additional bridging of the Tamiami Trail to provide for unconstrained flows to Northeast Shark River Slough and Florida Bay.

Restore Ecological Connectivity
- Improve ecological connectivity by removing obstructions to sheet flow between Water Conservation Area 3B and Northeast Shark River Slough.
- Reduce highway-caused mortality of wildlife moving across the Tamiami Trail.

Restore Habitat within the Park
- Restore historic slough vegetation and the deep-water sloughs.
- Restore slough vegetation and the deep-water sloughs.
- Restore processes that produce and maintain ridge and slough communities in Everglades National Park east of the L-67 Extension.

Scope

This study will consider impacts on health and safety, aesthetics and recreation, cultural resources, socioeconomic resources, hydrology, water quality, ecosystem habitat, fish and wildlife resources, threatened and endangered species, and construction costs.

The National Park Service is the lead agency on this federal action; however, the National Park Service has requested the U.S. Army Corps of Engineers and the Federal Highway Administration to be cooperating agencies on this effort. As the lead agency, the National Park Service will have decision authority over implementation. This project is complex and involves many agencies and stakeholders. Therefore, to develop a realistic plan, the National Park Service will seek input from other resource and technical agencies and stakeholders, including, but not limited to the following:

- Florida Department of Agriculture and Consumer Services
- Florida Department of Environmental Protection
- Florida Department of Transportation
- Florida Fish and Wildlife Conservation Commission
- Florida State Historic Preservation Office
- Miami-Dade County
- Miccosukee Tribe of Indians of Florida
- Seminole Tribe of Florida
- Seminole Tribe of Oklahoma
- South Florida Water Management District
- U. S. Fish and Wildlife Service
- U. S. Geological Survey
- U. S. Corps of Engineers

How You Can Participate

At this time, the superintendent of Everglades National Park is announcing a public comment period to solicit public feedback on this project. During this period, the public is invited and encouraged to comment on the proposed project and identify any issues or concerns so that the National Park Service can appropriately consider them.

There are a number of ways to participate in this process and make your voice heard. You may submit your comments electronically by going to the NPS Planning, Environment, and Public Comment website:

http://parkplanning.nps.gov

Once on the website, select "Everglades NP" from the drop-down box, then "Northeast Shark River Slough Restoration," and finally "Open for Public Comment." A paper copy of this newsletter may be requested by calling the park at 305-242-7700. If prompted by voice mail, press "2" at the first prompt and "5" at the second prompt to leave mailing information. Please state that you are requesting the newsletter for the **Northeast Shark River Slough Restoration Project.**

If you are unable to access this website, please submit written comments by June 12, 2009, to

National Park Service
Attention Pat Kenney
Denver Service Center, Planning Division
P.O. Box 25287
Denver, CO 80225-0287

Finally, we invite you to attend the following public meeting to be held on:

June 2, 2009
South-Dade Regional Library
1st Floor
10750 SW 211th Street
Cutler Bay, FL 33189

5:00 – 8:00 p.m.

The first hour of the meeting will be an open house and NPS staff wil be available to discuss the project, answer questions and record public comments. At 6:00 p.m. there will be a brief presentation on the project, followed by a public comment session.

Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment — including your personal identifying information — may be made publicly available at any time. Although you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

NATIONAL PARK SERVICE
DENVER SERVICE CENTER – P KENNEY
12795 W ALAMEDA PARKWAY
PO BOX 25287
DENVER, CO 80225

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Everglades National Park
Florida

National Park Service
U.S. Department of the Interior

Project Schedule

Steps	Planning Activity	Dates	Public/Agency Involvement Opportunities
1	Scoping: Identify planning issues and opportunities	Public comment period June 2009	• Attend public scoping meeting • Submit written comments by June 12, 2009
2	Prepare *Draft Environmental Impact Statement*	May 2009-September 2009	• Agency and tribal consultations
3	Publish and distribute *Draft Environmental Impact Statement*	December 2009-February 2010 60-day public comment period	• Review the *Draft Environmental Impact Statement* and provide comments to the National Park Service • Attend public meeting(s)
4	Publish and distribute *Final Environmental Impact Statement*	June 2010	• Review final document
5	Federal decision anticipated	September 2010	• Review NPS decision

LEHTINEN RIEDI BROOKS MONCARZ
ATTORNEYS AT LAW
A PROFESSIONAL ASSOCIATION

RECEIVED
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June 26, 2009

National Park Service
Denver Service Center
Planning Division
P.O. Box 25287
Denver, Colorado 80225-0287

Attention: Pat Kenney

Re: Miccosukee Tribe Comments on the *Notice of Intent to Prepare Feasibility Study and Environmental Impact Statement for Everglades National Park To Evaluate Modifications to the Tamiami Trail*

Dear Ms. Kenney,

The Miccosukee Tribe of Indians of Florida hereby provides its comments on the *Notice of Intent to Prepare Feasibility Study and Environmental Impact Statement for the Everglades National Park to Evaluate Modifications to Tamiami Trail*, which appeared in the Federal Register on May 29, 2009. The notice states that the purpose of the Environmental Impact Statement ("EIS") is to "*evaluate the feasibility of additional bridge length, beyond that to be constructed pursuant to the Modified Water Deliveries to Everglades National Park Project (16 U.S.C. 410r- S), including a continuous bridge, or additional bridges or some combination thereof, for the Tamiami Trail (United States Highway 41) to restore more natural water flow to Everglades National Park and Florida Bay and for the purpose of restoring habitat within the Park and the ecological connectivity between the Park and the Water Conservation Areas (Omnibus Appropriations Act 2009).*"

As the Department of Interior ("DOI") and National Park Service ("NPS") are aware, the Tribe has customary use and occupancy rights in Everglades National Park and a perpetual lease to 189,000 acres of Everglades north of the Park in Water Conservation Area 3A ("WCA 3A"). The Tribe is confused by the term "proposed project" in the federal register notice, since DOI was only instructed to evaluate feasibility. No "project" was authorized in the Act cited by NPS. However, since the NPS is conducting an EIS, it must fully comply with the National Environmental Policy Act ("NEPA") and other federal law. The Tribe is concerned that the EIS, which is hastily being undertaken by the NPS, will not adhere to the requirements of federal law. To that end, the Tribe provides the following comments on the confusing NPS notice and process.

7700 N. KENDALL DRIVE, SUITE 303 MIAMI, FLORIDA 33156 TELEPHONE (305) 279-1166 FAX (305) 279-1365

PROJECT AREA: The Project Area that NPS is planning to analyze in the EIS is too narrow in that it is limited only to Everglades National Park. The Project Area in which impacts are analyzed must include the Water Conservation Areas (including WCA 3A) and western Miami-Dade County.

CONSTRUCTION: The EIS must analyze any adverse impacts from construction, and post-construction, on the Tiger Tail and Osceola Camps (i.e. noise light, traffic, privacy, and cultural impacts) and all such adverse impacts must be avoided. NPS should not consider any alternative that places a bridge over or close to these camps. Impacts on hurricane, health, fire, and other vital access to Tamiami Trail must be analyzed and safety maintained. Any blocking of culverts during construction to prevent pollution from entering the Park will result in higher water levels in WCA 3A, and adversely impact the endangered Snail Kite, and must be analyzed in the EIS. The EIS should also review whether any hazardous waste sites exist along Tamiami Trail and divulge the cost of cleaning them up.

OPERATIONS: The EIS must analyze the impact of operations, as well as construction, on the WCAs and western Miami-Dade County. The NPS cannot assume benefits in the Park from operations, but refuse to assess impacts of operations on the WCAs and Miami-Dade County. The Corps and DOI are well aware that construction of any bridge will result in an average annual increase in flows into the Park, and a *de facto* change in operations, that could flood Indian camps, Tribal private property, and western Miami-Dade County. The impacts of operations on the Miccosukee Reserved Area, the Miccosukee Resort, and the Tiger Tail and Osceola Camps, as well as the Tribe's perpetual lease lands in WCA 3A, must be analyzed in the EIS. The Tribe will not tolerate any adverse impacts on these areas.

BENEFITS: The EIS should divulge that construction of a bridge alone will not provide benefits for the Park. The EIS should also analyze the impacts and benefits from operations and seek alternatives that will maximize benefits to the greater Everglades ecosystem. Alternatives should be assessed on whether they provide improvements in ecological and hydrological conditions, not just in the Park, but in the WCAs as well. No harm to the WCAs should occur either during construction or operation.

SEEPAGE CONTROL: Since benefits to the Park cannot be realized until seepage out of the Park is controlled, seepage control must be a component of the preferred alternative. Seepage to the east of the Park into the flood protected areas in western Miami-County must be analyzed and controlled.

SHARK RIVER SLOUGH RESTORATION: The EIS must analyze alternatives that facilitate both components of Shark River Slough restoration: 1) flows through WCA 3A and WCA 3B into Shark River Slough and 2) the lost component due to urbanization. Congress specifically directed that a purpose of the study is to restore connectivity between the Park and the WCAs. Thus, impacts of the alternatives on the WCAs must be fully analyzed in the EIS.

"UNCONSTRAINED FLOWS" AND VOLUME: The EIS documents should fully explain the concept of "unconstrained flows" that NPS has declared for the alternatives. It should also analyze whether unconstrained flows will resulting in flooding impacts to the Osceola Camp, private property, and Miami-Dade County. Peak and annual flows should be analyzed for each of the alternatives, including the increase in average annual flow into the Park that will result from a *de facto* change in operation from just building the bridge. Also, distribution of flows should be used as a performance measure. Moreover, the NPS has recently, and improperly, rejected the volume performance measure for the EIS and should reinstate it. Without knowing the volume desired, and delivered, the EIS can not possibly analyze what is necessary or the impacts on the environment.

CULVERTS: NPS reported that DOI Leadership Guidance includes the recommendation to "use con-span-like structures (prefabricated culverts) as potentially a more cost effective way to meet the Congressional intent to improved connectivity." Since con-spans are essentially large culverts, and culverts are technically small bridges, clearing out the exotic vegetation downstream of the existing culverts, and constructing additional culverts and swales, should be evaluated in the EIS as a cost-effective alternative to meet Congressional intent.

WATER QUALITY: The EIS must assess the impacts of construction and operations of each of the alternatives on water quality.

ENDANGERED SPECIES: The EIS must assess the impacts of construction and operations of each of the alternatives on all threatened and endangered species, including the Wood Stork colonies along Tamiami Trail and the Snail Kite in WCA 3A.

LAND TO BE ACQUIRED: The EIS must divulge the amount, and cost, of the land that must be acquired in the Everglades National Park Expansion Area and divulge that such land must be purchased before any benefits can be realized from operations.

COST CAP: According to NPS representatives, DOI leadership advised that there should be NO COST CAP for the preferred alternative. This is irresponsible in light of the current fiscal crisis in this country. Cost should be fully evaluated, and used as a factor to screen out alternatives.

COST OF DELAY: Irreversible damage to the Everglades must be stopped. Delay has a cost. All alternatives analyzed should look at the cost of delay to the Everglades. The amount of time it would take to implement each alternative should be used as a performance measure.

CERP AND NON-CERP PROJECTS: The EIS should look at the compatibility of the alternatives with Comprehensive Everglades Restoration Projects ("CERP") projects and non-CERP projects. The EIS should discuss each of the projects to be built and contain a time line for their completion. Any redundancies of the alternatives with future projects should be divulged. The alternatives must also be compatible with the spreader swale pilot project.

In closing, Tribal representatives have personally observed the NPS' attempt to hurriedly slap together something it can call an EIS, even though Congress gave no deadline for completing the feasibility study. In order to rush out a document, NPS intends to improperly rely on the Army

Corps of Engineers' *Second Supplemental Environmental Impact Statement for the Tamiami Trail Modifications for the Modified Water Deliveries Project* (2005). NPS is even seeking to extrapolate modeling from a completely different suite of alternatives and apply it to new alternatives, rather than conduct the requisite modeling. It plans to rely on a 2005 Mod Waters SEIS, even while claiming that its so-called "proposed project" is neither Mod Waters nor CERP. The NPS is clearly not conducting the feasibility evaluation that Congress directed.

Congress asked for an evaluation of the feasibility of, among other things, restoring "the ecological connectivity between the Park and the Water Conservation Areas." The 2005 SEIS did not study the connectivity between the Park and the WCAs. It only studied benefits in the Park. This is only one example of why reliance on this antiquated document, and its flawed science, is certain to result in an inadequate analysis and a legally deficient document. DOI appears to be attempting to hi-jack the language in the Omnibus Appropriations Act to rush through an "EIS" in order to claim it has a shovel-ready project, so it can seek stimulus money to achieve its plans for Tamiami Trail. DOI is doing so with no regard for science, fiscal responsibility, the needs of the greater Everglades ecosystem, or the rights and concerns of the Miccosukee Tribe, whose members lived in the Everglades long before the Park existed.

Sincerely,

Dexter Lehtinen

Dexter W. Lehtinen

cc Thomas Strickland, Assistant Secretary of Fish, Wildlife and Parks
Dan Kimball, Superintendent Everglades National Park

Dave S

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Florida Department of Transportation

CHARLIE CRIST
GOVERNOR

605 Suwannee Street
Tallahassee, FL 32399-0450

STEPHANIE C. KOPELOUSOS
SECRETARY

July 27, 2009

Mr. Dan B. Kimball
Superintendent
National Park Service
Everglades and Dry Tortugas National Parks
40001 State Road 9336
Homestead, Florida 33034

Colonel Paul L. Grosskruger
Army Corps of Engineers
Jacksonville District
Post Office Box 4970
Jacksonville, Florida 32232

Re: Interagency Feasibility Study and Environmental Impact Statement
Tamiami Trail (U.S. 41)

Dear Gentlemen:

I would like to clarify the Florida Department of Transportation's position on the referenced project. I have reviewed the letter from Federal Highway Administration (FHWA) on May 18, 2009, in which FHWA declines to be a cooperating agency in the referenced project. The Florida Department of Transportation (FDOT), like FHWA, understands the purpose of the project to be the restoration of water flows to Everglades National Park and Florida Bay. Like FHWA, FDOT declines to be a cooperating agency.

As indicated in the May 18 FHWA letter, FDOT does not have any planned transportation improvements related to the Tamiami Trail, other than certain maintenance. FDOT does not anticipate seeking Federal-Aid Highway Program Funds for the proposed Interagency study or any potential project that might be identified through the study.

Although we applaud your efforts to improve Florida's natural environment, FDOT will not seek to accomplish the goal of enhanced water delivery through a transportation project. Thank you for extending the invitation to our staff to participate in your planning process, but without any planned transportation project we will decline to participate. As District Secretary Pego indicated in his June

10th letter, we will be happy to provide technical information that you may need as you proceed with your water delivery project. We would like to have a staff member attend your project meetings, when appropriate, to better position FDOT to respond to technical questions that may arise. However, we want to be clear that staff is not authorized to enter into any agreements on behalf of FDOT concerning your contemplated project or the potential impacts on Tamiami Trail. Thank you.

Sincerely,

Deborah L. Hunt
Assistant Secretary for Intermodal Systems
Development

United States Department of the Interior
NATIONAL PARK SERVICE

Everglades and Dry Tortugas National Parks
40001 State Road 9336
Homestead, Florida 33034

In Reply Refer to:
L54

Mr. Steve Terry, Tribal Representative
Mr. Fred Dayhoff, Tribal Representative
Miccosukee Tribe of Indians of Florida
Tamiami Station
P.O. Box 440021
Miami, Florida 33144

Dear Mr.Terry and Mr. Dayhoff:

The National Park Service (NPS) in preparation of a Feasibility Study/Environmental Impact Statement (FS/EIS) for modifications to the Tamiami Trail, as directed in the 2009 Omnibus Appropriations Act, contracted New South Associates to conduct a Cultural Resource Survey of properties within a 10.7 mile corridor of the eastern Tamiami Trail. This Cultural Resource Survey is completed, except for minor edits (the summary is enclosed and the final report will be sent to you by COB November 30, 2009) which concludes that none of the alternatives proposed in this FS/EIS will adversely impact cultural resources of the Miccosukee Tribe of Indians. This conclusion is in agreement with the Cultural Resource Survey, dated January 11, 2006, conducted by New South Associates for the 2005 Revised General Reevaluation Report, where the project area and proposed alternatives were similar. It is our understanding that you concurred with the findings from the New South Associates Survey for the 2005 RGRR; however, my staff and I would like to consult with you to review the findings from this updated 2009 Cultural Resource Survey and address your concerns.

In a letter to you dated April 16, 2009, Everglades National Park requested consultation with you on this project; however, at that time the 2009 Cultural Resource Survey had not been completed. Now that this survey is completed, we wish to meet to discuss the findings, identify any impacts to tribal cultural resources not addressed in this report, and discuss potential mitigation options. As I indicated in the April 16, 2009 letter requesting consultation, Congressional language contained in the 2009 Omnibus Bill directs the National Park Service (Everglades National Park) to complete this project by March 10, 2010 (one year). To meet this challenging schedule, ENP has been expedient in completing many technical tasks; however, we have been cognizant of the need and NHPA and NAGPRA responsibility in consulting with the Miccosukee Tribe of Indians. If this priority has not been appropriately expressed through communications between my staff and tribal representatives, I assure you it was unintentional, as tribal matters are of the highest priority to Everglades National Park.

Everglades Chief of Cultural Resources Melissa Memory called on November 17 and requested a meeting on December 3, 2009. Please confirm if you are available and where you would like to meet. If you are not available on this date, please provide me with available dates and times when it is convenient for you to meet with me and Everglades National Park will accommodate your schedule needs. If you wish to review more information on this project, please contact me or have your staff contact Bruce Boler by email bruce_boler@nps.gov or telephone 305-224-4234. Thank you for your assistance in this matter.

Sincerely,

Dan B. Kimball

Dan B. Kimball
Superintendent

Enclosures

Consultation with the Miccosukee Tribe of Indians of Florida on the Tamiami Trail Modifications: Next Steps Project
Meeting Summary

11 December 2009 11AM-1PM

Subject: Consultation with the Miccosukee Tribe of Indians of Florida

Participants in Tamiami Trail: Next Steps (TTM: NS) project discussion:

Bruce Boler, ENP
Melissa Memory, ENP
Dan Kimball, ENP
Lt. Colonel Michael Kinard, USACE
Dave Sikkema, ENP
Greg Smith, New South Association
Fred Dahoff, Tribal Representative
Steve Terry, Tribal Representative

On December 11, 2009 representatives from the Miccosukee Tribe met with representatives from Everglades National Park (ENP) and the U.S. Army Corps of Engineers (USACE) to discuss the potential impacts of the TTM: NS project on the cultural resources of the Miccosukee Tribe. Prior to the TTM: NS discussion, there was discussion between the Tribal representatives, various members of the South Florida Water Management District, and Dan Kimball on several topics, including demolition of the old Tamiami Trail, exotic species, and new utility corridors.

The TTM: NS project discussion included Mr. Fred Dahoff and Mr. Steve Terry of the Miccosukee Tribe; Mr. Dan Kimball, Superintendent of Everglades and Dry Tortugas National Parks, and several members of his staff, and Lt. Colonel Michael Kinard of the USACE. The purpose of the meeting was to discuss the TTM: NS project and provide the opportunity for the Tribe to express their concerns or issues with the potential impacts of this project on Tribal resources, particularly those in Northeast Shark River Slough (NESRS). The project includes bridging up to 5 miles of the eastern 10.7 miles of the trail located between the L-67/S-333 structure and the S-334 structure (located near the eastern boundary of ENP) and raising the remaining road to allow stages in the L-29 Canal to be raised to 9.7 feet.

Fred Dahoff, representing the Miccosukee Tribe on cultural resources, first provided the position of the Tribe on several issues concerning the Tamiami Trail. Dan Kimball then asked Fred if he would like to hear the presentation his staff had prepared on the details of the Tamiami Trail Modifications: Next Steps project. Fred replied that he did not need to hear this presentation. At this time, Melissa Memory, Cultural Resource Chief for ENP, asked Fred if the Tribe had any specific concerns with the potential adverse effects of this project on Tribal resources, particularly cultural resources in Northeast Shark River Slough (NESRS). Mr. Dahoff did not identify any specific concerns or any cultural resources that he felt would be adversely impacted by this project.

At this time, ENP thanked the Miccosukee Tribe for the opportunity to consult with them on this project and for their willingness to host this meeting at their Miccosukee Reserve offices. The meeting was then adjourned.

United States Department of the Interior

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

February 25, 2010

Colonel Al Pantano
District Commander
U.S. Army Corps of Engineers
701 San Marco Boulevard, Room 372
Jacksonville, Florida 32207-8175

Service Activity Code:	41420-2007-FA-1577
Service Consultation Code:	41420-2008-F-0435
Original Service Log No.:	4-1-04-F-5912
Formal Consultation initiation Date:	May 15, 2008
Project:	Modified Water Deliveries; Tamiami Trail
County:	Miami-Dade

Dear Colonel Pantano:

The U.S. Fish and Wildlife Service (Service) has received your request (via email dated February 25, 2010) for an amendment to the Tamiami Trail portion of the Modified Water Deliveries to Everglades National Park (ENP) project Biological Opinion, and its effects on the wood stork (*Mycteria americana*). The following amendment is provided in accordance with section 7 of the Endangered Species Act of 1973, as amended (87 Stat. 884; 16 U.S.C. 1531 *et seq*.). The project site is located in Sections 01-06, Township 54 South, Range 37 East and Sections 07-11, Township 54 South, Range 38 East, Miami-Dade County, Florida (Figure 1).

In the original Biological Opinion dated January 12, 2006, (and later amended on June 25, 2008), and incorporated herein by reference, the U.S. Army Corps of Engineers (Corps) made a determination that the project "may affect, but is not likely to adversely affect" the wood stork. The Service concurred with this determination since disturbance would be minimized by the Corps' agreement to manage the construction activities according to the Service's "Draft Supplemental Habitat Management Guidelines for the Wood Stork in the South Florida Ecological Services Consultation Area." The Corps agreed to implement the primary and secondary zone restrictions for the Tamiami West and East colonies; however, new information has surfaced regarding the location of a previously unidentified wood stork colony (East 2) within the project area (Figure 1). The following amendment delineates the appropriate primary and secondary zone boundaries and provides guidance on the type of construction activities allowed within these zones.

As evaluated in the Biological Opinion, this project consists of constructing a 1-mile eastern bridge and raising the remaining US Highway 41 roadway to support an 8.5-ft National Geodetic Vertical Datum stage in the L-29 Canal. The endangered wood stork uses suitable habitats throughout the project area. Two annual nesting colonies occur near the project area, including the “Tamiami East” and “Tamiami West” colonies located just south of the Trail on the eastern end of the project area (Figure 1, inset). The 1-mile bridge is to be constructed midway between these two colonies, such that the bridge itself would not overlap the established primary or secondary zones. Construction activities for the bridge on-ramps and raising portions of the road however, would impinge into the disturbance zones for these two colonies. Conditions for these two areas have not changed.

However, as a direct result of having qualified avian observers on site, the Corps’ contractor, Kiewit Southern identified and alerted the Corps, Service, and ENP staff to a previously undefined colony located directly in the middle and just south of the 1-mile bridge construction site. This report was later verified by researchers at ENP who frequently conduct aerial surveys of wading bird colonies in the area. Based on numerous discussions with these researchers, other biological staff at ENP and the Corps, and through aerial photograph interpretation, the Service proposes the following zones and construction guidance to minimize impacts to this nesting colony.

The center point for the colony is located at 80°31’33.267”W and 25°45’36.599”N. The primary zone is represented by a circular buffer with a 250-ft radius. The secondary zone is indicated by a 500-ft radius buffer from the center point (Figure 1). The primary zone does not overlap the Trail but may intrude into the construction right-of-way which can be up to 100-ft south of the roadway. The secondary zone intersects the Trail at 80°31'28.722"W 25°45'39.373"N on the east side and 80°31'37.91"W 25°45'39.407"N on the west side which equals 840 linear feet of construction area within this zone.

In addition to the below guidelines set forth in prior correspondence for the primary and secondary zones:

A. Primary Zone Restrictions

   1. Avoid all construction activities in this zone during the nesting season (or prior to nesting if observer notices behavior consistent with colony formation). This includes any major changes to hydrologic regime (*e.g.*, significant changes to water depth underneath and around the colony).

   2. During the non-nesting season, carry out construction activities in the least obtrusive manner as possible (*i.e.*, no unnecessary removal of vegetation, or any other unauthorized activity that would impact this zone.

B. Secondary Zone Restrictions

   1. Avoid intrusive construction activities during the nesting season (*i.e.*, blasting, pile driving, dumping, etc.).

   2. During the non-nesting season, continue with authorized construction activities.

The Corps has agreed to keep heavy machinery (*e.g.*, Vermeer trencher) out of the secondary zone south of Tamiami Trail until the end of nesting season. Since the roadway provides an acoustic barrier to the storks the contractor will be permitted to operate machinery in the secondary zone north of the road, as long as the noise produced by the machine does not rise above that of normal traffic as measured by approved Florida Department of Transportation methods. Additionally, a monitor should be present to observe any reaction by nesting wading birds within the defined colonies. The Service concurs with the Corps' determination, that should the guidelines above be followed, the proposed action "may affect, but is not likely to adversely affect" wood storks in the project area.

The Service has been made aware of other non-protected (State and or Federal) migratory birds nesting in the general area of construction. While we encourage due diligence in minimizing impacts to these nesters (*e.g.*, following guidelines set forth in the Corps environmental protection guidelines) the contractor is not required to suspend construction in the vicinity of these nests. The Service will not refer the incidental take of any migratory bird for prosecution under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. 703-712), if such take occurs while the contractor is in accordance with all guidelines and recommendations stated in this and all prior correspondence from the Service and Corps regarding this project.

Thank you for your cooperation and effort in protecting fish and wildlife resources. If you have any questions regarding this project, please contact Kevin Palmer at 772-562-3909, extension 280..

Sincerely yours,

Pamela Repp

for Paul Souza
Field Supervisor
South Florida Ecological Services Office

cc:
Corps, Jacksonville, Florida (Eric Summa, Susan Conner)
DEP, Tallahassee, Florida (Inger Hansen)
District, West Palm Beach, Florida (Paul Linton)
ENP, Homestead, Florida (Alicia Logalbo)
EPA, Jacksonville, Florida (Eric Hughes)
FWC, Vero Beach, Florida (Tim Towles, Marsha Ward)
Service, Jacksonville, Florida (Miles Meyer)

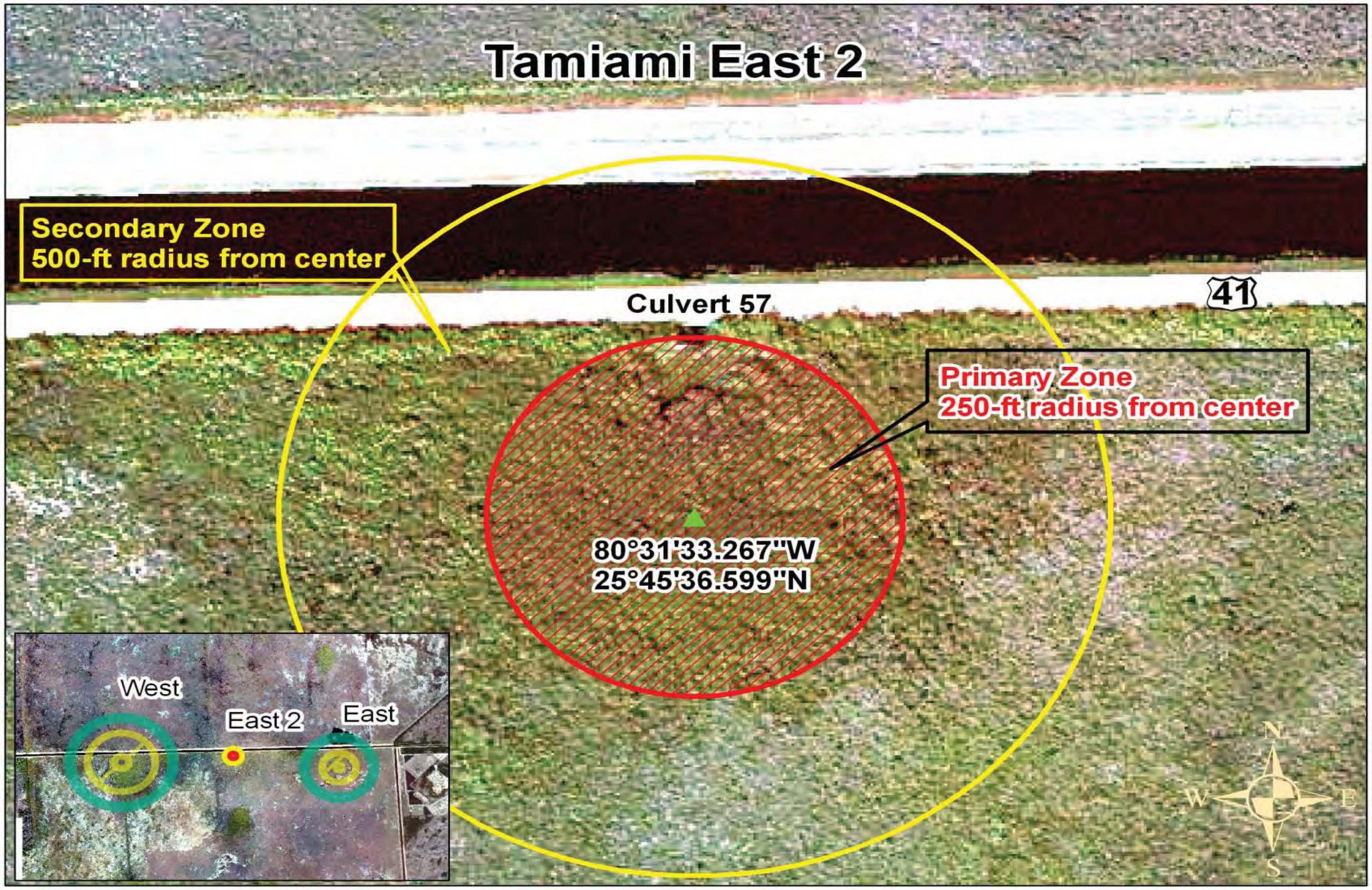


Figure 1. Aerial photograph depicting the center point, primary, and secondary zones of the Tamiami East 2 wood stork colony. The secondary zone perimeter (yellow line) intersects the Trail at 80°31'28.722"W 25°45'39.373"N on the east side and 80°31'37.91"W 25°45'39.407"N on the west side which equals 840 linear feet of construction area within this zone.

Miccosukee Tribe of Indians
of Florida

CHICKEECHOBEE

March 22, 2010

Superintendent Dan Kimball
Everglades National Park
40001 SR 9336
Homestead, FL 33034

Dear Superintendent Kimball:

The Miccosukee Tribe received the Preliminary Draft of the Tamiami Trail Modifications: Next Steps Draft Environmental Impact Statement. We were surprised to see that Mr. Fred Dayhoff was misquoted once again in this draft. This is the second time Mr. Dayhoff has been misquoted. The first time we thought this was a mistake. Now, we are beginning to believe that this is intentional to serve someone's agenda. The misquote is under Section 6.2.3 American Indian Tribes. In this section, third paragraph, Mr. Dayhoff is purported to have stated the Tribe did not have any concerns or cultural resources that would be adversely impacted in the Northeast Shark River Slough National Register Archaeological District. What Mr. Dayhoff did state at this meeting on December 11, 2009, is that the Tribe has no concerns or cultural resources within the ROW Footprint of the roadway, with the exception of the Tigertail Camp and the William McKinley and Alice Osceola Camp.

Every person with any knowledge of the Everglades knows that all islands in Everglades National Park and throughout the Everglades as a whole are of high importance to the Miccosukee Tribe. Every island was used by the Miccosukee people. Every island is of extreme interest to the Miccosukee Tribe. Mr. Dayhoff has been involved in archaeological investigations of the islands in Northeast Shark River Slough and knows full well the importance of these to the Miccosukee Tribe. Therefore, please correct the statement attributed to Mr. Dayhoff to reflect what he actually stated concerning the ROW roadway. Please also include a statement to the effect that all islands in Northeast Shark River Slough National Register Archaeological District are of extreme interest to the Miccosukee Tribe.

Thank you for your cooperation and prompt attention to our request.

Sincerely,

Steve Terry

Steve Terry
NAGPRA & Section 106 Coordinator for
Fred Dayhoff
NAGPRA & Section 106 Representative
Miccosukee Tribe

P.O. Box 440021, Tamiami Station, Miami, Florida 33144, (305) 223-8380, fax (305) 223-1011
Constitution Approved by the Secretary of the Interior, January 11, 1962

United States Department of the Interior
NATIONAL PARK SERVICE

Everglades and Dry Tortugas National Parks
40001 State Road 9336
Homestead, Florida 33034

In Reply Refer to:

Mr. Frederick Gaske
State Historic Preservation Officer
Florida Department of State
Division of Historical Resources
500 South Bronough Street
Tallahassee, Florida 32399-0250

Dear Mr. Gaske:

Enclosed is a copy of the *Everglades National Park, Tamiami Trail Modifications: Next Steps Draft Environmental Impact Statement* submitted for review and comment. This letter constitutes the NPS' request for SHPO review in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended, and 36 CFR Part 800, as amended.

The Omnibus Appropriations Act of 2009 (H.R. 1105; P.L. 111-008, March 11, 2009) directed the Department of the Interior and the National Park Service to evaluate the feasibility of additional bridging of the Tamiami Trail beyond that currently being constructed, pursuant to the Modified Water Deliveries to Everglades National Park Project (16 U.S.C. § 410r-S). The enclosed Draft Environmental Impact Statement (DEIS), prepared by Everglades National Park in technical collaboration with the U.S. Army Corps of Engineers, represents partial fulfillment of requirements of the Act. During the course of the preparation of the DEIS, the National Park Service worked with a Project Delivery Team consisting of other federal, state, local government representatives in the methodology as well as the subsequent evaluation of alternatives presented in the document. Representatives from the Miccosukee Tribe of Indians of Florida participated in these meetings and provided substantive comments.

The preferred plan identified in the DEIS would add 5.5 miles of bridging to the current 1-mile bridge under construction, increasing the total amount of bridge span within the 10.7-mile corridor to 6.5 miles. When coupled with other planned restoration projects, the additional bridging would provide for unconstrained flow to Northeast Shark River Slough, Everglades National Park. The increased water volumes and improved flow distributions will re-establish seasonal water depths and flooding durations that are critical to the survival of many fish and wildlife species, including the federally endangered Wood Stork, Everglades Snail Kite, and Cape Sable Seaside Sparrow, and state listed Roseate Spoonbill. Referred to as Alternative 6E, this plan would also enable the reconnection of Water Conservation Area 3 (WCA 3) to Everglades National Park, reducing the severity and duration of dry-down events in one compartment of this region (WCA 3B) and the prolonged deep-water conditions associated with loss of tree islands in another compartment (southern WCA 3A).

Applying the criteria of adverse effects found in 36 CFR 800.5, the Draft Environmental Impact Statement (DEIS) concludes that the preferred alternative would generally result in adverse effects on archaeological resources in the project footprint as a result of removal of sections of the existing Tamiami Trail road and likely impacts to two historic buildings at the Coopertown airboat facility. It is anticipated that the treatment of the adverse effects of the No-Action Alternative (2008 LRR that includes impacts to the trail), which involves development of an exhibit within the Shark Valley Interpretive Area of the Everglades National Park to publicly interpret the history of the Tamiami Trail and associated properties, would adequately mitigate the adverse effects of this project on the Tamiami Trail road. To mitigate for likely adverse impacts to the historic properties on the Coopertown facility, an exhibit on Coopertown and the history of Airboat tourism on the Tamiami Trail will be developed for the new South Florida Collections Management Center exhibit space to be located inside Everglades National Park.

Everglades National Park is committed to working closely with your office to prevent adverse effects on any archaeological resources. Impacts from proposed actions in this alternative would not result in impairment of archeological resources and there would be no adverse effect on ethnographic resources (see pages 334-336 of the draft plan for the supporting analyses and Section 106 conclusions). We request your concurrence with this determination and any other comments you may have.

The plan can also be viewed and commented upon at the NPS' Planning, Environment and Public Comment website, http://parkplanning.nps.gov. Should you have any questions, you may contact Bruce Boler at 305-224-4234 or at bruce_boler@nps.gov. Thank you for your assistance.

Please direct your response to the address at the top of this letter.

Sincerely,

Dan B. Kimball

Dan B. Kimball
Superintendent

United States Department of the Interior
NATIONAL PARK SERVICE

Everglades and Dry Tortugas National Parks
40001 State Road 9336
Homestead, Florida 33034

In Reply Refer to:

Ms. Lauren P. Milligan
Department of Environmental Protection
Florida State Clearinghouse
3900 Commonwealth Boulevard, M.S. 47
Tallahassee, Florida 32399-3000

Dear Ms. Milligan:

Enclosed are 10 copies of the *Everglades National Park, Tamiami Trail Modifications: Next Steps Draft Environmental Impact Statement* submitted for review and comment through the State Clearinghouse.

The Omnibus Appropriations Act of 2009 (H.R. 1105; P.L. 111-008, March 11, 2009) directed the Department of the Interior and the National Park Service to evaluate the feasibility of additional bridging of the Tamiami Trail beyond that currently being constructed, pursuant to the Modified Water Deliveries to Everglades National Park Project (16 U.S.C. § 410r-S). The enclosed Draft Environmental Impact Statement (DEIS), prepared by Everglades National Park in technical collaboration with the U.S. Army Corps of Engineers, represents partial fulfillment of requirements of the Act. During the course of the preparation of the DEIS, the National Park Service worked with a Project Delivery Team consisting of other federal, state, local government representatives in the methodology as well as the subsequent evaluation of alternatives presented in the document. Representatives from the Miccosukee Tribe of Indians of Florida also participated in these meetings and provided substantive comments.

The preferred plan identified in the DEIS would add 5.5 miles of bridging to the current 1-mile bridge under construction, increasing the total amount of bridge span within the 10.7-mile corridor to 6.5 miles. When coupled with other planned restoration projects, the additional bridging would provide for unconstrained flow to Northeast Shark River Slough, Everglades National Park. The increased water volumes and improved flow distributions will re-establish seasonal water depths and flooding durations that are critical to the survival of many fish and wildlife species, including the federally endangered Wood Stork, Everglades Snail Kite, and Cape Sable Seaside Sparrow, and state listed Roseate Spoonbill. Referred to as Alternative 6E, this plan would also enable the reconnection of Water Conservation Area 3 (WCA 3) to Everglades National Park, reducing the severity and duration of dry-down events in one compartment of this region (WCA 3B) and the prolonged deep-water conditions associated with loss of tree islands in another compartment (southern WCA 3A).

Please forward copies of this plan to all appropriate state and local agencies and send any comments to the address at the top of this letter by July 27, 2010. The plan can also be viewed and commented upon at the NPS' Planning, Environment and Public Comment website, http://parkplanning.nps.gov. Should you have any questions, you may contact Bruce Boler at 305-224-4234 or at bruce_boler@nps.gov. Thank you for your assistance.

Please direct your response to the address at the top of this letter.

Sincerely,

Dan B. Kimball
Superintendent

United States Department of the Interior
NATIONAL PARK SERVICE

Everglades and Dry Tortugas National Parks
40001 State Road 9336
Homestead, Florida 33034

In Reply Refer to:

The Honorable Colley Billie
Tribal Chairman
Miccosukee Tribe of Indians of Florida
P.O. Box 440021, Tamiami Station
Miami, Florida 33144

Dear Chairman Billie:

Enclosed is a copy of the *Everglades National Park, Tamiami Trail Modifications: Next Steps Draft Environmental Impact Statement* submitted for your review and comment.

The Omnibus Appropriations Act of 2009 (H.R. 1105; P.L. 111-008, March 11, 2009) directed the Department of the Interior and the National Park Service to evaluate the feasibility of additional bridging of the Tamiami Trail beyond that currently being constructed, pursuant to the Modified Water Deliveries to Everglades National Park Project (16 U.S.C. § 410r-S). The enclosed Draft Environmental Impact Statement (DEIS), prepared by Everglades National Park in technical collaboration with the U.S. Army Corps of Engineers, represents partial fulfillment of requirements of the Act. During the course of the preparation of the DEIS, the National Park Service worked with a Project Delivery Team consisting of federal, state, local government representatives in the methodology as well as the subsequent evaluation of alternatives presented in the document. Representatives from the Miccosukee Tribe of Indians of Florida also participated in these meetings and provided substantive comments.

The preferred plan identified in the DEIS would add 5.5 miles of bridging to the current 1-mile bridge under construction, increasing the total amount of bridge span within the 10.7-mile corridor to 6.5 miles. When coupled with other planned restoration projects, the additional bridging would provide for unconstrained flow to Northeast Shark River Slough, Everglades National Park. The increased water volumes and improved flow distributions will re-establish seasonal water depths and flooding durations that are critical to the survival of many fish and wildlife species, including the federally endangered Wood Stork, Everglades Snail Kite, and Cape Sable Seaside Sparrow, and state listed Roseate Spoonbill. Referred to as Alternative 6E, this plan would also enable the reconnection of Water Conservation Area 3 (WCA 3) to Everglades National Park, reducing the severity and duration of dry-down events in one compartment of this region (WCA 3B) and the prolonged deep-water conditions associated with loss of tree islands in another compartment (southern WCA 3A).

This letter constitutes the NPS’ request for continued consultation on this plan with the Miccosukee Tribe.

Please feel free to contact us at any time to schedule meetings to discuss the *Everglades National Park, Tamiami Trail Modifications: Next Steps Draft Environmental Impact Statement*, or if you prefer, provide your comments to the address at the top of this letter by July 27, 2010. The plan can also be viewed and commented upon at the NPS' Planning, Environment and Public Comment website, http://parkplanning.nps.gov. Should you have any questions, you may contact Bruce Boler at 305-224-4234 or at bruce_boler@nps.gov. Thank you for your assistance.

Please direct your response to the address at the top of this letter.

Sincerely,

Dan B. Kimball
Superintendent

United States Department of the Interior
NATIONAL PARK SERVICE

Everglades and Dry Tortugas National Parks
40001 State Road 9336
Homestead, Florida 33034

In Reply Refer to:

Dear Friends and Neighbors of Everglades National Park:

I am excited to announce the publication of the *Everglades National Park, Tamiami Trail Modifications: Next Steps Draft Environmental Impact Statement*. It is the culmination of a great deal of time, effort, energy, and input from members of the public; the National Park Service; American Indian Tribes; and other federal, state, and local agencies. Please review this document and let us know what you like about the plan as well as what you feel can be improved.

The Omnibus Appropriations Act of 2009 (H.R. 1105; P.L. 111-008, March 11, 2009) directed the Department of the Interior and the National Park Service to evaluate the feasibility of additional bridging of the Tamiami Trail beyond that currently being constructed, pursuant to the Modified Water Deliveries to Everglades National Park Project (16 U.S.C. § 410r-S). The enclosed Draft Environmental Impact Statement (DEIS), prepared by Everglades National Park in technical collaboration with the U.S. Army Corps of Engineers, represents partial fulfillment of requirements of the Act. During the course of the preparation of the DEIS, the National Park Service worked with a Project Delivery Team consisting of other federal, state, local government representatives in the methodology as well as the subsequent evaluation of alternatives presented in the document. Representatives from the Miccosukee Tribe of Indians of Florida also participated in these meetings and provided substantive comments.

The preferred plan identified in the DEIS would add 5.5 miles of bridging to the current 1-mile bridge under construction, increasing the total amount of bridge span within the 10.7-mile corridor to 6.5 miles. When coupled with other planned restoration projects, the additional bridging would provide for unconstrained flow to Northeast Shark River Slough, Everglades National Park. The increased water volumes and improved flow distributions will re-establish seasonal water depths and flooding durations that are critical to the survival of many fish and wildlife species, including the federally endangered Wood Stork, Everglades Snail Kite, and Cape Sable Seaside Sparrow, and state listed Roseate Spoonbill. Referred to as Alternative 6E, this plan would also enable the reconnection of Water Conservation Area 3 (WCA 3) to Everglades National Park, reducing the severity and duration of dry-down events in one compartment of this region (WCA 3B) and the prolonged deep-water conditions associated with loss of tree islands in another compartment (southern WCA 3A).

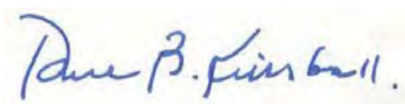
With this letter, we are asking you to tell us what you think about the preferred plan. This DEIS will be available for public review and comment through July 27th. We strongly encourage you to submit your comments online at the NPS Planning, Environment, and Public Comment (PEPC) website located at: http://parkplanning.nps.gov. Select "Everglades National Park" from the drop down box and follow the links for the Tamiami Trail Modifications: Next Steps Project/EIS. You may also submit written comments via conventional mail to:

Everglades National Park
Attn: Bruce Boler
950 North Krome Avenue, 3rd Floor
Homestead, FL 33030

You may also wish to attend the public meeting to be held on June 24, 2010 at the South Dade Regional Library, Cutler Bay, Florida. The meeting will take place from 6:00 to 9:00 pm in the 1st Floor Conference Room and will include a formal public hearing to take public comment on the DEIS. Figures and maps of the alternatives are included in the plan and will be available for review.

A thorough public review of the alternatives and their potential effects is crucial to finalizing the DEIS, and I encourage you to comment and/or attend the public meeting on June 24, 2010. My staff and I are committed to developing a final plan that substantially improves ecological conditions in Everglades National Park and Water Conservation Area 3, while maintaining access to the many important Tribal areas and private facilities located along the Tamiami Trail. We look forward to hearing your thoughts and opinions.

Sincerely,



Dan B. Kimball
Superintendent

United States Department of the Interior
NATIONAL PARK SERVICE

Everglades and Dry Tortugas National Parks
40001 State Road 9336
Homestead, Florida 33034

In Reply Refer to:

Mr. Paul Souza, Field Supervisor
South Florida Ecological Services Office
U.S. Fish and Wildlife Service
1339 20th Street
Vero Beach, Florida 32960

Dear Mr. Souza:

Enclosed is a copy of the *Everglades National Park, Tamiami Trail Modifications: Next Steps Draft Environmental Impact Statement* submitted for your review and comment.

The Omnibus Appropriations Act of 2009 (H.R. 1105; P.L. 111-008, March 11, 2009) directed the Department of the Interior and the National Park Service to evaluate the feasibility of additional bridging of the Tamiami Trail beyond that currently being constructed, pursuant to the Modified Water Deliveries to Everglades National Park Project (16 U.S.C. § 410r-S). The enclosed Draft Environmental Impact Statement (DEIS), prepared by Everglades National Park in technical collaboration with the U.S. Army Corps of Engineers, represents partial fulfillment of requirements of the Act. During the course of the preparation of the DEIS, the National Park Service worked with a Project Delivery Team consisting of other federal, state, and local government representatives on the methodology as well as the subsequent evaluation of alternatives presented in the document. Representatives from the Miccosukee Tribe of Indians of Florida also participated in these meetings and provided substantive comments.

The preferred plan identified in the DEIS would add 5.5 miles of bridging to the current 1-mile bridge under construction, increasing the total amount of bridge span within the 10.7-mile corridor to 6.5 miles. When coupled with other planned restoration projects, the additional bridging would provide for unconstrained flow to Northeast Shark River Slough, Everglades National Park. The increased water volumes and improved flow distributions will re-establish seasonal water depths and flooding durations that are critical to the survival of many fish and wildlife species, including the federally endangered Wood Stork, Everglades Snail Kite, and Cape Sable Seaside Sparrow, and state listed Roseate Spoonbill. Referred to as Alternative 6E, this plan would also enable the reconnection of Water Conservation Area 3 (WCA 3) to Everglades National Park, reducing the severity and duration of dry-down events in one compartment of this region (WCA 3B) and the prolonged deep-water conditions associated with loss of tree islands in another compartment (southern WCA 3A).

Enclosed with this letter is the completed Interagency Section 7 Biological Evaluation form used by your office. As documented in the enclosed form, the Environmental Impact Statement (EIS) concludes that the preferred alternative may affect, not likely to adversely affect the Florida panther (*Puma concolor coryi)*, West Indian manatee (*Trichechus manatus)*, Everglades snail kite (*Rostrhamus sociabilis plumbeus)*, Eastern Indigo snake (*Drymarchon coaris couperi*), and Cape Sable seaside sparrow (*Ammodramus maritimus mirabilis)*. It may adversely affect the wood stork (*Mycteria americana*). The supporting analysis and ESA determinations of effect can be found on pages 4-25 to 4-33 of the draft EIS plan.

This letter constitutes the NPS' request for informal consultation in accordance with Section 7 of the Endangered Species Act of 1973, as amended. We request your concurrence with this determination and any other comments you may have.

The plan can also be viewed and commented upon at the NPS' Planning, Environment and Public Comment website, http://parkplanning.nps.gov. Should you have any questions, you may contact Bruce Boler at 305-224-4234 or at bruce_boler@nps.gov. Thank you for your assistance.

Please direct your response to the address at the top of this letter.

Sincerely,

Dan B. Kimball
Superintendent

United States Department of the Interior
NATIONAL PARK SERVICE

Everglades and Dry Tortugas National Parks
40001 State Road 9336
Homestead, Florida 33034

In Reply Refer to:

The Honorable Mitchell Cypress
Tribal Chairman
Seminole Tribe of Florida
6300 Stirling Road
Hollywood, Florida 33024

Dear Chairman Cypress:

Enclosed is a copy of the *Everglades National Park, Tamiami Trail Modifications: Next Steps Draft Environmental Impact Statement* submitted for your review and comment.

The Omnibus Appropriations Act of 2009 (H.R. 1105; P.L. 111-008, March 11, 2009) directed the Department of the Interior and the National Park Service to evaluate the feasibility of additional bridging of the Tamiami Trail beyond that currently being constructed, pursuant to the Modified Water Deliveries to Everglades National Park Project (16 U.S.C. § 410r-S). The enclosed Draft Environmental Impact Statement (DEIS), prepared by Everglades National Park in technical collaboration with the U.S. Army Corps of Engineers, represents partial fulfillment of requirements of the Act. During the course of the preparation of the DEIS, the National Park Service worked with a Project Delivery Team consisting of federal, state, and local government representatives in the methodology as well as the subsequent evaluation of alternatives presented in the document. Representatives from the Miccosukee Tribe of Indians of Florida also participated in these meetings and provided substantive comments.

The preferred plan identified in the DEIS would add 5.5 miles of bridging to the current 1-mile bridge under construction, increasing the total amount of bridge span within the 10.7-mile corridor to 6.5 miles. When coupled with other planned restoration projects, the additional bridging would provide for unconstrained flow to Northeast Shark River Slough, Everglades National Park. The increased water volumes and improved flow distributions will re-establish seasonal water depths and flooding durations that are critical to the survival of many fish and wildlife species, including the federally endangered Wood Stork, Everglades Snail Kite, and Cape Sable Seaside Sparrow, and state listed Roseate Spoonbill. Referred to as Alternative 6E, this plan would also enable the reconnection of Water Conservation Area 3 (WCA 3) to Everglades National Park, reducing the severity and duration of dry-down events in one compartment of this region (WCA 3B) and the prolonged deep-water conditions associated with loss of tree islands in another compartment (southern WCA 3A).

This letter constitutes the NPS' request for continued consultation on this Plan with the Seminole Tribe.

Please feel free to contact us at any time to schedule meetings to discuss the *Everglades National Park, Tamiami Trail Modifications: Next Steps Draft Environmental Impact Statement*, or if you prefer, provide your comments to the address at the top of this letter by July 27, 2010. The plan can also be viewed and commented upon at the NPS' Planning, Environment and Public Comment website, http://parkplanning.nps.gov. Should you have any questions, you may contact Bruce Boler at 305-224-4234 or at bruce_boler@nps.gov. Thank you for your assistance.

Please direct your response to the address at the top of this letter.

Sincerely,

Dan B. Kimball

Dan B. Kimball
Superintendent

FLORIDA DEPARTMENT OF STATE
Kurt S. Browning
Secretary of State
DIVISION OF HISTORICAL RESOURCES

Ms. Melissa Memory
Everglades & Dry Tortugas National Parks
40001 State Road 9336
Homestead, FL 33034

April 21, 2010

Re: **Memorandum of Agreement**
Between the Department among Everglades National Park, National Park Service; and the Florida State Historic Preservation Officer Pursuant to 36 CFR Part 800.6(a) – For the Mitigation of Certain Adverse Effects to Cultural Resources by the Tamiami Trail Modifications: Next Steps Project, Everglades National Park, Dade County, Florida

DHR/SHPO Project File No.: 2010-1074

Dear Ms. Memory:

In accordance with the procedures contained in 36 CFR Part 800, this office reviewed the referenced Memorandum of Agreement (two original copies) and signed each signature page. We are returning with this letter one original Agreement signed by the Florida State Historic Preservation Officer (SHPO). As directed, this office is retaining one original signed Agreement in our files.

Please be sure to remember to forward a copy of the Agreement and any necessary explanatory documentation to the Advisory Council on Historic Preservation, Washington, D.C. If this office can assist with this effort in any other way, please do not hesitate to contact this office at (850) 245-6333.

Sincerely,

Laura A. Kammerer

Laura A. Kammerer
Deputy State Historic Preservation Officer
For Review and Compliance

Enclosure

MEMORANDUM OF AGREEMENT AMONG EVERGLADES NATIONAL PARK, NATIONAL PARK SERVICE; and THE FLORIDA STATE HISTORIC PRESERVATION OFFICER PURSUANT TO 36 C.F.R.PART 800.6(a)

FOR THE MITIGATION OF CERTAIN ADVERSE EFFECTS TO CULTURAL RESOURCES BY THE TAMIAMI TRAIL MODIFICATIONS:NEXT STEPS PROJECT, EVERGLADES NATIONAL PARK, DADE COUNTY, FLORIDA.

WHEREAS, Everglades National Park as pursuant to 36 CFR Part 800, regulations implementing Section 106 of the National Historic Preservation Act [16 U.S.C. Section 470(f)], in consultation with the Florida State Historic Preservation Officer (FLSHPO), has conducted a survey of the Tamiami Trail Modification Modified Water Deliveries (MWD) Project; with subsequent documentation and assessments of effects done as part of the Tamiami Trail Modifications: Next Steps Project and

WHEREAS, the modifications to the Tamami Trail roadway (Alternative 6e) consist of 5.5 miles of bridges and elevating the remaining roadway, the shift of the Tamiami Trail right-of-way to the south as described in the Tamiami Trail Modifications: Next Steps report;. The bridge configurations are located between mile (?) and mile (?) (see Attachment A); and

WHEREAS, Everglades National identified two historic properties which are eligible for the National Register of Historic Places: 8DA6765 (Tamiami Trail, a historic roadway), and 8DA6767 (Coopertown, a historic structure and Everglades tourist destination) in the area to be affected by the Tamiami Trail Modifications: Next Steps Project Alternative 3.2.2.a (see ATTACHMENT B); and

WHEREAS, a portion of historical properties 8DA6765 (Tamiami Trail), and 8DA6767 (Coopertown) cannot be avoided and will be adversely affected by the construction of Tamiami Trail Modification: Next Steps Project.

NOW, THEREFORE, Everglades National Park and the FLSHPO agree that the undertaking shall be implemented in accordance with the following stipulations in order to mitigate the adverse effects on cultural resources properties: 8DA6765 (Tamiami Trail), and 8DA6767 (Coopertown) .

Stipulations

Everglades National Park, National Park Service (ENP) will ensure that the following are carried out:

1. Adverse effects to historical property 8DA6765 (Tamiami Trail) cannot be avoided. Pursuant to the *MEMORANDUM OF AGREEMENT AMONG*

THE U.S. ARMY CORPS OF ENGINEERS, JACKSONVILLE DISTRICT; EVERGLADES NATIONAL PARK, NATIONAL PARK SERVICE; and THE FLORIDA STATE HISTORIC PRESERVATION OFFICER PURSUANT TO 36 C.F.R.PART 800.6(a) FOR THE MITIGATION OF CERTAIN ADVERSE EFFECTS TO CULTURAL RESOURCES BY THE MODIFIED WATER DELIVERIES, EVERGLADES NATIONAL PARK, TAMIAMI TRAIL FEATURE (Tamiami Trail Modification MWD) PROJECT, DADE COUNTY, FLORIDA {July 3, 2008], an interpretive display will be developed by ENP and consist of a park or kiosk at a location within the existing Shark Valley Interpretive Area. The display shall contain, but not be limited to: a history of the historical properties and structures associated with 8DA6765 (Tamiami Trail); it shall contain original maps and diagrams of the historic properties, a photographic documentation to include both original (such as are available) and current photographs. No further mitigations for 8DA6765 (Tamiami Trail) are required for adverse effects proposed in the Tamiami Trail Modification: Next Steps Project.

2. Adverse effects to the historic structure at 8DA6565 (Coopertown) cannot be avoided. In order to mitigate adverse effects, an exhibit on Coopertown and the history of Airboat tourism on the Tamiami Trail will be developed for the new South Florida Collections Management Center exhibit space, to be located inside of ENP, which is currently in its initial planning stage. The exhibit will be designed by the National Park Service in consultation with the FLSHPO. If the new museum facility is not complete prior to completion of the Tamiami Trail Modifications: Next Steps Project, documentation and design of the exhibit will be completed.

3. If during the construction work of the Tamiami Trail Modification:Next Steps Project, there are unanticipated finds, the FLSHPO will be notified to assess the significance of the discovery and devise appropriate actions pursuant to 36 CFR Part 800.13. Based on the circumstances of the discovery, equity to all parties, and considerations of the public interest, work in the immediate area of the find will be suspended while the discovery is investigated in accordance with 36 CFR Part 800.

4. Human remains are not anticipated to be recovered from this project. In the unlikely event that human remains on State Controlled property are inadvertently discovered, they will be treated in accordance with 872.05(5) *Florida.Statutes*. If human remains are found on Federal Land within ENP, the Native American Graves Protection and Repatriation Act (NAGPRA) would apply within the boundaries of the Park. Procedures for complying with NAGPRA would follow the Draft 5/01/2008 Park NAGPRA Plan of Action for Inadvertent Discoveries, ENP and

Associated Tribes. If subsequent versions of this document are revised in consultation with the Tribes, the most current version will be used.

Administrative Conditions

1. Dispute Resolution – Should any signatory to this MOA object at any time to any actions proposed or the manner in which the terms of this MOA are implemented, the ENP shall consult with such party to resolve the objection. If the ENP determines that such objection cannot be resolved, the ENP will:

   a. Forward all documentation relevant to the dispute, including the ENP proposed resolution to the Advisory Council on Historic Preservation (Council). The Council shall provide the ENP with its advice on the resolution of the objection within thirty (30) days of receiving adequate documentation. Prior to reaching a final decision on the dispute, ENP shall prepare a written response that takes into account any timely advice or comments regarding the dispute from the Council and/or signatory and provide them with a copy of this written response. The ENP will then proceed according to its final decision.

   b. If the Council does not provide its advice regarding the dispute within the thirty (30) day time period, ENP may make a final decision on the dispute and proceed accordingly. Prior to reaching such a final decision, ENP shall prepare a written response that takes into account any timely comments regarding the dispute from the signatory to the MOA, and provide them and the Council with a copy of such written response.

   c. The ENP responsibilities to carry out all other actions subject to the terms of this MOA that are not the subject of the dispute remain unchanged.

2. Amendments – This MOA may be amended when such an amendment is agreed to in writing by all signatories. The amendment will be effective on the date a copy signed by all of the signatories is filed with the Council.

3. Termination – If ENP determines that terms of the Agreement cannot be implemented, unless the signatories agree in writing to an extension for carrying out its terms; or the FLSHPO determines that the Agreement is not properly implemented, ENP or the FLSHPO may propose that it be terminated. The signatory proposing to terminate this Agreement will so notify the other signatories to this Agreement, explaining the reason(s) for termination and affording them at least thirty (30) calendar days to consult and seek alternatives to termination. Should such consultation fail and the

Agreement be terminated, ENP will consult in accordance with 36 CFR Section 800.6(c)7 to develop a new Agreement.

If the terms of this Agreement have not been implemented by 31 March 2013 this Agreement shall be considered null and void. In such event, the ENP shall notify the parties to this Agreement and if it chooses to continue with the Undertaking, shall re-initiate review of the Undertaking in accordance with 36 CFR Part 800.

EXECUTION OF THIS MEMORANDUM OF AGREEMENT by the Florida State Historic Preservation Officer and National Park Service, Everglades National Park and the implementation of its terms, evidence that the effects of the undertaking on historic properties has been taken into account and mitigated so that the undertaking may proceed.

AGREED TO BY:

EVERGLADES NATIONAL PARK, NATIONAL PARK SERVICE

Signature: Dan B. Kimball Date: 4/12/2010

Dan B. Kimball
Superintendent

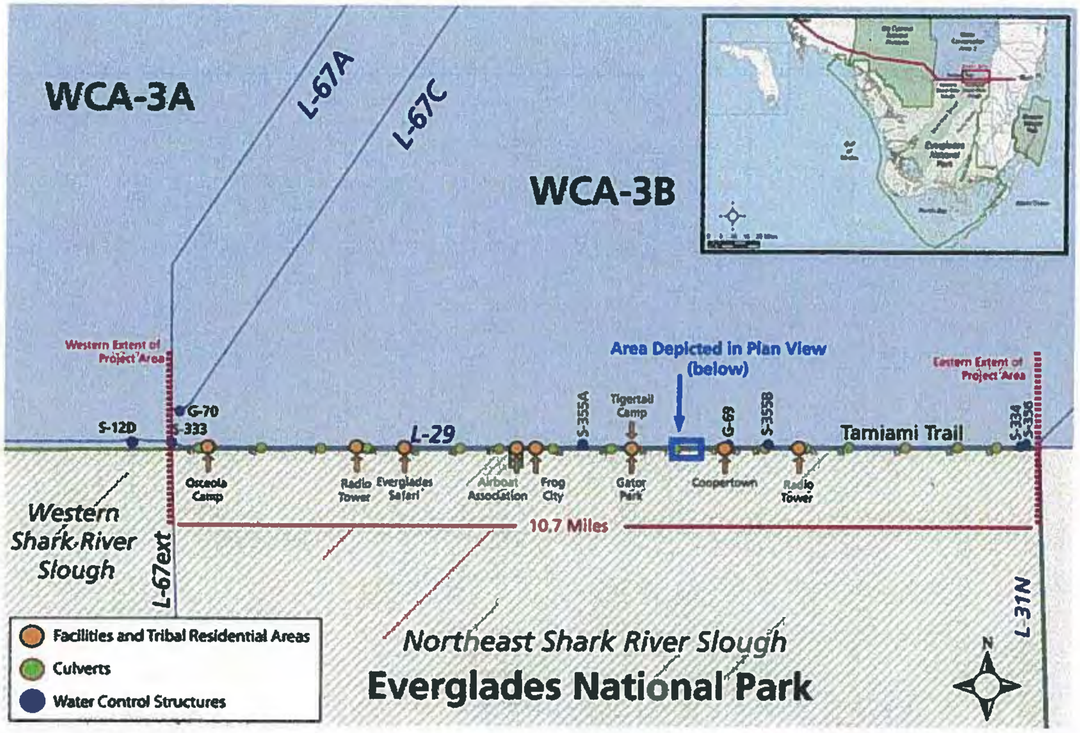
FLORIDA STATE HISTORIC PRESERVATION OFFICER

Signature: Date: 4/19/2010

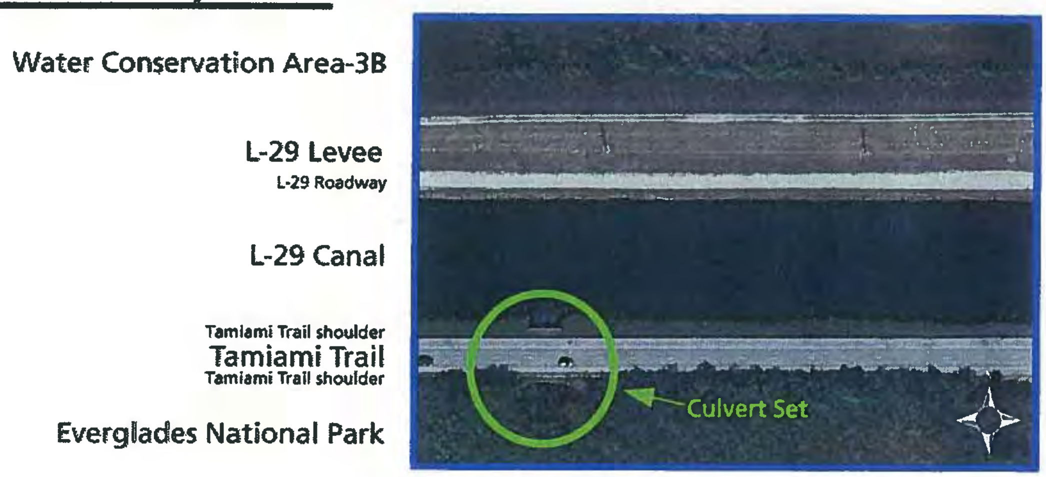
Scott M. Stroh III
Florida State Historic Preservation Officer

ATTACHMENT A

Project Area



Plan View of Project Area



INTERAGENCY SECTION 7 BIOLOGICAL EVALUATION

Originating Person: Bruce Boler
Telephone Number: 305-224-4234 **E-Mail:** bruce_boler@nps.gov
Date: May 11, 2010

PROJECT NAME: *Everglades National Park, Tamiami Trail Modifications: Next Steps Draft Environmental Impact Statement*

I. Agency Program:

___ Ecological Services
___ Federal Aid
___ Clean Vessel Act
___ Coastal Wetlands
___ Endangered Species Section 6
___ Partners for Fish and Wildlife
___ Sport Fish Restoration
___ Wildlife Restoration
___ Fisheries
_X_ National Park Service

II. State/Agency: National Park Service (NPS)

III. Station Name: Everglades National Park (ENP)

IV. Description of Proposed Action (attach additional pages as needed):

The Omnibus Appropriations Act of 2009 (H.R. 1105; P.L. 111-008, March 11, 2009) directed the Department of the Interior and the National Park Service to evaluate the feasibility of additional bridging of the Tamiami Trail beyond that currently being constructed, pursuant to the Modified Water Deliveries to Everglades National Park Project (16 U.S.C. § 410r-S). The enclosed Draft Environmental Impact Statement (DEIS), prepared by ENP in technical collaboration with the U.S. Army Corps of Engineers, represents partial fulfillment of requirements of the Act. During the course of the preparation of the DEIS, the National Park Service worked with a Project Delivery Team consisting of other federal, state, and local government representatives on the methodology as well as the subsequent evaluation of alternatives presented in the document. Representatives from the Miccosukee Tribe of Indians of Florida also participated in these meetings and provided substantive comments.

The preferred plan (Alternative 6E) identified in the DEIS would add approximately 5.5 miles of bridging to the current one mile bridge under construction, increasing the total amount of bridge span within the 10.7-mile Tamiami Trail corridor between the L-67 Extension and the S-334 structure to approximately 6.5 miles. When coupled with other planned restoration projects, the additional bridging would provide the infrastructure necessary to allow for unconstrained flows to Northeast Shark River Slough, ENP. The increased water volumes and improved flow distributions will re-establish hydropatterns and hydroperiods that are critical to the survival of many native fish and wildlife species, including the federally endangered wood stork, Everglade snail kite, and Cape Sable Seaside sparrow and their associated habitats. Referred to as Alternative 6E, this plan would also enable the reconnection of Water Conservation Area 3 (WCA 3) to ENP, reducing the severity and duration of dry-down events in one compartment of this region (WCA 3B) and the prolonged deep-water conditions associated with loss of tree islands in another compartment (southern WCA 3A).

V. Pertinent Species and Habitat:

A. Include species/habitat occurrence map: Six federally-listed animal species have the potential to occur in the vicinity of the project area. These species, and their status, are outlined in the table below.

Federally-Listed Threatened and Endangered Species with Potential to Occur in the Tamiami Trail Project Area

Common Name	Scientific Name	Federal Status	Designated Critical Habitat in Park
Mammals			
Florida panther	*Puma concolor coryi*	endangered	No federally designated critical habitat
West Indian manatee	*Trichechus manatus*	endangered	Portions of ENP are within federally designated critical habitat. The Alternative 6E construction footprint is not within designated critical habitat.
Reptiles			
Everglade snail kite	*Rostrhamus sociabilis plumbeus*	endangered	Portions of ENP are within designated critical habitat. The Alternative 6E construction footprint is not within designated critical habitat.
eastern indigo snake	*Drymarchon corais couperi*	threatened	No federally designated critical habitat.
Birds			
Cape Sable seaside sparrow	*Ammodramus maritimus mirabilis*	endangered	Portions of ENP are within federally designated critical habitat. The Alternative 6E construction footprint is not within designated critical habitat.
wood stork	*Mycteria americana*	endangered	No federally designated critical habitat.

Florida Panther

The Florida panther was listed as endangered under the ESA in 1967. The Florida panther is a large, pale brown or buff cat with white underparts and tail tip. Mature males weigh between 100 to 150 pounds and would reach 7 feet from nose to tip of tail. Females are smaller – from 50 to 100 pounds and up to approximately six feet in length. They subsist on mammalian prey consisting of white-tailed deer, wild hogs, and raccoon and, in some areas, small game. The Florida panther primarily utilizes upper dry land habitats such as hardwood hammocks, pine flatwoods, and thicket swamps near wetlands. Although panthers do not prefer deepwater marsh habitat, they will cross waterways if necessary to locate food and drier land. A panther's home range covers 20 to over 450 square miles, with a historic range from eastern Texas through the southeastern states. The only known self-sustaining population occurs in South Florida, generally within the Big Cypress Swamp region. It is estimated that approximately 100 individuals of this subspecies remain in the wild population in South Florida (USFWS, 2008).

Per the US Fish and Wildlife Service (USFWS) *Florida Panther Recovery Plan, Third Revision* (2008):

> *Three priority zones were identified as important for panther habitat conservation: (1) Primary Zone – lands essential to the long-term viability and persistence of the panther in the wild; (2) Secondary Zone - lands contiguous with the Primary Zone, currently used by few panthers, but which could accommodate expansion of the panther population south of the Caloosahatchee River; and (3) Dispersal Zone - the area which may facilitate future panther expansion north of the Caloosahatchee River (Kautz et al, 2006). The Primary Zone is currently occupied and supports the breeding population of panthers. Although panthers move through the Secondary and Dispersal Zones, they are not currently occupied by resident panthers. Some areas of the Secondary Zone would require restoration to support panthers. These zones vary in size, ownership, and land cover composition.*
>
> *The Primary Zone is 3,548 mi^2 (9,189 km^2) in size, 73% of which is publicly owned, and includes portions of the [Big Cypress National Preserve], ENP, Fakahatchee Strand Preserve State Park, [Florida Panther National Wildlife Refuge], Okaloacoochee Slough State Forest, and Picayune Strand State Forest. This zone's composition is 45% forest, 41% freshwater marsh, 7.6% agriculture lands, 2.6% prairie and shrub lands, and 0.52% urban lands. The Secondary Zone is 1,269 mi^2 (3,287 km^2) in size, 38% of which is public land. This zone's composition is 43% freshwater marsh, 36% agriculture, 11% forest, 6.1% prairie and shrub lands, and 2.3% low-density residential areas and open urban lands. The Dispersal Zone is 44 mi^2 (113 km^2) in size, all of which is privately owned. This zone's composition is 49% agriculture (primarily improved pasture and citrus groves), 29% forest (wetland and upland), 8.8% prairie and shrub land, 7.5% freshwater marsh, and 5.1% barren and urban lands (Kautz et al. 2006).*

Refer to ***Figure 1*** depicts the Primary, Secondary, and Dispersal zones for the Florida Panther, as designated by the USFWS.

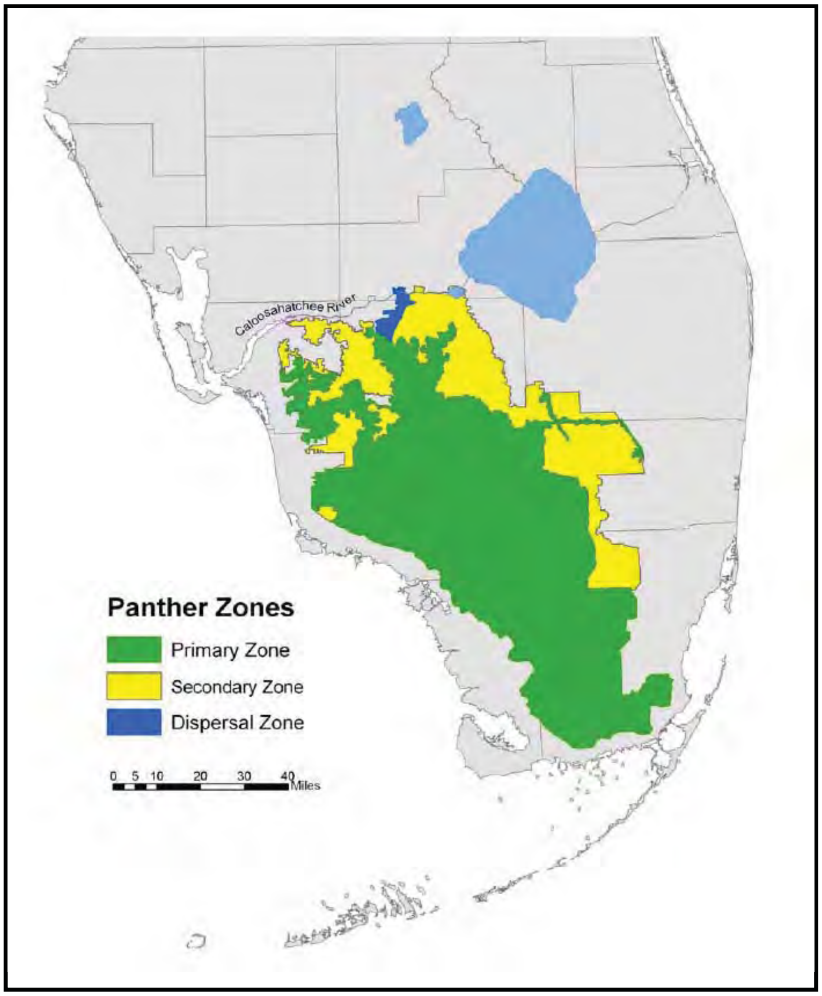


Figure 1. USFWS Designated Florida Panther Priority Habitat Zones (Kautz et al., 2006)

The USFWS also developed Standard Local Operating Procedures for Endangered Species (SLOPES) for the Florida panther (April 18, 2000). According to the SLOPES, the USFWS designated a Panther Consultation Area in South Florida that extends from Monroe and Miami-Dade Counties north to Charlotte and Glades Counties, including portions of Collier, Broward, Palm Beach, Lee, and Hendry Counties. Within the designated Panther Consultation Area (PCA) are Panther Preservation Areas (PPA) ranked as Priority 1 and 2. Also included are areas otherwise designated as Conservation Lands, such as national preserves (Big Cypress), national parks (ENP), state parks (Collier-Seminole), South Florida Water Management District Water Conservations Areas (WCA-1, -2, -3), etc. Throughout the occupied range of the panther, the ENP population represents at least 11 percent of the panther population known to the USFWS. According to radio collar telemetry data, two panthers in ENP have been documented crossing the Shark River Slough into Big Cypress National Preserve; however, no Florida panther activity has been recorded in the project area in the past six years. ***Figure 2*** illustrates panther radio collar telemetry data points collected between 1981 and 2009 in relation to the project area.

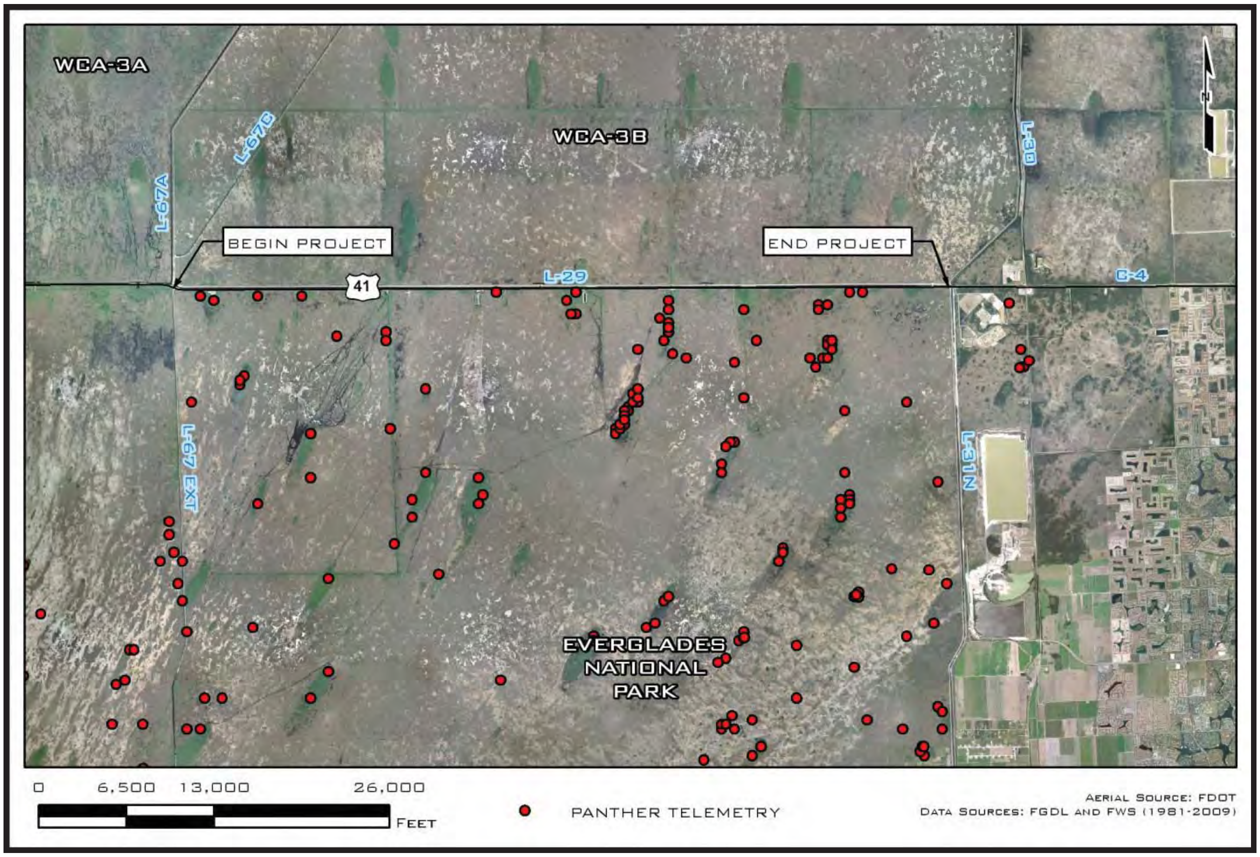


Figure 2. Florida Panther Radio Collar Telemetry Data Points

West Indian Manatee

The West Indian manatee, listed as endangered under the ESA, is a fully aquatic herbivorous mammal. Manatees have large, seal-shaped bodies with paired flippers and a round, paddle-shaped tail. They are typically grey in color (color can range from black to light brown) and occasionally spotted with barnacles or colored by patches of green or red algae. The muzzle is heavily whiskered and coarse, single hairs are sparsely distributed throughout the body. Adult manatees, on average, are about nine feet long (3 meters) and weigh about 1,000 pounds (200 kilograms). At birth, calves are between three and four feet long (1 meter) and weigh between 40 and 60 pounds (30 kilograms). The West Indian manatee is typically found in coastal or estuarine waters, bays, rivers, and lakes, but may be found in inland canals during winter months. Manatees are grazers and require sheltered coves for feeding, resting, and calving. The manatee occurs in ENP's marine and estuarine systems and spends approximately five hours a day feeding. Submerged aquatic vegetation, such as seagrasses, is a major component of the manatee's diet, and although manatees appear to tolerate marine and hypersaline conditions, they are most frequently found in fresh or brackish waters. Changes in freshwater flow on salinity patterns, submerged vegetation, and the overall quality of the foraging habitat in Florida Bay and elsewhere in the Park are, along with water temperature, important influences on the distribution and abundance of manatees in the area. Increases in salinity are generally considered to result in less favorable conditions for manatees, although manatees move freely through a wide range of salinities. Manatees may or may not need freshwater to survive, but are frequently reported drinking freshwater from natural sources as well as hoses, sewage outfalls, and culverts in marine and estuarine areas. For the period of record of over 20 years, there has been only one record of a manatee utilizing the L-29 Canal adjacent to Tamiami Trail.

Everglade snail kite

The Everglade snail kite, listed as endangered under the ESA in 1967, is a medium-sized hawk with a wingspan of approximately 45 inches. The adult males are slate gray with black head and wing tips, a white patch at the base of a square tail, and red legs. The female has a buff-colored body, heavily streaked with dark lines, a white line above the eye, a white tail patch, yellow legs, and red eyes. Immature snail kites resemble the females, only they are darker in color and their eyes are brown. Their beaks are slender and hooked. Snail kites require long hydroperiod wetlands that remain inundated throughout the year. This preference is associated with the freshwater apple snail (*Pomacea paludosa*), its primary food source. Suitable habitats for the snail kite include freshwater marsh and shallow vegetated lake margins where apple snails can be found. Preferred nesting habitat includes small trees and shrubs such as pond apple, willow, bald cypress, pond cypress, sweet bay, dahoon holly, southern bayberry, and elderberry. During dry periods when suitable shrubs and trees experience dry conditions, herbaceous species such as sawgrass, cattail, bulrush, and common reed are used for nest sites. Critical habitat for the snail kite was designated in 1977 and includes WCA-1, -2, and -3A, and portions of ENP, as well as Lake Okeechobee shorelines and portions of the St. Johns marsh.

Since the mid-1990s, the geographic range of the snail kite has been reduced to the Everglades, Lake Okeechobee, Loxahatchee Slough, the Kissimmee River, and the Upper St. Johns River watersheds (Cattau et al, 2008). During 1992-2001 the majority of successful snail kite reproduction occurred in WCA-3A (Cattau et al, 2009). However, no snail kites were fledged out of WCA-3A in 2001, 2005, 2007, or 2008; only two snail kites from the same nest fledged out of WCA-3A in 2009 (Cattau et al, 2009). During 1985 – 1995 Lake Okeechobee once provided a productive breeding site for snail kite nesting but this area no longer constitutes productive breeding grounds (Cattau et al, 2009). Since the loss of the productive snail kite breeding grounds in Lake Okeechobee and WCA-3A, the majority of the snail kite nesting has most recently occurred in the Kissimmee Chain of Lakes, namely Lake Tohopekaligo (Toho); this area accounted for the majority of the successful nesting attempts from 2005-2009 (Cattau et al, 2009).

Reproductive declines throughout the geographic range of the snail kite have been attributed to natural disturbances such as droughts, anthropogenic water management practices, and long-term habitat degradation. Another contributing factor linked to the lack of successful nesting and fledgling success is the aging snail kite population that is known to be less reproductively viable and less capable of responding to poor environmental conditions such as drought (Cattau et al, 2009). The spread of the exotic apple snail may also limit juvenile snail kite survival and contribute to overall population declines (Cattau et al, 2009). Snail kite recovery is thought to be dependent upon maintaining hydrologic conditions that support nesting and foraging conditions and provide suitable conditions for its primary prey, the native apple snail. The long-term recovery of this species will be dependent on reducing habitat fragmentation, and improving environmental and ultimately habitat conditions throughout the remaining range of its habitat from the Kissimmee Chain of Lakes to ENP.

The USFWS drafted management guidelines for the snail kite in 2006. According to the USFWS, snail kite nesting does not occur randomly within wetland systems. Instead, there are generally areas within wetlands, where snail kite nesting is concentrated. The density of kite nests, frequency of nesting within each area, and the sizes of these “priority snail kite nesting areas” are highly variable, but identifying these areas may help to focus management actions. In most years, the majority of kite nesting will occur within these areas, though new nesting areas may become active. In most years, the majority of the snail kite nesting is anticipated to occur within the priority management zones, though new nesting areas may become active.”

The breeding season can vary from year to year depending on rainfall and water levels. Breeding attempts can occur from December through July, with most initiated between January and June. The USFWS *Draft Snail Kite Management Guidelines* (2006) dictate that nest protection buffers be established around every active snail kite nest. These buffer zones will be in effect from when kites begin nest building through the time when breeding activity is no longer observed at the site. Because kites can renest, and often renest in the same area as previous attempts, buffer zones may remain in place past the time when fledglings leave the area if adult kites continue to show breeding activity, including courtship, in the general area (USFWS, 2006).

- No-entry Buffer Zone - A 500-foot (~150 meter) radius no-entry buffer zone will be established around all active nests that are discovered. The purpose of this buffer zone is to protect kites from direct disturbance that may affect the fate of nesting (USFWS, 2006).
- Limited Activity Buffer Zone - A 1,640-foot (500 meter) radius limited-activity buffer zone will be established around all active kite nests. This buffer zone is intended to maintain and protect foraging opportunities and habitat conditions around each nest to allow the nest to succeed. The goal is to maintain habitat conditions for the entire nesting period similar to those that were present when the birds selected the site (USFWS, 2006).

Figure 3 depicts snail kite nesting locations (based on the 1996-2008 Kitchens et al dataset) and protection zones in relation to the proposed project area.

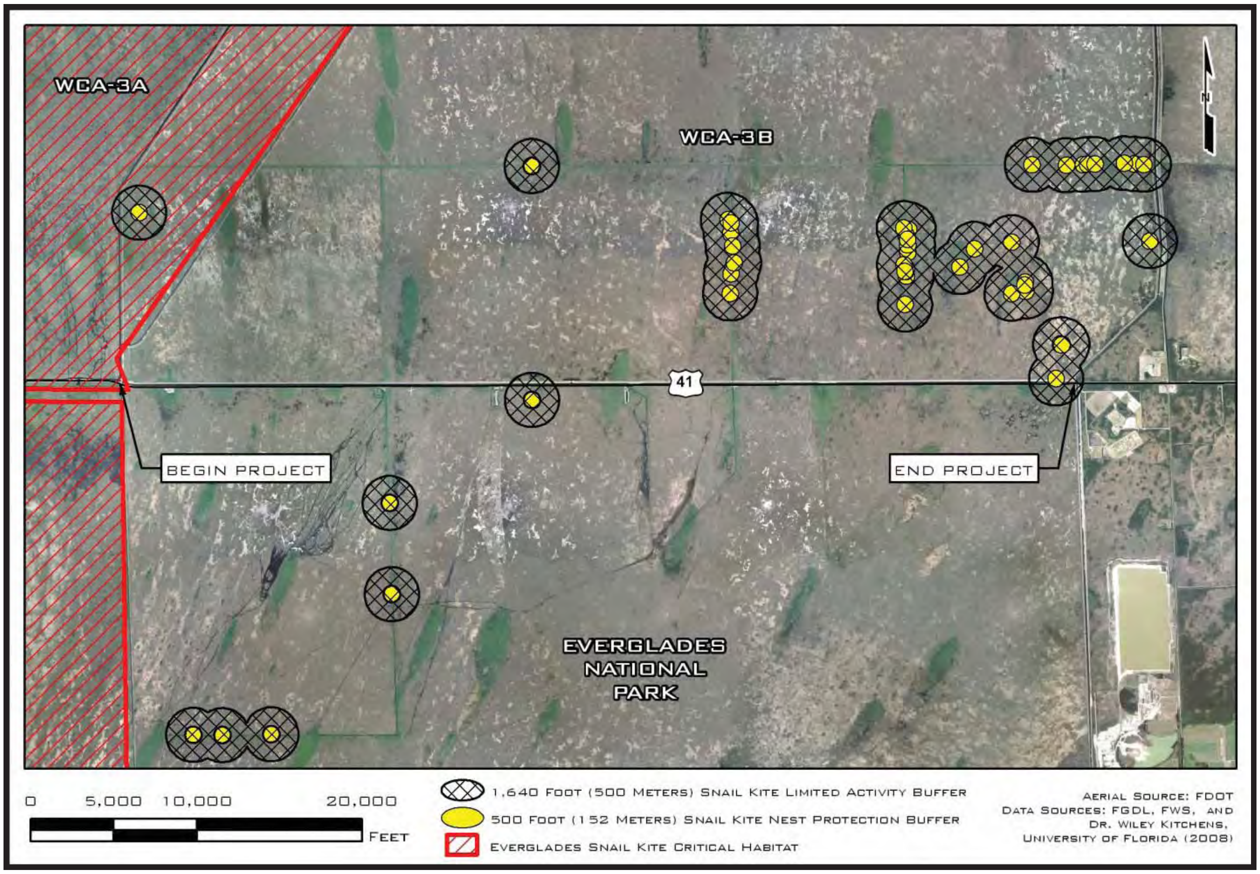


Figure 3. Snail Kite Nesting Locations and Management Zones

<u>Eastern indigo snake</u>

The Eastern Indigo snake is a large, non-poisonous snake that may reach up to eight feet in length. The snake gets its name from its shiny, blue-black color. Its diet consists mainly of other snakes, amphibians, small mammals, and occasionally birds and sea turtles. This species occurs throughout Florida and along the coastal plain of Georgia. The eastern indigo snake is found in a variety of habitats and would readily utilize disturbed areas and populated residential areas; however, their preferred habitat is dry pineland bordered by water. The project area consists of large expanses of wetland, which are not particularly attractive as habitat to this snake. The decline in populations is attributed to loss of habitat to agriculture, and also collecting for the pet trade. The species has also suffered from mortality during gassing of gopher tortoise burrows for rattlesnake collection. Little is known about the specific habits and niche of the Eastern indigo snake in the Park. This species is generally found in and near hardwood hammocks, and has shown no preference for disturbed sites. Eastern indigo snake protection measures have also established by the USFWS for all construction activities.

<u>Cape Sable seaside sparrow</u>

The Cape Sable seaside sparrow (CSSS) is one of eight extant subspecies of seaside sparrow in North America. Its distribution is limited to the short-hydroperiod wetlands on the southern tip of mainland Florida. In the 1930s, Cape Sable was the only known breeding range for the sparrow. Areas on Cape Sable that were occupied by CSSS in the 1930s have experienced a shift in vegetative communities from freshwater vegetation to mangroves, bare mud flats, and salt-tolerant plants such as *Batis maritima* and *Borrichia frutescens*. The hurricane of 1935 is believed to have initiated the succession of the plant community on Cape Sable from one dominated by freshwater plants to one dominated by salt tolerant plants. Sea level rise, reduced freshwater flows to the area resulting from upstream water management practices, and effects of a hurricane in 1960 were also likely factors in this habitat change. As a result, the CSSS no longer uses this area. The currently preferred nesting habitat of the CSSS appears to be a mixed marl prairie community that often includes muhly grass. These short-hydroperiod, mixed marl prairies contain moderately dense, clumped grasses with open space permitting ground movements by the sparrow. Sparrows tend to avoid tall, dense, sawgrass-dominated communities, spikerush marshes, extensive cattail monocultures, long hydroperiod wetlands with tall, dense vegetative cover, and sites supporting woody vegetation. The suitability of short-hydroperiod, mixed marl prairie communities for the sparrow is driven by a combination of hydroperiod and periodic fires. Fires prevent hardwood species from invading these communities and prevent the accretion of dead plant material, both of which decrease the suitability of habitat for CSSSs. In the Taylor Slough area, sparrow numbers increased annually in areas that had been burned up to three years previously.

The CSSS was first provided protection when it was listed on March 11, 1967, under the Endangered Species Preservation Act of 1967 (32 Federal Register 4001). That protection was continued under the Endangered Species Conservation Act of 1969. The sparrow and all other species listed under the Endangered Species Conservation Act were the first species protected under the Act of 1973, as amended. The CSSS inhabits six distinct subpopulations called A, B, C, D, E, and F. Critical habitat for this species was designated on August 11, 1977 (42 FR 42840). Currently, the critical habitat includes areas of land, water, and airspace in the Taylor Slough, vicinity of Collier, Miami-Dade, and Monroe Counties. Much of this area is within the boundaries of ENP. Because this was one of the first critical habitat designations under the Act, there were no primary constituent elements defined. The designated area encompasses about 197,260 acres (79,828 hectares), and includes portions of subpopulations B through F.

The CSSS Subpopulation A is the only area occupied by sparrows that does not have associated designated critical habitat. This subpopulation flanks the area west of Shark River Slough and is in the direct path of discharge from WCA-3A through the S-12 discharges. Water levels within the subpopulation are also thought to be affected by discharges from upstream water management operations including water stages within WCA-3A. This subpopulation, once estimated to be the largest subpopulation besides Subpopulation B, is thought to provide a critical role to the overall survival of the species. The CSSS Subpopulation A drastically declined approximately 84% from an estimated 2,608 birds in 1992 to only 432 birds in 1993 (Pimm et al, 2002). To prevent extirpation of the remaining CSSS Subpopulation A, the USFWS issued a biological opinion (BO) providing recommendations to the USACE on how to control water levels in nesting habitat. The USACE responded by developing changes in water management operations that are still currently in effect. The goals are to keep subpopulations (particularly Subpopulation A) dry during a portion of the breeding season and to keep habitat for the subpopulations B, C, D, E, and F from excessive drying to prevent unnatural fire frequencies. The decline of Subpopulation A has been attributed to upstream water management practices and a recent analysis by ENP scientists indicated that this decline cannot be attributed solely to rainfall increases (Kotun presentation, 2009 CSSS Symposium, 2009). Survey and nesting monitoring within Subpopulation A indicate this is an extant, functional subpopulation but that no significant recovery of the subpopulation has occurred since the massive crash in 1993 (Virzi et al, 2009). In 2009, only 19 breeding pairs were detected in Subpopulation A. The 2009 survey revealed few unmated males in Subpopulation A, and no significant differences in clutch sizes, adult return rates, or proportion of early to late nesters as compared to the largest and most stable subpopulation, Subpopulation B (Virzi et al, 2009).

Wood stork

The wood stork is a large, long-legged wading bird with adult wingspans sometimes exceeding 60 inches. It has white plumage and a short, black tail. Their bill is black, thick at the base, and curved. Their U.S. range consists of parts of Florida, Georgia, and South Carolina. Wood stork forage mainly in shallow water in freshwater marshes, swamps, lagoons, ponds, tidal creeks, flooded pastures and ditches, where they are attracted to falling water levels that concentrate food sources (mainly fish). Wood storks use thermal drafts for soaring, and may travel 80 miles from nest to feeding areas. These birds eat small fish and probe with their bills for their food in shallow water no more than about 10 inches deep. Highly social, these birds nest in large rookeries and feed in flocks. They are long-lived and first breed at approximately three to four years old. In South Florida, nesting occurs as early as October, with young leaving the nest in February or March. The decline in wood stork populations is attributed mostly to loss of habitat by destruction of wetlands and control of the flows that originally created the Everglades. To minimize adverse effects to the wood stork due to any loss of wetlands, the USFWS recommends that any lost foraging habitat resulting from the project be replaced within the Core Foraging Area (CFA) which is an approximate average radius of 18.6 miles from the colony.

Overall nesting colony trends in ENP have indicated an increasing population size of wood storks since 1985 with peak nesting years occurring in 1994, 2000, 2007, and 2009 (SFWBR 2009). Year 2009 was marked a banner year for wood stork production in south Florida, with the largest nesting success since the predrainage period (SFWBR 2009). There were an estimated 6,452 wood stork nests in south Florida in 2009, constituting a 203% increase over the last decade (SFWBR 2009). The lack of dry season rainfall and reversals likely allowed for the optimal foraging conditions during 2009 that lead to such a successful breeding season (SFWBR, 2009).

Three wood stork colonies have previously formed south of the Tamiami Trail called Tamiami West, Tamiami East 2, and Tamiami East 1 (***Figure 4).*** These colonies are located in pond apple habitats that create a visual barrier between the rookeries and Tamiami Trail and the storks appear to have become somewhat acclimated to highway traffic noise.

The USFWS, using the Draft Habitat Management Guidelines for the Wood Stork in the Southeastern United States (2006) and based on recent photography during nesting season, have identified the primary and secondary management zones for the Tamiami Trail wood stork colonies. Figure 3-32 depicts the Tamiami West and the Tamiami East 1 colonies and their USFWS-designated primary and secondary management zone delineations. These zones are designed to protect stork nesting activities and behaviors and place restrictions on certain human activities during the stork nesting season. The following general guidelines apply to the wood stork management zones:

- **Primary/Secondary Zone:** From February (or onset of nesting activity) through the onset of the rainy season (or when the young have fledged), construction *(*e.g., heavy human/equipment activity, pile driving, blasting) shall not be permitted in the reach of the highway affected by that alternative while wood storks are actively nesting.
- **Primary/Secondary Zones:** No unauthorized human activity (on foot, airboat, or off-road vehicle) should occur at any time of the year within the reach of highway

affected by that alternative on the south side of the highway and particularly during the nesting season.

- **Length of Restrictions:** These restrictions shall remain in effect during the construction phase of implementation of the Alternative 6E bridging project.
- **Qualified Observer:** Subject to the approval of the USFWS and ENP, a qualified observer(s) shall be stationed onsite during the construction phase of the Tamiami Trail project. The observer shall monitor wood stork activity and shall notify USFWS, Florida Fish and Wildlife Commission (FFWCC) and ENP if wood stork behavior is affected such that roosting, nest building, breeding, nesting, and/or fledging of young is disrupted or otherwise interfered with.

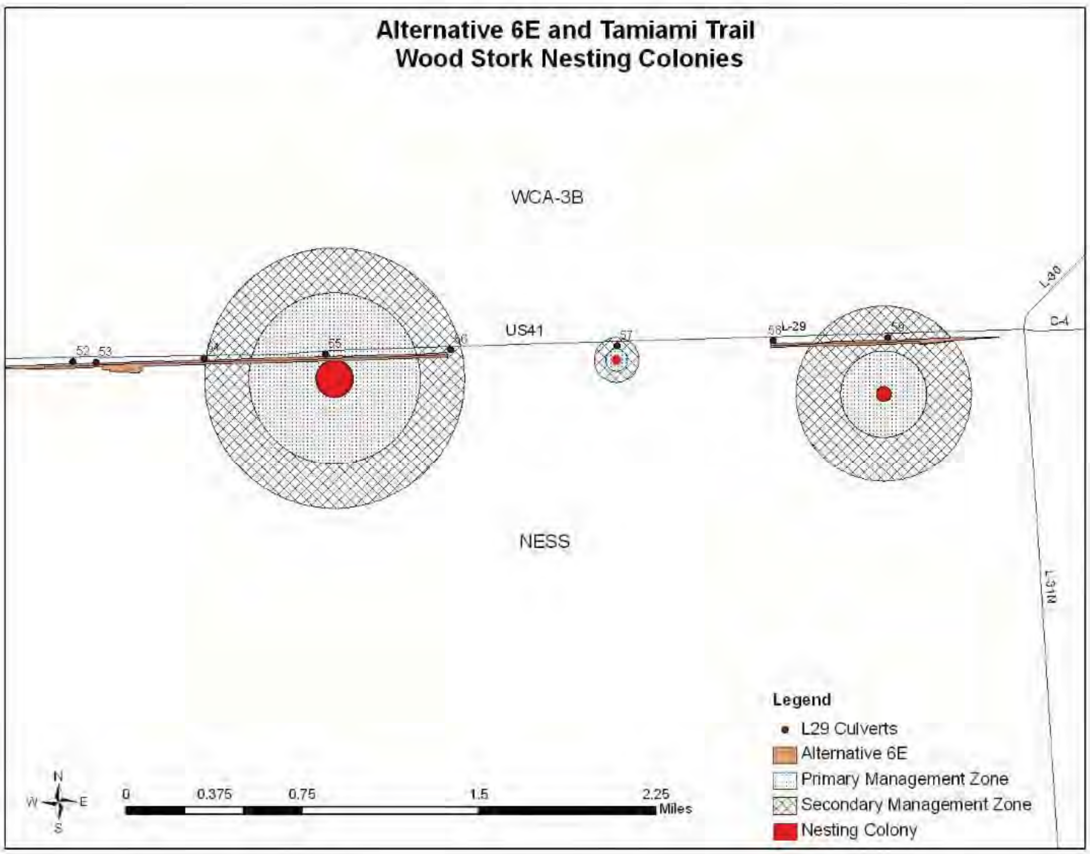


Figure 4. Tamiami West, Tamiami East 2, and Tamiami East 1 wood stork colonies and management zones along the Alternative 6E Project Corridor

If new information becomes available concerning the wood stork colonies, the NPS, USFWS and FFWCC should immediately contact each other to determine what modifications, if any, are warranted.

The table below includes the status of those federally listed species that may be affected by the project.

B. SPECIES/CRITICAL HABITAT

Common Name	Scientific Name	Federal Status	Designated Critical Habitat in Park
Mammals			
Florida panther	*Puma concolor coryi*	Endangered	No federally designated critical habitat
West Indian manatee	*Trichechus manatus*	Endangered	Portions of ENP are within federally designated critical habitat. The Alternative 6E construction footprint is not within designated critical habitat.
Reptiles			
Everglade snail kite	*Rostrhamus sociabilis plumbeus*	Endangered	Portions of ENP are within designated critical habitat. The Alternative 6E construction footprint is not within designated critical habitat.
eastern indigo snake	*Drymarchon corais couperi*	Threatened	No federally designated critical habitat.
Birds			
Cape Sable seaside sparrow	*Ammodramus maritimus mirabilis*	Endangered	Portions of ENP are within designated critical habitat. The Alternative 6E construction footprint is not within designated critical habitat.
wood stork	*Mycteria americana*	Endangered	No federally designated critical habitat

(NPS, 2010)

VI. Location:

A. Ecoregion Number and Name: 53, South Florida

B. County and State: Miami-Dade County, Florida

C. Section All **Township** 49-53 **Range** 29-34

D. Distance (miles) and direction to nearest town: 15 miles west of Miami and 17 miles northwest of Homestead, Florida.

D. Species/habitat occurrence: (see narrative and maps in Section V)

VII. Determination of Effects:

A. **A. Explanation of effects of the action on species and critical habitats in item V.** ***B.***

Effect Determinations for Federally-Listed Species

Species	Effect Determination	Reason
Florida panther	May affect, not likely to adversely affect	Project is not within the preferred habitat of the panther. Beneficial effects anticipated from project include improved ecological and hydrological connectivity. Potential reduction in panther vehicle collisions along the Tamiami Trail from project implementation.
West Indian manatee	May affect, not likely to adversely affect	No manatees expected in the project area since there have been no manatees observed in the project area for 20 years. No work will be performed in the L-29 Canal where a manatee has previously been sighted. Mitigation will include implementation of the UFWS *Standard manatee conditions for in-water work*.
Everglade snail kite	May affect, not likely to adversely affect	Species is anticipated to occur in the project area. However, there are no recorded nesting sites within the project construction footprint and there will be no impacts to designated critical habitat. Mitigation measures will include monitoring of nesting activities and implementation of the USFWS *Draft snail kite management guidelines.*
eastern indigo snake	May affect, not likely to adversely affect	No recorded sightings within project area. Not the preferred habitat for the eastern indigo snake. Mitigation will include implementation of the USFWS *Standard protective measures for the eastern indigo snake*.
Cape Sable seaside sparrow	May affect, not likely to adversely affect	The species is not anticipated to occur in the project area and critical habitat is not located within the project footprint. Nearest anticipated nesting site is approximately 10 miles south of project area.
wood stork	May affect, likely to adversely affect	Implementation of Alternative 6E will result in loss of nesting colony, primary management zone, and secondary management wood stork habitat within the Tamiami West and Tamiami East 1 colonies as summarized in the table below. Temporary habitat losses are those that result from the construction phase of the project. Wherever feasible, mitigation measures will include implementation of USFWS *Habitat management guidelines for the wood stork in the southeast region*. Alternative 6E, in association with a suitable operational plan, will provide beneficial effects to the overall wood stork population due to improved hydroperiods and hydropatterns within Shark River Slough and flanking short-hydroperiod wetlands. Beneficial project effects are anticipated from improved potential ecological and hydrological connectivity between WCA 3 and ENP.

Please review the Draft EIS, pages 3-79 to 3-83 of the draft plan for a more-detailed list of mitigative measures for the proposed action.

Estimated Habitat Impacts to Wood Stork Tamiami Trail Colonies from Implementation of Alternative 6E

colony	temporary nesting colony impacts (acres)	permanent nesting colony impacts (acres)	temporary primary manageme nt zone impacts (acres)	permanent primary manageme nt zone impacts (acres)	temporary secondary manageme nt zone impacts (acres)	permanent secondary manageme nt zone impacts (acres)
Tamiami West	0.04	0.00	4.25	3.80	1.94	1.69
Tamiami East 1	0.00	0.00	0.00	0.00	2.99	3.81
Tamiami East 2	0	0	0	0	0	0

VIII. Draft Effect Determination and Response Requested:

SPECIES/ CRITICAL HABITAT	DETERMINATION[1]			RESPONSE[1] REQUESTED
	NE	NA	AA	
Florida panther		X		Concurrence
West Indian manatee		X		Concurrence
wood stork			X	Concurrence
Cape Sable seaside sparrow		X		Concurrence
Everglade snail kite		X		Concurrence
eastern indigo snake		X		Concurrence

[1]DETERMINATION/ RESPONSE REQUESTED:

NE = no effect/no adverse modification.
NA = may affect not likely to adversely affect.
AA = may affect likely to adversely affect.

________________________________ ________________
Signature (originating station) **Date**

____
Title

FLORIDA DEPARTMENT OF STATE
Dawn K. Roberts
Interim Secretary of State
DIVISION OF HISTORICAL RESOURCES

Ms. Lauren Milligan
Director, Florida State Clearinghouse
Florida Department of Environmental Protection
3900 Commonwealth Boulevard, Mail Station 47
Tallahassee, Florida 32399-3000

July 15,2010

RECEIVED
JUL 16 2010
DEP Office of
Intergovt'l Programs

RE: DHR Project File Number: 2010-3248
SAI #: FL201006025273C
National Park Service
Draft Environmental Impact Statement, Tamiami Trail Modification: Next Steps
Everglades National Park, Miami-Dade County

Dear Ms. Milligan:

This office reviewed the referenced project for possible impact to historic properties listed, or eligible for listing, in the *National Register of Historic Places.* The review was conducted in accordance with Section 106 of the *National Historic Preservation Act of 1966*, as amended, *36 CFR Part 800: Protection of Historic Properties* and the *National Environmental Policy Act of 1969,* as amended.

Based on the information provided, this office concurs with the finding of the National Park Service's determination that the proposed undertaking will have an adverse effect on historic properties. Therefore, procedures relating to 36 CFR Part 800.6 must be followed. Part 800.6(a) *Continue consultation,* states that the agency official (National Park Service) "*shall consult with the SHPO/THPO and other consulting parties to develop and evaluate alternatives or modifications to the undertaking that could avoid, minimize, or mitigate adverse effects on historic properties.*" If the adverse effect cannot be avoided then Part 800.6(b) *Resolve adverse effect* must be followed. 800.6(b) states "*If the agency official and the SHPO/THPO agree on how the adverse effects will be resolved, they shall execute a memorandum of agreement.*"

If you have any questions concerning our comments, please contact Scott Edwards, Historic Preservationist, by electronic mail *sedwards@dos.state.fl.us*, or at 850-245-6333 or 800-847-7278.

Sincerely,

Laura A. Kammerer

Laura A. Kammerer
Deputy State Historic Preservation Officer
For Review and Compliance

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4
SAM NUNN
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA GEORGIA 30303-8960

July 19, 2010

Bruce Boler
Tamiami Trail EIS Project Manager
Everglades National Park
950 N. Krome Avenue
Homestead, Florida 33034

SUBJECT: Draft Environmental Impact Statement for the Tamiami Trail Modifications: Next Steps Project in Everglades National Park, Florida; CEQ Number 20100196

Dear Mr. Boler:

The U.S. Environmental Protection Agency (EPA) has reviewed the referenced Draft Environmental Impact Statement (EIS) in accordance with its responsibilities under Section 309 of the Clean Air Act and Section 102(2)(C) of the National Environmental Policy Act. The project purpose was developed as part of the 2009 Omnibus Appropriations Act which directed the National Park Service (NPS) to evaluate the feasibility of additional bridge length, including a continuous bridge or additional bridges or some combination thereof, for the Tamiami Trail (U.S. Highway 41) to restore more natural water flow to Everglades National Park (ENP) and Florida Bay in south Florida. The project will assist in restoring habitat within ENP and ecological connectivity between ENP and the Water Conservation Areas north of Tamiami Trail.

Six alternatives, including the no action alternative, were developed as approaches to improve Tamiami Trail in this corridor and increase hydrologic flow into ENP. All alternatives include bridge construction and reconstruction of the remaining highway, with differences being the lengths and locations of the bridges or prefabricated culverts. Alternative 6e, which is the maximum bridging alternative and includes 5.5 miles of bridges and the remaining highway raised to an elevation of 12.3 feet, was identified as the preferred alternative. The typical roadway section will consist of two 12-foot wide travel lanes, 5-foot paved shoulders on each side of the roadway, and 6.5-foot grassed shoulders along the outside of the paved shoulders. Access facilities, such as ramps to the bridges or elevated roadway, would be provided for existing businesses/access points. Staging areas for construction equipment and materials may be located at business sites along the corridor. This project would generate a large quantity of material excavated from the road bed that could be disposed or recycled for use in other area projects.

EPA recognizes the importance of removing obstacles to flow at Tamiami Trail and supports the NPS in the implementation of this project. This issue has become a critical component in all Everglades restoration planning for the future. Successful ecological restoration of the Everglades system hinges on substantial modifications to Tamiami Trail, as proposed in this project and the preferred alternative in particular. It is important to note that all action alternatives will have a long-term, beneficial effect on hydrology based on their capacity to convey flows and relative low velocities. The preferred alternative provides the most bridging of all alternatives and consequently would provide for the highest restoration of floodplain values and functions compared to the other alternatives. In addition, all action alternatives would result in an increase in ecological connectivity in ENP. The ability for wildlife to move between habitat components is crucial for maintaining wildlife population health and diversity. Tamiami Trail has long represented a barrier to wildlife movement to the north and south, and the construction of bridges would provide much improved access for a number of species.

However, the project is certainly not without impacts. All action alternatives will have short-term, adverse, minor localized effects on a number of resource categories during road reconstruction. Excavation of the project area and other construction-related disturbance activities would cause temporary impacts to water quality in Northeast Shark River Slough, such as increased total phosphorus, total suspended solids, and turbidity in the surface water in all of the bridging alternatives. Implementation of the preferred alternative would result in unavoidable temporary and permanent direct impacts to approximately 102 acres of jurisdictional wetlands. Therefore, EPA offers the following comments for consideration in the development of the Final EIS for this project.

The Draft EIS has a thorough review of the setting and context related to climate change/sea level rise in the project area and does a good job of analyzing the potential for climate change impacts in each of the impact categories. However, there does not appear to be any discussion of the extent to which the current proposed design of Tamiami Trail will conform to the predictions of sea level rise in the foreseeable future discussed in the document. EPA recommends that the Final EIS include a discussion of sea level rise and adaptation of the preferred alternative in the context of the proposed modifications.

At present an operational plan for manipulation of water levels in the L-29 Canal is being developed; however, since it has not been completed, it is not reviewed in the Draft EIS. Full realization of project benefits is dependent upon an operational plan that utilizes the structural capacity of the preferred alternative. Potential benefits that would occur once an operational plan is defined and executed include enhancement of degraded wetland habitats within the Northeast Shark River Slough system. The Draft EIS suggests that implementation of the preferred alternative in conjunction with a new operational plan would mitigate for itself, meaning that permanent and temporary wetland impacts associated with the construction of the proposed project would be offset by the enhancement to wetlands attributed to changed operations. However, long-term effects to wetlands resulting from operations remain unknown, since an operational plan has not yet been developed for the project alternatives.

Since there is uncertainty as to the level of wetland improvements that would be achieved with the operation of the project, EPA recommends that the Final EIS discuss the timing of development of the operations plan. The Final EIS should also discuss an adaptive management strategy that would address appropriate mitigation responsibilities should anticipated project benefits not adequately offset the project's impacts to wetland value and functions. An off-site mitigation plan should be implemented. Potential off-site mitigation scenarios may include purchase of mitigation bank credits at Hole-in-the-Donut Mitigation Bank or performing mitigation elsewhere on ENP property.

A number of specific resource protection measures, as well as a comprehensive monitoring and evaluation program, are proposed to be implemented during and after construction. Construction procedures would include the use of best management practices to contain disturbed sediments and reduce water quality impacts. These practices would include employment of staked silt fences and turbidity barriers. The turbidity barriers would be employed in canals and deep water sites prior to commencement of construction at a sufficient distance from the work zone. Anticipated monitoring during construction would include water quality monitoring and monitoring for protected wildlife species. A turbidity monitoring plan would be implemented during construction to ensure continued compliance with state water quality criteria. If monitoring reveals that turbidity levels exceed the standards, construction activities would be immediately halted and would not resume until corrective actions are employed. Anticipated long-term monitoring/maintenance would include roadway/bridge monitoring for maintenance activities conducted by FDOT.

Because the project is located in an Outstanding Florida Water (OFW) which has restrictive water quality requirements including no degradation of water quality above ambient levels, EPA strongly recommends implementation of all mitigation measures described above and in the Draft EIS. All turbidity barriers should remain in place and be inspected daily throughout the construction phase of the project. After construction, temporarily disturbed areas should be restored to pre-existing conditions (e.g. regraded, soil uncompacted, etc) in upland areas and wetlands allowed to reestablish naturally. The Draft EIS does not identify any mitigation measures related to post-construction stormwater management associated with the roadway. To further assist in the long-term reduction of pollutant loadings to surface water resources in the project area, EPA recommends that all stormwater runoff from the proposed roadway be collected and treated before being discharged to surface waters. Drainage from bridges and elevated sections should be diverted and discharged to upland areas, as much as possible, to assist in attenuation of stormwater pollution. Given the large quantity of material excavated from the road bed, EPA also strongly recommends recycling as much material as possible for use in other area projects. All measures should be clearly identified in the Final EIS.

EPA rates this document and the preferred alternative – LO (Lack of Objections). We support the need for additional downstream flows to ENP, and this project is an important step to restore natural hydrologic conditions in ENP. We also strongly agree with the need for a robust monitoring and evaluation program to determine the potential for any adverse impacts from the project. We appreciate the opportunity to review the proposed action. Please contact Ben West of my staff at (404) 562-9643 if you have any questions or want to discuss our comments further.

Sincerely,

Heinz J. Mueller, Chief
NEPA Program Office
Office of Policy and Management

Memorandum

TO: Florida State Clearinghouse

THROUGH: Ernie Marks, Administrator
Restoration Planning and Permitting Program

FROM: Inger Hansen, Annet Forkink, John Outland, Katie Hallas, Lisa Galocy

DATE: July 19, 2010

SUBJECT: National Park Service – Draft Environmental Impact Statement, Tamiami Trail Modifications: Next Steps Project
SAI #: FL10-5273C

BACKGROUND:

The Draft Environmental Impact Statement for the Tamiami Trail Modifications: Next Steps Project came about as a result of the 2009 Omnibus Appropriations Act, which directed the National Park Service "to immediately evaluate the feasibility of additional bridge length, beyond that to be constructed pursuant to the Modified Water Deliveries to Everglades National Park (ENP) Project (16 U.S.C. §§ 410R-S), including a continuous bridge, or additional bridges or some combination thereof, for the Tamiami Trail (U.S. Highway 41) to restore a more natural water flow to ENP and Florida Bay and for the purpose of restoring habitat within the Park and the ecological connectivity between the Park and the Water Conservation Areas."

The study area consists of a 10.7-mile stretch of Tamiami Trail adjacent to the northern edge of ENP. Alternative 6e is identified as the environmentally preferred alternative which provides for four bridges totaling 5.5 miles along the corridor with the remaining highway raised to an elevation of 12.3 feet. The bridges will be constructed 50 feet south of the centerline of the existing roadway and down ramps will be used to maintain access to Everglades Safari and Coopertown.

COMMENTS:

- Impacts to wetlands associated with Alternative 6e are predicted to be 59.22 acres of permanent impacts and 42.85 acres of temporary impacts (102.07 acres of impact total). The area of pavement proposed to be removed under Alternative 6e to allow for flow under the bridges is approximately 50 acres. The EA states that the "areas of pavement to be removed to allow flow under the bridges would be restored to wetland grade and planted with native wetland vegetation." The Draft EIS goes on to state that these efforts would be considered as partial mitigation for the project impacts. Additional information (i.e., monitoring of mitigation efforts, ratio of proposed mitigation, invasive species control, etc.) associated with these areas will be required to determine whether the mitigation for the proposed wetland impacts are considered sufficient, appropriate and ultimately successful in the absence of an operational plan that would offset the project's long-term effects.

- The Draft Environmental Impact Statement (EIS) did not provide a site specific wetland assessment to determine environmental impacts, but relied on a table top analysis derived from the Uniform Mitigation Assessment Method (UMAM) done for the Tamiami Trail Pilot Swales project. Please note that a site specific field evaluation (i.e., UMAM) should be conducted in coordination with the Department to satisfy future permitting requirements.

- In order to completely realize the environmental benefits expected from the proposed project, it is necessary for an operational plan to be developed that will successfully take advantage of the hydrologic connectivity provided by the proposed bridges. It is anticipated that the preferred alternative, in combination with an operation plan that takes advantage of this improved flow, will enhance wetlands and possibly offset the permanent and temporary loss of wetlands. However, the Draft EIS acknowledges the uncertainty surrounding proposed benefits in the absence of such an operational plan. In light of this, an alternative mitigation plan is being developed to offset the loss of the observed wetland impacts, both permanent and temporary, caused by construction of the alternative. The Department requests that any mitigation plan be coordinated with the Department to ensure that the proposed plan is consistent with Department Rules and Statutes.

- The Department recommends a closer evaluation of the eastern bridge segment proposed under Alternative 6e. This suggestion is based on the proximity to the northern boundary of the Tamiami Trail East Wood Stork Colony. This Colony is a rookery that supports both state and federally listed species. The Department suggests ongoing coordination with the U.S. Fish and Wildlife Service, as well as the State of Florida's Fish and Wildlife Conservation Commission, to identify whether potential impacts to the Tamiami Trail East Wood Stork Colony and the rookery have been fully determined.

- The proposed 0.7-mile eastern bridge segment, a component of the preferred alternative, is in close proximity to the L-31 North Canal and in a relatively low topographic location. As noted in the Draft EIS, seepage concerns have been identified in association with this segment. Park staff has determined that a seepage evaluation would be necessary to evaluate seepage impacts associated with constructing a bridge between the existing Tamiami Trail Bridge and the S-334 Structure. Prior to moving forward with any construction, a seepage analysis should be undertaken to determine potential seepage impacts of the proposed project. The cost of the additional seepage management measures should also be considered when evaluating cost effectiveness between the alternatives.

- The Draft EIS concludes that for all of the action alternatives short-term water quality impacts in Northeast Shark River Slough are expected to occur during project implementation. These impacts are expected to result in temporary increases in total phosphorous (TP), total suspended solids (TSS) and turbidity in the surface waters adjacent to bridge construction sites. Best Management Practices have been proposed to minimize impacts to water quality resulting during construction and maintenance-related activities. The EIS also reports that "Based on the results of the S-12D Flow-way Maintenance Plan water quality monitoring and the scope of the bridging projects, it is anticipated that the water quality impacts resulting from construction-related activities for all bridging alternatives would be adverse, local, minor, and short-term." Further qualification should be provided as to what these water quality impacts are expected to be.

- The Draft EIS states that a selected culvert set would be blocked during construction to avoid excess turbidity. Please provide a detailed analysis of the potential impact that blocking of the culverts during construction may cause (Page 2-20).

- The Department suggests looking at swales and/or shallow stormwater treatment areas along the old portion of the Tamiami Trail to address runoff from impervious surfaces. Each of the bridges will require long stretches of approach ramps where excess runoff is expected occur. These areas, as well as the bridges, will be required to incorporate the treatment and treatment capacity for runoff prior to it being discharged. Shallow swales or wetland treatment systems could be considered along the north end of the ramps, in the footprint of the old roadway.

- Chapter 3 of the Draft EIS addresses existing water quality conditions that may affect the proposed project. As noted in Chapter 3, the 12-month flow weighted mean TP concentration at inflows to the ENP through Shark River Slough have achieved the interim and the long-term TP concentrations for inflow to the Park since the limits were put into effect by the United States v. South Florida Water Management District, S.D. Fla. Case No. 88-1886 (a.k.a. the Settlement Agreement). However, as noted, the TP concentrations for water year 2008 and 2009 were equal to or close to the limits. Modifications to water deliveries may reasonably be expected to result in non-compliance. A comprehensive analysis of hydrologic modifications and their effects on water quality shall be required by the Department in order to ensure any modification to the delivery of water from the proposed project will not result in a violation of water quality standards.

- Regarding water quality and Dissolved Oxygen (DO), one item that should be taken into account is that concentrations in the Everglades routinely fall below the 5.0 mg/l state Class III water quality criteria (Rule 62-302.530, F.A.C.) due to natural background conditions. As a result, the Department has developed a Site Specific Alternative Criteria (SSAC) for DO within the Everglades Protection Area, which includes discharges to the marsh within Everglades National Park. In order to determine whether DO concentrations are in compliance with water quality standards, the EIS should include an evaluation of the measured DO concentrations using the SSAC.

- It is important to note that the NPS concludes that the cumulative impacts from any of the action alternatives will not detract from the water quality benefits anticipated from current and future projects associated with the Modified Water Deliveries Project (MWD) and the Comprehensive Everglades Restoration Plan (CERP). The NPS states that "It is expected that the total cumulative impacts to water quality given the action alternatives of the proposed project combined with related projects would be beneficial and long-term." However, long-term effects to water quality resulting from operations are claimed to be unknown since an Operational Plan has not yet been developed for this project (page 4-17). The Department believes that it is critical to evaluate and assess potential water quality impacts as part of evaluating the feasibility of providing additional bridge length. Specifically, the potential impacts of increased flow and potential increased nutrient loading.

- The Draft EIS recognizes that there is a potential for nutrient impacts to the Park with the increased flows from the proposed bridge alternatives, yet these impacts are not quantified in the Draft EIS. Chapter 4 of the Draft EIS makes little mention of environmental consequence of long-term water quality impacts associated with this project as a specific operation plan has not yet been developed. Even though the evaluation does not attempt to develop a specific operation plan, there should be an evaluation of potential impacts based upon any increase or modification to flow that may be reasonably expected to exist at the time of project implementation. For example, it is anticipated that the Everglades Restoration Transition Plan, which is also in the NEPA process and is currently expected to have a final record of decision issued by the U.S. Army Corps of Engineers in January 2011, would have operational modifications. The Department believes that these modifications should be evaluated as part of the EIS since these conditions are reasonably expected to exist upon implementation of any of the alternatives contemplated in the Draft EIS.

- The potential increases in the TP concentration to the Park should be analyzed, so that all stakeholders have a clear understanding of the potential impacts, risks and uncertainties associated with moving forward with any alternative. Water quality effects from the project, whether short-term or long-term, should not conflict with the requirements of State law or the Settlement Agreement. A determination regarding consistency with Florida Statutes will be made when the Department receives and reviews an application for the construction and operation of the proposed project pursuant to its authority under Chapters 373 and 403, Florida Statutes, and under the authority delegated to the State under the federal Coastal Zone Management Act.

- A more detailed discussion is expected during the permitting process regarding temporary impacts of construction on water quality and the justification for a temporary mixing zone for elevated turbidity levels within the Park.

In addition, the Department would like to make the following recommendations:

- The second sentence "It is possible to complete this evaluation without knowing precisely whether artifacts or significant sites are present on the properties." Should the sentence read "it is not possible (Page 2-14, section 2.3.7)"?

- It is stated that climate change and the resulting sea level rise are affecting all of South Florida, especially low-lying areas such as Everglades National Park (Park), and therefore will be addressed as part of this EIS (page 4-9). On page 4-10 it is stated that sea level change will be monitored and evaluated and its impacts on the Park's landscape will be predicted. However, it is unclear how impacts caused by sea level change have been taken into consideration in the comparison of the alternatives for this draft EIS.

- The Department recommends integrating wildlife corridors into the bridge flow-way design. Looking at the Panther data provided in the report, it becomes clear that the existing road and canal is a barrier to Panthers migrating and moving from the Park north to the WCA 3. Recognizing that the ultimate plan is to connect the Water Conservation Areas and the Park, wildlife crossings should be integrated into the design of any new bridge provided.

- Proposed modifications to Tamiami Trail are adjacent to the northern edge of ENP and span eastward from the L-67 to the L-30 levee. This study area, identified as the Tamiami Trail Corridor, has been assigned a high priority ranking on the State's Multi-use Trail Network Opportunity Map. The Department suggests looking for opportunities to include such passive recreational amenities as part of the project design at a later date, regardless of the final selected alternative.

- Provided the necessary environmental approvals and permits can be obtained, the Department requests that consideration be given to the inclusion of a non-motorized bicycle and pedestrian pathway, separated from vehicular traffic. This would ensure a cross-state alternative transportation corridor that would expand visitor use; encourage ecotourism; and reduce carbon emissions.

- Fencing, as used successfully along other Florida highways to protect wildlife, should be evaluated to protect animals from crossing on un-bridged areas and divert them to a safe crossing that could be provided as part of this project.

The Department sincerely appreciates the opportunity to comment on Tamiami Trail Modifications. Please continue to keep us informed about this project as this phase moves forward. Should you have any questions on the comments provided, please feel free to contact Ms. Annet Forkink at (850) 245-8527.

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July 20, 2010

Lauren Milligan
Florida State Clearinghouse
Department of Environmental Protection
3900 Commonwealth Boulevard, MS 47
Tallahassee, FL 32399

Re: SAI #FL201006025273C, Draft Environmental Impact Statement, Tamiami Trail Modifications: Next Steps, Everglades National Park – Miami-Dade County, Florida

Dear Ms. Milligan:

The Division of Habitat and Species Conservation, Terrestrial Habitat Conservation and Restoration Section, of the Florida Fish and Wildlife Conservation Commission (FWC) has coordinated our agency's review of the above-referenced project, and provides the following comments in accordance with the Coastal Zone Management Act/Florida Coastal Management Program and the National Environmental Policy Act.

Project Description

The Omnibus Appropriations Act of 2009 directed the National Park Service (NPS) "to immediately evaluate the feasibility of additional bridging of the Tamiami Trail beyond that currently being constructed pursuant to the Modified Water Deliveries to Everglades National Park Project." The direction was to include "a continuous bridge, additional bridges, or a combination thereof for the Tamiami Trail… to restore more natural water flow to the Park and Florida Bay, and for the purpose of restoring habitat within Park and ecological connectivity between the Park and the Water Conservation Areas." The Draft Environmental Impact Statement (DEIS), prepared by Everglades National Park (ENP) in technical collaboration with the U.S. Army Corps of Engineers (COE), represents partial fulfillment of requirements of the Act.

A total of six alternatives, including the no-action alternative, were included in the DEIS. All action alternatives include bridge construction and reconstruction of the remaining highway, with differences in the bridge or culvert lengths and locations. The environmentally preferred plan (Alternative 6e) identified in the DEIS would add four bridges totally 5.5 miles to the current 1-mile bridge under construction, increasing the total amount of bridge span within the 10.7-mile corridor to 6.5 miles. When coupled with other planned restoration projects, the additional bridging would provide for unconstrained flow to Northeast Shark River Slough (NESRS) in ENP. The increased water volumes and improved flow distributions would re-establish seasonal water depths and flooding durations that are critical to the survival of many fish and wildlife species. This plan would also enable the reconnection of Water Conservation Area (WCA) 3 to ENP, reducing the severity and duration of dry-down events in one compartment of this region (WCA 3B) and the prolonged deep-water conditions associated with loss of tree islands in another compartment (southern WCA 3A). All action alternatives would result in permanent impacts to wetlands, soils, and habitats or special status species.

Issues and Recommendations

The FWC has fish and wildlife and land management responsibilities for WCAs 2 and 3, which are managed as the Everglades and Francis S. Taylor Wildlife Management Area. We fully support actions that will restore hydropatterns that improve current conditions that affect fish and wildlife and their habitats; however, we have identified the following issues that should be addressed during the planning process for this project.

We also ask that the NPS address our prior relevant concerns and recommendations on the Tamimai Trail projects. Our original concerns on raising the height of Tamiami Trail were conveyed to the COE in a letter (enclosed) dated June 13, 2000, to James C. Duck. Subsequently, we have relayed additional detailed comments and recommendations on the various Tamiami Trail features directly to the COE through several Fish and Wildlife Coordination Act Report (FWCAR) documents as well as through the Florida State Clearinghouse. This correspondence includes a preliminary supplemental FWCAR (enclosed) dated August 11, 2005; a letter (enclosed) dated March 17, 2004, to James C. Duck; a preliminary FWCAR (enclosed) dated June 24, 2003, on the preliminary draft GRR/SEIS; a Planning Aid Letter (PAL; enclosed) dated February 26, 2001; a letter (enclosed) dated September 14, 2001, to Col. James G. May; and letters (enclosed) via the Florida State Clearinghouse dated March 4, 2008, and May 14, 2008, to Lauren Milligan; and another dated January 16, 2002, to Jasmine Raffington.

Water management operations: We note that an operational plan for water levels in the L-29 canal has not yet been developed for this project, and the DEIS states that full realization of project benefits is dependent upon this operational plan. Additionally, seepage concerns and the operational aspects of how and when future flows would be delivered under the bridges were not addressed in the DEIS. We recommend that these operational aspects be addressed prior to the release of the final EIS for this project.

State-listed species: We recommend taking all state-listed fish and wildlife species into account when analyzing a project and its alternatives. Doing so is necessary for us to concur with any determination of consistency under the Coastal Zone Management Act/Florida Coastal Management Program that NPS may provide in the future. The following species from the state list of endangered species (E), threatened species (T), and species of special concern (SSC) potentially occur within the project area and/or could be impacted by the project: American alligator (*Alligator mississippiensis*, SSC), Florida burrowing owl (*Athene cunicularia floridana*, SSC), roseate spoonbill (*Platalea ajaja*, SSC), limpkin (*Aramus guarauna*, SSC), little blue heron (*Egretta caerulea*, SSC), snowy egret (*Egretta thula*, SSC), tricolored heron (*Egretta tricolor*, SSC), white ibis (*Eudocimus albus*, SSC), wood stork (*Mycteria americana*, E), snail kite (*Rostrhamus sociabilis plumbeus*, E), Florida manatee (*Trichechus manatus latirostris*, E), Cape Sable seaside sparrow (*Ammodramus maritimus mirabilis*, E), Florida panther (*Puma concolor coryi*, E), and Everglades mink (*Mustela vison evergladensis*, T). In cases where state-listed species may be impacted, we recommended compliance with all federal and state regulations and recommendations concerning each species.

The Everglades mink approaches the eastern limits of its distribution in the project area. The Everglades mink is known to utilize all types of shallow wetland habitats, but exhibits a decided preference for swamp forest habitat. Smith (1980) found Everglades mink to be most abundant around old agricultural canals, levees, and the Tamiami Trail roadway. Although road-kill data indicate that minks historically occurred along the entire length of the roadway, a higher incidence of mortality tended to occur where old agricultural canals and/or spoil areas intersected the Tamiami Trail. Consequently, these man-made upland habitats are more likely to be used by the Everglades mink for hunting and den placement. Bridges "A1 and B2" and "G1 and I1" in alternative 6e (Figure 2-5) would traverse old agricultural canals that may be affected by road removal and/or bridge construction. An experienced biologist should survey areas near construction sites with suitable potential habitat prior to the initiation of construction activity to help determine whether any mink are present in the study area, and if any den areas may be present. Ideally, the survey should be done during the mink mating season which extends from September through November. We ask that FWC be notified if any mink are detected.

Snail kites have been documented nesting within WCA 3B as recently as the 2010 breeding season. We note that NPS will actively monitor for snail kite nesting during the construction of the project and will implement the U.S. Fish and Wildlife Service's (USFWS's) snail kite management guidelines if any nesting sites are detected.

The Florida burrowing owl inhabits open native prairies and cleared areas that offer short groundcover; these include pastures, agricultural fields, golf courses, and vacant lots. Burrowing owls have also been associated with unnatural elevated areas such as road berms, canal banks, and levee sides. The FWC recommends that an experienced biologist survey areas near construction sites with suitable potential habitat prior to the initiation of construction activity to help determine whether any burrowing owl nest burrows are present in the project area. We ask that the FWC be notified if any burrows are detected.

Modification of the roadway could result in work that affects the surrounding canals, in which manatees have been observed. The FWC recommends adherence to the "Guidelines for Manatee Conservation during Comprehensive Everglades Restoration Plan (CERP) Implementation" prepared by the CERP Interagency Manatee Task Force in October of 2006 (CERP Manatee Task Force 2006). The document recommends that careful consideration be given to any project implemented that either alters manatee accessibility or adds new structures that may result in physical harm to or entrapment of manatees (Section III (B)). The manatee conservation guidelines include protection measures to avoid adverse impacts, such as physical harm or entrapment, to manatees to be implemented during project design and construction.

Florida panthers have been recorded within five miles of the project area on 117 occasions since 1989 (USFWS 2006). No panthers have been documented north of the Tamiami Trail in this area, however, suggesting that the roadway and/or L-29 canal may act as a barrier to panther movements.

Wading bird nesting habitat: Bridges identified as "I1" and "J1" in Alternative 2a (Figure 2-2) and as "A1 and B2," "G1 and I1," and "J1" in Alternative 6e (Figure 2-5) would be constructed close to three wading bird colonies (Tamiami West, Tamiami East, and Tamiami East 1) located immediately south of the Tamiami Trail. State-listed wading birds, including white ibis, snowy egret, tricolored heron, little blue heron, and wood stork, are known to nest in these colonies (Cook and Kobza 2009, Frederick 1995). The removal of woody colony vegetation could negatively impact these colonies. While Tamiami East and Tamiami East 1 are currently small in terms of size and abundance, these colonies could become more productive once anticipated increased flows to NESRS are realized and the hydroperiod of the area increases. Additionally, alternative 6e would result in the removal of colony vegetation at Tamiami West, a larger and consistently active colony that supported 1,300 wood stork, 5,000 white ibis, and 300 tri-colored heron nests in 2009 (Cook and Kobza 2009).

The Tamiami Trail road-kill survey conducted by the FWS in 2002-2003 documented the mortality of a wood stork and a snowy egret along the current roadway (USFWS 2004). With elevated bridges, wading birds departing from colonies or from nearby foraging sites would be required to gain additional altitude to avoid passing traffic. This could lead to a slight increase in risk for wading birds being struck by passing traffic.

The DEIS states that guidelines for wood stork protection would be followed during all phases of project construction. We request that appropriate precautions are taken to avoid disrupting the nesting efforts of state-listed wading birds that also use these same colonies. The FWC has developed set-back distances to protect nesting bird colonies from human disturbance (Rodgers and Smith 1994). These guidelines establish a minimum 100-meter recommended set-back distance around mixed wading bird colonies. Human disturbance should be restricted around the colony site during the wading bird nesting season and during roosting periods.

We ask that the NPS reconsider the necessity of the easternmost bridge in the selected alternative, given the potential impacts to nesting wading birds as well as to a lack of an effective seepage management plan for the L-31 levee (see below).

Wildlife passage improvements: The DEIS states that all action alternatives would result in an increase in ecological connectivity, and that the construction of bridges would provide much improved access for species to move between habitats in the WCAs and NESRS as well as reduced wildlife mortality along the Tamiami Trail; however, we note that there are no wildlife crossing features associated with the planned bridges. We have previously expressed concerns regarding wildlife crossings in our prior letter to the COE concerning the construction of the one-mile bridge for MWD.

The Tamiami Trail road-kill survey conducted by the USFWS in 2002-2003 documented 991 road-killed vertebrates along two miles of selected transects over 13 monthly sampling periods (USFWS 2004). The Everglades mink, which has been documented from roadkills along this section of the Tamiami Trail (Smith 1980), is particularly vulnerable to highway-related mortality (Humphrey 1992). To reduce road-related mortality of the Everglades mink and other riparian wildlife, we recommend that underpass shelves be incorporated into bridge and culvert designs. Wildlife underpass shelves have proven to be effective in promoting the safe passage of three mustelid species in The Netherlands (Veenbaas and Brandjes 1999). The installation of wildlife crossing shelves would create a safe passage corridor for large mammals (including the endangered Florida panther), medium-sized mammals, and other wildlife that use the L-

31 levee and the tree-lined agricultural canals within WCA 3B. A shelf width of 10 to 15 feet placed at an elevation slightly above the mean high water line would accommodate the large and small animals. A shelf width of 2 to 3 feet would be sufficient to accommodate the Everglades mink.

The DEIS states that permanent removal of peat soils (ranging from 8 to 51inches in depth) would occur for all action alternatives. Absent wildlife shelves or other elevated passage features, the deeper water below the bridged expanses where soil removal occurred would not provide for the safe passage of terrestrial and semi-aquatic animals as stated in the DEIS. We recommend that those areas beneath the bridge where terrestrial wildlife are most likely to occur, in particular at the intersection of the agricultural canals within WCA 3B, retain their peat soil and the additional elevation and vegetative cover it provides.

We would be glad to work with ENP to determine the best locations for crossing features or prioritize locations for leaving the existing peat soil in place to facilitate animal passage beneath the planned bridge expanses.

Recreational fishing: The DEIS states that boat ramps would experience either no long-term impacts or very negligible long-term impacts to visitor use and experience as a result of any of the action alternatives. We recommend that particular consideration be given to how increased water levels in the L-29 canal may impact the existing function and accessibility of our boat ramp that is located between the S-333 and S-334 structures and provides access into the L-29 canal. We recommend that actions are identified to provide continued public utilization of this ramp. The increased connectivity of the L-29 canal to a long hydroperiod marsh has the potential to improve fishing in this canal segment, and this boat ramp may become even more valuable in the future.

Other related projects: We recommend consideration be given to the Pilot Spreader Swale project and its potential impacts to this project. There may be overlap between implementation and monitoring of the pilot test and the construction schedule for the proposed bridges. In addition, if flows can be adequately handled by the spreader swales, all of the bridges in the preferred alternative may not be necessary.

The easternmost bridge in alternatives 2a and 6e, identified as J1 in the DEIS, is in close proximity to the L-31 levee. We note that it may exacerbate seepage across the L-31, and increase the need to operate the S-356 pump station to return the increased seepage back to the L-29 canal. This additional pumping at S-356 during high water events in WCA 3 may compete with the S-333 or S-355 structures and prolong the duration of such events. Conversely, such bridge placement could contribute to excessive dry downs in southeastern WCA 3B during severe droughts (assuming removal of the L-29 levee under the Decompartmentalization project under CERP), particularly if no effective seepage barriers are in place along the L-31 levee. In addition, we understand that the project delivery team recommended exclusion of the easternmost bridge from the preferred alternative due to seepage concerns. We recommend that ENP provide more information regarding these concerns and the incremental ecological benefits to be derived from the construction of the easternmost bridge.

Summary

In summary, the FWC supports the ecological benefits expected from this project. The NPS has not appeared to have provided a consistency determination under the Coastal Zone Management Act/Florida Coastal Management Program with this DEIS; therefore, we are not obligated to provide concurrence at this time. We note that when the NPS does provide a consistency determination, we will need to be able to review an analysis of the impacts not just to federally listed fish and wildlife species, but also impacts to those listed by the State of Florida in order to concur with their determination

We appreciate the opportunity to provide comments on this project. If you or your staff would like to coordinate further on the recommendations contained in this letter, please contact me at (850) 410-5272 or email me at maryann.poole@myfwc.com, and I will be glad to help make the necessary arrangements. If you or your staff has any specific questions regarding our comments, I encourage them to contact Ms. Marsha Ward in our Sunrise Field Office at (954) 746-1789 or at marsha.ward@myfwc.com.

Sincerely,

Mary Ann Poole

Mary Ann Poole
Commenting Program Administrator

map/mw
ENV 1-3-2
NPS Tamiami trail Modifications DEIS_2866_071410
Enclosures
cc: Dan Kimball, ENP, Homestead
Paul Souza, USFWS, Vero Beach
Chuck Collins, FWC, West Palm Beach
Tim Towles, FWC, Vero Beach
Barron Moody, FWC, West Palm Beach

Literature Cited

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SEMINOLE TRIBE OF FLORIDA
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Date: July 22, 2010

Everglades National Park,
Attn: Bruce Boler
950 North Krome Avenue, 3rd Floor
Homestead, FL 33030

THPO: 006157

Subject: Everglades National Park, Tamiami Trail Modifications: Next Steps Draft Environmental Impact Statement

Dear Mr. Boler:

The Seminole Tribe of Florida is in receipt of a request for review of the Draft EIS for the Everglades National Park, Tamiami Trail Modifications Preferred Alternative 6E for the addition of 5.5 miles of bridging to the current 1-mile bridge under construction along the Tamiami Trail.

In review of the documents provided on the Alternatives and Assessments of Effect of Modifications to the Tamiami Trail, the Seminole Tribe of Florida requests response to and consideration of the following: Will the project interfere with traditional cultural properties utilized by the native peoples such as medicinal and plant gathering areas? Please provide a response to this inquiry.

Should you have any questions, please do not hesitate to contact myself or Anne Mullins, Compliance Supervisor at (863) 983-6549.

Sincerely,

Willard Steele,
Tribal Historic Preservation Officer
Seminole Tribe of Florida

Direct routine inquiries to:

Anne Mullins
Compliance Review Supervisor
annemullins@semtribe.com

Received SFNRC 7/27/2010
4:30 pm cem

Comments

Park: Everglades NP
Project: Tamiami Trail Modifications: Next Steps Project/EIS (ID: 26159)
Document: EVER Tamiami Trail Modifications: Next Steps / Draft Environmental Impact Statement - April 2010 (ID: 33397)

We welcome your comments on this project. The comment period closes on 07/27/2010. Your comments must be postmarked no later than 07/27/2010.

Please note: The preferred method for commenting is to use the electronic form located at: http://parkplanning.nps.gov. Click on the link 'Plans/Documents Open for Comment', then select the document on which you wish to comment.

If you cannot use the electronic form, you may send this hard copy form and/or your letter to:

Before including your address, telephone number, electronic mail address, or other personal identifying information in your comments, you should be aware that your entire comment (including your personal identifying information) may be made publicly available at any time. While you can ask us to withhold your personal identifying information from public review by checking the box **"keep my contact information private,"** we cannot guarantee that we will be able to do so.

* indicates required fields

Comment Form

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Last Name:	O'Donnell		
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Member:			
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☐ **Keep my contact information private**

Topic Questions Instructions:

Topic Questions:

Comments or Requests:

Please see attached letter.

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July 26, 2010

Via Fed-Ex And E-mail
Dan Kimball
Superintendent
Everglades National Park
950 N. Krome Avenue
Homestead, Florida 33034

Attention: Bruce Boller at Bruce_Boler@nps.gov and Dan_Kimball@nps.gov

Re: Miccosukee Tribe of Indians of Florida's Comments on the *Everglades National Park Tamiami Trail Modifications: Next Steps Draft Environmental Impact Statement* dated April 2010

Dear Superintendent Kimball,

I. INTRODUCTION

The Miccosukee Tribe of Indians of Florida ("Tribe") hereby provides comments on the *Everglades National Park Tamiami Trail Modifications: Next Steps Draft Environmental Impact Statement* ("Draft EIS") dated April 2010. The Tribe also incorporates by reference its comments on Tamiami Trail made at meetings that it attended and the comments that were sent as part of the scoping process. As the Department of Interior ("DOI") and National Park Service ("NPS") are aware, the Tribe has customary use and occupancy rights in Everglades National Park and a perpetual lease to 189,000 acres of Everglades north of the Park in Water Conservation Area 3A ("WCA 3A"). The Tribe strenuously objects to the Preferred Alternative 6(e), which is a plan to construct another 5.5 miles of bridges in Everglades National Park ("Park) at a cost of $329.8 million dollars in this time of fiscal crisis. The Tribe also objects to the legally inadequate process that produced it. The NPS failed to analyze impacts to all of the areas of the human environment that will be impacted by the Preferred Alternative, which is required by the National Environmental Policy Act ("NEPA"); failed to conduct formal Section 7 consultation with the Fish and Wildlife Service on the impacts to WCA 3A and the Snail Kite; failed to follow the Federal Advisory Committee Act ("FACA") for the CBA advisory team; failed to conduct the Section 4(f) review required under the Department of Transportation Act ("DOT") of 1966, as codified at 49 U.S.C. 303; and, failed to meet its federal Trust responsibility to maintain the lands in perpetuity in their "natural state," for the Miccosukee Tribe. As a result, the Tribe contends that (1) the NPS cannot destroy lands which must be preserved in perpetuity in its "natural state"; and (2) NEPA cannot adversely impact land to which the Tribe has maintained customary usage and occupancy rights.

The Tribe further contends that Alternative 6(e), which will cost at least $329.8 million dollars, is unnecessary and a waste of money. It could also have seriously adverse environmental impacts on the Tribal Everglades and flood protected areas in Miami-Dade County, which the NPS has failed to analyze in the Draft EIS. Contrary to NPS' claims, the 2009 Omnibus Appropriations Act did not give the Park authority to construct more bridges but merely directed that their feasibility be studied. The languages instructs DOI: *"To immediately evaluate the feasibility of additional bridge length, beyond that to be constructed pursuant to the Modified Water Deliveries to Everglades National Park Project (16 U.S.C. 410r-S), including a continuous bridge, or additional bridges or some combination thereof, for the Tamiami Trail (United States Highway 41) to restore more natural water flow to Everglades National Park and Florida Bay and for the purpose of restoring habitat within the Park and the ecological connectivity between the Park and the Water Conservation Areas (Omnibus Appropriations Act 2009)."* This language clearly provided no project authority for the 5.5 miles of bridges, which the NPS admits are not part of the Modified Water Deliveries Project ("MWD").

As NPS knows, the Water Resources Development Act of 2000 ("WRDA 2000") required completion of the MWD Project prior to funding components of the Comprehensive Everglades Restoration Plan ("CERP") Decompartmentalization Project, including the bridging of Tamiami Trail. WRDA 2000 specifically mandates that: "No appropriation shall be made to construct the Water Conservation Area 3 Decompartmentalization and Sheetflow Enhancement Project (including, Raise and Bridge East Portion of Tamiami Trail) until the completion of the project to improve water deliveries to Everglades National Park authorized by section 104 of the Everglades National Park Protection Act of 1989 (16 U.S.C. 410 r-8)." This language has not been changed. Yet, the Park intends to construct 5.5 miles of bridges with the L-29 levee still in place. This is clearly an attempt to hood wink Congress, and the public, into wasting taxpayer money to build a bridge that can not operate because the levee is still in place.

Building bridges in the Park that will not operate for years, and the environmental impacts which have not been analyzed, is a waste of taxpayer money. It is also a threat to the Tribe and their Tribal lands. The bridges will provide no benefits to Everglades National Park until the L-29 levee is removed, which may not be for decades. Even though the Tribe asked, the NPS failed to analyze reasonable alternatives that would improve conveyance of water through Tamiami Trail by clearing out the area downstream of the culverts that is blocked with sediment and heavy vegetation that built up on the discharge side. Interestingly, while Park staff have stubbornly refused to allow the sediment/vegetation blockage to be removed downstream of the culverts to allow more water to flow, they are now proposing to build a series of 5.5 miles of bridges by destroying at least 60 acres of wetlands in Everglades National Park, land on which the Miccosukee Tribe has customary use and occupancy rights.

Not only is this destructive to Park resources, it is a complete waste of money, since the Draft EIS admits at page 4-29 that full realization of the benefits is dependent on an operational plan that does not exist. Reasonable alternatives exist, which cost far less, but the NPS has failed to evaluate them. The Tribe continues to contend that cleaning the blockages downstream of the discharge areas of the culverts would be far more economical and would maximize the effectiveness of the existing culverts. Maximizing the efficiency of the existing culverts, and constructing swales downstream, would also distribute and increase the flows across the entire 10.7 miles of Tamiami Trail. The Tribe contends that it would be more prudent, and environmentally beneficial to: 1) clear the area downstream of the culverts; 2) construct additional culverts and swales as necessary; 3) raise the road as necessary; and 4) wait for CERP Decompartmentalization to embark on any expensive modifications to the Tamiami Trail that are shown to be necessary. Instead, the Draft EIS rejects prudence and economy and relies on a skewed analysis, and no 2x2 modeling with the SFWMM, to select a predetermined plan to build 5.5 miles of "Bridges to Nowhere" in Everglades National Park.

II. GENERAL COMMENTS ON THE DRAFT EIS

A. The Draft EIS Is Fundamentally Flawed And Fails To Comply With NEPA

1. <u>Benefits, If Any, Will Not Be Felt For Decades</u>.

The Draft EIS waits until late in the document to disclose the fact that the full realization of project benefits for the Park directly depend an on an operational plan which has not yet been developed. The NPS knows that the bridges can not operate without removing the L-29 canal, which will be far into the future. But, NPA fails to address it. Instead, the NPS is attempting to have it both ways and analyzes the "potential" benefits to ENP that will only occur from operations while refusing to analyze the adverse impacts on both: (1) flood control in the Tribal Everglades in WCA 3A; and (2) flood control in Miami-Dade County.

2. <u>The EIS Fails to Adequately Analyze Factual Operations and *De Facto* Operations</u>.

The Draft EIS fails to analyze the impact of both "actual" operation, and de facto operations, of the bridges on both the WCAs and western Miami-Dade County. This is especially disconcerting in that page 4-5 appears to state that the NPS intends to use these bridges as part of the Combined Structural and Operational Plan ("CSOP") even though their operations have not been analyzed and important flood protection projects have not yet been built. Additionally, the NPS is well aware that construction of these bridges will result in an average annual increase in flows into the Park, and a *de facto* change in operations, that could flood Indian camps, flood Tribal private property, and flood western Miami-Dade County.

The full impact of operations on the Miccosukee Reserved Area, the Miccosukee Resort, and the Tiger Tail and Osceola Camps, as well as the Tribe's perpetual lease lands in WCA 3A should have been analyzed in the Draft EIS. They were not. The Draft EIS should have also analyzed the impacts and benefits from operations and selected alternatives that would maximize benefits to the greater Everglades ecosystem. It failed to do so. Alternatives should have been assessed on whether they provide improvements in ecological and hydrological conditions, not just in the Park, but in the WCAs, as well. That too, simply was not done.

3. **The Draft EIS Process Was Pre-Determined and All Reasonable Alternatives were Systematically Ignored.**

Contrary to the NPS' contention that it is conducting a public process, NPS' selection of the Preferred Alternative, its summary dismissal of superior alternatives, and its lack of any meaningful analysis show that the "process" was an exercise in futility. The outcome had already been determined.

4. **The Draft EIS Fails to Analyze Reasonable Alternatives.**

Contrary to NEPA, and requests by the Tribe, the Draft EIS fails to conduct an analysis of all reasonable alternatives. For instance, the reasonable culvert/swale/road raising alternative suggested by the Tribe was rejected from consideration even though NPS Staff reported that DOI Leadership Guidance includes the recommendation to "use con-span-like structures (prefabricated culverts) as potentially a more cost effective way to meet the Congressional intent to improve connectivity." Since con-spans are essentially large culverts, and culverts are technically small bridges, clearing out the exotic vegetation downstream of the existing culverts, and constructing additional culverts and swales, should have been evaluated in the Draft EIS as a cost-effective alternative to meet Congressional intent. It was not.

5. **The Draft EIS Improperly Segments the CERP DECOMP Project.**

NEPA requires that connected projects should be evaluated in a single Environmental Impact Statement (EIS). (40 C.F.R. § 1502.4). The Council on Environmental Quality ("CEQ") regulations governing NEPA further state that, p*roposals or parts of proposals which are related to each other closely enough to be, in effect, a single course of action shall be evaluated in a single impact statement.* This improper segmentation has caused the Draft EIS to inadequately assess impacts on Tribal lands and resources.

6. **The Draft EIS Improperly Narrows the Project and Study Area.**

The Project Area analyzed in the Draft EIS was limited to only 10.7 miles along Tamiami Trail and a section of Everglades National Park. The Project and Study Area in which impacts were analyzed should have included the Water Conservation Areas (including WCA 3A) and western Miami-Dade County. The Study area in the Draft EIS should have included the WCAs, Northeast Shark River Slough and the Shark River Slough Basin of ENP. It did not. As a result, the narrow purpose and scope of the study area in the Draft EIS resulted in a flawed and incomplete analysis that omits issues of vital importance, such as the impact of the project and project delays on Tribal Everglades and the endangered and threatened species that inhabit these areas.

7. The Cumulative Impacts Analysis is Woefully Inadequate.

The Cumulative Impact Analysis in the Draft EIS is woefully inadequate. It merely lists projects. It does not analyze their cumulative impacts. CEQ implementing regulations require that the cumulative impacts of past, present, and future actions be analyzed in an EIS. Unfortunately, Section 4.13 does not contain any meaningful analysis of the cumulative impact. Instead, the section merely reiterates NEPA requirements for a cumulative impact analysis, and discusses the history of the Everglades. It ignores vast areas of the Everglades, such as the Tribal Everglades in WCA 3A. They are simply not discussed. Neither is there discussion of how the projects will impact one another.

8. The Draft EIS Fails to Adequately Analyze Impacts of Construction.

Although Tribal representatives made NPS Staff aware that culverts could be blocked during construction to protect water quality in the Park, the NPS failed to analyze its impact on the flora and fauna of Tribal lands in WCA 3A, including the endangered Snail Kite.

9. The Draft EIS Fails to Explain Unconstrained Flows and Volumes.

The Draft EIS fails to fully explain the concept of "unconstrained flows" that NPS has declared for the alternatives. The Draft EIS also fails to analyze whether these "unconstrained flows" will result in flooding of the Osceola Camp, private property, and Miami-Dade County, in general. Peak and annual flows should have been analyzed for each of the alternatives, including the increase in average annual flow into the Park that will result from a *de facto* change in operation from just building the bridge. The impact of these *de facto* changes was not adequately analyzed. Neither were the changes actually proposed. Instead, the NPS improperly rejected the volume performance measure for the Draft EIS. Without knowing the volume desired, and delivered, the EIS can not possibly analyze what is necessary. Neither can it adequately evaluate the actual impact on the environment.

10. The Draft EIS Fails to Adequately Address Seepage Control.

Since benefits to the Park cannot be realized until seepage out of the Park is controlled, seepage control should have been a component of the preferred alternative. It was not. Seepage to the east of the Park into the flood protected areas in western Miami-County must be controlled. Unfortunately NPS failed to even analyze seepage control in the Draft EIS. As stated above, this is especially disconcerting since the NPS has telegraphed that they intend to use these bridges under CSOP.

11. <u>The Draft EIS is Based Upon No Viable Authority or Project Purpose</u>.

The Draft EIS states that the Project Purpose is the language in the Omnibus Appropriations Act which only directed DOI to evaluate the feasibility of additional bridge length. This language is also listed under Project Authorization. The language in the Omnibus Appropriation Act is not authorization to construct a project. The Tribe is concerned that the federal government will once again use language in an appropriations act to attempt to evade the requirements of NEPA and other applicable laws.

12. <u>The Draft EIS Failed to Adequately Model the Alternatives and Impacts</u>.

Tribal representatives were told repeatedly that there would be no time for modeling of the alternatives. However, the Draft EIS refers to a simplistic River Analysis Model in an attempt to provide some justification for the rushed analysis that was conducted. The Tribe continues to contend that the SFWMM 2x2 model should have been used to assess the benefits and impacts of alternatives on a larger study area. It is incomprehensible to the Tribe that the NPS is attempting to get more than $300 million dollars for a series of bridges and has never analyzed the impact of operations, including with the 2x2 model.

13. <u>The Draft EIS Does Not Detail What Will Be Done to Modify the Road</u>.

Members of the Miccosukee Tribe live along Tamiami Trail, and their safety is of the utmost importance. The Draft EIS contains no details as to what will be done to ensure the safety of the Tamiami Trail. Nor are there any details on how adjacent Tribal property is going to be protected and preserved. Details on how the Park envisions this is to be accomplished are simply scant, at best. It is unclear whether the Corps or the Department of Transportation ("DOT") will construct the bridges and raise the road. There is no detailed engineering analysis of the road modifications and cost. Moreover, a review of the multiple on and off ramps and segments in the Preferred Alternatives also raises safety questions which have clearly not been reviewed.

14. <u>The Draft EIS Contains an Improperly Limited and Inappropriately Skewed Environmental Impact Analysis</u>.

The Draft EIS contains a skewed, and incomplete, environmental benefits analysis that uses a reduced area of impact to analyze the impacts of alternatives only in the Park. It is improper to conduct a realistic assessment of the environmental impact of alternatives, if the analysis is improperly limited to a limited area in Everglades National Park when (as is the case here) the area actually impacted by operations of the bridges, will be much larger and includes Tribal lands in WCA 3A. This skewed analysis was used by the CBA advisory group in the screening of alternatives. It should not have been.

15. <u>The Draft EIS Fails to Contain An Adequate Analysis of Water Quality</u>.

The Draft EIS does not contain an adequate analysis of the water quality impacts of the alternatives, including 6(e). This is especially important, because the bridges would be built in the Park, which is an Outstanding Florida Water ("OFW"). The DOI is a party to the Consent Decree in the federal Everglades lawsuit. Yet the Draft EIS only contains a general section on water quality and does not adequately analyze the impacts of the alternatives and/or de facto operations on water quality into the Park. Nor does it analyze whether Stormwater Treatment Area ("STA") or STAs may be necessary to meet water quality requirements. Neither does the Draft EIS mention the fact that the S-9 pump could discharge water into the Park under the MWD Project. All such factors should be considered.

16. <u>Draft EIS Fails to Address Compatibility With Restoration Projects</u>.

The Draft EIS also fails to adequately address the compatibility of the alternatives with Comprehensive Everglades Restoration Projects ("CERP") projects and non-CERP projects. Specifically, the Draft EIS fails to divulge the time frame in which these bridges would be used by any CERP or pre-CERP project. Since the modifications to the Tamiami Trail (which were supposed to be part of CERP Decompartmentalization) are being considered out of sequence, there is no way to assess if they will be compatible with the final design for CERP. The Draft EIS also fails to address or analyze whether the alternatives are compatible with the spreader swale pilot project.

17. <u>The Draft EIS Fails to Divulge That DOI Had No Cost Cap</u>.

It is difficult to believe that in the present critical fiscal climate, the DOI leadership would advise a regulatory agency that there should be NO COST CAP for the preferred alternative. Unfortunately, they did. This is not divulged in the Draft EIS. It should be. The public has a right to know. The public also has a right to know that even though another alternative provided a better benefit to cost ratio, and was more than $100 million dollars less, NPS chose the most expensive alternative in a time of required fiscal restraint.

18. <u>The Draft EIS Fails to Assess the Cost of Delay</u>.

Irreversible damage to the Everglades must be stopped. So must the governments' failure to comply with judicial mandates. Both will be rendered more adverse under the EIS Draft. Delay of important restoration projects will result. Money will be siphoned from restoration projects to fund the building of bridges that will not be used for years. All alternatives analyzed should have been looked at in terms of the cost of delay to the Everglades. The amount of time it would take to implement each alternative should also have been be used as a performance measure. It was not.

B. A Section 4(f) Review Is Required To Build Bridges In The Park

Section 4(f) of the Department of Transportation Act ("DOT") of 1966, which protects public lands and historic sites was codified without substantive change as 49 U.S.C. 303 in 1983. Congress declares that it is a national policy to preserve public park lands. Congress also prohibits the Department of Transportation ("DOT") from approving any program that uses publicly owned lands unless: 1) there is no feasible and prudent alternative, and 2) such use includes all possible planning to minimize harm. Nowhere in the Draft EIS does it discuss that Section 4(f) must be followed to build 5.5 miles of bridges in Everglades National Park. Nor does the Draft EIS discuss whether these Park lands will have to be transferred to construct the bridge. It is clear that Alternative 6(e) will use Section 4(f) lands. So, a Section 4(f) review is required. Yet, the Park contains no discussion of this requirement. The Tribe contends that a Section 4(f) review is required here, because the federal government plans to build 5.5 miles of bridges on national park lands. The Tribe suspects that the Park does not want to conduct a Section 4 (f) review, because it knows that such a review would show that there are feasible and prudent alternatives to constructing a bridge on these federal park lands.

C. The NPS Failed To Comply With The ESA

The NPS failed to comply with the Endangered Species Act ("ESA") in that, among other things, it failed to conduct Section 7 consultation with the Fish and Wildlife Service ("FWS") on the impacts on Water Conservation Area 3A, and the endangered Snail Kite, as a result of constructing and operating the Preferred Alternative. The NPS has a duty to conduct Section 7 consultation with the FWS on the impacts that the Preferred Alternative will have on the Snail Kite and its critical habitat in WCA 3A. It failed to do so. Likewise, the FWS failed to issue a Biological Opinion ("BO") prior to the Draft EIS being issued. The NPS also failed to adequately analyze the impact that operations, including de facto operations, will have on other endangered and threatened species.

D. The NPS Failed To Comply With FACA

The so-called CBA Team discussed in the Draft EIS is a federal advisory group that screened alternatives, and made recommendations to NPS. Unfortunately, it did so, without complying with the Federal Advisory Committee Act ("FACA"). The advisory group included non-federal entities, who developed performance measures and screened alternatives at non-public meetings. This same advisory group also held a CBA Workshop. This group made recommendations to a federal agency. Yet, the NPS failed to follow the requirements of FACA when establishing and/or utilizing this advisory group.

E. The NPS Did Not Meet Its Trust Responsibility To The Tribe

DOI agencies, including NPS, have a Trust responsibility to the Tribe. Contrary to this Trust responsibility, the NPS failed to analyze a culvert/swale alternative in the Draft EIS despite requests from Tribal representatives to do so. The NPS also allowed a CBA advisory group to rate performance measures and give a low rating to cultural resources. The NPS also refused to analyze the impacts of the alternatives on Tribal resources in WCA 3A, including from construction, operations and *de facto* operations, despite repeated requests that it do so. The NPS has a solemn trust responsibility: (1) to protect Tribal natural resources; (2) to preserve Trust resources; and (3) to maintain all such property in its "natural state." As a result, the NPS should have analyzed the impacts of the alternatives on Tribal lands. Finally, the NPS should have analyzed alternatives that did not require the destruction of lands in Everglades National Park to which the Tribe has customary use and occupancy rights. Again, the NPS failed to do so.

III. ADDITIONAL SPECIFIC COMMENTS ON THE DRAFT EIS

A. Impact On Tribal Lands

The Draft EIS contains no modeling or analysis of the impact that the operation of the Preferred Alternative will have on Tribal lands. The NPS must analyze the impact that operations will have on the MRA, other Tribal properties, and, on the Tiger Tail and Osceola Camps.

B. Impact on Businesses

The Draft EIS does not assess the impact that both construction and operation of Alternative 6(e) would have on Tribal businesses, such as the Miccosukee Resort and Gaming Facility, and the Tribe's Miccosukee Indian Village, Airboats, Restaurant, and Gas Station along Tamiami Trail. It should.

C. Hurricane Evacuation

Tamiami Trail is the only hurricane evacuation route for Tribal members who live along it. Since the Miccosukee Tribal members and others in the Service Area use Tamiami Trail to travel across the Everglades, it is vital that the NPS conduct an analysis of the impact that a one lane evacuation route would have on hurricane evacuation capability in the Final EIS. Access must be maintained to protect the health and safety of both Tribal members and the public.

D. Real Estate Costs Are Not Adequately Assessed

The Draft EIS states at Appendix G that it has been determined that project implementation will cause an increase in water elevations south but it does not adequately analyze the impact on real estate. Nor does the Draft EIS adequately assess all real estate costs that will result from the Preferred Alternative. The Draft EIS states that the costs of real estate "may vary drastically." It is the responsibility of the NPS to assess some costs, and add them to the costs of the bridges to fully evaluate impacts and costs in the Daft EIS.

E. Modeling

Tribal representatives were told repeatedly that there would be no time for modeling of the alternatives. However, the Draft EIS refers to a simplistic River Analysis Model in an attempt to provide some justification for the rushed analysis that was conducted. The Tribe continues to contend that the SFWMM 2x2 model should have been used to assess the benefits and impacts of alternatives on a larger study area. It is incomprehensible to the Tribe that the NPS is attempting to get more than $300 million dollars for a series of bridges, but has never analyzed the impact of operations, including with the 2x2 model.

IV. CONCLUSION

The Tribe contends that the NPS Preferred Alternative to construct 5.5 miles of bridges in Everglades National Park: (1) will not operate effectively; and (2) is a waste of precious funds that could go to more pressing restoration needs. It is clear that DOI has decided to construct a number of "Bridges to Nowhere" in a time of economic crisis without having even analyzed the full environmental impact of doing so, as required by NEPA. Congress asked for an evaluation of the feasibility of, among other things, of restoring "the ecological connectivity between the Park and the Water Conservation Areas." A review of the Draft EIS shows that the NPS did not conduct the modeling that is necessary to analyze the connectivity between the Park and the WCAs. The NPS only studied benefits in the Park. And, since these bridges are not part of any project, and have no operational plan, there will be no benefits to the Everglades, including in the Park.

In sum, the NPS appears to be attempting to hi-jack the language in the 2009 Omnibus Appropriations Act to conduct a rush "EIS" process in order to claim it has a shovel-ready project, so it can seek government funds to achieve its plans for Tamiami Trail. DOI is doing so, with no regard for science, fiscal responsibility, or the rights and concerns of the Miccsoukee Tribe, whose members lived in the Everglades long before the Park existed. DOI is doing so, at the expense of other vital restoration projects, such as CERP Decompartmentalization, which is a vital pre-requisite to any bridging of Tamiami Trail.

Sincerely,

Janice Burton Sharpstein, Esq.

Sonia Escobio O'Donnell
Janice Burton Sharpstein

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

July 26, 2010

Bruce Boler – TTM:NS DEIS
Everglades National Park
950 North Krome Avenue, 3rd Floor
Homestead, FL
33030-0019

Dear Mr. Boler:

**Subject: Comments on Tamiami Trial Modifications: Next Steps
Summary of Findings and Draft Environmental Impact Statement**

Thank you for the opportunity to review the Everglades National Park's draft report and environmental impact statement for this important Everglades restoration project. SFWMD continues to support implementation of the Modified Water Deliveries to ENP Project, as well as ENP's pursuit of this new federally funded project to restore more natural flows to ENP.

We have circulated the draft documents to several reviewers within the South Florida Water Management District and requested comments that would help ENP to improve the completeness, accuracy and clarity of the final summary report and EIS. I have attached comments from SFWMD reviewers for your consideration.

There are two substantive concerns that that were common among SFWMD reviewers. The first deals with potential impacts of the proposed project on water quality within ENP. The draft summary report and EIS emphasize the point that under current conditions, total phosphorus concentrations are often very close to violating the phosphorus limits specified by the Consent Decree. However, the documents do not adequately discuss how the project will be implemented to avoid exacerbating this issue. For example, the project may need to be phased and sequenced in coordination with other planned restoration efforts to avoid water quality violations that would result from additional flows and phosphorus loading. If ENP desires to implement the entire project in the near-term, additional treatment capacity may need to be incorporated into the project, at Federal expense, to avoid causing a violation, or it may be necessary to modify the Consent Decree.

The second common concern identified by SFWMD reviewers was the lack of a draft operating plan for the project. The discussion of cumulative effects and benefits of the project are based on an assumed operating plan to be developed in the future.

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However, there is no discussion of when or under what authority this operating plan will be developed. There is no discussion of interim project operations in the event that the conveyance features of the Modified Water Deliveries Project are not completed on schedule. Without a better understanding of the potential flexibility in the operating plan for this project, it is difficult to evaluate potential effects on the existing C&SF Project and the South Dade Conveyance System features. For example, if it is assumed that the project operations would rigidly adhere to a 9.7 foot design maximum operating stage in the L-29 Canal, there would likely be significant impacts to WCA-3B and urban areas in southwest Miami Dade County due to the significantly higher canal operating levels unless other mitigating measures were implemented. It is also difficult to determine the impacts and constraints that would be placed on formulation of future Everglades restoration projects under CERP and the State's Long-Term Plan if this project is authorized and is subsequently required as a "without project condition" . While SFWMD supports the goal of increasing stages and flows in the southern Everglades, we are not prepared to fully adopt a 9.7 foot stage in the L-29 Canal as the maximum design operating stage without further analysis of the potential collateral impacts on the environmental resources in WCA3B and regional flood control. It seems prudent that development and evaluation of interim and final operating plans would be necessary to determine whether the proposed 9.7 foot design maximum can be achieved. It is recommended that the final documents include a discussion of the assumed operating conditions that resulted in the specified impacts and benefits, as well as a commitment to develop an interim and final operating plan during subsequent design analyses, and to adjust the assumed operating parameters (e.g., 9.7 ft. stage) based on these subsequent analyses.

Again, thank you for the opportunity to review and comment on these documents. We look forward to supporting you in seeking Congressional authorization of this project. If you have questions, or would like to meet with SFWMD staff to further discuss our enclosed comments, please contact Tom Teets, Assistant Deputy Director for Everglades Restoration and Capital Projects, at (561)-682-6993.

Sincerely,

Larry D. Carter

for Kenneth G. Ammon, P.E.
Deputy Executive Director for Everglades Restoration and Capital Projects
South Florida Water Management District

KGA/pf
Enclosures (9)

c: Dennis Duke, U.S. Department of Interior
Bob Johnson, Everglades National Park
Joan Lawrence, Everglades National Park

Tamiami Trial Modifications: Next Steps

Summary of Findings and Draft Environmental Impact Statement

SFWMD Comments: Reviewer No. 1

Page v – Executive Summary; 2nd Paragraph and Page 2-3; 2nd Paragraph Section 2.2

Editorial suggestion: Through further discussion and refinement other project alternatives emerged and if the adjustment were small, the ~~they were small adjustments to an~~ existing alternative ~~there~~ were given a lower case letter designation (e.g. a, b, or c) depending on the order in which they were developed.

Page vi - Executive Summary; 1st Paragraph

Editorial suggestion: The lengths of the bridges, transition areas between the bridges and the roadway~~, and the roadway~~ are separated in the descriptions. Please note that Alternative 3 was eliminated per direction of the USACE. Make a statement as to why it was requested to be eliminated.

Page 2-16 Section alternatives Considered and Dismissed

Recent studies by ENP concerning placement of swales downstream of the existing TT culverts suggest a significant improvement can be achieved in the volume of water flow from L-29 to ENP utilizing the existing culverts. This would suggest that smaller bridges in combination with the swales could provide the target flow of 6,200 cfs. It would be prudent to acknowledge this new information and discuss why an alternative using a combination of swales and existing culverts was not considered.

Page 2-26 Section 2.9 – 3rd Paragraph

"Alternative 6e most closely meets the project objectives and the National Park Service mission by having the highest total importance value after summing the importance scores for each of the eight factors for each alternative." The eight factors are not listed and should be described. Appendix B identifies and describes these factors on page 17. It would be useful to reference this page. The performance measures identified for the project are also the factors used in the CBA scoring. It would less confusing to also identify these similarities early.

In the following paragraph, analysis is presented from USACE (Table 2-14) which also justifies the selection of Alternative 6e as the most efficient alternative. However, the documentation of these calculations are not presented in the report. This latter analysis appears less subjectively influenced by the weighting method used in the CBA but without the supporting documentation it is not possible to make an informed decision. Recommend this information be incorporated into the report.

The following paragraph references USACE cost benefit analysis but provides no detail description of how the USACE arrived at these calculations in the main body of the report or in the appendices. Since this information is used as supporting documentation for the 6e selection as the preferred plan, additional details should be provided.

Page 3-15; Last Sentence

"In addition, the plant community composition directly downstream of some of the Tamiami Trail
culvert sets show evidence of nutrient enrichment with cattails pluming in some of the immediate downstream culvert pool locations (***Figure 3-8***)." The description of "pluming" is misleading. There are multiple factors that may contribute to the presence and dispersal of cattail within the Everglades environment. Recent research shows that cattail may also expand in response to changes in hydrology.

Page 4-3; 2nd Paragraph, last sentence

"Next Steps project is to provide the additional modifications to the trail needed to meet the restoration objectives of the MWD and CERP projects. No adverse environmental impacts are identified."

The lack of environmental impacts is predicated on broad assumptions concerning future operating conditions that have not been defined in this document. A number of operational constraints were previously identified in the 2008 Tamiami Trail LRR/EAA and these are presumed to be alleviated by the proposed 6e plan. The selection of a preferred alternative in absence of an operational plan imposes significant burden on the State and a future yet to be defined process to adopt an operational plan capable of fulfilling the benefits assumed in the preferred alternative 6e with no discernable long tern environmental consequences. The history of similar projects relying on future efforts to define acceptable operating conditions commensurate with these expectations has not been encouraging. Moreover, the selection of the preferred alternative in the absence of an operational plan commits future actions in CERP or other related projects to provide the requisite infrastructure, capacity and water quality necessary to sustain these presumed benefit levels. This will result in future projects having to consider higher cost alternatives to comply with the flow expectations of the TT Next Steps project. Future proposed projects and their related operating plans will be costly and less expensive plans will be judged as circumventing the environmental benefits and purposes of the recommended TT Next Steps project.

It is also not possible to determine if the proposed bridging and assumed design high water operating stage of 9.7 feet is consistent with Florida Department of Transportation requirements to maintain adequate and safe operating conditions for the road. Reconstruction of the un-bridged portions of TT is proposed to increase the road crown elevation to 12.3 ft NGVD. NSM model results were used to define a frequency of L-29 canal elevations reaching a specific peak stage in the simulated period of record that may cause concern for the road. Based on the information presented, it is not possible to determine if a storm event coupled with an operating stage of 9.7 ft would cause topping of the road surface.

There is also a high probability of increased erosion of the L-29 canal at these higher operating stages that would lead to greater maintenance costs for the canal embankment and for the road shoulder.

Page 4-5; 1st Paragraph

"While the recommended plan of the 2005 RGRR/SEIS was abandoned due to escalating costs, and the CSOP was not finalized after selecting a preferred plan in 2006, the modeling evaluations of both plans show the potential regional benefits that can be achieved by providing increased flow capacity into Northeast Shark River Slough."

Since the CSOP document referenced was not released to the public, it would be fitting to provide relevant portions of the document as an appendix supporting the benefit of increased conveyance via bridge openings.

Section 4.3 Page 4-13

Impacts of the alternatives and their respective cumulative impacts are discussed in light of NPS regulations and policies. There is no assessment of the potential flood control impact differences among the alternatives considered or the potential cumulative impacts of prior projects in combination with the proposed bridge openings concerning the L-31N canal and S. Dade operations. Operations of the regional water system in this area are sensitive to water level changes within ENP and the proximity of these changes to the canal system. Although no specific water operating plan has been proposed for this project, a discussion of the potential influence on the regional canal system is warranted based on the available data and historical operations. It is particularly important that dependent projects either in the planning or construction phase be identified that will be required to compensate for any specific mitigation needed to offset potential reduced flood storage within the L-31N and S. Dade Conveyance System resulting from the improved conveyance of water afforded by more bridging of TT. The dependent improvements would be pre-requisite for the full implementation of the TT Next Step recommended plan.

Section 4.3.2 Water Quality

Recent court rulings have created uncertainty concerning the added measures that may be imposed to meet mandated water quality standards for the Everglades. There is no information or discussion of the proposed bridges and added flow benefits in light of the water quality constraints. This is in stark contrast to the text presented in the Affected Environment (chapter 3) describing the long term trends in water quality and potential for non-compliance. The document acknowledges that water quality is related to the operating plan which is undefined for this project. Without additional information it is impossible to determine if the proposed plan is implementable or can be operated under the existing or future likely water quality constraints.

Accordingly, the flow benefits may be constrained or additional water quality treatment required to fully implement the desired levels of flow. The costs and responsibility of these requirements are undefined.

Section 4.3.3 Wetlands

The proposed higher operating levels of 9.7 feet will create a significant tailwater on the outflow structures for WCA3B resulting in potentially adverse peak stages for long periods within the WCA3B marsh. This impact was acknowledged in the Final 2008 Tamiami Trail Modifications LRR and EA Engineering Appendix as stated:

> "The L-29BC acts as a stage equalizer upstream of the roadway embankment and this increased stage is then propagated into WCA-3B as water is discharged through the S-355s and potentially other passive structures (ΔS) in L-29 (resulting in a stage increase for WCA-3B of $\Delta H + \Delta S$)."

The current wetlands assessment does not discuss these potential impacts to WCA3B and the related environmental resources. It can be anticipated that some habitat impacts are likely as water levels in WCA3B are increased and these should be tempered with proposed measures to limit these impacts until the marsh has adapted to a new equilibrium around the higher operating water levels. This progression would affect the timing of when the desired flow rates and operating maximum could be achieved.

Section 4.12 Socioeconomics

Staffs at SFWMD and ENP have previously discussed the potential impact of increased water levels resulting from TT Next Steps implementation on the S-12D communication tower owned by SFWMD. There is no mention of this need in the real estate discussion on page 4-72 or within the Real Estate Appendix G. Please provide justification why this relocation is no longer required by the project. If this relocation is still desired by ENP, the real estate appendix should reflect this requirement as justification to secure federal funding.

Real Estate – page 4-72

Construction of the new bridges and other road improvements require additional road right of way south of the existing highway. There is no discussion of the options ENP would exercise to replace park lands impacted by the new bridges and road improvements. Would the impacts fall within the ENP authority to modify the park boundary to accommodate these impacts or would Congressional approval be required? Will replacement lands be required and what lands would ENP seek to incorporate?

Engineering Appendix; Section 6.3.4 and 7.7 Drainage and Runoff Treatment

There is no description of the anticipated volume of water to be treated as runoff from the bridge surface and therefore, the adequacy of the treatment cannot be determined. A more definitive analysis will be required to obtain permits and additional retention/treatment may be required.

This could impact the anticipated design on the collection system at the ends of the proposed bridges.

Engineering Appendix; Section 10 Operations and Maintenance

This section identifies SFWMD as the party responsible for maintenance of the areas under the constructed bridges. These costs are not captured in the project costs as long term maintenance costs associated with this project. Without this information, there is no mechanism to secure federal funding of these costs and these costs are not currently part of the anticipated SFWMD future maintenance plans.

Maintenance costs of the L-29 canal and control structures S-333, S-334, and S-355A/B would also be greater than current conditions under a higher operating water level as proposed with new bridging. These costs should be factored into the overall plan and the appropriate federal funding of these costs included in the project total.

Engineering Appendix; Section 12.1 Construction Durations

This section identifies a Notice to Proceed (NTP) construction start of January 2, 2013 and is dependent on the completion of the currently authorized 1.0 mile bridge project on TT. Additional dependent projects such as the Modwaters Seepage and Conveyance components should be completed prior to a NTP for the new bridge sections and an operational permit acquired for the S-356 pump station.

Tamiami Trial Modifications: Next Steps
Summary of Findings and Draft Environmental Impact Statement

SFWMD Comments: Reviewer No. 2

Comments on Appendix A – Section 2

I. General Comments

- Much of the material currently provided in Section 2 of Appendix A provides project background, but is not directly applicable to the hydrology and hydraulic analysis performed as part of the evaluation criteria for the EIS.
- An additional sub-section (2.11) of Appendix A is needed to further describe the application and assumption of terms in the manning's equation analysis described in section 2.3.3 of the main body of the EIS.
- An additional sub-section (2.12) of Appendix A is needed to further describe the HEC-RAS application and derivation of the normalized scores described in section 2.3.4 of the main body of the EIS.

The hydrologic and hydraulic PMs used in the EIS are not described in sufficient detail in the main body or the Appendix. While I am confident that this is primarily a documentation issue (the previously performed analyses detailed in the appendix would lead to similar conclusions), it is none-the-less something that should be addressed prior to finalizing the report.

II. Comments on Content and Conclusions:

- In general, the appendix provides an appropriate level of previously published background information. The conclusions drawn in the main body of the EIS are consistent with analysis performed by earlier efforts, although this is not explicitly stated.
- The hydrology and hydraulic analysis described in sections 2.3.3 and 2.3.4 of the main body of the document are largely independent of the material in Appendix A, with the exception of section 2.5 (NSM) which is directly used in the development of PM3.
- While the results of the NSM data analysis and RMA-2 modeling performed for the 2005 RGRR are presented in detail, no description is given of the Manning's data analysis (PM3) or HEC-RAS modeling effort (PM4) used in the evaluation criteria of the EIS is provided.
- I'm not sure what the basis is for using the 0.1 fps threshold as an indicator of damaging conditions to ridge and slough environment. Some of Jud Harvey's work (2008) indicates

that flow velocities of equal to or even greater than 0.1 fps (e.g. 3.3 to 6.4 cm/s) are needed for Everglades sediment entrainment. These types of conditions may be necessary under some circumstances.

II. Editorial Comments:

- Section 2.3, paragraph 1, sentence 1: revise to "… from rainfall, from Lake Okeechobee and from upstream basins…"
- Section 2.5, paragraph 1, sentence 4: replace "NSM accounts for" with "simulated NSM conditions are an appropriate surrogate for the expected outcomes of"
- Table 2.1, column headers: Should "West Brook" and "East Brook" be "West Book" and "East Book"?
- Image quality of Figure 2-10 needs to be improved (cannot read tables even when enlarged).

Tamiami Trial Modifications: Next Steps
Summary of Findings and Draft Environmental Impact Statement

SFWMD Comments: Reviewer No. 3

Comments on Chapter 4 (Environmental Consequences)

I) General Comments

Chapter 4 is a very comprehensive discussion of all the specific and perceived impacts associated with the six action alternatives of the Tamiami Trail Modifications: Next Steps project. Impacts were grouped into sixteen topics, of which many had multiple sub-topics such as, the Special Status Species topic, which had subtopics dealing with the Florida Panther, manatee, Snail Kite, Eastern Indigo snake, Cape Sable Seaside Sparrow and the Wood Stork. Each topic was discussed using the same format; policies and regulations, methodologies used, no-action alternative evaluation, and action alternatives evaluations. The impacts of the no action alternative were said to be "already realized from the construction of the 2008 LRR/EA preferred alternative (1-mile eastern bridge)," and as a result the analysis for each topic was exactly the same: "If the No-Action Alternative is selected as the preferred alternative, there would be no additional direct or indirect short- or long-term impacts."

This repetition of findings was also prevalent throughout Chapter 4 whenever it was required, by Executive Order 13514, to discuss climate change. Chapter 4 does a very good job of describing the findings of the Intergovernmental Panel on Climate Change (IPCC) and the Second Report of the Miami-Dade County Climate Change Advisory Task Force (CCATF). It does not do a very good job discussing the <u>implications</u> of these findings relative to the action alternatives. Rather than incorporate the large-scale implications of climate change and sea level rise into the section on Cumulative Impacts, this EIS simply repeats "that global warming would result in many changes in the natural environment" and that "sea level would rise an additional 1.5 feet in the next 50 years." It is not clear why this was repeated over and over, or why climate change was not mentioned in, the most appropriate action topic of, Hydrology.

A discussion of Cumulative Impacts as part of the Action Alternatives is a valuable and important element of this EIS. It helped point out the dependencies of this Next Steps program on other projects such as River of Grass, WCA-3A Decompartmentalization and MWD. However, Cumulative Impacts made a very simple but possibly incorrect assumption that these upstream programs will supply the water quantity and water quality needed to produce the flow capacities and habitat needs without damaging upstream habitats. The Cumulative Impacts sections reads like a justification to move forward due to large-scale downstream benefits, but there was no discussion of possible large-scale upstream impairments.

Also, discussing the construction of additional bridges across Tamiami Trail without a concomitant discussion of the operational plan creates a serious inability to evaluate any of the alternatives, and although the Cumulative Impact discussions goes a long way to reduce this deficit, it is not enough, especially in terms of water quality. Discussion of water quality in relation to greater residence times upstream, loading rates, and potential downstream impacts was particularly inadequate in light of the fact that much is known about the reasons for this

Extra Steps program and the water quality benefits and impacts associated with the operations of any of these action alternatives.
Finally, there was a tendency to couch the Minor, Moderate, and Major impacts thresholds over a relatively large area and long-term characteristic of the landscape. However, The analysis area was consistently disconnected by instead referring to "the 10.7-mile project corridor including the 50-foot right of way" (see pg 4-25 on Floodplains).

II) Specific Comments

1. Pg 4-1 – 4.2: Definitions of analysis terms is well done.

2. Pg 4-2: Cumulative Impact analysis technique would have been better implemented if there was a numeric measure used. A numeric approach would have removed the perception that this is a very subjective evaluation tool.

3. The Design High Water (DHW) discussion is confusing. Is the Next Steps program based upon the 20-year 9.7 ft criteria of the 100-yr 10,1 ft criteria?

4. Pg 4-10 – 4.12: The whole topography and soils topic should have tried to deal with a more CERP-like performance measure such as, Ridge and Slough microtopography. Peat loss is indeed important, however returning Everglades function requires differential peat loss and accumulation rates.

5. Pg 4-11: The statement that " the implementation of MWD and CERP projects planned for the Everglades area is anticipated to result in a cumulated long-term beneficial effect on soils" is false because these programs do not have plans for water quality improvement projects, and because nutrient loading rates to the Park will likely increase soil TP.

6. Pg 4-15: References for the velocity targets should be given since this is a goal with much uncertainty.

7. Pg 4-28 -- pg 4-29: Even without an Operational Plan it is clear that all action plans will increase ecological connectivity. The problem is that this is considered to be completely beneficial in this EIS when the spread of exotic fish from upstream canals may be an impairment to the Park. How can one implement exotic species control for exotic fish?

8. Pg 4-67 – 4-72: This topic on Socioeconomics is complex. It is great that a actual model was used to supplement the evaluations. However, more effort should have been spent upon the cumulative impacts associated with recreation, fishing and environmental justice.

Tamiami Trial Modifications: Next Steps
Summary of Findings and Draft Environmental Impact Statement

SFWMD Comments: Reviewer No. 4

Comments on Chapter 2 – Alternatives

I) Introduction/Outline:

The following is an assessment of the alternative evaluation approach, including a) the appropriateness of the recommended Performance Measures (PMs) to quantify attainment of project specific goals and objectives, b) a review of PM scoring and ranking methods and c) a review of the overall ranking or integration of PM scores (to select a TSP).

II) Appropriateness or relevance of PMs to project goals and objectives:

The goals and objectives of the Tamiami Trail Modification project include: attainment of more natural connectivity including increased flows and velocities and increased sheetflow. Increased connectivity is expected to benefit ridge and slough habitat within ENP wetlands. In addition to flow and habitat benefits, the project is expected to benefit (or at least not harm) wildlife and cultural resources.

Eight of the original 13 PMs used in the 2005 RGRR and 4 additional PMs from the 2008 LRR were screened out of the original list of potential PMs because no hydrologic model output was available for the alternatives in question.

The Draft EIS indicated that two types of PMs were applied to evaluate the varying (6) project alternatives. The first class of PMs was ecological and the later set was developed for cultural resources. In total 8 PMs were applied to the Tamiami Trail Modification project. The main focus of this evaluation is the ecological PMs.

a. Ecological PMs included:

   i. PM-1 <u>Potential connectivity of Water Conservation Area 3B marsh and Northeast Shark River Slough as percent of total project length</u>- the PM is justified and consistent with the goals of the project. The metric used was miles of bridges (relative to the potential 10.7 miles maximum bridging extent).
   ii. PM-2 <u>Number of sloughs crossed by each alternative</u>- although the goal of the program is not only to rehydrate sloughs, but rather to achieve natural system hydroperiods, the metric is consistent with the goals and objectives of the project. By hydrating sloughs one also hydrates neighboring habitats within the ridge and slough mosaic of the Everglades. Without hydrologic output, one cannot evaluate the effects on varying habitat types. During alternative design and associated modeling, potential effects of high stages and extremes should be evaluated. Similar to the PM above, this PM uses miles of bridges as the metric but combines location to determine the number of historic sloughs the bridges will cross.

iii. PM-3 <u>Flows into NE Shark River Slough (NESRS) provided via bridge</u>- The PM is consistent with the goals and objectives of the project and the metric effectively characterizes relative potential flows of the varying alternatives to the estimated marsh capacity of an approximately 11 mile stretch of marsh across NESRS (from the L-67 to the L-31 ext). The metric used was miles of bridges. *(One uncertainty is the 200 ft wide intervals used to calculate marsh capacity. Given that the HAED is not available at 200 ft intervals it s unclear what data was used)? Additional uncertainty associated with actual bridge length and sloping and support features-detailed design phase.*

iv. PM-4 <u>Difference between average velocity in Marsh and average velocity at road</u>- this PM is consistent with the goals and objectives of increased flows and sheetflow. The model HECRAS was used to simulate the bridge and culvert alternative. HECRAS indicated that all alternatives could pass the potential needed maximum flows of 6200 cfs. Although noted in the Choosing by Advantage (CAB) report- table 4 lacks the average flow velocity in the marsh and hence the normalized scores are assumed to be correct. Additionally, it is unclear that the normalization effectively characterizes the ecological impact of varying flow velocities associated with each alternative. It more or less assumes a linear relationship between equitable flows and ecological performance. There is considerable uncertainty surrounding the exact shape of this curve and the range of velocities needed.

v. PM-5 <u>Reduction in wildlife mortality</u>- consistent with the do no harm objective, this PM aims to forecast the effects of bridging on highway mortality of Everglades wildlife. Although an understandable objective and important, the methods used to quantify this effect appear to be crude and lack references and supporting evidence. The general assumption that increased bridging will decrease access to the road may be correct, but without a stronger understanding of species and population dynamics, this is a big assumption. An alternative assumption could be that bridging leads to concentration effects by neighboring structures thereby making wildlife more susceptible. This PM is focused on the footprint of the project and does not account for the potential benefits that the hydrologic feature can provide across the larger domain (ponded upstream habitat and dry downstream of Tamiami Trail.)

vi. PM-8 <u>Impacts to wetlands</u> (Uniform Mitigation Assessment Method or UMAM approach)- The UMAM PM is focused on the footprint of the project. Construction features were intersected with the Land Use Land Classification layer to estimate the amount of permanent effects to wetlands. The impacted area before and after alternative implementation are compared. Without a specific listing of the acreages used, the UMAM scores cannot be replicated.

b. Cultural resource PMs included:

i. PM-6 <u>Impacts of Tamiami Trail as cultural resource-</u> under this PM, the alternative that minimizes the length of roadway removal performs the best.
ii. PM-7 <u>Impacts to historic properties-</u> provides a qualitative description of the potential impacts to 3 historic properties. Impacts are described as limiting access, loss of usable ground, degradation of the visual setting, etc.

III) PM Scoring and weighting/ranking methods:

a. The PM scoring methods were more or less described in the CAB document and in Chapter 2. Because bridge length (and in some cases location) were used as metrics for the first five environmental PMs, all of the PMs score similarly. The rank performance for each alternative is the same for each of these PMs. Only the UMAM PM scores differently. It is difficult to evaluate the UMAM PM given the limited documentation available. For PMs 1 -5, the alternatives rank (from best to worst) is 6E, 2A, 1, 5, 4, and lastly the no-action alternative. The UMAM PM, which is mainly focused on the project footprint, scores the no-action alternative the best, followed by 6e. The remaining alternatives perform more or less the same.
b. The weighting/ranking methods are not described in detail. A table of PM scores and importance values is provided. The current method assigns the most importance to the sheet flow factor and then workshop participants weighted all other factors on the same scale. This is an outcome of both the CBA and the defender-challenger process. One would likely have to refer to detailed meeting notes to determine what factors were considered when establishing the relative weights. It is more transparent to apply equal weights across alternatives for each PM thereby providing a weighted score for each metric which can then be aggregated to select the TSP.

IV) Aggregation and synthesis of PMs:

Once performance of alternatives was evaluated using individual PMs and the PMs were ranked based on importance, scores were then aggregated to come up with a single importance score. The alternative scoring the highest was selected as the recommended alternative. It should be noted that the measure or metric used for Performance Measures 1, 2, 3 and 5 was the same measure. Bridge length was used as a proxy for these PMs (noted above). For some of the PMs bridge location was also part of the consideration. Although the ecological justification is warranted, using the same measure leads to similar results. Although the goals are appropriate, it is likely better to provide the narrative about goals and objectives and point out that a single measure can be applied. Although PM 4 does not use bridge length as the measure, alternatives rank exactly the same for PMs 1-5. (Basically the goals are correlated yet not exactly the same, yet the same metric was applied. Essentially this can overweight the goal relative to other project goals). In addition to having the same or highly correlated metrics, these same PMs were all weighted as the most important factors. This compounds the potential weighting bias. Although the results would likely be the same, the perception is that there is overemphasis on a single or highly correlated set of metrics.

It should also be noted that the cultural resource PMs and the UMAM PM were weighted the least (see discussion above). Although the cultural resource PMs score the alternatives nearly opposite to the ecological PMs, when aggregated these measures provide little input to the total alternative score given the low weights assigned.

V) Value analysis/cost benefit:

Overall this is a cost accounting section that compares the estimated benefits with costs. Figure 2-6 and table 2-14 show the distribution in cost-benefits across alternatives. Although all alternatives (except the no-action) were deemed cost effective, alternative 6e was decided to be the most efficient. Alternative 6e clearly provides the most benefit yet it should be noted that it is hard to say that the alternative is the most cost efficient. Given the uncertainties associated with the above methods, alternative 2a also appears to be very cost efficient relative to the other alts. The cost per unit lift for Alt 6e and alt 2a is $0.99 and $1.0, respectively. *One factor not included is the potential adaptive management costs if alt 2e is not sufficient in scale. Alt 6a provides needed flexibility and robustness.*

VI) Assumptions and related Uncertainty:

Achievement of the benefits noted in chapter two and the CBA document (Appendix A&B) is based on set of critical assumptions. Given that timelines and certainties of the scale and scope of other everglades restoration projects is uncertain, the benefits ultimately achieved by the TSP are also uncertain. This approach is different from the traditional USACE planning process of looking at the project in isolation (or the next added increment process). The following list of assumptions must be met to maximize the restoration benefits of the selected plan.

Assumptions:

a. All of the alternatives assume 9.7 foot stage constraint in the L-29.
b. L-29 levee and canal will need to be removed for true marsh connectivity and sheetflow to occur. In the interim the S333 and L-29 will still be used.
c. A seepage buffer along the E levee is needed or much of the flow is likely to be lost to seepage
d. Lack of modeling results limit the understanding across the larger spatial extent N and S of the Tamiami Trail and this has led to dependency on earlier efforts and BPJ.

Uncertainty:

a. Section 5 of CBA indicates equitable distribution of flows yet introduction indicates distribution was not even? This is a bit unclear and the exact distribution of flows or target distribution has uncertainty associated with it.
b. Location of culverts- this is based on historic distributions since road construction. Landscape features may have changed in the region (sediment deposition, TI formation, etc) adding uncertainty to PM-2
c. Relationship to CERP and other programs/projects

VII) Conclusions and recommendations/ Take home result:

Chapter two of the Draft environmental impact statement links the goals and objectives of the project to the specific performance measures applied. Additionally the chapter and related materials (Appendix A&B) provide an overview of the PMs and how they were scored and how the PMs were weighted and aggregated in order to select a Tentatively Selected Plan. Overall the

PMs selected were consistent with the goals and objectives. Although the metrics associated with the PMs were duplicative, this would likely not have changed the result of the evaluation. Increased bridging is expected to increase sheet-flow and provide more natural hydroperiods. Key assumptions include future projects degrading and removing the L-29 levee and canal, thereby leading to true sheet-flow (as well as some form of seepage buffer in NESRS). Currently although flows would pass into NE shark river slough via the bridges, water would still pass through the canal. Under current conditions some control capacity is likely desirable given the potential to have effects upstream of the project. Without alternative hydrologic model results this factor cannot be effectively evaluated. Over time as increased water storage and treatment are available, the northern and southern projects are expected to come into alignment. Current discussions with the CERP DECOMP project include a Northern spreader canal that would increase sheet flow at the NWCA3A boundary. Maximizing natural flows at Tamiami Trail through increased bridging is consistent with the system level objectives including those of the CERP program and the Long-term Plan. Alternative 6e provides the greatest potential benefits given the above assumptions are met. It will also likely provide some interim benefit to some of NE SRS. Ultimately shifting flows from WCA3A (including the S-12s, etc) toward NESRS is highly desirable to achieve natural system hydrologic targets and to achieve corresponding ecological benefits in the ridge and slough and neighboring systems.

Tamiami Trial Modifications: Next Steps
Summary of Findings and Draft Environmental Impact Statement

SFWMD Comments: Reviewer No. 5

Comments on Chapter 3 (Affected Environment)

I. General Comments

This chapter describes the current environmental conditions within the project area, basically setting the stage for Chapter 4 in which potential impacts of the alternatives are noted. In its present format this chapter is repetitive, however, that may be the nature of an EIS document. If not, I suggest the length of the chapter be cut by 50 percent. Also, perhaps use a single editor to ensure the style and level of detail provided are more consistent throughout the chapter. Throughout the chapter, the Water Conservation Areas are discussed as though they are not part of the Everglades, while it is true they are not Everglades National Park, they provide more environmental benefits than just impoundments. I only make this point, because in Chapter 4 significant emphasis is placed on the importance of reconnecting the ecosystem.

II. Specific Comments

- Add p values for all statements that suggest significant differences were found, or remove the word significant.

- Figure 3-3. Suggest the addition of the equation for the trend line for Transect 2. For transect 3, a straight line may be equally viable, indicating no change with distance from canal. Suggest evaluating both no trend and trend line.

- Page 3-8, second line. The L67's were constructed to stop eastward seepage.

- Many of the detailed information, e.g., number of birds in the system, use Lodge 2005 as a reference. More technical references would be appropriate. Many of the figure legends, e.g., Figure 3-3, have a heading of time series. Yet values over time are not presented, but summarized in box plots. Suggest eliminating time series from the name.

- Table 3-2. Assuming TP load, Kgs, is kilograms, the correct unit is kg. Given the other units are imperial, suggest switching all units to metric, or all units to imperial.

- Page 3-15. Statement that "average TP concentrations….into Northeast Shark River Slough…..are above this ecologically meaning threshold…" needs to be clarified. The TP threshold is based on geometric means, it is not clear from this statement whether arithmetic or geometric means were calculated.

- Page 3-15, nutrient effects downstream of culverts may also be attributed to localized loading, even if TP concentrations were at or below the TP threshold. This may be a good place to make this point because it provides further support for creating larger openings in the landscape, as opposed to smaller bridges or culverts.

- Page 3-16, statement that community changes with even small increments of TP, e.g., 5 ug/L above background, should also note that the loads were high too.

- Page 3-17, define SpC.

- Page 3-19. Referring to Figure 3-13.."During recent years, since 2007, an increasing trend in sulfate…". It should also be noted that higher values were observed in 2004 and 2005. The trend lines alone are not that convincing, suggest further data analysis.

- Table 3-3. Because data are not paired, e.g., S333 has a POR of 1997-2007 for Cd (n=56), while Frog City POR= 1997-2000 (n=7), it is hard to draw any conclusions about the data. Suggest running comparisons for paired data to see if the same differences were observed.

- Page 3-21, 1st line, last paragraph- remove quarterly from descriptor of ambient monitoring program, because later on state that sediment samples were collected semi-annually. Also add when the program began, such that the above detection values observed since March 2008 can be put in context.

- Figure 3-15, not sure that I agree that values changed with distance from the S333 as there is no apparent consistency and values are all low. Were statistical tests run?

- Page 3-23. Not clear what is meant by (Fig 3.16b)?

- Figure 3-17. Suggest using different symbols of similar size for clarity because it is hard to see the decrease that is discussed in the text.

- Page 3-26. Suggest rewording sentence that suggests soil depth, plant composition etc are metrics of water depth.

- Page 3-27. The sulfate concentration bullet is misleading because high concentrations were also observed in earlier years. See prior comment on Figure 3-13.

- Figure 3-19. Appears to be a lot of sawgrass in this slough?

- Page 3-33. .."dahoon (Ilex…" should be dahoon holly.

- Page 3-36. No scientific name for banana lily.

- Page 3-38. I think the author means WCA3. Because while WCA3B is the Francis Taylor Wildlife management area it does not have a western boundary of Cypress trees.

USFWS should be the Florida Fish and Wildlife Conservation Commission, as the State agency manages the land.

- Page 3-41. WCA3B is not a reservoir.
- Page 3-43. Gray Fox and Racoon should not have the same genus and species.
- Page 3-49. Suggest identifying panther symbols by color based on year of observation. This would alleviate any confusion with data range 1981 to 2009, yet no panthers found in the area during the last six years. Conversion between metric and imperial is incorrect for weight. Also, in some cases a weight range is given therefore the conversion should be provided as a weight range.
- Too much detail in describing individual birds and animals, and no consistency in format, e.g. some have weight, eye color, leg color, others do not. Suggest reducing the length of the descriptions.
- Page 3-55. Suggest adding a map showing the location of the sub-populations of the cape sable seaside sparrow.
- Page 3-57. "Three wood stork rookeries"..This is a little confusing, as Figure 4 has four rookery symbols in the area.
- Page 3-76, para 2. …"slight modifications to the roadway"…wasn't the road significantly rebuilt- hence the old tamiami trail? Somewhat misleading.

Comments on Chapter 4 (Environmental Consequences)

- It is currently impossible to assess the environmental impact of the alternative options because, as noted throughout the chapter, no operational plan has been developed.
- For example, in the discussion on water quality impacts "Long-term effects on water quality would result from implementation of an operational plan in association with this project alternative. Long-term effects to water quality resulting from operations remain unknown since an operational plan has not yet been developed for this project alternative. Since a water operations plan has not yet been developed and is not being analyzed as part of this EIS, long-term effects to water quality would need to be assessed as part of any future project that implements an operational plan"
- How the system is operated will have a significant impact on downstream areas. For example, localized loading of nutrients was a key point made in chapter 3, resulting in vegetative "halos". As a result of just nutrients, one alternative is likely to have a greater long term impact than another. Higher flows through smaller gaps will likely have a greater local impact, than lower flows through larger gaps. Similarly, gaps more widely distributed across the project area are likely more beneficial than those located at either

end.

- Philosophically, increasing the connectivity is a key goal in Everglades restoration, and this document frequently cites the role this project plays in concert with other restoration efforts. Ultimately this is likely a positive move, however without any understanding of how the system will be operated, both before, during, and after the completion of other listed projects, the impact of this project this cannot be assessed.

Tamiami Trial Modifications: Next Steps
Summary of Findings and Draft Environmental Impact Statement

SFWMD Comments: Reviewer No. 6

Comments on Chapter 3 (Affected Environment)

I. General Comments:

- In general, the information contained within the chapter is adequate to describe existing conditions; however, the document contains speculative and statistically unsupported trends, conclusions, and predictions. In some cases data are presented without context or an inappropriate context. There are also numerous factual errors.

- It is recommended that Chapter 3 be substantially revised. Specifically:
    - The document needs a thorough review for accuracy
    - Statements regarding data trends and significance should be limited to published statements (i.e., authors of the EIS should avoid drawing their own conclusions unless supported by a rigorous analysis)
    - Statements relating data to environmental impacts require context so that the reader can draw their own conclusion; and
    - Use of ambiguous terms and statements should be removed (text should be factual).
- It is also suggested that the authors make use of an additional data source. There have been numerous Investigator Annual Reports (IAR) and Comprehensive Annual Reports (CAR) submitted to ENP by SFWMD as required by the Test-7 Collection Permit. These reports contain environmental monitoring summaries for sites in Shark River Slough and WCA-3B.

II. Specific Comments:

Provided below are some specific examples related to suggested recommendations above.

- Page 3-2- Provide the value(s) of the correlation coefficients (r=?) such that the strength of the relationship can be quantitatively established.

- Page 3-4- Is the statement "Since Tamiami Trail was constructed…" supported by independent research or is this an author's supposition? I am not aware of any study or data that concludes that sediment in sloughs has accumulated as a result of the influx of sediments.

- Pages 3-8 and 3-9- The section on "Current Surface Water Conditions" should be reviewed to produce a concise and accurate summary of current conditions.

- Page 3-9- The term "dwindling" is vague. This sentence implies that there will be less water in the future than now, not that human resources will require more water resulting in less water for the environment.

- Fig 3-5 and 3-6- It would be helpful if the sampling locations labels were the same.

- Fig 3-6- "Mean time series" is a redundant and meaningless phrase when reporting box plots.

- Page 3-14- What are the annual TP loads for the S-333?

- Page 3-15- The statement "However, it should be noted…" should be removed given the hyperoligotrophic nature of the Everglades, the entire systems is sensitive to "slight" increases in nutrients and teeters constantly on noncompliance.

- Page 3-15- The TP threshold is a geometric mean of 0.010 mg/L not an arithmetic mean. Are the references to "average" TP concentrations the geometric or arithmetic mean? This needs to be made clear throughout the entire document.

- Page 3-16- Example of context issues. While it is true that the DO standard for Class III waters is 5.0 mg/L, it must be stated this value is not appropriate for the Everglades. Oxygen values fluctuate greatly throughout a 24 hr period and the Florida's Department of Environmental Protection has suggested a mathematical procedure to convert point measurements to a daily value. Daily DO values in wetlands rarely meet this standard due to shallow water depths and greater amount of organic matter increasing respiration rates. It is unclear why discussion of standards for Class III waters was limited to just DO and did not include reference to other constituents, like specific conductivity? There is a value, and like DO, has little relevance to wetlands. Nonetheless, consistent context should be maintained throughout the document. I disagree with the statement that SpC increased with distance from the S-333. The means are likely not statistically significant given the box-plot characteristics. It is highly probable that sample size is having a profound effect on the author's interpretation. More importantly, one would be hard pressed to conclude that patterns in DO, pH, and SpC along the L-29 are ecologically significant or meaningful. Scientifically and statistically there is no gradient.

- Page 3-18 and Fig. 3-12- Again I disagree that a discernable and ecologically meaningful pattern can be drawn from the presented data. Suggest that just the data be presented and interpretations left to a minimum or qualified expert.

- Page 3-19, Fig 3-13, and Fig-14- The statement regarding an increasing trend is unsupported and meaningless given that they fall within historical patterns. Moreover, outlandish statements like "During recent years, since 2007, an increasing trend in sulfate concentration was recorded at the S-333 monitoring station is a concern due to concentrations of mercury…" need to be avoided. The data presented in no way supports this statement and is pure speculation. The fish data in Fig 3-14 are not from Shark River Slough, as stated in the text, but the L-67 canals. Also the trend in fish mercury concentrations does not follow the sulfate trend at the S-333.

- Page 3-20, Fig 3-15, Table 3-3. The values reported for these constituents are close to the minimum detection limits. With regards to the outliers, was there a QA/QC procedure utilized by the authors to warrant inclusion in the data presentation? Were the datasets reviewed for flags and qualifying statements? These values need to be put in context regarding the ecological concern (e.g., LD50's). It is highly likely that the purported trends lack an ecological concern.

- Page 3-26- What is the definition of an aquatic consumer? Does this include macro-invertebrates, fish, birds, reptiles?

- Page 3-26- I strongly disagree that a water quality gradient exists across the L-29.

- Page 3-27- Quantify what is meant by a strong relationship. A statistically strong relationship is defined by high correlation and regression coefficients.

- Page 3-38 and 3-39- Example of inaccuracies in the document- Management of the Francis S. Taylor Wildlife Management Area is the responsibility of the FWC not the USFWS and a cypress forest does not fringe the western border of WCA-3B.

- Page 3-42-Odd that bass are not included in the recreational fishery.

- Page 3-46- Anthropomorphic should be changed to anthropogenic disturbances.

- Page 3-48- "The American alligator, federally listed due to similarity in appearance…", similar to what?

- Table 3-8- Are there no federally listed plants in the project area? If not, state so.

- Page 3-49- "The Florida panther…would reach seven feet…", what prohibits males from reaching this?

- Page 3-51- Accuracy, 1000 lbs does not equate to 200 kg.

- Page 3-55- Taylor Slough is not in the vicinity of Collier County.

- Page 3-81- A map depicting the census zones 1, 2, and 3 for the project would be helpful. I find it difficult to believe that 30,000+ people live within 3 miles of the project area.

Comments on Chapter 4 (Environmental Consequences)

Chapter 4: Environmental Consequences examines the impact of each project alternative as they relate to the affected environments described in Chapter 3 both in terms of beneficial and adverse impacts. Summaries of relevant laws, policies, and assessment methods are also provided.

- One issue that could be better addressed is the analysis of Water Quality (section 4.3.2). Granted it is difficult to know with certainty what long-terms effects are likely without an operational plan; however, the topic still should be addressed in the EIS because the greatest negative ecological impact associated with the Tamiami Trail modifications will occur in the interim period between completion of this project and the entire restoration effort. Any interim operational plan implemented before the "Cumulative Impacts" can be realized will have likely have an impact that can be described in as a "realm of possibilities" or "worst case scenario". It is one thing to admit there will be a long-term effect and another to say that it remains unknown and it will be dealt with later (Page 4-17, 2nd paragraph in the analysis section). The EIS should outline what the concerns are and offer suggestions to have them minimized when the operation plan is developed.

Tamiami Trial Modifications: Next Steps

Summary of Findings and Draft Environmental Impact Statement

SFWMD Comments: Reviewer No. 7

Comments on Appendix F – Socioeconomic Report

I. General Comments

Cost Effective Analysis: Page 23.
Need to provide a reference where this method has been applied elsewhere in a similar context. I cannot follow the logic of how these numbers were calculated. For example, how were the "Importance Score" numbers calculated and how were these numbers converted into "Cost per lift"? In addition, how does the no Action Plan achieve a score of 70? What is the uncertainty of these analyses? This section needs a lot of work in terms of explaining the methodology especially since these numbers are converted directly into a cost which appears to the primary basis for the selection of the final alternative 6e. This section is weak and needs significant improvement for the non-economist to understand. Perhaps the method is explained in another part of the document which I have not read.

Impacts to Regional Water Supply: Similarly, the report does not address potential impacts of alternative 6E on regional water supplies and existing legal users located within the project area. Water levels maintained in WCA-3B currently seep underneath the eastern perimeter levee providing recharge to Miami-Dade County's Northwest wellfield. The draft report does not address potential impacts of alternative 6E on the adjacent Northwest wellfield which seems like a major deficiency in the draft report and not accounted for in its economic analysis. As stated in the report, the Northwest wellfield is the largest drinking water wellfield in the state and supplies 40 percent of Miami-Dade County's potable water.

Recreation: The FFWCC and the South Florida Anglers for Everglades Restoration (SFAER) have previously identified the WCA canal system and adjacent marshes as an important recreational fishery for the region. Florida is the fishing capital of the world. A survey take in 2006 found that 14% of Florida residents fish. The WCAs represent one of the "Top 10" bass fishing destinations in Florida and supports the highest catch per angler effort for largemouth bass of any water body in the state and also supports excellent catfish and bluegill fishing. The WCAs support hundreds of bass fishing tournaments each year, are important to the state in terms of fishing licenses issued, and to the local economy that support local bait-and-tackle shops, fishing marinas and fishing guide services. I was surprised that Table 16 in the report (Demand & Facility Needs) did not include fishing within the Regional 11 nor was the economic impact of fishing in the

WCAs specifically addressed in the report. I would have to assume that alternative 6e will have little impact on fishing in the WCA canal system. If that is true it should be stated in the report.

II. Specific Comments

Page 3, paragraphs 2 & 3. Provide reference where this information comes from.

Page 4, Eliminate the acronyms RED, SAP and OSE in report, they are not necessary.

Page 6, Fix the obvious problems (column width/point size) in Tables 1, 12, 14

Page 7. It would be helpful to provide a map of where Zones 1, 2 & 3 are located.

Page 10. Need a summary paragraph to Section 3:Socio-Economic Profile. What does all the demographic/statistical data tell us?

Page 10 Last paragraph. part of first sentence……making the state a significant <u>tourism</u> and retirement destination…..

Page 15,
3.3 Land Use, 2nd paragraph. The dominant natural features are the Everglades National Park, <u>WCA-3A and WCA-3B (Everglades and Francis S. Taylor Wildlife Management Area),</u> and Biscayne National Park……..

Page 17
3.4 Water Demand

Suggest replacing 1st sentence with <u>….The principal ground water resources within the study area are the Surficial Aquifer System (SAS), including the Biscayne Aquifer, and the Floridan Aquifer system (FAS). Both are critical to the local ecology and economy of the region. The surficial and Biscayne aquifers provide most of the fresh water for public water supply and agriculture within the region. Due to the regional importance of the Biscayne aquifer, it has been designated as a sole source aquifer by the U.S. Environmental Protection Agency under the Safe Drinking Water Act and is therefore provided stringent protection This designation was made because the Biscayne aquifer is the principal source of drinking water for the region and high vulnerable to contamination due to it high permeability and proximity to land surface</u>. (from LEC Water Supply Plan, SFWMD 2000).

Page 17

The figure showing the location of the major wellfields in Broward/Miami-Dade County needs a number, a title and a source.

Table 14. Might want to add a column to Table 14 adding up the numbers from Broward, Miami-Dade and Monroe counties so you know where the numbers come from in the text shown above the table.

Page 19.

Recreation. May want to mention that freshwater fishing, canoe/kayaking, airboating, birding, are also important recreational activities within the study area. See also my previous comments on recreation (page 2).

Tamiami Trial Modifications: Next Steps

Summary of Findings and Draft Environmental Impact Statement

SFWMD Comments: Reviewer No. 8

1. **Chapter2, Section 2.2.3, Page 2-7, Pavement Design;**
   Appendix A Engineering Report, Section 6.6.2 Pavement Design, Figure 6-1: Pavement Section (New Construction), Page 43

   Revise 12" Type B, LBR 40, SN=0.96 to 12" Type B Stabilized Subgrade, LBR 40, SN=0.96

2. **Chapter 4, Section 4.3.3.3, Action Alternatives, Analysis, Page 4-21**
   Chapter 4, Section 4.3.3.3, Action Alternatives, Conclusion, Page 4-23

   Consider the creation of wetlands as a result of the degradation of the road and construction of the bridge as one advantage (positive impact).

3. **Chapter 4, Section 4.5.3, Impacts of the Alternatives, Action Alternatives, Analysis, Page 4-31;**
   Appendix A Engineering Report, Section 6.6.6 Wetland Impacts, Page 45

   The conversion/degradation of the existing road to wetland should also be quantified and presented as part of the Analysis.

4. **Chapter 4, Section 4.9.3, Impacts of the Alternatives, Action Alternatives, Analysis, Page 4-54.**

   Revise the analysis. The airboat tour facilities are visitor use facilities.

5. **Chapter 4, Section 4.9.3, Impacts of the Alternatives, Action Alternatives, Analysis, Page 4-57, 3rd Paragraph.**

   This estimate for adding a bike path is too high. The minimum bridge width which has a 10-foot wide shoulder (Table E-1, page vii) can incorporate the bike path at no additional bridge construction cost. Likewise, the cost for widening the road for a bike path should be approximately $200K per mile.

6. **Appendix A Engineering Report, Section 2.62.6 2005 RGRR Alternatives for Tamiami Trail Roadway Modifications, Page 13**

Match the numbering system for each alternative with those shown in the Draft EIS Report

7. **Appendix A Engineering Report, Section 2.10 Basis of Design for the Modifications to the Tamiami Trail Roadway, Page 22, 3rd Paragraph**

   Correct the length of the bridges. Alternative 2A in the Engineering Report sums up to 3.4 miles vs. 3.3 miles in the Draft EIS

8. **Appendix A Engineering Report, Section 2.10 Basis of Design for the Modifications to the Tamiami Trail Roadway, Page 23, 2nd Paragraph**

   Correct the length of the bridges. Alternative 6E in the Engineering Report sums up to 5.4 miles vs. 5.5 miles in the Draft EIS

9. **Appendix A Engineering Report, Section 4.4.1 Bridge Structures, 1st Paragraph , Page 25;**

   Appendix A Engineering Report, Section 4.6 Anticipated Construction Techniques, Limitations and Problems, 1st Paragraph, Page 28

   Specify removal of muck prior to performing and driving of piles. This will eliminate the possibility of muck filling the preformed hole voids.

10. **Appendix A Engineering Report, Section 4.4.1 Bridge Structures, Page 26, 3rd Paragraph**

    Consider using clean sand to fill the preformed holes. Refer to FDOT 455-5.9.

11. **Appendix A Engineering Report, Section 6.1.2 Culverts, Page 31;**

    Appendix A Engineering Report, Section 7.1.5 Existing Culvert Extension, Page 50

    Identify size and length of existing culverts.

12. **Appendix A Engineering Report, Section 6.1.2 Culverts, Page 31,**

    When were the existing culverts installed? If these are nearing the Design Service Life of 50 years, replace these with new culverts.

13. Appendix A Engineering Report, Section 6.4.1 Roadway, Down Ramps and Bridges/Precast Arch-Type Bridge Culverts, Page 40

Revise MOT phasing to match plans and intent of project which is to widen the roadway towards the south.

14. Appendix A Engineering Report, Section 6.6.1.1 Roadway, Page 43

Consider adding bike path on each side of the roadway.

15. Appendix A Engineering Report, Section 7.4 Vertical Clearances, Page 50

Provide an 8-foot vertical clearance from high water elevation to allow for continuous access by SFWMD motor/air boats from the L-29 Canal to the south side of Tamiami Trail.

16. Appendix A Engineering Report, Section 12.1 Construction Durations, Page 55, 2nd Paragraph

Clarify duration to specify 6-day, 10 hour/day work week instead of 6 to 10-hour/day work week.

17. Appendix A Engineering Report, Section 4.4.2 Precast Arch-Type Bridge Culverts, Page 27;

Appendix A Engineering Report, Section 6.4.1 Roadway, Down Ramps and Bridges/Precast Arch-Type Bridge Culverts, Page 40;

Appendix A Engineering Report, Section 7.1.3 Precast Arch-Type Bridge Culverts, Page 49

Appendix A Engineering Report, Plates A-1 through A-2B;

Appendix A Engineering Report, Plates S-3, S-4

Consider using a girder bridge in lieu of the arch-type bridge.

18. Appendix A Engineering Report, Plate DR-E2, Option 2

Consider Option 2 but reduce taper length to minimize impact to existing wetlands.

19. Appendix A Engineering Report, Plate DR-C2, Option 2

Consider Option 2 but reduce taper length to minimize impact to existing wetlands. In addition, construct the eastbound exit ramp between the road and Coopertown. Shift the road alignment to the north to provide sufficient room between the road and Coopertown.

20. Chapter 4, 4.8.3 Impacts of the Alternatives, Action Alternatives, Analysis, Pages 4-48 through 4-51.

If bridges are constructed in areas where existing cultural resources exist, and if the bridges where designed to allow parking areas and traffic underneath, then relocation of the buildings may not be required.

Tamiami Trial Modifications: Next Steps
Summary of Findings and Draft Environmental Impact Statement

SFWMD Comments: Reviewer No. 9

I was able to review Chapters 2, 3 and 4 of the Draft EIS for the Tamiami Trail Modifications. I do not have any substantive additions/corrections to the document but do have an observation.

- In discussing the impacts of the alternatives, this draft EIS states that there is no water operations plan associated with the proposed project alternatives and therefore the long-term impacts cannot be assessed, specifically those associated with water quality and wetlands.

- The current draft of the Corps' ERTP document, (the proposed near-term operations plan) also does not address the potential impacts on water quality and wetlands. Perhaps the current draft ERTP is looking at a different timeframe, but if the Corps and ENP are not addressing these issues in the respective EISs, where does that leave the remainder of CERP and Everglades restoration efforts?

DERM Staff Comments
ENP Tamiami Trail Modifications: Next Steps Draft EIS
Submitted online July 27, 2010

Staff members of Miami-Dade Department of Environmental Resources Management (DERM) have reviewed portions of the Tamiami Trail Modifications: Next Steps Draft Environmental Impact Statement (DEIS). The following are general DERM staff technical comments on the DEIS.

Over one year ago, during the process for scoping of this DEIS, Miami-Dade DERM provided written recommendations, which stated in pertinent part:

> "…*The County recognizes that improvements to the Tamiami Trail are part of a critical step in achieving more natural flow of water from the Water Conservation Areas (WCA) to northeast Shark River Slough and Everglades National Park (ENP)… Miami-Dade County expects that improved flow will not only benefit hydrology and the ecosystem in ENP, but will also help to relieve unnaturally high water levels in portions of the WCAs, benefit fish and wildlife species (including listed species) in marshes and downstream areas, and enhance water quality and potential for water deliveries for human water supply. However, increased stages in eastern portions of the WCA and ENP and in certain canals may affect seepage and flood protection level of service to the east. The EIS should include evaluation of ecological and hydrological benefits, including effects on fish, birds, and other wildlife in WCA3a and WCA3b, as well as ENP. It should also evaluate water quality and quantity effects on the natural system and regional wellfields. The EIS should evaluate flood protection, including operational criteria for the S-356 and other seepage features under various canal stages and high water conditions."*

DERM staff continues to support this type of holistic approach. However, we understand that the DEIS is intended only to address alternative locations and sizes of bridge spans, and that changes to water levels, operations of water management features, and seepage management are to be evaluated in separate planning projects. DERM staff also acknowledges that stages in the L-29 and completion of other elements of restoration, such as Decompartmentalization, rather than the bridges alone, will have the most significant effects on hydrologic restoration and the volume of water that will ultimately move from the WCA3s to ENP, as well as related effects such as seepage to the east. Though the DEIS assumes a Design High Water of 9.7 feet for the purposes of evaluating potential of the various alternatives for passing water and for designing elements of the road and bridge elevations, this project will only address construction of the selected bridge configurations, and not itself result in changed water levels. Thus, it is expected that most hydrologic benefits associated with additional flow and possible impacts on ecological restoration targets (especially in the WCA3s), water supply or flood protection to the east will be limited, and therefore evaluation of these types of performance measures is largely absent from the DEIS.

In initial review of some sections of the DEIS, we find that it is not as clear as it should be the 9.7-foot Design High Water elevation is not recommended as an operating criterion, or that operating criteria and seepage will be addressed through a separate process. For example, in the current Section 1.5.3 Issues Not Addressed in this Plan (page 1-22 and 1-23), the Combined Operating Plan is mentioned only parenthetically, and water levels or benefits or impacts of increased water flows are mentioned only in a brief phrase. Also, some statements in other sections that refer to the 9.7-foot elevation could be misinterpreted as including an operation plan element (eg. page 2-13 "*For this project the Tamiami Trail would be improved to allow for a maximum stage in the L-29 Canal of 9.7 feet*" or page 1 of the Engineering Appendix *"Alternative 6E was selected as the preferred alternative and consists of approximately 5.4 miles of girder bridges separated into 4 sections with the remaining Tamiami Trail roadway raised to allow a stage of 9.7 ft-NGVD in L-29C…"*). Additionally, in the Appendix D: Floodplains Statement of Findings, Item 7 does not include any discussion on future operational criteria, future modeling studies, minimum flood protection level of service, possible benefits or possible impacts to the areas east of the L31-N, and to the floodplain. DERM staff recommends that a more detailed explanation of the process that will be used to address operating criteria in the region, flood protection, seepage management, and integration with other CERP projects be included prominently at the beginning of the report. If possible, a projected timeline should be included. There should also be clearer explanations of how the 9.7 foot DHW was selected and used in the development of alternatives, to distinguish it from an operating criterion. This explanation could be included or cited whenever the 9.7

foot figure appears in a description of the selected alternative, especially in introductory or summary sections of the DEIS.

DERM staff generally concurs that alternatives with larger bridge openings may have some immediate benefits related to more even distribution of existing flows to a larger area of sloughs and also may provide benefits for passage of wildlife, and even recreational users, from one side of the Tamiami Trail to the other. DERM supports the efforts to select alternatives that avoid and minimize direct impacts to cultural resources of the Miccosukee Tribe and to historic legal uses of marsh habitats for recreation. DERM staff also generally supports the selection of an alternative that will optimize future flexibility and potential for conveyance of clean water from the WCA3 to the south, since this is expected to offer greatest potential benefit to habitat and wildlife in Shark River Slough and in ponded areas of the southern WCA3A, and also to recharge the aquifer to help sustain existing water supply quantity and quality to the east. The selected Tamiami Trail alternative should not constrain future operational opportunities or coupling with related projects in the area. However, the county's full support for the Tamiami Trail improvements is conditioned upon a more comprehensive analysis, which includes operating criteria, seepage management and flood protection, and sequencing and integration with other restoration projects that address WCA3A and WCA3B.

DERM staff understands that CERP projects, and presumably other restoration projects must maintain existing level of flood protection and that projects must be designed and operated accordingly, and that this will occur as part of the Combined Operating Plan and Seepage Management Project. When this more extensive assessment of flooding and seepage occurs, it is important that information, either through modeling or other evaluation methods, be included to allow for objective validation of assumptions and conclusions. Following are more specific technical comments from the DERM Water Management Division outlining the type of flood level of service assessment that would be necessary for a more holistic review of the proposed bridge alternative as it would function together with a water management operations plan.

a. There was no flood routing analysis provided in the DEIS to evaluate possible impacts to the flood plain under stages as high as the Design High Water stage used in the report. The DEIS Report states that the Design High Water of 9.7 feet is based on the NSM and therefore does not take into consideration the urban areas to the east. A 100-year storm flood routing is necessary to map possible impacts to the floodplain, showing a comparison between 100-year maximum stages before and after the implementation of the alternatives. The last 100-year flood routing and mapping was performed under CSOP, but did not address this project. USACE and ENP should demonstrate that the new flood plain would not result in any impacts to the urbanized areas east of the L-31 canal, south of the Tamiami Trail, and C-1 canals, for the 100-year event conditions. The information in Appendix D is limited largely to the construction only and is insufficient for any determination of impacts to outside the immediate area of the bridges.

b. The stages provided by the systemwide model are not adequate to establish minimum flood protection levels of service (daily time step, 2-mile grid).

c. The RMA analysis provided in the engineering appendix is only adequate to calculate the bridge capacity and surface flow velocity, once a complete flood routing is conducted.

d. The Table 2-11 – in the main body of the report - provided comments related to impacts to flood plain without the benefit of a floodplain analysis. There is no mapping of the modified floodplain after implementation of the project. This mapping needs to be performed at least for the preferred alternative, based on modeling, and presented in the Appendix D.

e. There is no mention of possible seepage control methods or mitigation for flood plain impacts other than within the 8.5 Square Mile Area.

f. Issues related to the operation of the S-356 pump station must be resolved, including proximity of the easternmost bridge opening.

DERM Staff Comments
ENP Tamiami Trail Modifications: Next Steps Draft EIS
Submitted online July 27, 2010

> Please contact Marcia Steelman, DERM Water Management Division, 305-372-6691, regarding flood routing maps and related flood concerns.

Thank you for consideration of DERM staff recommendations. We look forward to working with the National Park Service and other project sponsors on future interagency teams addressing the Tamiami Trail, Combined Operating Plan, and Seepage Management.

Florida Department of Transportation

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SECRETARY

Office of General Counsel
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July 27, 2010

Everglades National Park
Attn: Bruce Boler, Tamiami Trail EIS
950 North Krome Avenue
Homestead, FL 33034

Re: FDOT Comments on the Tamiami Trail Modifications: Next Steps Project Draft Environmental Impact Statement, April 2010

Dear Mr. Boler:

The Florida Department of Transportation (FDOT) has reviewed the Tamiami Trail Modifications: Next Steps Project Draft Environmental Impact Statement (DEIS) dated April 2010, detailing preferred Alternative 6E, consisting of a combination of four new bridges resulting in approximately 5.37 miles of additional bridging and reconstruction of the remaining roadway. Please consider this letter and its attachments as FDOT's official response and comments to the DEIS for purposes of the National Environmental Policy Act (NEPA) administrative record. We understand this project will complete your modifications to this segment of Tamiami Trail and, together with other restoration-related projects and plans under the Modified Water Deliveries to Everglades National Park authorization ("Mod Waters") and Comprehensive Everglades Restoration Plan (CERP), is intended to provide for the long-term restoration of the regional Everglades ecosystem with more natural water flows and ecological connectivity, while successfully providing a substitute facility for the current roadway, which serves as a vital east-west transportation facility.

The interests of the FDOT are unique, as owner of this transportation facility before, during and after its reconstruction. Accordingly, FDOT has reviewed this DEIS to evaluate the impacts of the proposed project alternatives on the Tamiami Trail and surrounding environment. We reviewed your draft statement with the following assumptions:

1. FDOT is in favor of the restoration of the Everglades and is not opposed to modifications of the Tamiami Trail to support your water restoration project.

2. FDOT is, in effect, a condemnee in this process as the owner of a facility being taken for a larger public project.

3. FDOT is not the designer, builder or permittee of this project and does not assume any responsibility / liability for those functions.

4. FDOT is concerned with:

   a. Long term maintenance cost of the Tamiami Trail.
   b. Functionality/Feasibility of the proposed design.
   c. Maintaining an adequate margin of safety with design elevations to assure long-term integrity, safety and serviceability of the roadway (based on anticipated changes in operations of the overall Everglades system).
   d. Long-term exposure as the owner of the facility resulting from design changes in the facility and the operations of the adjacent waterways, and access to adjacent properties.
   e. The consistency of this project design with future restoration objectives and projects.
   f. The inability to review final engineering information for this project alternative at this time, including all interagency correspondence on this information.

Regardless of the selected alternative, FDOT has identified several key concerns which merit further attention in this NEPA process and must be satisfactorily addressed and resolved. Our support of the Tamiami Trail: Next Steps Project is contingent upon clarification of water level and roadway base clearance information as published in your draft statement, prior to completion of the Final Environmental Impact Statement (FEIS) and subsequent publication of the Record of Decision (ROD).

The table of engineering comments previously provided with our June 3, 2010 letter has been updated to include comments from review of the DEIS and Engineering Appendix and is attached.

We look forward to your responses to our comments. If you have any questions regarding these comments please contact Ms. Barbara Culhane, AICP, District Six Senior Environmental Project Manager, at 305.470.5231. We look forward to our continuing coordination on this important project.

Sincerely,

Debbie Hunt,
Assistant Secretary for
Intermodal Systems Development

Attachments

cc: Dan Kimball, Everglades National Park
Thomas Strickland, Department of Interior
Donald Jodrey, Department of Interior
Alfred Pantano, Jr., U.S. Army Corps of Engineers, Jacksonville District
Cem Goral, U.S. Army Corps of Engineers, Jacksonville District
Brad Foster, U.S. Army Corps of Engineers, Jacksonville District
Gwen Nelson, U.S. Army Corps of Engineers, Jacksonville District
Greg May, South Fla. Ecosystem Restoration Task Force Office
Michael Sole, Florida Department of Environmental Protection
Greg Knecht, Florida Department of Environmental Protection
Carol Wehle, South Florida Water Management District
Stephanie Kopelousos, Florida Department of Transportation, Tallahassee
Bob Burdick, Florida Department of Transportation, Tallahassee
Darcy Kohn, Florida Department of Transportation, Tallahassee
Marjorie Bixby, Florida Department of Transportation, Tallahassee
Gus Pego, Florida Department of Transportation, Miami
Aileen Boucle, Florida Department of Transportation, Miami
Barbara Culhane, Florida Department of Transportation, Miami

FLORIDA DEPARTMENT OF TRANSPORTATION COMMENTS			
SR 90/US41/Tamiami Trail Modifications: Next Steps **Draft Environmental Impact Statement, April 2010**			
No.	**Ref/Pg#**	**Area of Review**	**COMMENTS**
1	General	Project Development	The document should clearly state the DOI is responsible for all aspects of this project including designing, permitting, building and implementing this project. In addition, the NPS/DOI needs to obtain FDOT approval on design, plans and specifications before proceeding to construction. This approval shall include submittal of all plans, designs and specifications signed and sealed by a Florida registered Professional Engineer. The NPS' commitment to do so should be stated in the FEIS and ROD.
2	General	Project Development	The NPS need to get FDOT approval on design, plans and specifications before proceeding to construction. This approval shall include submittal of all plans, designs and specifications signed and sealed by a Florida registered Professional Engineer. The NPS' commitment to do so should be stated in the Final EIS.
3	General	Project Development	We continue to have very serious concerns as expressed in our letter of June 3, 2010 and in previous correspondence, regarding misrepresentation of the 9.7 foot Design High Water (DHW) level as the "stage" water level to be achieved as a result of this project. Based on a joint meeting of the NPS, ACOE and FDOT on April 21, 2009, the NPS's letter of May 19, 2009 and our response of June 10, 2009 (attached), the FDOT and NPS agreed that the DHW for this project would be 9.7 feet (NGVD). Despite FDOT's repeated verbal and written requests to correct this information, the DEIS contains confusing and conflicting information regarding water levels and does not clearly and fully disclose the restoration water levels anticipated from this project. Per the information provided by NPS at the April 2009 meeting, the two modeling evaluations prepared for this project, specifically the Natural System Model (NSM) analysis and the Everglades National Park (ENP) Model analysis, resulted in October Mean Stages of 8.47 and 8.95 feet, respectively. These anticipated restoration water levels (also called 'stage' or 'operational' water level) serve as the basis upon which the DHW was calculated, and represent the canal stage water level constraint upon which the Next Step Project is designed. While the DEIS correctly describes 9.7 feet as the DHW for this project it appears to contain no information regarding the stage water level (up to 8.9 feet) upon which the DHW was calculated. This, combined with statements in the DEIS and Project Evaluation Report (May 2010) such as, *"…Importantly, the increased bridging of Alternative 6E will allow stages in the L-29 Canal to be raised to 9.7 feet,"* gives the impression water levels in the L-29 can be raised, operated, or are expected to achieve through unconstrained flow, a 9.7 foot stage level on a regular basis. It is fundamentally imperative the DHW water level for this project not be misrepresented as the stage water level for this project. These two water levels are by definition mutually exclusive. The canal stage water level is by definition lower than the DHW water level, and, according to the NPS' models, is anticipated to be approximately up to 8.95 feet for this project.
4	General	Project Development	Allowance of a 9.7 foot stage water level in the L-29 Canal on a regular basis would expose the roadway base to risk of saturation during rainfall events by exceeding the design protections (20-yr., 24-hr. event) incorporated into the roadway design. This could result in compromising the

			serviceability, structural integrity and most importantly public safety on this roadway due to the risk of roadway base failure. A 9.7 foot stage level would also exceed the 8.75 foot Control Water Elevation (CWE) (i.e., the average high water elevation under the structure) for the Mod Waters 1-mile bridge presently under construction, as well as for the bridges planned under the Next Steps Project, by approximately a foot. This potentially may interfere with operation, inspection and maintenance of the Mod Waters 1-mile substitute facility as well as the new facility (roadway and bridges) proposed under the Tamiami Trail Next Steps Project.
5	General	Project Development	While the FDOT agreed, at the request of the ACOE, to a series of operational controls under the Tamiami Trail Mod Waters Limited Reevaluation Report (LRR) Project to temporarily allow water levels to exceed the 7.89 foot stage and approach the 8.5 foot DHW during the dry season (approximately six months of the year), FDOT does not support this same approach as a long term solution under the Next Steps Project. This operational agreement was prepared to help maximize benefits under the Corps' cost-constrained design under the LRR and to minimize expenditure of funds on improvements that would be removed with a future Tamiami Trail Project (the Next Steps Project). However, per our letter of June 3, 2010, the Next Steps Project must be designed such that the 9.7 foot DHW criterion is met all 12 months of the year since this project provides final water restoration improvements to this segment of Tamiami Trail and since the ultimate goal of this project is to allow unregulated flows. The FDOT needs assurance the Next Steps Projects will be operated within the constraints of the NPS's selected design for this project (i.e., up to an approximate 8.95 foot stage) throughout all 12 months of the year. This assurance should be stated in the FEIS and ROD.
6	General	Project Development	The FEIS should further clarify the known present and future constraints on stage water levels under the designs selected by the ACOE (the Mod Waters 1-mile bridge) and NPS (Next Steps Project) for Tamiami Trail, on the Combined Structural and Operational Plan (CSOP) and other future operational plans.
7	General	Project Development	If the anticipated River of Grass (ROG) purchase enables higher stage water levels than the approximate 8.95 foot stage currently planned for under Next Steps, it may be prudent to combine the Mod Waters 1-mile bridge (presently under initial stages of construction) and Next Steps Projects into one project which could be redesigned to accommodate a higher stage water level. The combination of these plans into one construction project would substantially reduce construction time as well as disruption to the motoring public, and could result in substantial cost savings by eliminating unnecessary construction on the roadway as planned under the Mod Waters/LRR Project. This may be feasible since no bridge pilings for the 1-mile bridge have yet been placed.
8	General	Project Development	To the extent that more natural flows may be implemented under the 1-mile bridge by 2013, and would coincide with commencement of construction of the Next Steps Project, also scheduled to begin in 2013, the impacts from the higher stages of between 7.89 and 8.5 feet in L-29 Canal (under the Mod Waters /LRR Project) could impact the Next Steps construction activities due to wetter conditions and longer hydroperiods in the construction area. This may require a change in construction methodology resulting in higher construction costs and a longer construction time for this project, the impacts of which are not addressed in the DEIS. If, alternately, the higher flows enabled under the LRR Project need to be delayed to facilitate construction of the Next Steps

			Project, this would render the roadway improvements currently under construction for the Mod Waters Project unnecessary, since the Next Steps Project would immediately replace the newly completed roadway improvements built under the Mod Waters/LRR Project, with additional bridges and reconstructed roadway.
9	General	Project Development	Transmissivity in the region is also a very important design parameter. The differential between the higher proposed elevations of the Tamiami Canal west of Krome Avenue compared to the lower existing elevations of the canal east of Krome Avenue may impact and modify existing underground water movement (transmissivity rate). As a result, the water elevation of the canal east of Krome Avenue may increase if high stages in the canal west of Krome Avenue are maintained for a long period of time. This may negatively affect the drainage within the Cities of Sweetwater and Doral. These potential impacts will need to be evaluated as part of the future operational plan for this project.
10	General	Project Development	Recognizing that only some portions of Tamiami Trail will be bridged and that roadway segments will be required for the project, it is important that the pavement design abide by the FDOT Flexible Pavement Design Manual and the Plans Preparation Manual (PPM). Per our letter of June 10, 2009, a minimum two foot base clearance is required throughout this project. Since drawdown rates for water elevations in the Everglades after a heavy storm are relatively slow compared to that of a traditional roadway bounded by swales, it is imperative that the NPS / ACOE's design provide the required two feet of base clearance. This will serve as a safety factor as it relates to drawdown rates and the anticipated extended duration of the roadway base to wet conditions. While the Engineering Appendix references adherence to a two foot base clearance, the DEIS repeatedly states all project alternatives will be designed to a 12.3 foot crown elevation. This crown elevation correlates with the 12.3 foot crown elevation utilized in the 2005 RGRR preferred alternative project design, and appears to be based on an approximate one foot base clearance. While the RGRR project had a one foot clearance from bottom of base to the DHW of 9.7 feet, that clearance was based on a pavement design which included black (asphaltic) base and an asphalt overlay on the existing roadway. The Next Steps Project involves complete reconstruction of the roadway between the bridges and requires a minimum two foot base clearance. A two foot clearance above the DHW of 9.7 feet yields a crown elevation of roughly 13.8 feet. This higher crown elevation will likely result in additional construction costs and may require reassessment of project impacts as described in this DEIS. The DEIS should specify the pavement design on which the 12.3 foot crown elevation calculation is based, and should verify and revise the crown elevation as stated in the document, if necessary.
11	General	Project Development	Please provide information regarding emergency operations of the water management system and their impact on the Preferred Alternative 6E.
12	General	Project Development	No supporting information or documentation regarding construction cost was provided in the DEIS or Engineering Appendix, therefore FDOT has not reviewed or evaluated the construction cost estimates for this project.
13	General	Project Development	Per the DEIS, an Attorney's Opinion of Compensability has been prepared for estimated damages to Tamiami Trail as a result of this project. Please note that a new Highway Easement Deed and Relocation Agreement will be necessary for this project.

14	Section 1.2, Page 1-3	Project Development	DEIS erroneously states the 2005 RGRR recommended plan would **“*accommodate the higher water levels (up to 9.7 ft stage) under the road*”**. This statement should be corrected to reflect the RGRR (Recommended Plan) project was designed to a 9.7 feet Design High Water (DHW) based on the 20-year 24- hour storm, which correlates to an average daily stage of approximately 8.88 feet NGVD.
15	Chapter 2	Drainage	Both the DEIS and the Engineering Appendix refer to an allowed stage elevation of 9.7 feet in the canal instead of referring to it as the DHW elevation. As per previous comments, the reports need to be consistent and refer to the 9.7 feet as the DHW elevation. Please reference page 3 of the April 21, 2009 meeting minutes provided by the Everglades National Park (ENP) regarding “Agreement of Design High Water Determination and Study Timeline” as follows: **NSM Mean October + Storm Events Method:** October Mean Stage = 8.47 feet NGVD 20-year, 24-hour storm = 0.82 feet 100 year storm = 1.1 feet DHW = 8.47 feet + 0.82 feet = 9.29 feet NGVD Overtopping Criteria = 8.47 feet + 1.1 feet = 9.57 feet NGVD CWE = 8.75 feet NGVD **ENP Mean October + Storm Events Method:** October Mean Stage = 8.95 feet NGVD 20 year, 24-hour storm = 0.82 feet 100 year storm = 1.1 feet DHW = 8.95 feet + 0.82 feet = 9.77 feet NGVD Overtopping Criteria = 8.95 feet + 1.1 feet = 10.05 feet NGVD CWE = feet NGVD Per the evaluation provided above, the daily stages in the L-29 Canal are expected range up to 8.47-8.95 ft (October mean stage). The DEIS and Engineering Appendix should be revised to accurately reflect the daily stage and DHW levels for this project.
16	Section 2.2, Pages 2-3 to 2-8	Drainage	There is reference in several portions of the DEIS of reconstructing the highway embankment to **“*raise the crown elevation to 12.3 feet, the minimum required based on the design high water of 9.7 feet and the roadway cross section geometry*”**. It is not clear where the 12.3 feet elevation is derived from. However, just based on the DHW = 9.7 feet + 2 feet base clearance would result in an elevation of 11.7 feet at the bottom of the base at the edge of shoulder; this only leaves 0.5 feet to the 12.3 feet crown elevation mentioned in the report. When the pavement and base thickness are added, in addition to the shoulder and lane width multiplied by the cross slopes (an estimated 1.8 feet, based on typical section design included in the Engineering Appendix); the minimum required crown elevation would be approximately 13.5 feet [9.7 feet DHW + 2 feet base clearance + 1.8 feet (thickness & cross slope)]. This needs to be verified and corrected in the FEIS and Engineering Appendix.

17	Section 2.2.2, Page 2-6	Traffic Operations	DEIS, Table 2-1 (Action Alternative Comparison) Estimated Total Project Cost is different from Appendix A – Engineering Report Table 6-4 (Alternative Comparison) Estimated cost. Assure consistency between different sections of the project documentation.
18	Section 2.2.2, Page 2-6	Project Development	Construction of four (4) additional bridges appears to open the possibility of airboats to cross under Tamiami Trail from north to south and vice versa within the project area. Neither the DEIS nor the attached Engineering Appendix provides any evaluation or analysis of whether these bridges will allow or accommodate airboats crossing including the height range of these boats and whether they will be able to cross under the bridges all or part of the year. The FDOT is concerned regarding public safety, potential damage to the bridge structure, as well as damage to private property if proper clearances are not provided.
19	Section 2.2.3, Page 2-6	Project Development	Recognizing that only some portions of Tamiami Trail will be bridged and that roadway segments will be required for the project, it is important that the pavement design abide by the FDOT Flexible Pavement Design Manual and the Plans Preparation Manual (PPM). Since drawdown rates for water elevations in the Everglades after a heavy storm are relatively slow compared to that of a traditional roadway bounded by swales, it is imperative that the NPS / ACOE's design provide two feet of base clearance. This will serve as a safety factor as it relates to drawdown rates and the anticipated extended duration of the roadway base to wet conditions.
20	Section 3.10, Page 3-76	Environmental	Section 3.10 references noise modeling for three noise sensitive receivers. Was a separate Noise Study Report prepared for this project? If so, it is recommended that report be referenced in the DEIS.
21	Section 3.13, Page 3-88	Environmental	Section 3.13 references a Phase I Hazardous, Toxic and Radioactive Waste Assessment prepared for the project. Was a separate report prepared? If so, it is recommended this report be referenced in the DEIS.
22	Section 3.11 and 4.12, Page 3-78 and Page 4-67	Project Development	The discussion of the roadway facility in the Affected Environment and Environmental Consequences sections should be strengthened to further expand on the importance of Tamiami Trail as an important east-west transportation facility which serves the motoring public and provides sole access to the Miccosukee Tribal Village, the numerous airboats concessions on the Trail and the Shark Valley Visitors Center of Everglades National Park. Tamiami Trail also serves as an alternate hurricane evacuation route as well as providing opportunity for bicyclist and recreational (consumptive and non-consumptive) uses.
23	Section 4.6, Page 4-35	Project Development	This section indicates bridging will provide increased habitat connectivity for the Federally endangered Florida Panther, however neither the DEIS nor Engineering Appendix contain any information regarding whether materials to be used for the bridge slopes is suitable for use by panthers or other wildlife. It is recommended to confirm suitability of bridge slope materials with the appropriate wildlife agencies. This treatment may be beneficial/warranted as the Florida Panther may avoid the deepest/wettest area under the bridge
24	Section 4.11, Page 4-66	Project Development	The analysis of short-term (i.e. construction) noise and vibration on the residential areas within the project limits, including Osceola and Tiger Tail Camps, should include evaluation of specific construction activities such as blasting, pile driving and night time work, which may affect these areas.

25	Section 4.13, Page 4-73	Project Development	The DEIS does not address the potential construction impacts from the higher water levels to be enabled by the Mod Waters Tamiami Trail Project, on the construction of the Tamiami Trail: Next Steps Project.
26	Section 4.14, Page 4-74	Project Development	Please note an asbestos survey will be necessary for demolished structured including culverts, and asbestos abatement and removal may be required during construction
27	Section 6	Project Development	This section should be expanded to include a discussion of early coordination with FDOT regarding the DHW and roadway base clearance requirements for this project, as well as reference to the May 19, 2009 letter from ENP to FDOT and responses from FDOT to ENP dated June 10, 2009 and July 27, 2009.
28	Section 6.3, Table 6-2, Page 6-6	Project Development	According to the Council on Environmental Quality, Section 1502.17, the environmental impact statement shall list the names, together with their qualifications, of the persons who were primarily responsible for preparing the environmental impact statement or significant background papers, including basic components of the statement. FDOT staff member, Barbara Culhane, AICP, and its consultant representative Mary Tery Vilches, P.E. neither prepared, nor made major contributions to this DEIS document. Please delete these names from Table 6-2 – List of Preparers and Contributors.
29	Section 8.0, Page 8-1	Project Development	In order to insure the use of proper and consistent terminology when describing water levels in this statement, we request that the Glossary (Section 8.0) be augmented in the FEIS to include definitions for “stage water level”, “operational water level”, “unconstrained flow”, “control water elevation” and “design high water” since these technical terms are used throughout the DEIS and appendices.

SR 90/US41/Tamiami Trail Modifications: Next Steps

Appendix A: Draft Final Engineering Report, February 19, 2010

No.	Ref/Pg#	Area of Review	COMMENTS
30	General	Project Development	As expressed in our letter of June 3, 2010, key engineering information is not yet available for this project which could substantially affect its cost, design and potential impacts. To date, the engineering provided for this project consists primarily of a roadway alignment with some geometric features but few details regarding preliminary roadway typical section, preliminary pavement design, drainage design, geotechnical analysis, structural details, bridge profiles and clearances, and location of acceleration and deceleration lanes. Given the NPS’s DEIS and required Project Evaluation Report are based on an alignment and without the above information, be aware that the many missing elements of the design which prohibit us from giving you more detailed comments at this time, are likely to affect the project design and cost as engineering plans are further developed for implementation by the Department of Interior (DOI).
31	General	Geotechnical	The project design needs to include measures and techniques to prevent differential settlement. The bridge plans need to include complete notes to address the preforming and grouting of the piles adequately, and avoid potential conflicts during construction. The clear and complete notes should be included in the design plans.
32	General	Construction	Please be advised that during the design phase, add a note requesting a certification package

			after the piles of the bent are completed, certifying integrity and capacity (axial and lateral) of all piles in the bent. Each package shall include a signed and sealed certification letter, and clearly legible copies of the driving records, all dynamic tests and load tests performed in the bent, numerical analysis including GRLWEAPS and CAPWAPS performed during the driving criteria derivation, and PDA records performed in the bent.
33	General	Traffic Operations, Construction	Access must be maintained during all construction phases to the various businesses and private properties on the south-side of Tamiami Trail. The Maintenance of Traffic (MOT) does not indicate how access to these properties is to be maintained. Three of the major businesses include Cooper Town Airboat Rides and Restaurant, Gator Park, and Everglades Safari Park.
34	General	Drainage	This general drainage review of this report focuses on the contents of the Draft Final Engineering Appendix for the Tamiami Trail Modifications: Next Steps report (2/19/10). This review does not include a detailed review of the modeling approach and assumptions implemented using the Natural Systems Model (NSM) or USACE RMA-2 model.
35	General	Project Development	Please note that all documents, plans, typical section package and pavement design package shall be signed and sealed by a Florida Registered Professional Engineer.
36	General	PLEMO	The discussion of the environmental impacts at the staging areas should be documented. If possible, it is advisable to test the soil, groundwater and/or surface water at a proposed staging area prior to use to establish pre-existing conditions. Closure of the site may require environmental sampling. Stormwater controls, such as silt fences, to prevent discharge of contaminated runoff into water bodies should be used where such discharge may cause violations of water quality standards.
37	General	Project Development	Please note per our letter dated July 27, 2009, that the FDOT is not part of the Project Delivery Team; we request the FEIS document be corrected to reflect this prior to distribution to the public.
38	General	Construction	Please submit during design phase a traffic lane closure analysis showing optimum lane closure hours.
39	Section 1.1, Page 1	Project Development	Regarding this statement, ***"….Alternative 6E was selected as the preferred alternative and consists of approximately 5.4 miles of girder bridges separated into 4 sections with the remaining Tamiami Trail roadway raised to allow a stage of 9.7 ft-NGVD in L-29C, and adding down ramps…"*** Please, be consistent throughout the report. It has been established that 9.7 feet is the DHW, not the daily stage in the L-29 Canal.
40	Section 1.1, Page 1	Project Development	Please update the following statement, ***"…..Plans for Modification to Tamiami Trail (Project Invitation No. W912EP-08-R-0025), for a 1-mile bridge construction project on the east end of the study area, with an anticipated construction start date in October 2009, is assumed as existing condition in this study."*** to reflect that this project is already under construction as of December 2009.
41	Section 2.4 & 2.5, Pages 8 & 9	Drainage	The CSOP analysis was used to determine the volume of water available and the NSM was utilized to determine the October mean stage and DHW. However, there does not appear to be a "feedback loop" where the DHW of 9.7 feet-NGVD is used as an operational constraint in the proposed structure operations in CSOP. The Draft GRR for CSOP shows flood releases when stages exceed 10.5 feet-NGVD in October which exceeds the DHW elevation. It is recommended that 2 separate notes be added: (1) the base clearance criteria will be included as a constraint in the proposed operational plan; (2) the proposed operational plan will call for a review of measured

			data on an inter-annual basis to verify the required base clearance is being provided.
42	Section 2.8, Page 20	Project Development	Please, consider changing graph size to an 11”x17” size page.
43	Section 4.4.1, Page 25	Drainage	The Appendix notes ***"A scour analysis was not performed during this study."*** Per the FDOT Plans Preparation Manual, Chapter 27, a Bridge Hydraulic Report (BHR) and Bridge Hydraulic Recommendation Sheet shall be prepared for new structures and widening. Please include the guidelines for preparing the BHR and indicate it is required to be prepared during the final design phase. Since the BHR will use peak flows and design stages from the modeling efforts developed as part of this report, this report should document results to support future development of the BHR.
44	Section 4.5, Page 28	Geotechnical	The report does not mention the use of a surcharge (placing fill to induce stresses higher than the expected stresses during service, including the traffic surcharge loads) to address settlements, but does mention the use of settlement plates. If no surcharge is being placed, what is the plan to prevent settlement? If the proposed plan is monitoring only after placement of the base, please be advised this type of treatment has not been successful in previous projects and FDOT does not anticipate accepting its use here. Observation of the behavior of fill over organic soils at a particular level does not yield information regarding how this fill will behave if the future loads are greater.
45	Section 6.0, Civil Design, Page 30-33	Drainage	Please add a sub-section in Section 6 to require the following during the final design stage: Final design of drainage and stormwater management systems shall be in compliance with the FDOT Drainage Manual, the FDOT District Six Drainage Guidelines, Florida Administrative Code Chapter 14-86, and the requirements of the regulatory agencies. Final design will include the engineering analysis necessary to design any or all of the following: cross drains, roadway ditches, outfall ditches, storm sewers, retention/detention facilities, roadway drainage and water management, and other drainage systems and elements of systems as required for a complete analysis. Continued coordination with the FDOT, District Six, Drainage Design Section will be required as the project Final Design proceeds. Full documentation of all meetings and decisions are to be documented as part of the Drainage documentation and reports.
46	Section 6.1.4, Page 33	Traffic Operations	Please note the functional classification of Tamiami Trail is “rural principal arterial.”
47	Section 6.1.5, Page 33 Section 6.1.7, Page 33 & 34	Roadway	According to section 6.1.7 the paved shoulder width is 5 feet. However, Section 6.1.5 Typical Sections shows the existing typical section for Tamiami Trail consists of two 12-foot travel lanes, one in each direction with 4 to 5 feet of paved shoulder on both sides. Please clarify the paved shoulder width for this project.
48	Section 6.1.7, Page 33	Roadway	Please modify the following statement to indicate which edition of the PPM is referenced ***“After the BASE PLANS construction is complete, the horizontal alignment on Tamiami Trail will satisfy the following FDOT Plans Preparation Manual (PPM) Volume 1 requirements”.***
49	Section 6.1.8, Page 34	Safety	Please consider removing fatalities from the following statement: ***“careless driving is the most common contributing cause of crashes and fatalities…”***This statement is appropriate when referring to crashes in general, but not fatalities since it implies all fatalities are related this contributing cause. Section 6.1.8, Crash Data, has almost no information. Please provide the complete information so the crash analysis can be properly reviewed.

			The following expands on the information that should be included for the crash data section 6.1.8, as indicated in the previous comment: 1. Include a summary table of the crashes by crash type, number of injury crashes, number of wet surface and night time crashes, contributing causes, etc. 2. Identify the probable causes for the occurrence of crashes in relation to the existing roadway conditions that could be mitigated with this project. 3. Identify crash clusters within the study corridor. 4. Perform an expected value analysis and confidence level analysis at critical intersections within the study corridor, as applicable. 5. Perform a confidence interval analysis for the study corridor. 6. Include in the crash data summary the latest two years 2007 and 2008 already available from FDOT to get a better representation of the crash data. 7. Please request from the Traffic Ops Office the High Crash Segment and Spot Lists for last 3 years to determine if there are any spots or segments within the study corridor that are considered high crash locations.
50	Section 6.1.10, Page 35	Project Development	Please refer to comment No. 17 in the November 12, 2009 letter from FDOT to ENP: ***"Pavement condition survey is available from the Department and should reflect the most recent survey".*** Please coordinate with FDOT, District Six, Planning Office to obtain the latest information and include it in the Engineering Appendix.
51	Section 6.2.2, Page 35	Safety	The traffic Volume Projections section has almost no information. Please provide complete information so it can be properly reviewed. Please elaborate more on the following items in relation to the traffic projections for this project: 1. Indicate the Interim Year of this project. 2. Indicate the yearly growth rate used to develop the AADTs, what sources were used to derive this percentage, and include in the report the output trend analysis results. It is suggested to check with the Collier Metropolitan Planning Organization (MPO) model (Lee-Collier County regional model).
52	Section(6.2) , Page 35	Traffic Operations	Provide a diagram that illustrates in detail the geometry, lane configurations and connectivity for the preferred alternative (6E), especially for the down ramps connections. Analyze down ramp merge and diverge to Everglades Safari and Coopertown Airboat Rides using Highway Capacity Software (HCS) for opening, interim and design years. State/describe the ramp terminal conditions in the design year and whether it will be signalized or free flow. Provide HCS/ Synchro analysis for the ramp terminals for the opening, interim and design years.
53	Section 6.3.2, Page 37	Traffic Operations	Please specify the AASHTO edition to be used in the analysis of the Design Elements and Standards.
54	Table 6-2, Page 37	Project Development	Please indicate Minimum Vertical Clearance and related Clear Zone for cases of Roadway over Roadway.
55	38, C-1	Bicycle/ Pedestrian	According to Section 8.4.2 and Table 8.1.1 of the FDOT Plans Preparation Manual –Volume 1, the proposed 5-foot paved shoulder meets FDOT requirements for adequate on-road bicycle facilities

			for all types of work beyond one mile of an urbanized area. Please note a minimum of 5 feet of clear width between the travel lane and the face of a vertical obstruction such as a guardrail, curb, or other roadside barrier is required. Any drainage inlets located within the paved shoulder shall be bicycle safe inlets. The Tamiami Trail corridor is the alignment for the proposed River Of Grass Greenway (ROGG). The DEIS contains no engineering evaluation regarding viable location, design, detailed construction cost, or constructability of this proposed 10-12 ft shared use path which is proposed along Tamiami Trail in Collier and Miami-Dade Counties. It appears this multi-use facility would need to be designed as part of the Next Steps project in order to be consistent with the roadway and structure design and with the restoration objectives for this region.
56	Section 6.3.4, Page 39	Drainage	The section notes ***"The edge of shoulder elevation will be higher than the 100-year flood elevation."*** Please reference Section 2.5 and include the 100-yr elevation (10.1 ft-NGVD) and the lowest shoulder elevation for the proposed profile.
57	Section 6.3.4 Page 39-40	PLEMO	The proposed water quality treatment for the roadway reconstruction is direct runoff through the paved shoulders and grassed shoulder. Please advise whether this is an acceptable or approved method of water treatment by FDEP. Coordination with the FDEP should be documented in the DEIS/FEIS.
58	Section 6.4 Page 39-40	Traffic Control Plan	Regarding the construction sequence and maintenance of traffic, the temporary asphalt on the eastbound shoulder will need to be placed in a separate, prior phase. Unless another option can be devised, this will require closing a lane and maintaining traffic with a one-way flagging operation, as is being done for current work on Tamiami Trail. The hours when this can be permitted will depend on a lane closure analysis. Attached herein are some suggestions depicting the typical construction phase.
59	Section 6.5 Page 41-42	Traffic Operations	Please elaborate on how the proposed roadway connections to the existing land uses will be developed within the existing right-of-way or if additional right-of-way will be required.
60	Section 6.6.2, Page 43	Traffic Operations	The 2038 K30 was estimated at 8.07%. Based on the FDOT Traffic Forecasting Handbook, the recommended K30 range is 9.20%-11.50%. Please include the reason for using a lower value.
61	Section 6.6.4 Page 44-45	PLEMO	This section states that ***"Utility relocation will be integrated into the overall project construction schedule."*** However, the schedule does not include utility relocation.
62	Section 6.6.4 Page 44-45	Project Development	The project potentially impacts five major utilities. Please verify location of utilities in order to avoid conflicts during construction phase. It is our experience that it may require up to one year for utility relocation to occur prior and/or during the commencement of project construction.
63	Section 7.1.1, Page 47 & 48	Project Development	Please consider merging Table 7-1 on an 11"x17" page.
64	Section7.2, Page 50	Structures	Bridge Design Criteria refers to FDOT Structural Manual (January 2009) while the Roadway Design Criteria 6.3.2 refers to FDOT 2010 Standards. Please be consistent and use the latest version of the FDOT Structure Manual.
65	Section 7.6, Page 51	Structures	Please include a statement in the Final Engineering Appendix that the wind load design methodology will be revised during Final Design as per the January 2010, or latest version, of the FDOT Structures Manual.
66	Section 7.7,	Drainage	This section infers that "spread analysis" has been performed in stating that runoff from a 4-inch

	Page 51		per hour storm must not encroach on the lanes. No explanation of the analysis methodology or results is provided. Similarly with the use of Continuous Deflective Separation (CDS) devices, there is no explanation regarding the treatment capacity of the proposed devices and whether the proposed capacity will meet water quality treatment requirements. Please provide these analyses and explanation of evaluations performed. The referenced "Supplemental Hydraulic Modified Water Deliveries Analyses Report" was not included with this submittal; if the aforementioned information is included within, a summary of the significant findings should be provided here.
67	Section 11, Page 52	Project Development	The Engineering Appendix does not contains a detailed engineering cost estimate/Long Range Estimate (LRE), therefore the Department could not provide any comment on this section.
68	Section 11.4, Page 53	Project Development	Show the cost of the Right-of-Way (ROW) as part of the overall construction cost. Also, add the ROW cost to the Long Range Estimate (LRE)/Detailed Estimate for the preferred alternative as part of an Appendix to the Draft Engineering Report.
69	Plate C-2	Construction	The proposed Traffic Control Plans (TCP) are not typical, since the approaches are constructed at an angle to the existing road. It is recommended the TCP would work better if in the Phase I permanent and/or temporary embankment is built to allow for two lanes of traffic. Traffic can then remain on the existing road until the bridges are constructed and then be switched to Phase II, at which time the remaining portions of the Typical Section can be constructed. Phase III would consist of removal of all temporary items – asphalt and embankment, and completion of the work. Phase IV would consist of completion of the last lift of structural and friction courses. In addition, TCP Phasing does not include in which phase of the construction the bridge access ramps will be added to the structure.
70	Plates S-1, S-2 Estimates	Structure	Refer to FDOT comment 39 from the November 12, 2009 comment letter to the Engineering Appendix Draft: ***"Four Florida Bulb T (FBT) 72 beams are proposed for all the bridges with span length 99.15 ft. Has Florida I-beam been considered and compared in cost estimate?"*** Based on your response to this comment that this information was obtained from Appendix D of the 2005 RGRR/SEIS document, please be advised that these estimated costs can only be a used for a comparison among the 10 alternatives presented in the Tamiami Trail: Next Steps Project, and cannot be used for cost estimating or budgeting purposes for structures. AASHTO and FBT beams are no longer used for new bridge designs, per the FDOT Design Bulletin below: ***Temporary Design Bulletin C09-03 (July 2, 2009): Florida I-Beams (FIB's) will be used on all new Design-Bid-Build projects having both a design start date of February 1, 2009 or later and a letting date of July 1, 2010 or later. The FIB's shall be used for preliminary design and estimates of projects with projected schedules falling on or after these dates. AASHTO Beams and Florida Bulb-T Beams will no longer be used in Design-Bid-Build projects where the design start date is scheduled on or after February 1, 2009 with a letting date on or after July 1, 2010. Bridge Development Reports (BDR's) for these projects shall not include AASHTO Beams and Florida Bulb-T Beams in cost comparisons.*** A completely new design using Florida I - Beam (FIB) for bridges must be done for cost estimating purposes. For 99 ft. span length and girder spacing of 12 ft., FIB 45 will be adequate. Compared to

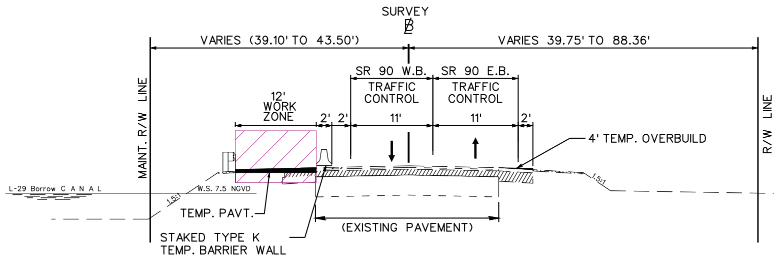
			the FBT 72 beams, the profile can be lowered by 27 inches, resulting in savings in both bridges and roadway embankment. Please include a statement in the Final Engineering Appendix that the structures design will utilize the January 2010, or latest version, of the FDOT Structures Manual.
71	Plates S-2	Structure	On the plan dated 10-09-2009, the bridge storm water collection system was proposed to be located outside the exterior girder right below the cutter line, and the FP&L utilities were proposed inside the exterior girder. On the plan dated 10-16-2009, which supersedes the plan on 10-09-2009, the locations of the proposed storm water collection system and FP&L utilities were switched. What is the reason for that change? It appears the locations proposed on 10-09-2009 plan are better. Has the change been discussed with FDOT Maintenance Office? Per the FDOT Maintenance Office, the Bridge Storm Water Collection System needs to be located beneath the cantilever portion of the bridge structure deck overhang, not inside the bridge exterior girder. Please revise plan sheet S-2.
72	Plate S-2 Bridge Section	Structures	Ratio of deck overhang to Girder spacing is such that the exterior Girder will control the Load Capacity of the Structure if the exterior and interior Girders have the same overall capacity. Since the Girder spacing is at the maximum desirable (12 feet), we recommend designing the exterior Girder such that its reserve capacity for Live Load is the same as for the interior Girders. This was done for the Mod Waters Tamiami Trail 1-mile bridge (Type IV Beam interior girders have 38 strands & exterior girders have 42 strands).
73	Plates DR-C1 – DR-E4	Traffic Operations	We strongly recommend acceleration and deceleration lanes be provided for connections to the major businesses along Tamiami Trail. For instance, the figures DR-C1 through DR-E4, showing the proposed entrance/exit ramps (down ramps) do not appear to have these lanes. Please confirm the required stopping sight distance.
74	Plate DR-E4	Roadway	Proposed profile for the entrance/exit ramps (down ramps) is not given. Since the proposed profile elevation for the new bridge will be approximately at 22.0 ft., how will the down ramp be able to cross under the bridge with enough clearance for vehicles to reach the existing roadway/new parking area that exists at an approximate elevation of 12 ft.? This problem may be avoided by constructing the entrance/exit ramps (down ramps) on the north side of the existing road and therefore providing direct access to the proposed parking area. Visitors may access the Safari facilities through a pedestrian walkway with low vertical clearance. In order for traffic to turn into the entrance/exit ramps (down ramps), the pavement will have to be widened at the intersection to create a turn lane. This concept would likely reduce the impact to the environmentally sensitive area to the south of the bridge, by utilizing the existing road to approach the proposed parking area.
75	Plate-DR-C5	Roadway	See comment 74 for Plate DR-E4
76	Plans C-1, C-3, C-4,S-1 through S-4	Construction	There are not typical section showing the bridge access ramps
77	Plans C-3, C-4, CP 301, CP 302, CP 303	Drainage	The profiles shown are "typical approaches" with stationing unlike the stationing provided in the typical sections. However the typical sections do not provide elevation information for the Profile Grade Line (PGL), edge of shoulder or bottom of base. Correspondingly it is difficult to accurately

	and CP 304		verify elevations at the lowest point of the proposed profile. It is recommended that an elevation range to the PGL and edge of shoulder be added for each cross section on CP 301 through CP 304. Also recommended is noting the control water elevation (CWE) and 100-yr elevation in addition to DHW on each typical section sheet.
78	P-3	Roadway	The reverse curves (Tamiami 2 and 3) will require superelevation (0.023 for an 8,200' radius). The length of the curves should be a minimum of 500 ft. long due to small delta and the tangent length between the curves should be a minimum of 300 ft. Please check geometry criteria for curves: Tamiami 4 and 5, Tamiami 6 and 7, Tamiami 8 and 9, and Tamiami 10 and 11

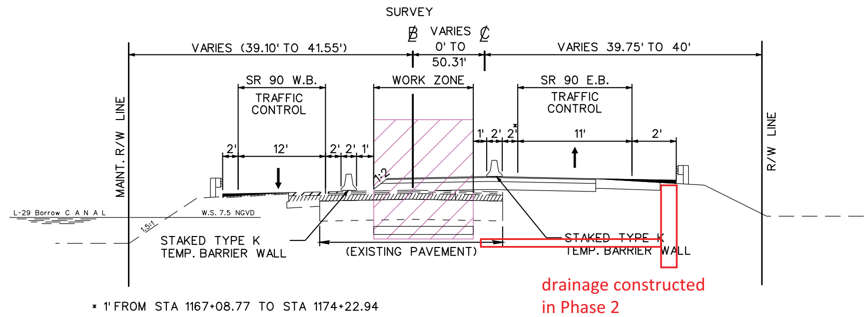
SR 90/US41/Tamiami Trail Modifications: Next Steps
Appendix B: Choosing By Advantages (CBA) and Value Analysis Report, February 2010

No.	Ref/Pg#	Area of Review	COMMENTS
79	Section 8, Page 23	Project Development	Please modify the list of Choosing By Advantages (CBA) Workshop table list to reflect FDOT staff member, Barbara Culhane, and FDOT consultant representative Mary Tery Vilches of URS Corporation as observers instead of participants.

MAINTENANCE OF TRAFFIC PHASING TYPICAL SECTION



PHASE 1



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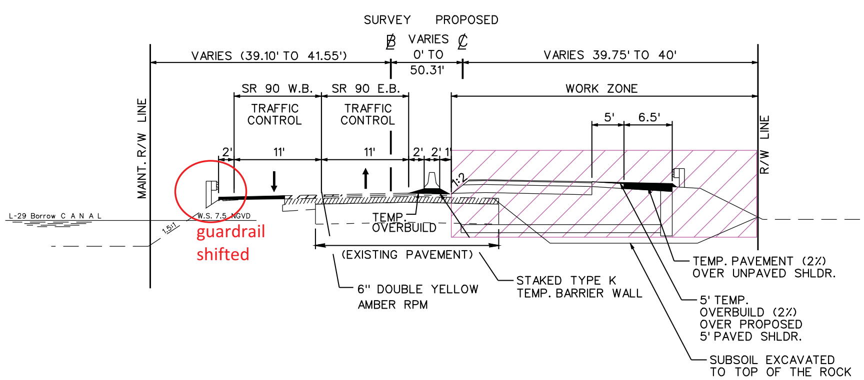

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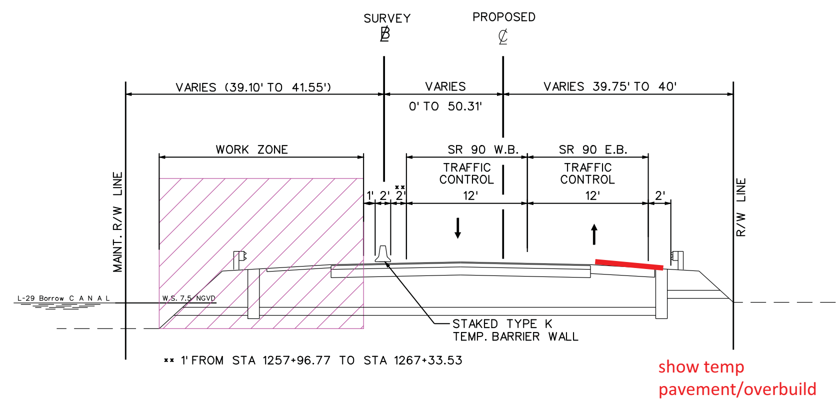


PHASE 4

US Army Corps of Engineers
Jacksonville District
SAFETY ON THIS JOB DEPENDS ON YOU

HNTB

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT, CORPS OF ENGINEERS
JACKSONVILLE, FLORIDA

Designed by: AJS
Dwn by: AJS
Ckd by: PTH
Dated: DECEMBER 2009

MODIFIED WATER DELIVERIES TO EVERGLADES NATIONAL PARK
MIAMI-DADE COUNTY, FLORIDA

MODIFICATIONS TO STATE ROAD NO. 90

PHASING TYPICAL SECTIONS

PLATE NO. A-8

09-OCT-2009 12:04 IP_PWP:dms48360\MDSR90-TAMIAMI-CM-MOT1.DGN

Florida Department of
Environmental Protection
Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

Charlie Crist
Governor

Jeff Kottkamp
Lt. Governor

Michael W. Sole
Secretary

August 2, 2010

Mr. Bruce Boler
Tamiami Trail EIS Project Manager
Everglades National Park
950 North Krome Avenue
Homestead, FL 33034

RE: National Park Service – Draft Environmental Impact Statement, Tamiami Trail Modifications: Next Steps, Everglades National Park – Miami-Dade County, Florida.
SAI # FL201006025273C

Dear Mr. Boler:

The Florida State Clearinghouse has coordinated a review of the Draft Environmental Impact Statement (EIS) under the following authorities: Presidential Executive Order 12372; Section 403.061(40), *Florida Statutes*; the Coastal Zone Management Act, 16 U.S.C. §§ 1451-1464, as amended; and the National Environmental Policy Act, 42 U.S.C. §§ 4321-4347, as amended.

The Florida Department of Environmental Protection (DEP) sincerely appreciates the opportunity to comment and offers a number of recommendations for the Final EIS pertaining to: the assessment of wetland impacts and sufficient mitigation to offset those impacts; the necessity of developing an operational plan to enhance the benefits of hydrologic connectivity to wetlands; the proximity of the eastern bridge to the Tamiami Trail East Wood Stork Colony; a seepage analysis of the L-31 North Canal; the assessment of short-term and long-term water quality impacts; impeded culvert flow during construction; stormwater treatment strategies; the inclusion of passive recreational facilities and bicycle/pedestrian lanes in project design; safe wildlife crossings; etc. Please refer to the enclosed DEP memorandum and contact Ms. Annet Forkink at (850) 245-8527 for further information and assistance.

The Florida Fish and Wildlife Conservation Commission (FWC) states that it has fish, wildlife and land management responsibilities for Water Conservation Areas 2 and 3, which are managed as the Everglades and Francis S. Taylor Wildlife Management Area. Although the FWC fully supports actions that improve current conditions for fish, wildlife and their habitats, staff has identified the following issues that should be addressed during the planning process for this project:

- develop an operational plan for water levels in the L-29 canal and address seepage concerns and flow delivery under the bridges;
- take all state-listed species (particularly, Everglades mink, snail kites, Florida burrowing owls, Florida manatees and Florida panthers) into account when analyzing the project alternatives;
- avoid impacts to adjacent wading bird nesting colonies;
- incorporate wildlife crossing features to improve wildlife passage;
- ensure continued public access to the L-29 canal boat ramp; and
- consider other projects, such as the Pilot Spreader Swale, and the effects of implementation on the subject bridge project.

FWC recommends that the National Park Service (NPS) provide more information regarding concerns that the easternmost bridge may exacerbate seepage across the L-31 canal levee and result in impacts to wading bird nesting habitat. Please refer to the enclosed FWC letter (and prior project comment letters provided directly to the NPS) for additional comments and recommendations.

The Florida Department of Transportation (FDOT) has reviewed the Draft EIS to evaluate the impacts of the proposed project alternatives on the Tamiami Trail and surrounding environment. While the FDOT is in favor of Everglades restoration and not opposed to the modification of Tamiami Trail to support the water restoration project, the agency is, in effect, a condemnee as owner of the facility and does not assume any responsibility/ liability for design, construction or permitting of the federal project. The FDOT has identified several key concerns that must be satisfactorily addressed and resolved prior to completion of the NEPA documentation process. Please refer to the enclosed FDOT letter and updated table of engineering comments, concerns and recommendations for further information.

The Florida Department of State (DOS) has reviewed the Draft EIS and concurs with the NPS' finding that the proposed undertaking will have an adverse effect on historic properties. The procedures outlined in 36 CFR 800.6 regarding State Historic Preservation Officer consultation and development and evaluation of alternatives or modifications that avoid, minimize or mitigate adverse effects must, therefore, be followed. Please see the enclosed DOS letter for additional details.

Based on the information contained in the Draft EIS and enclosed state agency comments, the state has determined that, at this stage, the proposed federal activities are consistent with the Florida Coastal Management Program (FCMP). To ensure the project's continued consistency with the FCMP, the concerns identified by our reviewing agencies must be addressed prior to project implementation. The state's continued concurrence will be based on the activity's compliance with FCMP authorities, including federal and state monitoring of the activity to ensure its continued conformance, and the adequate resolution of issues identified during this and subsequent reviews. The state's final concurrence of the project's consistency with the FCMP will be determined during the environmental permitting process under Section 373.428, *Florida Statutes*.

Thank you for the opportunity to review the draft document. Should you have any questions regarding this letter, please contact Mr. Chris Stahl at (850) 245-2169.

Yours sincerely,

Sally B. Mann

Sally B. Mann, Director
Office of Intergovernmental Programs

SBM/cjs
Enclosures

cc: John Outland, DEP, Ecosystem Projects
Ernie Marks, DEP, Everglades RPPP
Tim Gray, DEP, Southeast District
Mary Ann Poole, FWC
Martin Markovich, FDOT
Barbara Culhane, FDOT, District Six
Laura Kammerer, DOS
Jim Golden, SFWMD

Project Information	
Project:	FL201006025273C
Comments Due:	07/13/2010
Letter Due:	08/10/2010
Description:	NATIONAL PARK SERVICE - DRAFT ENVIRONMENTAL IMPACT STATEMENT, TAMIAMI TRAIL MODIFICATIONS: NEXT STEPS, EVERGLADES NATIONAL PARK - MIAMI-DADE COUNTY, FLORIDA.
Keywords:	NPS - DEIS, TAMIAMI TRAIL MODIFICATIONS, EVERGLADES NAT. PARK - MIAMI-DADE CO.
CFDA #:	15.916

Agency Comments:

SOUTH FL RPC - SOUTH FLORIDA REGIONAL PLANNING COUNCIL

No Comments Received

FISH and WILDLIFE COMMISSION - FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

The FWC states that it has fish, wildlife and land management responsibilities for WCAs 2 and 3, which are managed as the Everglades and Francis S. Taylor Wildlife Management Area. Although the FWC fully supports actions that improve current conditions for fish, wildlife and their habitats, staff has identified the following issues that should be addressed during the planning process for this project: - develop an operational plan for water levels in the L-29 canal and address seepage concerns and flow delivery under the bridges; - take all state-listed species (particularly, Everglades mink, snail kites, Florida burrowing owls, Florida manatees and Florida panthers) into account when analyzing the project alternatives; - avoid impacts to adjacent wading bird nesting colonies; - incorporate wildlife crossing features to improve wildlife passage; - ensure continued public access to the L-29 canal boat ramp; and - consider other projects, such as the Pilot Spreader Swale, and the effects of implementation on the subject bridge project. FWC recommends that the NPS provide more information regarding concerns that the easternmost bridge may exacerbate seepage across the L-31 levee and result in impacts to wading bird nesting habitat. Please refer to the enclosed FWC letter (and prior project comment letters provided directly to the NPS) for additional comments and recommendations.

STATE - FLORIDA DEPARTMENT OF STATE

The DOS concurs with the NPS' finding that the proposed undertaking will have an adverse effect on historic properties. The procedures outlined in 36 CFR 800.6 regarding SHPO consultation and development and evaluation of alternatives or modifications that avoid, minimize or mitigate adverse effects must, therefore, be followed.

TRANSPORTATION - FLORIDA DEPARTMENT OF TRANSPORTATION

The FDOT has reviewed the Draft EIS to evaluate the impacts of the proposed project alternatives on the Tamiami Trail and surrounding environment. While the FDOT is in favor of Everglades restoration and not opposed to the modification of Tamiami Trail to support the water restoration project, the agency is, in effect, a condemnee as owner of the facility and does not assume any responsibility/liability for design, construction or permitting of the federal project. FDOT has identified several key concerns that must be satisfactorily addressed and resolved prior to completion of the NEPA documentation process. Please refer to the enclosed FDOT letter and updated table of engineering comments, concerns and recommendations for further information.

ENVIRONMENTAL PROTECTION - FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

The DEP sincerely appreciates the opportunity to comment and offers a number of recommendations for the Final EIS pertaining to: the assessment of wetland impacts and sufficient mitigation to offset those impacts; the necessity of developing an operational plan to enhance the benefits of hydrologic connectivity to wetlands; the proximity of the eastern bridge to the Tamiami Trail East Wood Stork Colony; a seepage analysis of the L-31 North Canal; the assessment of short-term and long-term water quality impacts; impeded culvert flow during construction; stormwater treatment strategies; the inclusion of passive recreational facilities and bicycle/pedestrian lanes in project design; safe wildlife crossings; etc. Please refer to the enclosed DEP memorandum and contact Ms. Annet Forkink at (850) 245-8527 for further information and assistance.

SOUTH FLORIDA WMD - SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Although the District does not have any inconsistency issues regarding this proposal, we will be sending comments directly to the Department of the Interior (DOI) to assist the DOI in making this project a better project.

United States Department of the Interior

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

October 18, 2010

Memorandum

To: Dan B. Kimball, Superintendent, Everglades and Dry Tortugas National Parks

From: Paul Souza, Field Supervisor, South Florida Ecological Services Office

Subject: Biological Opinion for the Tamiami Trail Modifications: Next Steps Project

This memorandum transmits the U.S. Fish and Wildlife Service's (Service) Biological Opinion (Service Federal Activity Codes 41420-2010-CAP and 41420-2009-FA-0648 and Service Consultation Codes 41420-2010-F-0253 and 41420-2010-F-0370) for the Tamiami Trail Modifications: Next Steps Project and its effects on the wood stork (*Mycteria americana*) and the Florida panther (*Puma concolor coryi*), 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 project site is located in Sections 01 through 06, Township 54 South, Range 37 East and Sections 07 through 11, Township 54 South, Range 38 East, Miami-Dade County, Florida (Figure 1).

In your request for formal consultation received in this office on June 2, 2010, you asked the Service to consider the preferred alternative, Alternative 6e, and its effects on listed species within the project area. Alternative 6e proposes to add 5.5 miles of bridging to the 1-mile bridge currently under construction on U.S. Highway 41 (US 41) (Tamiami Trail) and bring the total amount of bridge span across the 10.7-mile Northeast Shark River Slough (NESRS) corridor to 6.5 miles. Although this project, in and of itself, will not provide the full array of ecological benefits, it will pave the way for future projects to reconnect the original flow way between Water Conservation Areas (WCA) 3A, 3B, NESRS, and Florida Bay. The result of this connection will be a much more passively managed system with the historic hydropatterns necessary to sustain the diversity of wildlife within the Greater Everglades.

The National Park Service (NPS), in their Draft Environmental Impact Statement (DEIS) (Everglades National Park [ENP] 2010), concluded that the preferred alternative "may affect, but is not likely to adversely affect" the threatened eastern indigo snake (*Drymarchon corais couperi*), the endangered Everglade snail kite (*Rostrhamus sociabilis plumbeus*) and Everglade snail kite critical habitat, the endangered West Indian manatee (*Trichechus manatus*) and West Indian manatee critical habitat, the endangered Cape Sable seaside sparrow (*Ammodramus matitimus mirabilis*) and Cape Sable seaside sparrow critical habitat, and the endangered Florida panther. The NPS further concluded that the project "may affect, and is likely to adversely affect" the endangered wood stork.

Eastern indigo snakes

The threatened Eastern indigo snakes are known to occur in a range of habitat types in south Florida; however, no sightings of indigo snakes have been made in the vicinity of the project area. Although it is feasible that indigo snakes could be affected by the proposed action, the removal of 5.5-miles of roadbed material (bridges) and raising (widening) the remainder of the road, it is unlikely due to the location of the project area within wetlands of WCA-3A and ENP which remain inundated for a majority of the year. Due to the commitment by the NPS (ENP 2010) to implement the Service's *Standard Protection Measures for the Eastern Indigo Snake* (Service 2004), the Service concurs with the determination that the construction of the preferred Alternative, 6e, is "not likely to adversely affect" the eastern indigo snake. Standard construction conditions require the education of contractors and equipment operators, posting of speed limit signs on all roadways during project construction and operation, on-site signs explaining penalties of intentionally running over snakes, and instructions that construction will cease if snakes are observed. No critical habitat has been designated for the eastern indigo snake; therefore, none will be affected.

Everglade snail kite

Potential effects to the endangered Everglade snail kite would result from construction activities during the 44 months it would take to complete the project. Based on nesting data from 1996 to 2010, the closest nest to Tamiami Trail was 285 feet (ft) from the road (2000 nest site). Because this distance falls within 500-ft of the project site, and the potential for future nesting exists in this area, the NPS will follow the Service's Draft Snail Kite Management Guidelines (Service 2006a). This guidance outlines means to minimize impacts to nesting snail kites through the establishment of buffer zones. In short, a 500-ft no-entry buffer zone (*i.e.*, no construction activities) would be placed around any active nest in proximity to the project area. Additionally, a 1,400-ft zone of minimal disturbance would also surround active nests. The Service and the Florida Fish and Wildlife Conservation Commission (FWC) track snail kite nesting through direct observations and efforts by various independent researchers and will notify the NPS should nests be detected in proximity to the project area. Therefore, the Service concurs with the NPS's conclusion that the project is not likely to adversely affect the Everglade snail kite. There is no designated critical habitat located within or adjacent to the project area, so none would be affected.

West Indian manatee

The endangered West Indian manatee has rarely been documented in the project area. For the entire period of record spanning over 20 years, there has been only one recorded manatee utilizing the L-29 Canal adjacent to Tamiami Trail. Therefore, the likelihood of a manatee occurring in the project area is negligible and the Service concurs with the NPS's conclusion that the project is not likely to adversely affect the West Indian manatee. There is no designated critical habitat located within or adjacent to the project area, so none would be affected.

Cape Sable seaside sparrow

The endangered Cape Sable seaside sparrow (CSSS) does not occur in the project footprint. The closest known nesting sparrow habitat lies 10 miles south of the project area. Construction activities would have no direct effect on this species. Therefore, the Service concurs with the NPS's conclusion that the project "may affect, but is not likely to adversely affect" the CSSS. There is no designated critical habitat located within the project area, so none would be affected.

Based on the reasons provided above, the Service concurs with the NPS's determination that the preferred Alternative (6e) for the Tamiami Trail Modifications: Next Steps Project "may affect, but is not likely to adversely affect" the eastern indigo snake, Everglade snail kite, West Indian manatee, and CSSS and will have "no effect" on Everglade snail kite critical habitat, West Indian manatee critical habitat, and CSSS critical habitat. Therefore, this Biological Opinion will focus on the preferred alternative and its effects on the Florida panther and wood stork.

Wood stork

The project site is located within the core foraging area (CFA) (within 18.6 miles) of six active breeding colonies of the endangered wood stork. The Service believes the loss of wetlands within a CFA may reduce foraging opportunities for wood storks. For projects that impact 5 or more acres of wood stork foraging habitat, the Service requires a functional assessment be conducted using our "Wood Stork Foraging Analysis Methodology" (Methodology) on the foraging habitat to be impacted and the foraging habitat provided as mitigation. By letter dated July 26, 2010, the Service requested the NPS to conduct the wood stork foraging analysis and provide other information regarding potential impacts the project may have on wood storks. Additionally, information provided by the NPS indicates that up to 3.04 acres of potential nesting substrate within the Primary Zone of the Tamiami West and East Colonies will be permanently removed as a result of the action.

The NPS has determined the project "may affect, and is likely to adversely affect" the wood stork. The Service notes the project will result in a loss of wetlands that currently provide foraging and nesting habitat for the wood stork. However, we anticipate that future restoration of wood stork foraging habitat by this project, both directly and indirectly through facilitation of future Comprehensive Everglades Restoration Plan (CERP) projects, will exceed the loss of habitat due to project construction. The Service will review all of the latest information regarding wood storks in this Biological Opinion.

Florida panther

Likewise, the project corridor occurs within the Primary Zone of the Service's Panther Focus Area (PFA) for the endangered Florida panther. The PFA is based on the latest scientific information on panther habitat usage provided in Kautz et al. 2006, and Thatcher et al. 2006, and denotes areas in Florida where development projects could potentially affect the panther. The NPS has determined the project "may affect, but is not likely to adversely affect" the Florida panther. The Service notes the project will result in the loss of panther habitat and, in a letter dated July 26, 2010, advised the NPS to change their determination for panther to “may affect, likely to adversely affect” and forward additional information regarding the impacts of the preferred alternative on the panther. The Service requested that the NPS include a functional assessment of the panther habitat to be lost due to the project (*i.e.*, all lands within the footprint of the new construction) using the Service’s panther habitat assessment methodology (Panther Methodology). The Panther Methodology assigns value to panther habitat in functional units known as Panther Habitat Units (PHU). The Service will review all of the latest information regarding panthers in this Biological Opinion.

This Biological Opinion is based on information provided in the NPS’s letter requesting initiation of formal consultation received in this office on June 2, 2010; the DEIS dated April 2010; the Service’s letter prepared on June 3, 2010, requesting additional information on project impacts; the NPS’s response to our request received via electronic mail on August 25, 2010; previous biological opinions and Fish and Wildlife Coordination Act Reports submitted for Tamiami Trail projects (Service 2003, 2006b, 2006d and 2008b); and meetings, telephone conversations, email, and other sources of information. A complete administrative record of this consultation is on file at the Service’s South Florida Ecological Services Office, Vero Beach, Florida.

POTENTIAL BENEFITS OF PROPOSED ACTION TO ENDANGERED SPECIES

This Biological Opinion assesses the direct impacts from construction in the project footprint on threatened and endangered species; however, the proposed action has the potential to benefit endangered species outside the footprint. This project represents the completion of the critical first step in integrating WCA-3A, 3B, and NESRS back into the historical Everglades flow way. Allowing the redistribution of a portion of water flow east toward NESRS should have the immediate and long lasting effect of lowering high water levels in WCA-3A. Lower water levels in southern WCA-3A would benefit the endangered Everglade snail kite which has suffered recent declines from sustained water depth and hydroperiod in this area. Creating a more natural hydrology in WCA 3A could also improve tree island habitat in the longer term and therefore improve habitat for the Florida panther. An ancillary benefit of lowering water levels in WCA-3A would be reduced discharges through the S-12 structures which have impacted the CSSS habitat located in the western Shark River Slough (SRS) (Pimm et al. 2002). Redistributing water to the east is the cornerstone of Everglades restoration (Curnutt et al. 1998; Corps 1999; Ogden 2007; Sustainable Ecosystems Institute [SEI] 2003) and modifying the Tamiami Trail, to pass greater volumes of water, will greatly aid in achieving the restoration envisioned. A panel of scientists concluded that there were strong indicators Everglades restoration, when complete, would benefit the CSSS, Everglade snail kite, and wood stork (SEI 2003). The Modified Water Deliveries to ENP Project (MWD), including the Tamiami Trail Modification: Next Steps Project is a key first step in this effort.

Wood stork

Hydrologic restoration of NESRS and eastern ENP is essential to the recovery of wading bird populations such as the wood stork, white ibis, great egrets and tricolor herons (Tabb 1963; Service 1990, 1991, 1999a; Corps 1992, 1999; Ogden et al. 1992). The population declines observed throughout ENP in the 1960s coincide with the hydrologic isolation of NESRS and subsequent lowering of water levels in the upstream Everglades ecosystem by the compartmentalization of WCA-3 (Leach et. al. 1972; Corps 1992; U.S. Department of Justice 1999). Augmentation of flows to NESRS would likely increase stages in the Rocky Glades and Taylor Slough areas. This movement toward historic seasonal flow distributions of water would likely increase water depths and hydroperiods within these areas which would improve the quality and quantity of forage fish that support wood stork nesting colonies in both their current and historic locations.

Cape Sable seaside sparrow

Since 1992, the decline in the CSSS population has been substantive, and there has been little evidence of improvement (Pimm et al. 2002; Service 2006c; Elderd and Nott 2007). Subpopulation A, located in Northwest SRS has been impacted by high water levels from both natural rainfall events and large, unseasonable S-12 discharges (Pimm et al. 2002; Pimm and Bass 2002; Service 2006c; Eldred and Nott 2007). This area once supported nearly half of the total sparrow population from 1981 to 1992 (Service 1999a, 2002, 2006c; Pimm et al. 2002; Pimm and Bass 2002; Elderd and Nott 2007). Conversely, CSSS subpopulations located on the eastern side of Shark Slough have experienced drier than normal conditions making them susceptible to increased fire risk. This risk was made clear recently when, in 2008, a fire started near subpopulation F and burned roughly 30,000 acres of prairie and slough habitat in NESRS. This fire consumed roughly the entire habitat in subpopulation F and 20 percent of the habitat in Subpopulation E, neither of which will return to sparrow habitat for at least 2 years (La Puma et al. 2007). Redistributing water from the current SRS water budget into NESRS would benefit CSSS in subpopulation A by reducing S-12 A, B, and C discharges during the early wet season. Furthermore, redistribution of flows to NESRS and increased stages downstream will help to restore historic hydroperiods in the eastern marl marshes of the Rocky Glades and Taylor Slough, benefiting eastern subpopulations of the CSSS which have been too dry.

Everglade snail kite

The Everglade snail kite has experienced pronounced population fluctuations over the past 30 years. These fluctuations are primarily associated with the regulation of water levels by the Central and Southern Florida project and natural meteorological conditions (Nicholson 1926; Howell 1932; Bent 1937; Sprunt 1945, 1954; Stieglitz and Thompson 1967; Service 1990, 1991, 1999a; Corps 1992). Specifically, in WCA-3A snail kites have been impacted by the maintenance of unnaturally high stages (Kitchens et al. 2002; Martin et al. 2003; Service 2006c). This condition is believed to have reduced suitable nesting substrate and foraging habitat. The loss of over half of the wetlands in central and southern Florida during the last century, coupled with habitat degradation and fragmentation of many remaining wetlands, has increased the importance of WCA-3A in sustaining the overall snail kite population. Drought conditions in south Florida between 2000 to 2001 and 2007 to 2008 have also adversely affected the snail kite population. Redistributing water from the current SRS water budget into NESRS, when combined with future operational improvements to water management of WCA-3A and 3B, would likely reduce unnaturally high wet season stages in WCA-3A that have been impacting snail kite nesting substrate and reducing foraging opportunities. Additionally, restoration of the historic SRS flow way would likely enhance the function of snail kite habitat in WCA-3B and NESRS. In short, completion of the MWD Project and the Tamiami Trail Modification: Next Steps Project are critical steps towards advancing CERP in this part of the system, and the best available science suggests CERP will benefit the snail kite (SEI 2003).

The Use of Best Scientific and Commercial Information by the Service

The Service uses the most current and up-to-date scientific and commercial information available. The nature of the scientific process dictates that information is constantly changing and improving as new studies are completed. The scientific method is an iterative process that builds on previous information. As the Service becomes aware of new information, we will ensure it is fully considered in our decisions, evaluations, reviews, and analyses as it relates to the base of scientific knowledge and any publications cited in our documents.

Specifically, there is one such document cited in this Biological Opinion that the Service acknowledges has been affected in its cited form by new scientific information. This document is the South Florida Multi-Species Recovery Plan (MSRP) of 1999 (Service 1999b). The Service has taken new information related to this document that has become available since its publication into account when using this document to help guide our analysis and decisions.

South Florida Multi-Species Recovery Plan

The MSRP was designed to be a living document and it was designed to be flexible to accommodate the change identified through ongoing and planned research and to be compatible with adaptive management strategies. These principals are set forth in both the transmittal letter from the Secretary of the Interior and in the document itself. As predicted, this is what indeed occurred in the intervening years since the MSRP was published. The Service uses the MSRP in the context it still presents useful information when taken in conjunction with all the new scientific information developed subsequent to its publication.

Consultation History

The Omnibus Appropriations Act of 2009 (H.R. 1105; P.L. 111-008, March 11, 2009) directed the Department of the Interior and NPS to evaluate the feasibility of additional bridging of the Tamiami Trail beyond that currently being constructed (1-Mile bridge) pursuant to the MOD (16 U.S.C. § 410r-S).

On May 18 and 19, 2009, Service staff participated in a scoping meeting and an initial site visit with an interagency group at ENP, Homestead, Florida.

On June 16, 2009, Service staff met with an interagency group in West Palm Beach, Florida to discuss alternative evaluation and benefits calculation methodologies.
On July 22, 2009, an interagency group conducted the Unified Mitigation Assessment Methodology on various sites along the project corridor.

On September 3, 2009, Service staff participated in an interagency project delivery team meeting at ENP, Homestead, Florida.

On November 3 and 4, 2009, Service staff attended a workshop at which the Choosing by Advantages method was used by an interagency group to select the preferred alternative.

On June 2, 2010, the Service received the *Everglades National Park, Tamiami Trail Modifications: Next Steps DEIS* and a letter requesting our review and concurrence with their species determinations in said document.

The NPS determined the project "may affect, but is not likely to adversely affect" the threatened eastern indigo snake, endangered West Indian manatee, CSSS, and Florida panther. The NPS also determined that the project "may affect" the endangered wood stork.

In a letter to the NPS, dated July 26, 2010, the Service indicated that we were evaluating the information within the DEIS regarding the impacts of the proposed action on the eastern indigo snake, West Indian manatee, and CSSS. The Service further stated that it would address these determinations in the Biological Opinion which would be prepared for the project's adverse effects to the wood stork, and Florida panther (please see concurrences for these species discussed above). The Service also stated that we concurred with the NPS's determination of "may affect" for the wood stork, and recommended the NPS change its determination for the Florida panther from "may affect, not likely to adversely affect" to "may affect, likely to adversely affect." The Service indicated that should the NPS wish to change its determination for the panther, the letter could be used as concurrence of that finding. Also, the Service stated that we needed additional information to initiate formal consultation on the wood stork and Florida panther in accordance with 50 CFR 402.14, and requested the additional information.

On August 25, 2010, via email, the Service received the additional information requested from the NPS.

As of August 25, 2010, we have received all the information necessary for initiation of formal consultation on the wood stork and Florida panther for this project as required in the regulations governing interagency consultations (50 CFR § 402.14). The Service is providing this Biological Opinion in conclusion of formal consultation.

BIOLOGICAL OPINION

DESCRIPTION OF PROPOSED ACTION

The NPS is proposing improvements to a 10.9-mile segment of Tamiami Trail/US 41 from approximately the L31N Canal to the L67 Extension Canal (Figure 2). The project feasibility study and DEIS was authorized as part of the 2009 Omnibus Appropriations Act passed by Congress on March 10, 2009. The improvements will include the construction of approximately 5.5 miles of new two-lane bridges. Specifically, the new bridges include: a 2.6-mile span from the Osceola Camp to the Airboat Association of Florida compound; a 0.4-mile span from the Airboat Association of Florida compound to the Tiger Tail Camp; a 1.8-mile span from the Tiger Tail Camp to the western terminus of the 1-mile bridge currently under construction located west of the L31N Canal (the Service has previously consulted on this segment of the proposed new Tamiami Trail corridor [Service Federal Activity Code 41420-2007-FA-1577]); and a 0.7-mile span from the eastern terminus of the 1-mile bridge to the L31 N Canal. The new bridges will be located approximately 50 feet south of the midline of the existing Tamiami Trail roadway. The pavement and roadbed of Tamiami Trail adjacent to the footprint of the new bridges will be removed, and the crown height of remaining roadway segments between the new bridges will be increased to an elevation of 12.3 feet NGVD. The project will also include the construction of four access ramps to properties south of the existing US 41 roadway. The purpose of the project is to improve hydrologic flow from the L-29 Canal and eventually WCA 3B into ENP and Florida Bay in order to improve the quality of existing wetlands in the region. The project site is located in Miami-Dade County, Florida (Figure 1).

<u>Adverse Effects to the Wood Stork</u>

The 148.96-acre project footprint is comprised of 46.9 acres of disturbed road right-of-way, 1.56 acres of surface waters, 33.9 acres of freshwater marsh, 48.8 acres of mixed wetland hardwood/shrub, and 17.8 acres of sawgrass marsh. The project will impact 100.5 acres of wetlands within the project corridor that may provide foraging habitat for the wood stork. The Service has assessed wood stork foraging habitat to be affected by the project with the Service's "Wood Stork Foraging Analysis Methodology" (Methodology). The Methodology can found in the Service's letter to the Corps dated May 18, 2010, (Service Federal Activity Code Number 41420-2007-FA-1494). Based on the Methodology, the project will result in the loss of 387.29 kilograms (kg) of wood stork forage from 100.5 acres of Class 5 hydroperiod wetlands. The Service finds that the eventual enhancement of wood stork foraging habitat in WCA-3A, 3B, and NESRS, made possible by this project, will more than fully compensate for the loss of the 387.29 kilograms of stork forage biomass lost due to the project.

The project corridor is located immediately north of two active wood stork colonies identified by FWC (Figure 3) and within the CFA's of 3 additional colonies. The Tamiami Trail East colony (Unnumbered by the FWC) is located approximately 1,000 feet south of the project footprint at Latitude 25.757616, Longitude -80.508016. The Tamiami Trail West colony (FWC 620313) is located approximately 300 ft south of the project footprint at Latitude 25.760000, Longitude -80.545000. The proposed action will relocate the roadway slightly closer (approximately 50 to

100 ft) to the two nesting colonies. The proposed action will result in disturbance from construction activities and roadway operation (*i.e.*, motor vehicles) occurring closer to wood storks at the existing nest colonies. The increased disturbance could cause wood storks to abandon the nest colonies. The project also increases the probability for wood stork mortality from motor vehicle collisions with wood storks flying in and out of the colonies. Additionally, the Service finds that up to 3.04 acres of potential nesting habitat (consisting of wetlands vegetated by pond apple [*Annona glabra*] trees) within the primary protection zone recommended by the Service (Service 2004) of the Tamiami West Colony will be permanently removed as a result of the action.

<u>Adverse Effects to the Florida Panther</u>

The 148.96-acre project footprint is located in the Primary Zone of the Florida panther (Kautz et al. 2006) (Figure 5), and the Service's PFA (Figure 6) for the endangered Florida panther. The PFA is based, in part, on the latest scientific information on panther habitat usage provided in Kautz et al. 2006 and Thatcher et al. 2006 and denotes areas in Florida where development projects could potentially affect the panther. The project footprint within the Primary Zone is comprised of 46.9 acres of disturbed road right-of-way, 1.56 acres of surface waters, 33.9 acres of freshwater marsh, 48.8 acres of mixed wetland hardwood/shrub, and 17.8 acres of sawgrass marsh. The Service finds that the project site provides 100.5 acres of habitat suitable for panther feeding and dispersal. Therefore, the project will result in the loss of 100.5 acres of panther habitat. Based on our assessment, the Service has determined that the 100.5 acres of panther habitat to be impacted provide a total of 1,278.48 PHUs (Table 13).

The Service finds that the NPS's proposal to use 142.5 acres of the more than 55,000 acres of restored panther primary habitat resulting from the Picayune Strand Restoration Project (PSRP) site in Collier County, Florida, will more than fully compensate for the loss of the 1,278.48 PHUs resulting from the project (see Habitat Assessment Methodology Application, pg 79). The proposed restoration is located near the project area, and benefits the survival and recovery of the Florida panther as referenced in the Panther Recovery Plan (Service 2006e, 2008) goal 1.1.1.2.3. This goal recommends that habitat preservation and restoration within the Primary Zone be provided in situations where land use intensification cannot be avoided. In addition, the eventual enhancement of habitat in the Everglades' ecosystem that will be made possible by this project is likely to provide improved habitat for panthers.

Action Area –Wood stork

The Service has determined the action area for the wood stork is larger than the proposed action area identified in the NPS' Draft EIS. Coulter and Bryan (1993) found that 85 percent of wood stork foraging occurs within 12.5 miles of the nesting colony. Furthermore, the FWC (Cox et al. 1994) considers the area within 18.6 miles (30 km) of a nesting colony as the CFA for wood storks.

Therefore, for the purposes of this BO, the action area includes the CFAs of all wood stork nesting colonies if they encompass the project area or any portion of it (Figure 3). Our records indicate that Tamiami West, Tarniami East-1 and Tamiami East-2 are located within 300-1,000-feet south of the project area; 3B Mud East is 2.5 miles northeast; and Grossman Ridge is 11.8 miles southwest of the project site. The CFAs of these wood stork colonies encompass all of the Tamiami Trail Modifications: Next Steps project area. The CFAs include about 457,316 acres of wetland cover types for the Tamiarni West, Tamiami East-1 and

Tamiami East-2 colonies, 396,664 acres for the 3B Mud East colony, and 201,155 acres of lands in the CFA of the Grossman Ridge colony. All five colonies encompass roughly 732,950 acres of wetland habitat (Figure 3).

Action Area –Florida panther

The Service's PFA includes lands in Charlotte, Glades, Hendry, Lee, Collier, Palm Beach, Broward, Miami-Dade, and Monroe Counties, as well as the southern portion of Highlands County (Figure 6). Developed urban coastal areas in eastern Palm Beach, Broward, and Miami-Dade Counties, and in western Charlotte, Lee, and Collier Counties were excluded because they contain little or no panther habitat and it is unlikely that panthers would use these areas.

Movements of Florida panthers are much larger than the project site and, therefore, the Service's action area is larger than the proposed action area identified by the Corps' public notice. The action area, which is a subset of the current panther range, includes those lands where the Service expects panthers may experience direct and indirect effects from the proposed development. Maehr et al. (1990a) monitored five solitary panthers continuously for 130-hour periods seasonally from 1986 to 1989, rarely observing measurable shifts in location during the day, but nocturnal shifts in location exceeding 20.0 kilometers (km) (12.4 miles) were not unusual. Maehr et al. (2002a) in a later report documented a "mean maximum dispersal distance" of 68.1 km (42.3 miles) for subadult males and 20.3 km (12.6 miles) for subadult females. In the same report Maehr et al. (2002a) documented a "mean dispersal distance" of 37.3 km (23.1 miles) for subadult males. Comiskey et al. (2002) documented a "mean dispersal distance" for subadult male panthers as an average distance of 40.1 km (24.9 miles) from their natal range, which is similar to the dispersal distance referenced by Maehr et al. (2002a).

Therefore, for both direct and indirect effects, the Service defines the action area for the Florida panther (Figure 4) as all lands within a 25-mile radius of the project. The 25-mile radius is slightly greater than the mean dispersal distance for subadult males. This action area does not include urban lands or lands outside of the Service's PFA. The action area does include lands anticipated to sustain direct and indirect effects, such as roadways experiencing increased traffic, lands with increased human disturbance (project area and periphery of project), and lands where habitat fragmentation and intraspecific aggression may occur.

STATUS OF THE SPECIES AND CRITICAL HABITAT RANGEWIDE

Wood Stork

Federal Status

The wood stork was listed under the Act as endangered on February 28, 1984 (49 FR 7332). Critical habitat has not been designated for the wood stork.

Species Description

The wood stork is a large, long-legged wading bird, with a head to tail length of 85 to 115 centimeters (cm) (33 to 45 inches) and a wingspan of 150 to 165 cm (59 to 65 inches) (Coulter et al. 1999). The plumage is white, except for iridescent black primary and secondary wing feathers and a short black tail. Wood storks fly with their neck and legs extended. On adults, the rough scaly skin of the head and neck is unfeathered and blackish in color, the legs are dark, and the feet are dull pink. The bill color is also blackish. During courtship and the early nesting season, adults have pale salmon coloring under the wings, fluffy undertail coverts that are longer than the tail, and their toes are bright pink. Immature wood storks, up to the age of about 3 years, have yellowish or straw-colored bills and varying amounts of dusky feathering on the head and neck (Coulter et al. 1999).

Status and Distribution

The wood stork is found from northern Argentina, eastern Peru and western Ecuador north to Central America, Mexico, Cuba, Hispaniola, and the southeastern United States (AOU 1983). Only the population segment that breeds in the southeastern United States is listed as endangered. In the United States, wood storks were historically known to nest in all coastal states from Texas to South Carolina (Wayne 1910; Bent 1926; Howell 1932; Oberholser 1938; Dusi and Dusi 1968; Cone and Hall 1970; Oberholser and Kincaid 1974). Dahl (1990) estimates these states lost about 38 million acres, or 45.6 percent, of their historic wetlands between the 1780s and the 1980s. However, it is important to note wetlands and wetland losses are not evenly distributed in the landscape. Hefner et al. (1994) estimated 55 percent of the 2.3 million acres of the wetlands lost in the southeastern United States between the mid-1970s and mid-1980s were located in the Gulf-Atlantic Coastal Flats. These wetlands were strongly preferred by wood storks as nesting habitat. Currently, wood stork nesting is known to occur in Florida, Georgia, South Carolina, and North Carolina. Breeding colonies of wood storks are currently documented in all southern Florida counties, except for Okeechobee County. Additional expansion of the breeding range of wood storks in the southeastern United States may continue in coming years, both to the north and possibly to the west along the Gulf Coast (Service 2007a).

The decline that led to listing in the United States population of the wood storks is thought to be related to one or more of the following factors: (1) reduction in the number of available nesting sites; (2) lack of protection at nesting sites; and (3) loss of an adequate food base during the nesting season (Ogden and Nesbitt 1979). Ogden and Nesbitt (1979) indicate a reduction in nesting sites is not the cause in the population decline, because the number of nesting sites used from year-to-year is relatively stable. They suggest loss of an adequate food base is a cause of wood stork declines. Ogden and Nesbitt (1979) also suggest that changes in remaining wetland systems in Florida, including drainage and impoundment, may be a larger concern for wood storks than loss of foraging habitat.

The primary causes of the wood stork population decline in the United States are loss of wetland habitats and loss of wetland function resulting in reduced prey availability. Almost any shallow wetland depression where fish become concentrated, through either local reproduction or receding water levels, may be used as feeding habitat by the wood stork during some portion of the year, but only a small portion of the available wetlands support foraging conditions (high prey density and favorable vegetation structure) that storks need to maintain growing nestlings. Browder et al. (1976) and Browder (1978) documented the distribution and the total acreage of wetland types occurring south of Lake Okeechobee, Florida, for the period from 1900 through 1973. We combined their data for habitat types known to be important foraging habitat for wood storks (cypress domes and strands, wet prairies, scrub cypress, freshwater marshes and sloughs, and sawgrass marshes) and found these south Florida wetland habitat types have been reduced by about 35 percent since 1900.

The alteration of wetlands and the manipulation of wetland hydroperiods to suit human needs have also reduced the amount of habitat available to wood storks. The decrease in wood storks nesting on Cape Sable was related to the construction of the drainage canals during the 1920s (Kushlan and Frohring 1986). Water level manipulation may decrease food production if the water levels and length of inundation do not match the breeding requirements of forage fish. Dry-downs of wetlands may selectively reduce the abundance of the larger forage fish species that wood storks tend to utilize, while still supporting smaller prey fish. Water level manipulation can also facilitate raccoon predation of wood stork nests when water is kept too low (alligators deter raccoon predation when water levels are high). Artificially high water levels may retard nest tree regeneration since many wetland tree species require periodic droughts to establish seedlings.

During the 1970s and 1980s, wood storks have also been observed to shift their nest sites to artificial impoundments or islands created by dredging activities (Ogden 1991). The percentage of nests in artificial habitats in central and north Florida increased from about 10 percent of all nesting pairs during 1959-1960 to 60-82 percent during 1976-1986 (Ogden 1991). Nest trees in these artificially impounded sites often include exotic species such as Brazilian pepper (*Schinus terebinthifolius)* or Australian pine (*Casuarina equisetifolia*). Ogden (1996) has suggested the use of these artificial wetlands indicates wood storks are not finding suitable conditions within natural nesting habitat or they are finding better conditions at the artificial wetlands. The long-term effect of these nesting areas on wood stork populations is unclear.

Human disturbance is a factor known to have a detrimental effect on wood stork nesting (Service 1997). Wood storks have been known to desert nests when disturbed by humans, thus exposing eggs and young birds to the elements and to predation by gulls and fish crows.

The role of chemical contamination in the decline of the wood stork is unclear. Pesticide levels high enough to cause eggshell thinning have been reported in wood storks, but decreased production has not yet been linked to chemical contamination (Ohlendorf et al. 1978; Fleming et al. 1984). Burger et al. (1993) studied heavy metal and selenium levels in wood storks from Florida and Costa Rica. Adult birds generally exhibited higher levels of contaminants than young birds. The authors attribute this to bioaccumulation in the adults who may be picking up contaminants at the colony nesting site and while foraging at other locations during the non-breeding season. There were higher levels of mercury in young birds from Florida than young birds or adults from Costa Rica. Young birds from Florida also exhibited higher levels of cadmium and lead than young birds from Costa Rica. The authors recommended the lead levels in Florida be monitored. Burger et al. (1993) drew no conclusions about the potential health effects to wood storks.

Prey and Foraging

Wood storks feed almost entirely on fish between 1 to 10 in (2.54 to 25.4 cm) in total length (Kahl 1964; Ogden et al. 1976; Coulter 1987). Depkin et al. (1992) studied the diets of wood storks at nesting colonies in east-central Georgia, and observed that fish constitute 92 percent of all individual prey items and 93 percent of the diet biomass. The availability of fish to the wood stork may be more a function of the productivity of each wetland rather than the immigration of fish from other adjacent wetlands. Carlson and Duever (1979) noted in their study that long distance movement of fish into deeper habitats is not a regular occurrence in the Big Cypress watershed communities. They also noted in their study that the preponderance of obstacles and plant debris all contribute to hindering mobility and limiting movement across the site. In addition, in Chapman and Warburton's (2006) studies on *Gambusia*, they noted that movement between drying pools was limited. Carlson and Duever (1979) concluded in their study that "*density and biomass of both wet and dry season fish populations are dependant primarily on the production of the particular site and not of adjacent habitats from which fish may have migrated*."

The diet of wood storks may also include crustaceans, amphibians, reptiles, mammals, birds, and arthropods. Depkin et al. (1992) found crayfish to represent 1 percent of the prey item biomass and 1.9 percent of the prey items in the wood stork's diet. Bryan and Gariboldi (1998) also noted a similar frequency of occurrence of crayfish in diet of wood storks, and Lauritsen (2007) observed wood storks foraging on crayfish at the Corkscrew Swamp Sanctuary. Other studies of the wood stork provide little information regarding the consumption of invertebrates (Ogden et al 1976; Coulter et al. 1999; Carlson and Duever 1979; Turner et al. 1999; Trexler et al. 2002). Ogden et al. (1976) summarized information from Kahl's publications (1962, 1964) on stomach contents of wood storks sampled in south Florida and southwest Florida and noted that all individuals examined contained only fish. Ogden et al. (1976) study also noted that the prey consumed were fish, although the average density of prawns was 2.5 times the density of the most abundant fish.

To catch prey items, wood storks generally employ a specialized feeding method called tactilocation, or grope feeding. This type of feeding consists of wading through the water with the beak immersed and open about 7 to 8 cm (2.5 to 3.5 inches) in width. When the wood stork encounters prey within its bill, the mandibles snap shut capturing the prey item, the head is raised, and the food is swallowed (Kahl 1964). Wood storks have also been reported to forage visually under some conditions (Kushlan 1979). In addition, wood storks have been observed to stir the water with their feet in an attempt to startle hiding prey (Rand 1956; Kahl 1964; Kushlan 1979). This foraging method allows them to forage effectively in turbid waters, at night, and under other conditions when other wading birds that employ visual foraging may not be able to forage successfully.

Wood storks forage in a wide variety of wetland types. Wetland habitat types used for foraging include freshwater marshes, ponds, hardwood and cypress swamps, narrow tidal creeks or shallow tidal pools, and artificial wetlands such as stock ponds, shallow and seasonally flooded roadside or agricultural ditches, and managed impoundments (Coulter and Bryan 1993; Coulter et al. 1999). Optimal foraging habitat consists of shallow-water wetlands (2 to 16 in [5 to 40 cm] in depth) that are sparsely vegetated (Ogden et al. 1978; Browder 1984; Coulter 1987; Coulter and Bryan 1993).

Hydrological patterns of wetlands in south Florida affect wood stork foraging. The annual hydrological pattern of wetland systems consists of water levels rising and peaking during the wet season (June to November) when the majority of the yearly total precipitation occurs, and gradually receding during the dry season (December to May). Shallow water levels within wetlands concentrate prey items (*i.e.*, fish) as they dry out and this is of particular importance during the wood stork nesting season (Kahl 1964). Therefore, a wetland site in south Florida may only provide suitable foraging conditions during part of the year when the water level has receded sufficiently to allow access and concentrate prey items. Consequently, during the nesting season there is a general progression in the suitability of wetlands for foraging based on their hydroperiods, with short hydroperiod wetlands used early in the season, mid-range hydroperiod wetlands used during the middle of the nesting season, and long hydroperiod wetlands used during the later part of the nesting season (Kahl 1964; Gawlik 2002).

Several other factors affect the suitability of foraging habitats for wood storks. Suitable foraging habitats must provide a sufficient density and biomass of forage fish or other prey species, and have vegetation characteristics that allow storks to locate and capture prey. Wetlands that contain deep water may not be accessible to wood storks for foraging. Conversely, wetlands with too little water may not provide adequate habitat for fish or other prey species. Longer hydroperiod wetlands are generally observed to support more fish and larger fish than shorter hydroperiod wetlands (Loftus and Ecklund 1994; Jordan et al. 1997 and 1998; Turner et al. 1999; Trexler et al. 2002). In addition, nutrient enrichment (primarily phosphorus) within the oligotrophic Everglades wetlands generally results in increased density and biomass of fish in potential stork foraging sites (Rehage and Trexler 2006). Distances from dry-season refugia, such as canals, alligator holes, and similar long hydroperiod sites, may also affect fish density and biomass in southern Florida. However, across the highly modified landscape of southern Florida, fish availability varies with respect to hydrologic gradients and nutrient availability gradients and it becomes very difficult to predict fish density. The foraging habitat for most wood stork colonies within southern Florida includes a wide variety of hydroperiod classes, nutrient conditions, and spatial variability.

Dense submerged and emergent vegetation may reduce foraging suitability by preventing storks from moving through the habitat and interfering with prey detection (Coulter and Bryan 1993). Wood storks tend to select foraging areas that have an open canopy, but occasionally use sites with 50 to 100 percent canopy closure (Coulter and Bryan 1993; O'Hare and Dalrymple 1997; Coulter et al. 1999). Densely forested wetlands may preclude storks from foraging (Coulter and Bryan 1993). However, the presence of minor to moderate amounts of submerged and emergent vegetation does not seem to detrimentally affect stork foraging and may be important to maintaining fish populations. Submergent and emergent vegetation cover at foraging sites at a Georgia nesting colony averaged 26 and 29 percent, respectively, but ranged from 0 to 100 percent (Coulter and Bryan 1993). These cover values did not differ significantly from random wetland sites.

During nesting, foraging areas must be sufficiently close to the colony to allow wood storks to efficiently capture prey and deliver prey to nestlings. In Georgia, wood storks generally forage in wetlands within 50 km (31 miles) of the colony site (Bryan and Coulter 1987), but forage most frequently within 20 km (12 miles) of the colony (Coulter and Bryan 1993). Herring (2007) noted similar foraging patterns for wood storks in south Florida with most frequent foraging within 10.29 km (6.4 miles). Maintaining this wide range of feeding site options ensures sufficient wetlands of all sizes and varying hydroperiods are available to support wood storks during shifts in seasonal and annual rainfall and surface water patterns. Storks forage the greatest distances from the colony at the beginning of the nesting season, before eggs are laid, and near the end of the season when the young are large. Wood storks feed nearest the colony during incubation (Browder 1984; Mitchell 1999). In south Florida, wood storks generally use wet prairie ponds early in the dry season and shift to slough ponds later in the dry season following receding water levels (Browder 1984).

Gawlik (2002) characterized wood storks foraging in the Everglades as "searchers" that employ a foraging strategy of seeking out areas of high-density prey and optimal (shallow) water depths, and abandoning foraging sites when prey density begins to decrease below a particular efficiency threshold. The wood storks' choice of foraging sites in the Everglades was significantly related to both prey density and water depth (Gawlik 2002). Based on this strategy, wood stork foraging opportunities are more constrained than many other wading bird species (Gawlik 2002).

Nesting and Reproduction

Wood stork nesting habitat consists of a variety of wooded habitat types including mangroves, cypress (as tall as 30.5 meters [100 ft]), and various other live or dead shrubs or trees located in standing water (swamps) or on islands surrounded by relatively broad expanses of open water (Palmer 1962; Rodgers et al. 1987; Ogden 1991; Coulter et al. 1999). Wood storks nest

colonially, often in conjunction with other wading bird species, and generally occupy the large-diameter trees at a colony site (Rodgers et al. 1996). The same colony site will be used for many years as long as the colony is undisturbed and sufficient feeding habitat remains in surrounding wetlands. However, not all storks nesting in a colony will return to the same site in subsequent years (Kushlan and Frohring 1986). Natural wetland nesting sites may be abandoned if surface water is removed from beneath the trees during the nesting season (Rodgers et al. 1996). In response to this type of change to nest site hydrology, wood storks may abandon that site and establish a breeding colony in managed or impounded wetlands (Ogden 1991). Wood storks that abandon a colony early in the nesting season due to unsuitable hydrological conditions may re-nest in other nearby areas (Borkhataria et al. 2004; Crozier and Cook 2004). Between breeding seasons or while foraging wood storks may roost in trees over dry ground, on levees, or on large patches of open ground. Wood storks may also roost within wetlands while foraging far from nest sites and outside of the breeding season (Gawlik 2002).
The majority of wood stork nesting generally occurs within a core of established rookeries that are used annually. However, each year a few new nesting colonies may be established or abandoned (Meyer and Frederick 2004). Abandoned nesting colonies may remain inactive permanently (Meyer and Frederick 2004). The establishment or abandonment of colony sites is likely related to the environmental conditions at the site (*e.g.*, prey availability, water levels, etc.) that make site conducive to successful nesting (Meyer and Frederick 2004).

Breeding wood storks are believed to form new pair bonds every breeding season. Wood storks have been documented to breed as young as 3 to 4 years of age. A single clutch of two to five (average three) eggs is laid per breeding season, but a second clutch may be laid if a nest failure occurs early in the breeding season (Coulter et al. 1999). Eggs are laid as early as October in south Florida and as late as June in north Florida (Rodgers 1990). Yearly, variation in clutch size has been observed and may be related to habitat conditions at the time of laying. The incubation period for the wood stork egg is about 30 days. Egg laying, and subsequently hatching, is staggered resulting in the nestlings varying in size (Coulter et al. 1999). The younger and smaller nestlings are first to die when food is scarce.

The young fledge in about 8 weeks, but will stay at the nest for 3 to 4 more weeks to be fed. Adults feed the young by regurgitating whole fish into the bottom of the nest about 3 to 10 times per day. Feedings are more frequent when the birds are young (Coulter et al. 1999), and less frequent when wood storks are forced to fly great distances to locate food (Bryan et al. 1995). The total nesting period, from courtship and nest building through independence of young, lasts about 100 to 120 days (Coulter et al. 1999). Nest initiation may be asynchronous within the colony. Adults and independent young may continue to forage around the colony site for a relatively short period following the completion of breeding.

Considerable variation in annual wood stork production may occur in response to local habitat conditions and food availability (Holt 1929; Kahl 1964; Ogden et al. 1978; Clark 1978; Ehrhart 1979; Hopkins and Humphries 1983; Rodgers and Schwikert 1997). Rodgers and Schwikert (1997) documented breeding production of 21 north and central Florida wood stork colonies from 1981 through 1985, and observed an average of 1.29 fledglings per nest and 0.42 fledglings per egg, and survivorship probability from egg laying to fledgling of 42 percent. More recent studies (Rodgers et al. 2008; Bryan and Robinette 2008; Winn et al. 2008; Murphy and Coker 2008) have documented production rates similar to rates observed from the 1970s to the 1990s. Rodgers et al. (2008) reported a combined production rate for 21 north and central Florida colonies from 2003 to 2005 of 1.19± 0.09 fledglings per nest attempt (n=4,855 nests). Bryan and Robinette (2008) reported rates of 2.3 and 1.6 fledged young per nesting attempt for South Carolina and Georgia in 2004 and 2005. Murphy and Coker (2008) reported, since listing, South Carolina colonies averaged 2.08 young per successful nest (range 1.72 to 2.73). The Palm Beach County (PBC) Solid Waste Authority colony (Morrison 2008) documented 0.86-fledglings per nesting attempt (2003 to 2008) with annual rates ranging from 0.25 to 1.49.

During nesting wood storks are dependent on consistent foraging opportunities with the greatest energy demands occurring during the middle of the nestling period (*i.e.*, when nestlings are 23 to 45 days old) (Kahl 1964). The average wood stork family requires 201 kg (443 pounds [lbs]) of fish during the breeding season, with 50 percent of the nestling stork's food requirement occurring during the middle third of the nestling period (Kahl 1964). As discussed, receding water levels are necessary in south Florida to concentrate suitable densities of forage fish for wood storks (Kahl 1964; Kushlan et al. 1975).

Short hydroperiod wetlands in south Florida are an important source of forage for wood storks during pre-nesting activities (Fleming et al. 1994; Ceilley and Bortone 2000) and immediately following hatching. As discussed, short hydroperiod wetlands are accessible to wood storks due to their lower water levels. Based on Kahl's (1964) estimate that 201 kg of forage are required for successful nesting, about 50 kg are needed to meet the foraging needs of the adults and nestlings in the first third of the nesting cycle. Large acreages of short hydroperiod wetlands are required to meet this need because short hydroperiod wetlands are known to produce fewer fish and lower fish biomass per unit area than long hydroperiod wetlands. Loftus and Eklund (1994) estimated 50 fish per square meter for long hydroperiod wetlands and 10 fish per square meter for short hydroperiod wetlands in the Everglades. The disproportionate reduction (85 percent) of this wetland type due to development and over drainage has been proposed as a major cause of late colony formation and survivorship reduction in early nestling survival rates (Fleming et al. 1994).

Following the completion of the nesting season, both adult and fledgling wood storks generally begin to disperse away from the nesting colony. Fledglings have relatively high mortality rates within the first 6 months following fledging, most likely because of their lack of experience, including the selection of poor foraging locations (Hylton et al. 2006). Post-fledging survival also appears to be variable among years, probably reflecting the environmental variability that affects storks and their ability to forage (Hylton et al. 2006).

In southern Florida, both adult and juvenile storks consistently disperse northward following fledging in what has been described as a mass exodus (Kahl 1964). Storks in central Florida also appear to move northward following the completion of breeding, but generally do not move as far (Coulter et al. 1999). Many of the juvenile storks from southern Florida move far beyond Florida into Georgia, Alabama, Mississippi, and South Carolina (Coulter et al. 1999; Borkhataria et al. 2004; Borkhataria et al. 2006). Some flocks of juvenile storks have also been reported to move well beyond the breeding range of storks in the months following fledging (Kahl 1964). This post-breeding northward movement appears consistent across years.

Adult and juvenile storks return southward in the late fall and early winter months. Borkhataria et al. (2006) reported that nearly all radio-tagged wood storks in the southeastern United States moved into Florida near the beginning of the dry season, including all subadult storks that fledged from Florida and Georgia colonies. Adult storks that breed in Georgia remained in Florida until March, and then moved back to northern breeding colonies (Borkhataria et al. 2006). Overall, about 75 percent of all locations of radio-tagged wood storks occurred within Florida (Borkhataria et al. 2006). Range wide occurrence of wood storks in December, recorded during the 1995 to 2008 Audubon Society Christmas Bird Counts for the Southeast United States (Audubon 2008) suggests that the majority of the southeastern United States wood stork population occurs in central and southern Florida. Relative abundance of storks in this region was 10 to 100 times higher than in northern Florida and Georgia (Service 2007a). As a result of these general population-level movement patterns during the earlier period of the stork breeding season in southern Florida, the wetlands upon which nesting storks depend are also being heavily used by a significant portion of the southeastern United States wood stork population, including storks that breed in Georgia and the Carolinas, and subadult storks from throughout the stork's range. In addition, these same wetlands support a wide variety of other wading bird species (Gawlik 2002).

Population Dynamics

The United States breeding population of wood storks declined from an estimated 20,000 pairs in the 1930s to about 10,000 pairs by 1960 and a low of 2,500 pairs during a severe drought conditions in 1978 (49 FR 7332). The total number of nesting pairs in 1995 was 7,853 with 11 percent in South Carolina, 19 percent in Georgia, and 70 percent in Florida (Service 1997). However, nesting data from 1981 to 2006 suggest that the wood stork population in the southeastern United States appears to be increasing (Figure 7). Population totals indicate that the stork population has reached its highest level since it was listed as endangered in 1984. More than 11,000 wood stork pairs nested within their breeding range in the southeastern United States in 2006 (Service 2007). The nesting and colony data (Figure 7) show increases in both the number of nests and the number of colonies, with the greatest increases in both nests and colonies in Georgia, South Carolina, and North Carolina. Recent data also show a decrease in the average size of colonies (Frederick and Meyer 2008). The Florida nesting population appears to fluctuate yearly and vary around a 3-year running average of 5,040 nests and 49 colonies annually (data through 2006). Total population and nest data are not available for 2007 and 2008 nesting years as all Florida colonies are not monitored from year to year (Brooks 2009). All south Florida colonies have been continuously monitored since listing and south Florida nesting data show a significant drop in nesting pairs from 2,710 (2006) to 770 (2007), and 704 (2008) (Cook and Herring 2007; Cook and Kobza 2008). Researchers attribute this drop to the severe drought conditions present in south Florida during the nesting periods.

However, wood stork numbers appeared to increase in 2009. During 2009, Corkscrew Rookery produced 1,120 nests and 2,570 nestlings (Audubon 2009). Similar rebounds in nest production were recorded for other south Florida rookeries as well, with probably the largest number of nest starts since 2004 (Cook and Kobza 2009). Approximately 3,000 nest starts were estimated within colonies throughout the WCAs (District 2009). Data reported by Cook and Kobza (2009) noted approximately 6,452 nests in south Florida during the 2009 breeding season. Reports of breeding during 2009 from rookeries in north Florida and Georgia also noted record numbers of wood stork nests (Georgia Department of Natural Resources [GDNR] 2009; Brooks 2009).

A review of the historic data show that, since the 1960s, the wood stork population declined in southern Florida and increased in northern Florida, Georgia, and South Carolina (Ogden et al. 1987). The number of nesting pairs in the Everglades and Big Cypress ecosystems (southern Florida) declined from 8,500 pairs in 1961 to 969 pairs in 1995. During the same period, nesting pairs in Georgia increased from 4 to 1,501 and nesting pairs in South Carolina increased from 11 to 829 (Service 1997). The number of nesting pairs in northern and central Florida doubled between 1976 and 1986 (Ogden 1991). Although Ogden (1991) attributed this to an increase in the availability of altered wetland and artificial wetland nesting sites, the regional increase coincided with the northward shift of the wood stork breeding population center and the overall population decline in the southeastern United States.

Between 1958 and 1985, the wood stork breeding population center shifted north from Lake Okeechobee to Polk County, a distance of about 132 km (82 miles) (Ogden et al. 1987). The 1976 breeding season was the last year when more pairs nested in south Florida than in central and north Florida. Production is generally higher in central-north Florida than south Florida. Whereas the number of colonies in south Florida has remained relatively stable, the number of colonies in central and north Florida region continues to increase (Ogden et al. 1987). The increase in central-north Florida is associated with an increase in colony numbers and not colony size. Colonies in the north are smaller than colonies in the south. Historically, colonies in the south were associated with extensive wetlands and food was abundant. The implication is that food resources may be limiting colony sizes in central-north Florida (Ogden et al. 1987). Ogden et al. (1987) suggested the population shift is the result of deteriorating feeding conditions in south Florida and better nesting success rates in central and north Florida that compound population growth in that area.

Wood stork nesting data for the southeast United States indicate that the wood stork nesting has reached its highest level since it was listed as endangered in 1984 (Service 2007a). In 2006, an estimated 11,232 wood stork pairs nested within their breeding range in the southeastern United States. Wood stork nesting was again recorded in North Carolina in 2006, 2007, and 2008 after it was first documented there in 2005. This suggests the northward expansion of wood stork nesting may be continuing. New colonies have been documented in recent years (2007 and 2008) including several in Florida and some colonies have become inactive. New colonies were also recorded in 2008 in Georgia and South Carolina (Brooks 2009). The total number of colonies has peaked at over 80 in 2006 (Service 2007a), which is the highest to date in any year. From 2001 through 2006, the number of colonies and nesting wood storks in Florida appears to fluctuate yearly and varies around a 3-year running average of 49 colonies and 5,040 nests annually (Service 2007a).

Wood stork nesting effort within the southeastern United States appears to be increasing. A total of 4,300 nesting pairs were documeted in 2007 and 5,900 nesting pairs were documented in 2009. Rangewide nesting data for 2009 is not currently available, but large numbers of wood storks were observed in North Florida (Brooks 2009) and Georgia rookeries during 2009 (GDNR 2009). Wood stork nesting within south Florida rookeries decreased significantly during 2007 (Cook and Herring 2007) and 2008 (Cook and Kobza 2008), most likely due to severe drought conditions experienced by the region. However, large numbers of wood storks nest were also observed to nest in south Florida rookeries during 2009 (Cook and Kobza 2009; District 2009; Brooks 2009).

Analysis of the Species Likely to be Affected

The primary cause of wood stork population decline in the United States is loss of wetland habitats or loss of wetland function resulting in reduced prey availability. The alteration of wetlands and the manipulation of wetland hydroperiods to suit human needs have also reduced the amount of habitat available to wood storks and affected the prey base availability. The altered hydrology of the central and south Florida wetland systems has also fostered the invasion of these systems by the exotic plant species melaleuca (*Melaleuca quinquenervia*). This plant species produces a dense understory and closed canopy, limiting the suitability of these wetland systems to foraging by wood storks, although sufficient prey base may be present in the wetlands. Increasing human population has resulted in increasing impacts on native habitat and flora and fauna. Continuing threats to wood storks include habitat loss, habitat fragmentation, and human disturbance.

Critical habitat has not been designated for the wood stork; therefore, none would be affected.

STATUS OF THE SPECIES AND CRITICAL HABITAT RANGEWIDE

Florida Panther

Federal Status

The Florida panther is the last subspecies of *Puma* (also known as mountain lion, cougar, panther, or catamount) still surviving in the eastern United States. Historically occurring throughout the southeastern United States (Young and Goldman 1946), today the panther is restricted to less than 5 percent of its historic range in one breeding population of approximately 100 animals, located in south Florida.

When Europeans first came to this country, pumas roamed most all of North, Central, and South America. Early settlers attempted to eradicate pumas by every means possible. By 1899, it was believed Florida panthers had been restricted to peninsular Florida (Bangs 1899). By the late 1920s to mid 1930s, it was thought by many the Florida panther had been completely extirpated

(Tinsley 1970). In 1935, Dave Newell, a Florida sportsman, hired Vince and Ernest Lee, Arizona houndsmen, to hunt for panthers in Florida. They killed eight in the Big Cypress Swamp (Newell 1935). Every survey conducted since then has confirmed that a breeding panther population occurs in southern Florida south of the Caloosahatchee River, and no survey since then has been able to confirm a panther population outside of southern Florida.

Attempts to eradicate panthers and a decline in panther prey (primarily white-tailed deer [*Odocoileus virginianus*]) resulted in a panther population threatened with extinction. Prior to 1949, panthers could be killed in Florida at any time of the year. In 1950, the Florida Game and Freshwater Fish Commission (now FWC) declared the panther a regulated game species due to concerns over declining numbers. The FWC removed panthers from the game animal list in 1958 and gave them complete legal protection. On March 11, 1967, the Service listed the panther as endangered (32 FR 4001) throughout its historic range, and these animals received Federal protection under the passage of the Act. In addition, the Florida Panther Act (Florida Statute 372.671), a 1978 Florida State law, made killing a panther a felony. The Florida panther is listed as endangered by the States of Florida, Georgia, Louisiana, and Mississippi.

Since the panther was designated as an endangered species prior to enactment of the Act, there was no formal listing package identifying threats to the species as currently required by section 4(a)(1) of the Act. However, the Florida Panther Recovery Plan, third revision, addressed the five factor threats analysis (Service 2006e, 2008). Critical habitat has not been designated for the panther.

Taxonomy

The Florida panther was first described by Charles B. Cory in 1896 as *Felis concolor floridana* (Cory 1896). The type specimen was collected in Sebastian, Florida. Bangs (1899), however, believed that the Florida panther was restricted to peninsular Florida and could not intergrade with other *Felis* spp. Therefore, he assigned it full specific status and named it *Felis coryi* since *Felis floridana* had been used previously for a bobcat (*Lynx rufus*). The taxonomic classification of the *Felis concolor* group was revised and described by Nelson and Goldman (1929) and Young and Goldman (1946). These authors differentiated 30 subspecies using geographic and morphometric (measurement of forms) criteria and reassigned the Florida panther to subspecific status as *Felis concolor coryi*. This designation also incorporated *F. arundivaga*, which had been classified by Hollister (1911) from specimens collected in Louisiana, into *F. c. coryi*. Nowell and Jackson (1996) reviewed the genus *Felis* and placed mountain lions, including the Florida panther, in the genus *Puma*. The taxonomic classification of the puma is now considered to be *Puma concolor* (Wozencraft 1993), making the accepted name for the Florida panther *P. c. coryi*.

Culver et al. (2000) examined genetic diversity within and among the described subspecies of *Puma concolor* using three groups of genetic markers and proposed a revision of the genus to include only six subspecies, one of which encompassed all puma in North America including the Florida panther. However, Culver et al. (2000) determined that the Florida panther was one of several smaller populations that had unique features. Specifically, the number of polymorphic microsatellite loci and amount of variation were lower, and it was highly inbred (eight fixed loci). The degree to which the scientific community has accepted the results of Culver et al. (2000) and the proposed change in taxonomy is not resolved at this time (Service 2008). The Florida panther remains listed as a subspecies and continues to receive protection pursuant to the Act.

Species Description

An adult Florida panther is unspotted and typically rusty reddish-brown on the back, tawny on the sides, and pale gray underneath. There has never been a melanistic (black) puma documented in North America (Tinsley 1970; 1987). Adult males can reach a length of 7 ft (2.1 meters) from their nose to the tip of their tail and may exceed 161 lbs (73 kg) in weight; but, typically adult males average around 116 lbs (52.6 kg) and stand about 24-28 in (60-70 cm) at the shoulder (Roelke 1990). Female panthers are smaller with an average weight of 75 lbs (34 kg) and length of 6 ft (1.8 meters) Roelke 1990). The skull of the Florida panther is unique in that it has a broad, flat, frontal region, and broad, high-arched or upward-expanded nasal bones (Young and Goldman 1946).

Florida panther kittens are gray with dark brown or blackish spots and five bands around the tail. The spots gradually fade as the kittens grow older and are almost unnoticeable by the time they are 6 months old. At this age, their bright blue eyes slowly turn to the light-brown straw color of the adult (Belden 1988).

Three external characters – a right angle crook at the terminal end of the tail, a whorl of hair or cowlick in the middle of the back, and irregular, white flecking on the head, nape, and shoulders – not found in combination in other subspecies of *Puma* (Belden 1986), were commonly observed in Florida panthers through the mid-1990s. The kinked tail and cowlicks were considered manifestations of inbreeding (Seal 1994); whereas the white flecking was thought to be a result of scarring from tick bites (Maehr 1992; Wilkins et al. 1997). Four other abnormalities prevalent in the panther population prior to the mid-1990s were cryptorchidism (one or two undescended testicles), low sperm quality, atrial septal defects (the opening between two atria in the heart fails to close normally during fetal development), and immune deficiencies; and these were suspected to be the result of low genetic variability (Roelke et al. 1993a).

A plan for genetic restoration and management of the Florida panther was developed in September 1994 (Seal 1994) and eight non-pregnant adult female Texas panthers (*Puma concolor stanleyana*) were released in five areas of south Florida from March to July 1995. Since this introgression, rates of genetic defects, including crooked tails and cowlicks, have dramatically decreased (Land et al. 2004). In addition, to date, neither atrial septal defects nor cryptorchidism have been found in introgressed panthers (Cunningham 2005). As of January 27, 2003, none of the eight female Texas panthers introduced in 1995 remain in the wild.

Population Trends and Distribution

The Florida panther once ranged throughout the southeastern United States from Arkansas and Louisiana eastward across Mississippi, Alabama, Georgia, Florida, and parts of South Carolina and Tennessee (Young and Goldman 1946). Historically, the panther intergraded to the north with *P. c. cougar*, to the west with *P. c. stanleyana*, and to the northwest with *P. c. hippolestes* (Young and Goldman 1946).

Although generally considered unreliable, sightings of panthers regularly occur throughout the Southeast. However, no reproducing populations of panthers have been found outside of south Florida for at least 30 years, despite intensive searches to document them (Belden et al. 1991; McBride et al. 1993; Clark et al. 2002). Field surveys and more than 90,000 locations of radio-collared panthers recorded between 1981 and 2010 clearly define the panther's current breeding range. Reproduction is known only in the Big Cypress Swamp and Everglades physiographic region in Collier, Lee, Hendry, Miami-Dade, and Monroe Counties, south of the Caloosahatchee River (Belden et al. 1991). Although the breeding segment of the panther population occurs only in south Florida, panthers have been documented north of the Caloosahatchee River over 125 times since February 1972. This has been confirmed through field signs (*e.g.*, tracks, urine markers, scats), camera-trap photographs, seven highway mortalities, four radio-collared animals, two captured animals (one of which was radio-collared), and one skeleton. From 1972 through 2004, panthers have been confirmed in 11 counties (Flagler, Glades, Highlands, Hillsborough, Indian River, Okeechobee, Orange, Osceola, Polk, Sarasota, and Volusia) north of the river (Belden et al. 1991; Belden and McBride 2005). However, no evidence of a female or reproduction has been documented north of the Caloosahatchee River since 1973 (Nowak and McBride 1974; Belden et al. 1991; Land and Taylor 1998; Land et al. 1999; Shindle et al. 2000; McBride 2002; Belden and McBride 2005).

Puma are wide ranging, secretive, and occur at low densities. However, their tracks, urine markers, and scats are readily found by trained observers, and resident populations are easily located. Van Dyke (1986a) determined that all resident puma, 78 percent of transient puma, and 57 percent of kittens could be detected by track searches in Utah. In south Florida, the Florida panthers limited range and low densities may make the population count derived from track searches more accurate than in Utah. During 2 month-long investigations – one late in 1972 and early 1973 and another in 1974 – funded by the World Wildlife Fund to determine if panthers still existed in Florida, McBride searched for signs of panthers in portions of south Florida. In 1972, McBride authenticated a road-killed male panther in Glades County and a female captured and released from a bobcat trap in Collier County (McBride 2005). In 1973, McBride captured one female in Glades County (Nowak and McBride 1974). Based on this preliminary evidence, Nowak and McBride (1974) estimated the "population from the Lake Okeechobee area southward to be about 20 or 30 individuals." In 1974, McBride found evidence of only two additional panthers in the Fakahatchee Strand and suggested that "there could be as few as 10 individual panthers in the area around Lake Okeechobee and southward in the state" (Nowak and McBride 1975). This initial survey, while brief in nature, proved that panthers still existed in Florida and delineated areas where a more exhaustive search was warranted. After this initial investigation, more comprehensive surveys on both public and private lands were completed (Reeves 1978; Belden and McBride 1983a, b; Belden et al. 1991). Thirty individual panthers were identified during a wide-ranging survey in 1985 in south Florida (McBride 1985).

Using a population genetics approach, Culver et al. (2008) estimated that to reduce the microsatellite variation to that seen in the Florida panther, a very small bottleneck size of approximately 2 animals for several generations and a small effective population size in other generations would be necessary. Using demographic data from Yellowstone pumas, Culver et al. (2008) estimated the ratio of effective to census population size to be 0.315. Using this ratio, they determined that the census population size in the Florida panthers necessary to explain the loss of microsatellite variation was approximately 41 for the non-bottleneck generations and 6.2 for the two bottleneck generations.

More recently, McBride et al. (2008) and McBride (2010) reported minimum population counts (*i.e.*, number known alive) based on physical evidence (*e.g*., tracks, urine markers, panther treed with hounds, trail-camera photos). They counted adult and subadult panthers but not kittens at the den. Three rules were used to distinguish individuals: (1) gender was determined by track size or stride length; (2) time (freshness) was determined by known events within the past 24 hours, such as wind or rain; and (3) distance between individual track sets. These rules were used as an exclusionary tool to avoid over-counting (McBride et al. 2008). The number of panthers detected and verified by physical evidence from 1981 to 1994 fluctuated between a high of 30 and a low of 19 adult and juvenile panthers, with the lowest point occurring in 1991 following the removal of 7 juveniles and 3 kittens to initiate a captive breeding program (McBride et al. 2008). In 1995, eight female pumas from Texas were released to address suspected deleterious effects of inbreeding. From 1996 to 2003, the panther population was increasing at a rate of 14 percent per year with 26.6 kittens being produced annually (Johnson et al. 2010). The effective population size (N_e) rose from 9.6 to 32.1, and N_e /N was 0.314 (Johnson et al. 2010). The population has tripled since 1995 (McBride et al. 2008, Johnson et al. 2010), reaching a high of 117 by 2007 (mortalities not subtracted) (McBride et al. 2008). The count for 2009 (mortalities not subtracted) was 113 (McBride 2010). The deterministic annual growth rate (λ) for pre-1995 panthers was 0.952 ± 0.026 (SE), suggestive of a shrinking population (Hostetler et al. 2009). The λ for the overall population now is 1.052 ± 0.023 suggestive of a growing population (Hostetler et al. 2009).

Maehr et al. (1991) provides an estimate of population density of 1 panther/27,520 acres (11,137 hectares [ha]) based on 17 concurrently radio-collared and 4 uncollared panthers. They extrapolated this density to the area occupied (1,245,435 acres [504,012 ha]) by radio-collared panthers during the period 1985 to 1990 to achieve a population estimate of 46 adult panthers for southwest Florida (excluding ENP, eastern Big Cypress National Preserve [BICY], and Glades and Highlands Counties). Beier et al. (2003), however, argued that this estimate of density, although "reasonably rigorous," could not be extrapolated to other areas because it was not known whether densities were comparable in those areas. Kautz et al. (2006) provided a density estimate of 1 panther/31,923 acres (12,919 ha) by dividing the panther count at that time (67) by the area within the Primary Zone. However, panther densities are variable across the landscape. Using an average of the 2007 to 2009 panther counts in the eight survey units of McBride et al. (2008) and Kautz et al. (2006) Primary Zone land within these survey units, density estimates range from a low of 1 panther/81,479 acres (32,974 ha) to a high of 1 panther/7,850 acres (3,177 ha).

Life History

Reproduction: Male Florida panthers are polygynous, maintaining large, overlapping home ranges containing several adult females and their dependent offspring. The first sexual encounters for males normally occur at about 3 years based on 26 radio-collared panthers of both sexes (Maehr et al. 1991). Based on genetics work, some males may become breeders as early as 17 months. Breeding activity peaks from December to March (Shindle et al. 2003). Litters (n = 82) are produced throughout the year, with 56-60 percent of births occurring between March and June (Jansen et al. 2005; Lotz et al. 2005). The greatest number of births occurs in May and June (Jansen et al. 2005; Lotz et al. 2005). Female panthers have bred as young as 18 months (Maehr et al. 1989) and successful reproduction has occurred up to 11 years old. The mean age of denning females is 4.6 ± 2.1 (standard deviation [sd]) years (Lotz et al. 2005). Age at first reproduction for 19 known-aged female panthers averaged 2.2 ± 0.246 (sd) years and ranged from 1.8-3.2 years. Average litter size is 2.4 ± 0.91 (sd) kittens. Seventy percent of litters are comprised of either two or three kittens. Mean birth intervals (elapsed time between successive litters) are 19.8 ± 9.0 (sd) months for female panthers (n = 56) (range 4.1-36.5 months) (Lotz et al. 2005). Females that lose their litters generally produce another more quickly; five of seven females whose kittens were brought into captivity successfully produced another litter an average of 10.4 months after the removal of the initial litter (Land 1994).

Panther dens are usually located closer to upland hardwoods, pinelands, and mixed wet forests and farther from freshwater marsh-wet prairie (Benson et al. 2008). Most den sites are located in dense saw palmetto (*Serenoa repens*), shrubs, or vines (Maehr 1990; Shindle et al. 2003, Benson et al. 2008). Den sites are used for 6 to 8 weeks by female panthers and their litters from birth to weaning (Benson et al. 2008). Independence and dispersal of young typically occurs at 18 months, but may occur as early as one year (Maehr 1992).

Survivorship and Causes of Mortality: Benson et al. (2009) analyzed survival and cause-specific mortality of subadult and adult Florida panthers. They found that sex and age influenced panther survival, as females survived better than males, and older adults (≥10 years) survived poorly compared with younger adults. Genetic ancestry strongly influenced annual survival of subadults and adults after introgression, as F_1 generation admixed panthers survived longer than pre-introgression panthers and non-F_1 admixed individuals (Benson et al. 2009).

Mortality records for uncollared panthers have been kept since February 13, 1972, and for radio-collared panthers since February 10, 1981. Through June 24, 2010, 280 mortalities have been documented (FWC 2010). Of the 280 total mortalities, 127 were radio-collared panthers that have died since 1981 (FWC 2010). Intraspecific aggression was the leading cause of mortality for radio-collared panthers, and was more common for males than females (Benson et al. 2009). Older-adult males had significantly higher and sub-adult males had marginally higher mortality due to intraspecific aggression than prime-adult males (Benson et al. 2009). Most intraspecific aggression occurs between male panthers; but, aggressive encounters between males and females have occurred, resulting in the death of the female. Defense of kittens and\or a kill is suspected in half (5 of 10) of the known instances through 2003 (Shindle et al. 2003).

Following intraspecific aggression, the greatest causes of mortality for radio-collared Florida panthers was from unknown causes, vehicles, and other (Benson et al. 2009). From February 13, 1972, through June 30, 2010, 152 radio-collared and uncollared Florida panthers were hit by vehicles (FWC 2010). Eight of the collisions were not fatal. The number of panther/vehicle collisions per year tracks very closely the annual panther count (McBride et al. 2008).

Female panthers are considered adult residents if they are older than 18 months, have established home ranges and bred (Maehr et al. 1991). Land et al. (2004) reported that 23 of 24 female panthers first captured as kittens survived to become residents and 18 (78.3 percent) produced litters; 1 female was too young to determine residency. Male panthers are considered adult residents if they are older than 3 years and have established a home range that overlaps with females. Thirty-one male panthers were captured as kittens and 12 (38.7 percent) of these cats survived to become residents (Jansen et al. 2005; FWC 2005). "Successful male recruitment appears to depend on the death or home range shift of a resident adult male" (Maehr et al. 1991). Turnover in the breeding population is low with documented mortality in radio-collared panthers being greatest in subadult and non-resident males (Maehr et al. 1991; Shindle et al. 2003). Den sites of female panthers have been visited since 1992 and the kittens tagged with passive integrated transponder chips. Annual survival of these kittens has been determined to be 0.328 ± 0.072 (SE) (Hostetler et al. 2009). There was no evidence that survival rate differed between male and female kittens or was influenced by litter size. (Hostetler et al. 2009) found that kitten survival generally increased with degree of admixture with introduced Texas pumas and decreased with panther abundance. Kitten survival is lowest during the first 3 months of their lives (Hostetler et al. 2009).

Dispersal: Panther dispersal begins after a juvenile becomes independent from its mother and continues until it establishes a home range. Dispersal distances are greater for males (n = 18) than females (n = 9) (42.5 miles [68.4 km] verses 12.6 miles [20.3 km], respectively) and the maximum dispersal distance recorded for a young male was 139.2 miles (224.1 km) over a 7-month period followed by a secondary dispersal of 145 miles (233 km) (Maehr et al. 2002a). Males disperse an average distance of 25 miles (40 km); females typically remain in or disperse short distances from their natal ranges (Comiskey et al. 2002). Female dispersers are considered philopatric because they usually establish home ranges less than one average home range width from their natal range (Maehr et al. 2002a). Maehr et al. (2002a) reported that all female dispersers (n = 9) were successful at establishing a home range whereas only 63 percent of males (n = 18) were successful. Young panthers become independent at 14 months on average for both sexes, but male dispersals are longer in duration than female dispersals (9.6 months and 7.0 months, respectively) (Maehr et al. 2002a). Dispersing males usually go through a period as transient (non-resident) subadults, moving through the fringes of the resident population and often occupying suboptimal habitat until an established range becomes vacant (Maehr 1997).

Most panther dispersal occurs south of the Caloosahatchee River with only four radio-collared panthers crossing the river and continuing north since 1981 (Land and Taylor 1998; Land et al. 1999; Shindle et al. 2000; Maehr et al. 2002a; Belden and McBride 2005). Western subspecies of *Puma* have been documented crossing wide, swift-flowing rivers up to a mile in width

(Seidensticker et al. 1973; Anderson 1983). The Caloosahatchee River, a narrow (295-328 ft [90-100 meters]), channelized river, probably is not a significant barrier to panther movements, but the combination of the river, State Road (SR) 80, and land uses along the river seems to have restricted panther dispersal northward (Maehr et al. 2002a). Documented physical evidence of at least 15 other uncollared male panthers have been confirmed north of the river since 1972, but no female panthers nor reproduction have been documented in this area since 1973 (Belden and McBride 2005).

<u>Home Range Dynamics and Movements</u>: Panthers require large areas to meet their needs. Numerous factors influence panther home range size, including: habitat quality, prey density, and landscape configuration (Belden 1988; Comiskey et al. 2002). Home range sizes of six radio-collared panthers monitored between 1985 and 1990 averaged 128,000 acres (51,800 ha) for resident adult males and 48,000 acres (19,425 ha) for resident adult females; transient males had a home range of 153,599 acres (62,160 ha) (Maehr et al. 1991). Comiskey et al. (2002) examined the home range size for 50 adult panthers (residents greater than 1.5 years old) monitored in south Florida from 1981-2000 and found resident males had a mean home range of 160,639 acres (65,009 ha) and females had a mean home range of 97,920 acres (39,627 ha). Beier et al. (2003) found home range size estimates for panthers reported by Maehr et al. (1991) and Comiskey et al. (2002) to be reliable.

Annual minimum convex polygon home range sizes of 52 adult radio-collared panthers monitored between 1998 and 2002 ranged from 15,360 – 293,759 acres (6,216 – 118,880 ha), averaging 89,600 acres (36,260 ha) for 20 resident adult males and 44,160 acres (17,871 ha) for 32 resident adult females (Land et al. 1999; Shindle et al. 2000, 2001; Land et al. 2002). The most current estimate of home-range sizes (minimum convex polygon method) for established, non-dispersing, adult, radio-collared panthers averaged 29,056 acres (11,759 ha) for females (n = 11) and 62,528 acres (25,304 ha) for males (n = 11) (Lotz et al. 2005). The average home range was 35,089 acres (14,200 ha) for resident females (n = 6) and 137,143 acres (55,500 ha) (n = 5) for males located at BICY (Jansen et al. 2005). Home ranges of resident adults tend to be stable unless influenced by the death of other residents; however, several males have shown significant home range shifts that may be related to aging. Home-range overlap is extensive among resident females and limited among resident males (Maehr et al. 1991).

Activity levels for Florida panthers are greatest at night with peaks around sunrise and after sunset (Maehr et al. 1990a). The lowest activity levels occur during the middle of the day. Female panthers at natal dens follow a similar pattern with less difference between high and low activity periods.

Telemetry data indicate panthers typically do not return to the same resting site day after day, with the exception of females with dens or panthers remaining near kill sites for several days. The presence of physical evidence such as tracks, scats, and urine markers confirm that panthers move extensively within home ranges, visiting all parts of the range regularly in the course of hunting, breeding, and other activities (Maehr 1997; Comiskey et al. 2002). Males travel widely throughout their home ranges to maintain exclusive breeding rights to females. Females without kittens also move extensively within their ranges (Maehr 1997). Panthers are capable of moving large distances in short periods of time. Nightly panther movements of 12 miles (20 km) are not uncommon (Maehr et al. 1990a).

Intraspecific Interactions: Interactions between panthers occur indirectly through urine markers or directly through contact. Urine markers are made by piling ground litter using a backwards-pushing motion with the hind feet. This pile is then scent-marked with urine and occasionally feces. Both sexes make urine markers. Apparently, males use them as a way to mark their territory and announce presence while females advertise their reproductive condition.

Adult females and their kittens interact more frequently than any other group of panthers. Interactions between adult male and female panthers last from one to seven days and usually result in pregnancy (Maehr et al. 1991). Aggressive interactions between males often result in serious injury or death. Independent subadult males have been known to associate with each other for several days and these interactions do not appear to be aggressive in nature. Aggression between males is the most common cause of male mortality and an important determinant of male spatial and recruitment patterns based on radio-collared panthers (Maehr et al. 1991; Shindle et al. 2003). Aggressive encounters between radio-collared males and females also have been documented (Shindle et al. 2003; Jansen et al. 2005).

Food Habits: Primary panther prey species are white-tailed deer and feral hog (*Sus scrofa*) (Maehr et al. 1990b; Dalrymple and Bass 1996). Generally, feral hogs constitute the greatest biomass consumed by panthers north of the Alligator Alley section of Interstate 75 (I-75), while white-tailed deer are the greatest biomass consumed to the south (Maehr et al. 1990b). Secondary prey species includes raccoons (*Procyon lotor*), nine-banded armadillos (*Dasypus novemcinctus*), marsh rabbits (*Sylvilagus palustris*) (Maehr et al. 1990b) and American alligators (*Alligator mississippiensis*) (Dalrymple and Bass 1996). No seasonal variation in diet has been detected. Maehr et al. (1990b) rarely observed domestic livestock in scats or kills of the Florida panther, although cattle were readily available in the study area.

Little information on the feeding frequency of the Florida panther is available. However, the feeding frequency of the Puma is likely similar to the feeding frequency of the Florida panther. Ackerman et al. (1986) reported that a resident adult male puma generally consumes one deer-sized prey every 8 to 11 days. Moreover, a female puma will consume one deer-sized prey item every 14 to 17 days for a resident female and one deer-sized prey item every 3.3 days for a female with three 13-month-old kittens.

Infectious Diseases, Parasites, and Environmental Contaminants:

Viral Diseases - Feline leukemia virus (FeLV) is common in domestic cats (*Felis catus*), but is quite rare in non-domestic felids. Routine testing for FeLV antigen (indicating active infection) in captured and necropsied panthers was negative since testing began in 1978. However, between November 2002 and February 2003, two panthers tested FeLV antigen positive (Cunningham 2005; Cunningham et al. 2008). The following year, three more cases were diagnosed (Brown et al. 2008). All infected panthers had overlapping home ranges in the Okaloacoochee Slough ecosystem. Three of the panthers died due to suspected FeLV-related diseases (opportunistic bacterial infections and anemia) and the two others died from intraspecific aggression. Testing of serum samples collected from 1990 to 2005 for antibodies (indicating exposure) to FeLV indicated increasing exposure to FeLV beginning in the late 1990s and concentrated north of I-75. There was apparently minimal exposure to FeLV during this period south of I-75. Positive antibody titers in different areas at different times may indicate that multiple introductions of the virus into the panther population may have occurred. These smaller epizootics were apparently self-limiting and did not result in any known mortalities. Positive antibody titers, in the absence of an active infection (antigen positive), indicate panthers can be exposed and overcome the infection (Cunningham 2005). Genetic analysis of the panther FeLV determined that the source of this outbreak was a cross-species transmission from a domestic cat (Brown et al. 2008). Management of the disease includes vaccination (Cunningham et al. 2008) as well as removal of infected panthers to captivity for quarantine and supportive care. As of June 1, 2005, about one-third of the population had received at least one vaccination against FeLV (Cunningham et al. 2008). No new positive cases have been diagnosed since July 2004; however, the potential for reintroduction of the virus remains (Cunningham et al. 2008).

Pseudorabies virus (PRV) (Aujeszky's disease) causes respiratory and reproductive disorders in adult hogs and mortality in neonates, but is a rapidly fatal neurologic disease in carnivores. At least one panther died from PRV infection presumably through consumption of an infected feral hog (Glass et al. 1994). At least one panther has also died of rabies (Taylor et al. 2002). This panther was radio-collared but not vaccinated against the disease.

Feline immunodeficiency virus (FIV) is a retrovirus of felids that is endemic in the panther population. About 28 percent of Florida panthers were positive for antibodies to the puma lentivirus strain of FIV (Olmstead et al. 1992); however, the prevalence may be increasing. Between November 2004 and April 2005, 13 of 17 (76 percent) panthers tested were positive (M.Cunningham, FWC, unpublished data). The cause of this increase is unknown but warrants continued monitoring and investigation. There is also evidence of exposure to Feline panleukopenia virus (PLV) in adult panthers (Roelke et al. 1993b) although no PLV-related mortalities are known to have occurred.

Serological evidence of other viral diseases in the panther population includes feline calicivirus, feline herpes virus, and West Nile virus. However, these diseases are not believed to cause significant morbidity or mortality in the population. All panthers found dead due to unknown causes are tested for alphaviruses, flaviviruses (including West Nile virus), and canine distemper virus. These viruses have not been detected in panthers by viral culture or polymerase chain reaction (FWC, unpublished data).

Other Infectious Diseases **-** Bacteria have played a role in free-ranging panther morbidity and mortality as opportunistic pathogens, taking advantage of pre-existing trauma or FeLV infections (FWC, unpublished data). Dermatophytosis (ringworm infection) has been diagnosed in several panthers and resulted in severe generalized infection in at least one (Rotstein et al. 1999). Severe infections may reflect an underlying immunocompromise, possibly resulting from inbreeding depression or immunosuppressive viral infections.

Parasites **-** The hookworm, *Ancylostoma pluridentatum,* is found in a high prevalence in the panther population. Other parasites identified from live-captured or necropsied panthers include: eight arthropod species, eight nematode species, three cestode species, two trematode species, and three protozoa species (Forrester et al. 1985; Forrester 1992; Wehinger et al. 1995; Rotstein et al. 1999; Land et al. 2002; Foster et al. 2006). Of these, only an arthropod, *Notoedres felis*, caused significant morbidity in at least one panther (Maehr et al. 1995).

Environmental Contaminants - Overall, mercury in south Florida biota has decreased over the last several years (Frederick et al. 2002). However, high mercury concentrations are still found in some panthers. At least one panther is thought to have died of mercury toxicosis and mercury has been implicated in the death of two other panthers in ENP (Roelke 1991). One individual panther had mercury concentrations of 150 parts per million (ppm) in its hair (Land et al. 2004). Elevated levels of p, p'– DDE were also detected in fat from that panther. The role of mercury and/or p, p'– DDE in this panther's death is unknown and no cause of death was determined despite extensive diagnostic testing. Elevated mercury concentrations have also been found in panthers from Florida Panther National Wildlife Refuge (FPNWR). Two sibling neonatal kittens from this area had hair mercury concentrations of 35 and 40 ppm. Although other factors were believed to have been responsible, these kittens did not survive to leave their natal den and neonates may be more susceptible to the toxic effects of mercury (Berglund and Berlin 1969). Consistently high hair mercury values in ENP and FPNWR and the finding of elevated values in some portions of BICY warrant continued monitoring (Land et al. 2004). Other environmental contaminants found in panthers include polychlorinated biphenyls (Arochlor 1260) and organochlorines (p, p'–DDE) (Dunbar 1995, Land et al. 2004).

Habitat Characteristics/Ecosystem

<u>Landscape Composition</u>: Noss and Cooperrider (1994) considered the landscape implications of maintaining viable panther populations. Assuming a male home range size of 137,599 acres (55,685 ha) (Maehr 1990), an adult sex ratio of 50:50 (Anderson 1983), and some margin of safety, they determined that a reserve network as large as 15,625 - 23,438 mi^2 (40,469 to 60,703 km^2) would be needed to support an effective population size of 50 individuals (equating to an actual adult population of 100 to 200 panthers [Ballou et al. 1989]). However, to provide for long-term persistence based on an effective population size of 500 individuals (equating to 1,000 to 2,000 adult panthers [Ballou et al. 1989]), could require as much as 156,251 to 234,376 mi^2 (404,687 to 607,031 km^2). This latter acreage corresponds to roughly 60 to 70 percent of the Florida panthers' historical range. Although it is uncertain, whether this much land is needed for panther recovery, it does provide some qualitative insight into the importance of habitat conservation across large landscapes for achieving a viable panther population (Noss and Cooperrider 1994).

Between 1981 and 2010 more than 90,000 locations were collected from more than 180 radio-collared panthers. Belden et al. (1988); Maehr et al. (1991); Maehr and Cox (1995); Maehr (1997); Kerkoff et al. (2000); Comiskey et al. (2002); Cox et al. (2006); Kautz et al. (2006) provide information on habitat use based on various subsets of these data. Since almost all locations from radio collars have been collected during daytime hours (generally 0700 to

1100) using very high frequency (VHF) aerial telemetry, and because panthers are most active during nocturnal and crepuscular periods (Maehr et al. 1990a), daytime telemetry data may be insufficient to describe habitat use patterns of nocturnal animals (Beyer and Haufler 1994; Comiskey et al. 2002; Beier et al. 2003; Dickson et al. 2005; Beier et al. 2006). However, Land et al. (2008), investigated habitat selection of 12 panthers in the northern portion of the breeding range using Global Positioning System (GPS) telemetry data collected during nocturnal and diurnal periods as well as VHF telemetry data collected only during diurnal periods and found that analysis of both types of telemetry data yielded similar results.

A landscape-level strategy for the conservation of the panther population in south Florida was developed using a Florida panther potential habitat model based on the following criteria: (1) forest patches greater than 4.95 acres (2 ha); (2) non-urban cover types within 656 ft (200 meters) of forest patches; and (3) exclusion of lands within 984 ft (300 meters) of urban areas (Kautz et al. 2006). In developing the model, data from radio-collared panthers collected from 1981 through 2000 were used to evaluate the relative importance of various land cover types as panther habitat, thus identifying landscape components important for panther habitat conservation. Those components were then combined with a least cost path (LCP)analysis to delineate three panther habitat conservation zones for south Florida: (1) Primary Zone – lands important to the long-term viability and persistence of the panther in the wild; (2) Secondary Zone – lands which few panthers use contiguous with the Primary Zone, but given sufficient habitat restoration could accommodate expansion of the panther population south of the Caloosahatchee River; and (3) Dispersal Zone – the area which may facilitate future panther expansion north of the Caloosahatchee River (Kautz et al. 2006) (Figures 4 and 5). The Primary Zone is currently occupied and supports the breeding population of panthers. The Secondary Zone could support resident panthers with sufficient restoration. Although panthers move through the Dispersal Zone, it is not currently occupied by resident panthers.

These zones vary in size, ownership, and land cover composition. The Primary Zone is 2,270,711 acres (918,928 ha) in size, 73 percent of which is publicly owned, and includes portions of the BICY, ENP, Fakahatchee Strand Preserve State Park (FSPSP), FPNWR, Okaloacoochee Slough State Forest, and Picayune Strand State Forest. This zone's composition is 45 percent forest, 41 percent freshwater marsh, 7.6 percent agriculture lands, 2.6 percent prairie and shrub lands, and 0.52 percent urban lands (Kautz et al. 2006). The Secondary Zone is 812,157 acres (328,670 ha) in size, 38 percent of which is public land. This zone's composition is 43 percent freshwater marsh, 36 percent agriculture, 11 percent forest, 6.1 percent prairie and shrub lands, and 2.3 percent low-density residential areas and open urban lands (Kautz et al. 2006). The Dispersal Zone is 28,160 acres (11,396 ha) in size, 12 percent of which is either publicly owned or in conservation easement. This zone's composition is 49 percent agriculture (primarily improved pasture and citrus groves), 29 percent forest (wetland and upland), 8.8 percent prairie and shrub land, 7.5 percent freshwater marsh, and 5.1 percent barren and urban lands (Kautz et al. 2006).

As part of their evaluation of occupied panther habitat, in addition to the average density estimate of one panther per 27,181 acres (11,000 ha) developed by Maehr et al. (1991), Kautz et al. (2006) estimated the average density during the timeframe of the study, based on telemetry and other occurrence data, to average one panther per 31,923 acres (12,919 ha). In the following discussions of the number of panthers that a particular zone may support, the lower number is based on the 31,923 acres (12,919 ha) value (Kautz et al. 2006) and the higher number is based on the 27,181 acres (11,000 ha) value (Maehr et al. 1991).

Based on these average densities, the Primary Zone could support 71 to 84 panthers; the Secondary Zone could support 8 to 10 panthers without habitat restoration and 25 to 30 panthers with habitat restoration (existing high quality panther habitat currently present in the Secondary Zone is estimated at 32 percent of the available Secondary Zone lands); and the Dispersal Zone could support 0 panthers. Taken together, the three zones in their current condition have the capacity to support about 79 to 94 Florida panthers.

Kautz et al.'s (2006) assessment of available habitat south of the Caloosahatchee River determined that non-urban lands in the Primary, Secondary, and Dispersal Zones were not sufficient to sustain a population of 240 individuals south of the Caloosahatchee River. However, Kautz et al. (2006) determined sufficient lands were available south of the Caloosahatchee River to support a population of 79 to 94 individuals (although not all lands are managed and protected).

Even though some suitable panther habitat remains in south-central Florida, it is widely scattered and fragmented (Belden and McBride 2005). Thatcher et al. (2006) used a statistical model in combination with a geographic information system to develop a multivariate landscape-scale habitat model based on the Mahalanobis distance statistic (D^2) to evaluate habitats in south central Florida for potential expansion of the Florida panther population. They identified four potential habitat patches: the Avon Park Bombing Range area, Fisheating Creek/Babcock-Webb Wildlife Management Area (WMA), eastern Fisheating Creek, and the Duette Park/Manatee County area. These habitat patches are smaller and more isolated compared with the current Florida panther range, and the landscape matrix where these habitat patches exist provides relatively poor habitat connectivity among the patches (Thatcher et al. 2006, 2009). Major highways and urban or agricultural development isolate these habitat patches, and they are rapidly being lost to the same development that threatens southern Florida (Belden and McBride 2005).

<u>Panther Habitat Use</u>: Radio-collar data and ground tracking indicate that panthers use the mosaic of habitats available to them as resting and denning sites, hunting grounds, and travel routes. The majority of panther telemetry locations (Belden 1986; Belden et al. 1988; Maehr 1990; Maehr et al. 1991; Maehr 1992; Smith and Bass 1994; Kerkhoff et al. 2000; Comiskey et al. 2002, Cox et al. 2006, Kautz et al. 2006, Land et al. 2008) and natal den sites (Benson et al. 2008) were within or close to forested cover types, particularly cypress swamp, pinelands, hardwood swamp, and upland hardwood forests. Global Positioning System data has shown that panthers (n = 12) use all habitats contained within their home ranges by selecting for forested habitat types and using all others in proportion to availability (Land et al. 2008).

Kautz et al. (2006) found that the smallest class of forest patches (*i.e.*, 9 to 26 acres [3.6 to 10.4 ha]) were the highest ranked forest patch sizes within panther home ranges. The diverse woody flora of forest edges probably provides cover suitable for stalking and ambushing prey (Belden et al. 1988; Cox et al. 2006). Also, dense understory vegetation comprised of saw palmetto provides some of the most important resting and denning cover for panthers (Maehr 1990; Benson et al. 2008). Shindle et al. (2003) estimated that 73 percent of panther dens were in saw palmetto thickets.

Prey Habitat Use: Panther habitat selection is related to prey availability (Janis and Clark 1999; Dees et al. 2001) and, consequently, prey habitat use. Adequate cover and the size, distribution, and abundance of available prey species are critical factors to the persistence of panthers in south Florida and often determine the extent of panther use of an area. Duever et al. (1986) calculated a deer population of 1,760 in BICY, based on Harlow (1959) deer density estimates of 1 per 210 acres (85 ha) in pine forest, 1 per 299 acres (121 ha) in swamps, 1 per 1,280 acres (518 ha) in prairie, 1 per 250 acres (101 ha) in marshes, and 1 per 111 acres (45 ha) in hammocks. Schortemeyer et al (1991) estimated deer densities at 1 per 49 to 247 acres (20 to100 ha) in three management units of BICY based on track counts and aerial surveys. Labisky et al. (1995) reported 1 per 9 acres (20 ha) in southeastern BICY. Using track counts alone, McCown (1994) estimated 1 per 183 to 225 acres (74 to 91 ha) on the FPNWR and 1 per 133 to 200 acres (54 to 81 ha) in the FSPSP.

Hardwood hammocks and other forest cover types are important habitat for white-tailed deer and other panther prey (Harlow and Jones 1965; Belden et al. 1988; Maehr 1990; Maehr et al. 1991; Maehr 1992; Comiskey et al. 1994; Dees et al. 2001). Periodic understory brushfires (Dees et al. 2001) as well as increased amounts of edge (Miller 1993) may enhance deer use of hardwood hammocks, pine, and other forest cover types. However, wetland and other vegetation types can support high deer densities. In the Everglades, for example, deer appear to be adapted to a mosaic of intergrading patches comprised of wet prairie, hardwood tree islands, and peripheral wetland habitat (Fleming et al. 1994; Labisky et al. 2003). High-nutrient deer forage, especially preferred by females, includes hydrophytic marsh plants, white waterlily (*Nymphaea odorata*), and swamp lily (*Crinum americana*) (Loveless 1959; Labisky et al. 2003). Wetland willow (*Salix spp.*) thickets also provide nutritious browse for deer (Loveless 1959; Labisky et al. 2003). However, the importance of these habitat types to panthers is dependent upon the availability of stalking and ambush cover.

Marshes, rangeland, and low-intensity agricultural areas support prey populations of deer and hogs. The importance of these habitat types to panthers cannot be dismissed based solely on use or lack of use when daytime telemetry are the only data available (Comiskey et al. 2002; Beier et al. 2003; Comiskey et al. 2004; Beier et al. 2006).

Travel and Dispersal Corridors: In the absence of direct field observations/measurements, Harrison (1992) suggested landscape corridors for wide-ranging predators should be half the width of an average home range size. Following Harrison’s (1992) suggestion, corridor widths for Florida panthers would range 6.1 to 10.9 miles (9.8 to17.6 km) depending on whether the target animal was an adult female or a transient male. Beier (1995) suggested that corridor widths for transient male puma in California could be as small as 30 percent of the average home range size of an adult. For Florida panthers, this would translate to a corridor width of 5.5 miles

(8.8 km). Without supporting empirical evidence, Noss (1992) suggests that regional corridors connecting larger hubs of habitat should be at least 1.0 mile (1.6 km) wide. Beier (1995) makes specific recommendations for very narrow corridor widths based on short corridor lengths in a California setting of wild lands completely surrounded by urban areas; he recommended that corridors with a length less than 0.5 mile (0.8 km) should be more than 328 ft (100 meters) wide, and corridors extending 0.6 to 4 miles (1 to 7 km) should be more than 1,312 ft (400 meters) wide. The Dispersal Zone encompasses 44 mi^2 (113 km^2) with a mean width of 3.4 miles (5.4 km). Although it is not adequate to support even one panther, the Dispersal Zone is strategically located and expected to function as a critical landscape linkage to south-central Florida (Kautz et al. 2006). Transient male panthers currently utilize this zone as they disperse northward into south-central Florida.

Panther Recovery Objectives

The recovery objectives identified in the final third revision of the Florida Panther Recovery Plan (Service 2008a) are to: (1) maintain, restore, and expand the Florida panther population and its habitat in south Florida and, if feasible, expand the known occurrence of Florida panthers north of the Caloosahatchee River to maximize the probability of the long-term persistence of this metapopulation; (2) identify, secure, maintain, and restore habitat in potential reintroduction areas within the panther's historic range, and to establish viable populations of the panther outside south and south-central Florida; and (3) facilitate panther conservation and recovery through public awareness and education.

Panther Management and Conservation

Habitat Conservation and Protection

Panthers, because of their wide-ranging movements and extensive spatial requirements, are particularly sensitive to habitat fragmentation (Harris 1984). Mac et al. (1998) defines habitat fragmentation as: "The breaking up of a habitat into unconnected patches interspersed with other habitat which may not be inhabitable by species occupying the habitat that was broken up. The breaking up is usually by human action, as, for example, the clearing of forest or grassland for agriculture, residential development, or overland electrical lines." The reference to "unconnected patches" is a central underpinning of the definition. For panther conservation, this definition underscores the need to maintain contiguous habitat and protected habitat corridors in key locations in south Florida and throughout the panther's historic range. Habitat fragmentation can result from road construction, urban development, and agricultural land conversions.

Habitat protection has been identified as being one of the most important elements to achieving panther recovery. While efforts have been made to secure habitat (Figure 8), continued action is needed to obtain additions to and inholdings for public lands, assure linkages are maintained, restore degraded and fragmented habitat, and obtain the support of private landowners for maintaining property in a manner that is compatible with panther use. Conservation lands used by panthers are held and managed by a variety of entities including the Service, NPS, Seminole Tribes of Florida, Miccosukee Tribe of Indians of Florida, FWC, Florida Department of

Environmental Protection (DEP), Florida Division of Forestry (FDOF), Water Management Districts, non-governmental organizations, counties, and private landowners.

<u>Public Lands</u>: Public lands in south Florida that benefit the panther are listed below and shown in Figure 8:

1. In 1944, Collier County donated 5,475 acres to the State of Florida for what would eventually become the 7,271-acre CSSP, which straddles US 41. Approximately 1,097 acres of the park are located north of US 41, and the majority of the area south of US 41 is mangroves (5,000 acres).

2. In 1947, ENP was established with 1,507,834 acres (610,199 ha) and in 1989 was expanded with the addition of 104,320 acres (42,217 ha).

3. In 1954, the National Audubon Society established the nearly 10,880-acre (4,403-ha) Corkscrew Swamp Sanctuary.

4. In 1974, Congress approved the purchase and formation of BICY, protecting 570,238 acres (230,767 ha); they later added 145,919 acres (59,051 ha).

5. In 1974, the State of Florida began acquiring land for the FSPSP, which encompasses over 80,000 acres (32,375 ha). Efforts are underway to acquire about 16,640 acres (6,734 ha).

6. In 1985, acquisition of Picayune Strand State Forest and WMA began with the complex Golden Gate Estates (GGE) subdivision buyouts and now comprises over 76,160 acres (30,821 ha). The Southern GGE buyout through State and Federal funds is complete. The South Belle Meade portion of Picayune Strand is about 90 percent purchased; and, although the State is no longer purchasing in South Belle Meade, Collier County's Transfer of Development Rights program is helping to secure the in-holdings.

7. In 1989, FPNWR was established and now protects 26,240 acres (10,619 ha).

8. In 1989, CREW Land and Water Trust, a public/private partnership, was established and to date has coordinated the purchase of approximately 60,000 acres (24,281 ha).

9. In 1996, the South District purchased the 32,000-acre (12,950-ha) Okaloacoochee Slough State Forest.

10. In 2002 Spirit of the Wild WMA, consisting of over 7,040 acres (2,849 ha), was taken into public ownership by the State of Florida and is managed by FDOF.

11. In 2003, Dinner Island Ranch WMA, consisting of 21,760 acres (8,806 ha) in southern Hendry County, was taken into public ownership by the State of Florida and is managed by FDOF.

12. The State of Florida in 2006 in cooperation with Lee and Charlotte Counties and with coordination with the Babcock Ranch family, the Babcock Florida Company, interested environmental advocacy groups, and concerned citizens, acquired 73,575 acres of the 91,362-acre Babcock Ranch. The 73,575-acre acquisition is referred to as the Babcock Ranch Preserve. The remaining 17,787 acres were purchased by the Babcock Ranch Community, an affiliate Babcock Ranch family company. The purchase agreement for the Babcock Ranch Preserve expressly reserved the ability to utilize portions of the property acquired by the State for mitigation of impacts from the Babcock Ranch Community's proposed residential development. These reserved lands are referred to as the Babcock Ranch Mitigation Park and encompass about 16,925 acres.

13. Lands of the Seminole Tribes of Florida and Miccosukee Tribe of Indians of Florida encompass over 350,079 acres (141,673 ha) in south Florida. Of these, 115,840 acres (46,879 ha) are used by panthers, and comprise 5 percent of the Primary Zone (Kautz 2005). In general, these lands are not specifically managed for the panther and are largely in cultivation. However, in 2007, the Seminole Tribes of Florida reserved about 4,144 acres within the Big Cypress Seminole Indian Reservation Native Area, an area encompassing about 14,724 acres, specifically for the benefit of the Florida panther. The remaining native area, about 10,580 acres, although not specifically managed for the Florida panther, provides high quality value habitat for the Florida panther and panther prey species.

<u>Tribal Lands</u>: Lands of the Seminole Tribes of Florida and Miccosukee Tribe of Indians of Florida encompass over 350,079 acres (141,673 ha) in south Florida. Of these, 115,840 acres (46,879 ha) are used by panthers, and comprise 5 percent of the Primary Zone. In general, these lands are not specifically managed for the panther and are largely in cultivation. However, in 2007, the Seminole Tribes of Florida reserved about 4,144 acres within the Big Cypress Seminole Indian Reservation Native Area, an area encompassing about 14,724 acres, specifically for the benefit of the Florida panther. The remaining native area, about 10,580 acres, although not specifically managed for the Florida panther, provides high quality value habitat for the Florida panther and panther prey species.

<u>Private Lands</u>: A variety of Federal, State, and private incentive programs are available to assist private landowners and other individuals with the protection and management of wildlife habitat. Voluntary agreements, estate planning, conservation easements, land exchanges, and mitigation banks are all methods that hold untapped potential for conserving private lands. In 1954, the National Audubon Society established the nearly 10,880-acre (4,403-ha) Corkscrew Swamp Sanctuary. However, little additional private land has been protected south of the Caloosahatchee River for panther conservation. A number of properties identified by the State Acquisition and Restoration Council for purchase by the Florida Forever Program are used by panthers (*e.g.*, Devil's Garden, Half Circle F Ranch, Pal Mal, and Panther Glades). North of the Caloosahatchee River, the Fisheating Creek Conservation Easement consists of 41,600 acres (16,835 ha) in Glades County and is a private holding used by dispersing male panthers.

Habitat and Prey Management

Land management agencies in south Florida are implementing fire programs that mimic a natural fire regime through the suppression of human-caused wildfires and the application of prescribed natural fires. No studies have been conducted to determine the effects of invasive plant management on panthers. However, invasive vegetation may reduce the panther's prey base by disrupting natural processes, such as water flow and fire, and by significantly reducing available forage for prey (Fleming et al. 1994). All public lands in south Florida have active invasive plant treatment programs. Management for panther prey consists of a variety of approaches such as habitat management and regulation of hunting and off-road vehicle (ORV) use.

Response to Management Activities

Few studies have examined the response of panthers to various land/habitat management activities. Dees et al. (2001) investigated panther habitat use in response to prescribed fire and found that panther use of pine habitats was greatest for the first year after the area had been burned and declined thereafter. Prescribed burning is believed to be important to panthers because prey species (*e.g.*, deer and hogs) are attracted to burned habitats to take advantage of changes in vegetation structure and composition, including exploiting hard mast that is exposed and increased quality or quantity of forage (Dees et al. 2001). Responses of puma to logging activities (Van Dyke et al. 1986b) indicate that they generally avoid areas within their home range with intensification of disturbance.

There is the potential for disturbance to panthers from recreational uses on public lands. Maehr (1990) reported that indirect human disturbance of panthers may include activities associated with hunting and that panther use of Bear Island (part of BICY) is significantly less during the hunting season. Schortemeyer et al. (1991) examined the effects of deer hunting on panthers at BICY between 1983 and 1990. They concluded that, based on telemetry data, panthers may be altering their use patterns because of hunting. Janis and Clark (2002) compared the behavior of panthers before, during, and after the recreational deer and hog hunting season (October through December) on areas open (BICY) and closed (FPNWR, FSPSP) to hunting. Variables examined were: (1) activity rates; (2) movement rates; (3) predation success; (4) home range size; (5) home range shifts; (6) proximity to ORV trails; (7) use of areas with concentrated human activity; and (8) habitat selection. Responses to hunting for variables most directly related to panther energy intake or expenditure (i.e., activity rates, movement rates, predation success of females) were not detected (Janis and Clark 2002). However, panthers reduced their use of Bear Island, an area of concentrated human activity, and were found farther from ORV trails during the hunting season, indicative of a reaction to human disturbance (Janis and Clark 2002). Whereas the reaction to trails was probably minor and could be related to prey behavior, decreased use of Bear Island most likely reflects a direct reaction to human activity and resulted in increased use of adjacent private lands (Janis and Clark 2002).

Roads and Highways

Roads and highways facilitate the movement of people and goods by cars and trucks, and may adversely affect the Florida panther. The construction of new roads and the widening of existing roads can result in the direct loss of wildlife habitat (Fornan et al. 2003). Moreover, disturbance resulting from motorized vehicles may cause panthers to avoid busy roads. Maher (1990) reported that female panthers are less likely to cross busy highways. Consequently, roads may act as barriers affecting panther movement and fragmenting panther habitat. Panthers can also be injured or killed due to collisions with motorized vehicles when attempting to cross highways, and the potential for collisions increases as traffic increases. Adverse effects resulting from roads and highways represent a potential threat to the existing panther population.

Collisions with motor vehicles on highways appear to be a significant source of mortality for the Florida panther. As discussed above, the FWC documented 144 vehicle-related panther mortalities and 9 vehicle-related panther injuries from 1972 to the present on highways in south Florida. In portions of the panther's range the rate of panther vehicle-related mortalities may be increasing. Smith et al. (2006) found that vehicle-related panther mortalities in Collier County have increased by a factor of four from 2000 to the present compared to previous decades. This increase in panther mortality is likely related to the increase in traffic from Collier County's burgeoning population growth. Unfortunately, the effect of vehicle-related mortality on the existing panther population is largely unknown.

Wildlife underpasses, or crossings, can be constructed within highway corridors to reduce the potential for panther injuries and mortalities resulting from vehicle collisions. Underpasses allow panthers and other wildlife to safely cross under busy roadways, and maintain connectivity and gene flow within the panther population. Underpasses usually consist of a open-span bridge, prefabricated concrete box, or culvert (Fornan et al. 2003). Effective crossing structures are large enough to allow the passage of panthers and include adequate wing fencing to funnel panthers to the crossing site. Crossings should be designed so that panthers have an unobstructed view of habitat on the opposite side of the underpass (Foster and Humphrey, 1995). The status of lands adjacent to the crossing site should also be considered when determining the location of a crossing. Unprotected private lands adjacent to the crossing could be developed and render the crossing unviable. Accordingly, lands adjacent to crossings should be acquired or placed under a conservation easement or other protective covenant to ensure the crossing will function in perpetuity.

A number of wildlife crossings with associated fencing have already been constructed within major roadways in southwest Florida to benefit the panther and other wildlife species. In the 1991, the Florida Department of Transportation (FDOT) constructed 28 wildlife crossings within I-75 corridor from U.S. Highway 27 to just west of Everglades Boulevard. A total of five vehicle-related panther mortalities were documented within this corridor prior to construction of the crossings. Following construction of the crossings a total of four vehicle-related panther mortality (all in 2009) were recorded in the corridor from 1991 to the present. For three of these mortalities, it appears that the panther had entered the I-75 right-of-way through the gaps in the fence at existing roadway intersections (*i.e.,* SR 29, Snake Road).

The FDOT has also constructed six wildlife crossings on SR 29 between Oil Well Road and US 41. Crossings A, B, C, and D are located north of I-75 and Crossings E and F are located south of I-75. Crossings A and B were constructed in 2007, Crossings C and D were constructed in 1995, Crossing E was constructed in 1997, and Crossing F was constructed in 1999. Prior to construction of the SR 29 Crossings, a total of 10 vehicle-related panther mortalities were recorded near the locations of Crossings A and B from 1980 through 2004, and 2 vehicle-related panther mortalities were recorded near the location of Crossings C and D from 1979 through 1990. Vehicle-related panther mortalities have not been recorded in the vicinity of Crossings A, B, C, or D following their installation. A total of 2 vehicle–related panther mortalities were documented within 3.5 miles of the location of Crossing E prior to construction, and vehicle-related panther mortalities were not observed within 2.5 miles of the location of Crossing F prior to construction. Following construction of Crossings E and F, a total of four vehicle-related panther mortalities have been reported within 3 miles of Crossing E, and two vehicle-related panther mortality has been documented within 1 mile of Crossing F. The observed increase in the number of vehicle-related panther mortalities following the construction of Crossings E and F may be related to the increase in the panther population within recent years.

The wildlife crossings described above represent a commendable effort by the FDOT to reduce panther deaths resulting from collisions with vehicles, however more crossings are needed within the major roadways of south Florida to significantly reduce this threat to the panther and other wildlife species (Smith et al. 2006). Accordingly, recent studies have been conducted to identify locations for wildlife crossings in south Florida. Swanson et al. (2005) used a LCP modeling approach to identify the most likely travel routes for panthers among six major use areas in southwest Florida. LCP modeling takes into consideration elements in the landscape that permit or impede panther movement when traveling. Swanson et al. (2005) identified 20 key highway segments where LCPs intersected improved roadways. Smith et al. (2006) studied the movements of the Florida panther, the Florida black bear, and other wildlife species along SR 29, County Road (CR) 846 and CR 858 in Collier County, Florida. Data analyzed in the study were obtained from roadkill and track surveys, infra-red camera monitoring stations, existing data provided by the FWC (Florida panther radio telemetry and vehicle mortality reports), and other studies. Smith et al. (2006) recommended that new wildlife crossings be considered at various sites along these roadways to reduce road-related mortality of panthers and other wildlife species, and increase connectivity among wildlife populations. County governments are also working with the Service to construct needed crossings for the panther. Collier County has committed to construct two wildlife crossings and associated fencing in association with the Oil Well Road widening project. These crossings will be located within the Oil Well Road (CR 858) corridor at Camp Keais Strand. The locations of these crossings have been identified as travel corridors for panthers and other wildlife.

Agriculture, Development, and Mining

The Service developed a Panther Habitat Assessment methodology and refugia design in 2003 to help guide the agency in evaluating permit applications for projects that could affect panther habitat (see discussion below). This methodology was a way to assess the level of impacts to panthers expected from a given project, and to evaluate the effect of any proposed compensation offered by the project applicant. Prior to the development of this methodology, the Service, from March 1984 through August 2003, concluded consultation on 41 projects involving the panther and habitat preservation (Table 2). The minimum expected result of these projects is impacts to 71,308 acres and the preservation on of 14,179 acres of panther habitat. Of the 71,308 acres of impacts, 38,932 acres are due to agricultural conversion and 32,376 acres to development and mining. Portions (10,370 acres) of the largest agricultural conversion project, 28,700 acres by U.S. Sugar Corporation, were re-acquired by the Federal government as a component of the Talisman Land Acquisition (Section 390 of the Federal Agricultural Improvement and Reform Act of 1996 [Public Law 104-127] Farm Bill Cooperative Agreement, FB4) for use in the CERP. The non-agriculture impacts are permanent land losses, whereas the agricultural conversions may continue to provide some habitat functional value to panthers, depending on the type of conversion.

From August 2003 through the date of this Biological Opinion, the Service concluded consultations on 90 projects affecting 25,549 acres with preservation of 27,319 acres (Table 2). Following our refugia design assessment approach, the projects affected 12,825 acres in the Primary Zone, 7,507 acres in the Secondary Zone, and 4,516 acres in the Other Zone. Compensation provided included 24,574 acres in the Primary Zone, 272 acres in the Secondary Zone, 652 acres in the Dispersal Zone, and 1,646 acres in the Other Zone. The project-affected lands were primarily agricultural fields consisting of row crops and citrus groves and natural lands with varying degrees of exotic vegetation. Functional habitat value of these lands to the Florida panther, following our Panther Habitat Assessment methodology provided a PHU loss from development of 109,588 primary equivalent PHUs, with a corresponding PHU preservation and enhancement complement of 216,302 primary equivalent PHUs. The preservation lands were generally native habitat lands or disturbed lands that included restoration components. Restoration components included exotic species removal, fire management, wetland hydrology improvement, improved forest management practices, and full habitat restoration from agriculture uses to native habitats.

Panther Habitat Evaluation and Compensation

Population Viability Analysis

Population Viability Analysis (PVA) has emerged as a key component of endangered species conservation. This process is designed to incorporate demographic information into models that predict if a population is likely to persist in the future. PVAs incorporate deterministic and stochastic events including demographic and environmental variation, and natural catastrophes. PVAs have also been criticized as being overly optimistic about future population levels (Brook et al. 1997) and should be viewed with caution; however, they are and have been shown to be surprisingly accurate for managing endangered taxa and evaluating different management practices (Brook 2000). They are also useful in conducting sensitivity analyses to determine where more precise information is needed (Hamilton and Moller 1995; Beissinger and Westphal 1998; Reed et al. 1998; Fieberg and Ellner 2000).

Shaffer (1981) originally defined a viable population as follows, "a minimum viable population for any given species in any given habitat is the smallest isolated population having a 99 percent chance of remaining extant for 1,000 years despite the foreseeable effects of demographic, environmental and genetic stochasticity, and natural catastrophes." However, the goal of 95 percent probability of persistence for 100 years is the standard recommended by population biologists and is used in management strategies and conservation planning, particularly for situations where it is difficult to accurately predict long-term effects (Shaffer 1978, 1981, 1987, Sarkar 2004).

Since 1981, 139 Florida panthers have been radio-collared and monitored on public and private lands throughout south Florida (Lotz et al. 2005). These data were used by researchers to estimate survival rates and fecundity and were incorporated into PVA models previously developed for the Florida panther (Seal et al. 1989; 1992; Cox et al. 1994; Kautz and Cox 2001; Maehr et al. 2002b). These models incorporated a range of different model parameters such as general sex ratios, kitten survival rates, age distributions, and various levels of habitat losses, density dependence, and intermittent catastrophes or epidemics. The outputs of these models predicted a variety of survival scenarios for the Florida panther and predicted population levels needed to ensure the survival of the species.

Root (2004) developed an updated set of PVA models for the Florida panther based on RAMAS GIS software. These models were used to perform a set of spatially explicit PVAs. Three general single-sex (*i.e.*, females only) models were constructed using demographic variables from Maehr et al. (2002b) and other sources. A conservative model was based on Seal and Lacy (1989), a moderate model was based on Seal and Lacy (1992), and an optimistic model was based on the 1999 consensus model of Maehr et al. (2002b). In each model, first-year kitten survival was set at 62 percent based on recent information from routine panther population monitoring (Shindle et al. 2001). All of the models assumed a 1:1 sex ratio, a stable age distribution, 50 percent of females breeding in any year, and an initial population of 41 females (82 individuals including males), which was the approximate population size in 2001 to 2002 (McBride 2001, 2002).

The use of 41 females in the model was based on the best available data when the model was developed. The 41 females represent the number of individual panthers documented in surveys by McBride (2001, 2002). While the 41 females includes subadults that do not yet breed, it is reasonable to use this total number in modeling to evaluate population trends for several reasons. First, it is not feasible to differentiate between subadults and adults through field observation. Second, although it is possible that some of the 41 females were not breeding in year one of the model, these females would mature to breeding age by year two of the model. Third, the Root (2004) model assumed females to have "a 50 percent chance of breeding in a given year," and therefore only half of the 41 females were modeled as breeding each year. The primary reason the model (Root, 2004) assumed a 50 percent chance of breeding in a given year is that kittens stay with their mother from 15 to 24 months prior to dispersal, however, this assumption accounts for the likelihood some of the 41 females would not breed in a given year, including subadult status of some individuals. Fourth, the Service recognizes the McBride data is not intended to provide a total population estimate. Although the Service believes population estimates derived through field surveys are close to the actual population number, it is likely some individuals in the current panther population have not been documented. Finally, the Service notes population modeling is only one of several tools used by the Service to assess possible effects on the panther. As detailed elsewhere in this biological opinion, the Service's conclusions about possible effects on the panther are also supported by the Service's assessment of remaining habitat, as well as consideration of other factors such as the overall recovery objectives and other cumulative effects from actions in the action area. In light of these factors, the Service believes it is reasonable to use the best available count of 41 subadult and adult females as the breeding population for modeling purposes.

Basic Versions: The basic versions of each model incorporated no catastrophes or epidemics, no change in habitat quality or amount, and a ceiling type of density dependence. The basic versions of the models incorporated a carrying capacity of 41 females (82 panthers - 50:50 sex ratio). Variants of the models were run with differing values for density dependence, various levels of habitat loss, and intermittent catastrophes or epidemics. Each simulation was run with 10,000 replications for a 100-year period. The minimum number of panthers needed to ensure a 95 percent probability of persistence for 100 years was estimated in a series of simulations in which initial abundance was increased until probability of extinction at 100 years was no greater than 5 percent. More detailed information concerning the PVA model parameters appears in Root (2004).

The results of these model runs predicted a probability of extinction for the conservative model of 78.5 percent in 100 years with a mean final total abundance of 3.5 females. Also, the probability of a large decline in abundance (50 percent) was 94.1 percent. The moderate model resulted in a 5 percent probability of extinction and mean final abundance of 42.3 females in 100 years. The probability of panther abundance declining by half the initial amount was 20 percent in 100 years under the moderate model. The optimistic model resulted in a 2 percent probability of extinction and mean final abundance of 51.2 females in 100 years. The probability of panther abundance declining by half the initial amount was only 9 percent in 100 years under the optimistic model. These models also provide a probability of persistence (100 percent minus probability of extinction) over a 100-year period of 95 percent for the moderate model and 98 percent for the optimistic model.

One Percent Habitat Loss: Model results were also provided by Root (2004) for probability of extinctions for one percent loss of habitat, within the first 25 years of the model run. The 1 percent loss of habitat equates to essentially all remaining non-urban privately owned lands in the Primary Zone and corresponds to the estimated rate of habitat loss from 1986 to 1996 for the five southwest counties based on land use changes (Root 2004). For the moderate model, the model runs predict a probability of extinction increase of about 1 percent, from a probability of extinction of about 5 percent with no loss of habitat to 6 percent with 1.0 percent habitat loss per year, for the first 25 years. For the optimistic model, probability of extinction increased from about 2 percent with no loss of habitat to 3 percent with 1.0 percent habitat loss per year, for the first 25 years. These models also predicted that the mean final abundance of females would decrease from 41 to 31 females, a 24.3 percent reduction for the moderate model and from 41 to 38 females, a 7.3 percent reduction for the optimistic model.

The model runs predict a probability of persistence (100 percent minus the probability of extinction) over a 100-year period of about 94 percent for the moderate model and 97 percent for the optimistic model. The model runs also predict a mean final abundance of 62 individuals (31 females and 31 males) for the moderate model and 76 individuals (38 females and 38 males) for the optimistic model.

Population Guidelines: Kautz et al. (2006), following review of the output of Root's PVA models and those of other previous PVAs for the Florida panther, suggested a set of population guidelines for use in the management and recovery of the Florida panther. These guidelines are: (1) populations of less than 50 individuals are likely to become extinct in less than 100 years; (2) populations of 60 to 70 are barely viable and expected to decline by 25 percent over 100 years; (3) populations of 80 to 100 are likely stable but would still be subject to genetic problems (*i.e.*, heterozygosity would slowly decline); and (4) populations greater than 240 have a high probability of persistence for 100 years and are demographically stable and large enough to retain 90 percent of original genetic diversity.

Population guidelines for populations of panthers between 50 and 60 individuals and between 70 and 80 individuals were not specifically provided in Kautz et al. (2006). However, the Service views the guidelines in Kautz et al. (2006) as a continuum. Therefore, we consider populations of 50 to 60 individuals to be less than barely viable or not viable with declines in population and heterozygosity. Similarly, we consider populations of 70 to 80 to be more than barely viable or somewhat viable with some declines in population and heterozygosity. Like other population guidelines presented in Kautz et al. (2006), these assume no habitat loss or catastrophes.

PVA Summaries and Population Guidelines: Root's (2004) moderate model runs, which have a carrying capacity 41 females (82 individuals), show final populations of 42.3 females (84 total) and 31.2 females (62 total) with extinction rates of 5 percent and 6 percent, respectively, for the basic and 1 percent habitat loss scenarios. The predicted final populations in Root (2004) are 84 and 62 panthers for no loss of habitat and 1 percent loss of habitat, respectively, over a 100-year period.

Kautz et al.'s (2006) population guidelines, when applied to the populations predicted by Root's (2004) moderate models, describe the "with habitat loss" population (62 panthers) as barely viable and expected to decline by 25 percent over a 100-year period. The "without habitat loss" population (84 panthers) is likely stable but would still be subject to genetic problems.

As discussed in the section on "Population Trends and Distribution," the 3-year average verified panther population estimate has shown an increase in the number of panthers reported yearly, beginning in 2000. The Service believes that McBride's verified population of 97 panthers in 2006 and 117 panthers in 2007 is within Kautz et al.'s (2006) population guidelines representing a population that is likely stable but would still be subject to genetic problems.

The Service also believes the model runs show lands in the Primary Zone are important to the survival and recovery of the Florida panther and sufficient lands need to be managed and protected in south Florida to provide for a population of 80 to 100 panthers, the population range defined as likely stable over 100 years, but subject to genetic problems. As discussed in the following section, the Service has developed a landscape level program that through regulatory reviews and coordinated conservation efforts with landowners and resource management partners provides a mechanism to achieve this population threshold.

Model Violations: The actual likelihood of population declines and extinctions may be different than the guidelines and models suggest, depending upon the number of and severity of assumptions violated. The Service realizes habitat loss is occurring at an estimated 0.8 percent loss of habitat per year. The Service has accounted for some habitat loss and changes in habitat quality within its regulatory program, specifically through its habitat assessment methodology (discussed below). For example, we have increased the base ratio used within this methodology to account for unexpected increases in habitat loss. Similarly, we consider changes in habitat quality and encourage habitat restoration wherever possible.

With regard to the assumption of no catastrophes, the Service has considered the recent outbreak of FeLV in the panther population at Okaloacoochee Slough as a potential catastrophe. The FWC is carefully monitoring the situation and it appears to be under control at this time due to a successful vaccination program. However, if the outbreak spreads into the population, the Service will consider this as a catastrophe and factor this into our decisions.

We acknowledge uncertainties exist, assumptions can be violated, and catastrophes can occur. The Service and FWC, along with our partners, will continue to monitor the panther population and the south Florida landscape and incorporate any new information and changes into our decision-making process.

South Florida Panther Population Objective

Although the Service supports Kautz et al.'s (2006) guideline 4 "that a population greater than 240 panthers have a high probability of persistence for 100 years and are demographically stable and large enough to retain 90 percent of original genetic diversity," we believe that for the southwest Florida population, Kautz et al.'s (2006) guideline 3 is a more appropriate threshold. The support for this guideline is that there is an insufficient acreage of non-urban lands, based on Kautz et al.'s (2006) average density value of 31,923 acres per panther, available in southwest Florida south of the Caloosahatchee River for a panther population of this size. However, based on Kautz et al.'s (2006) average density value, sufficient lands are available for a population between 80 and 100 panthers. Although this size population does not meet the recovery goals in the Service's Florida Panther Recovery Plan (Service 2006e, 2008), a population of this size, based on Kautz et al. (2006) evaluation, would provide a population that is likely stable but would still be subject to genetic problems and would meet the Service's Florida Panther Recovery Plan (Service 2006e, 2008) objective (1), which is to maintain, restore, and expand the Florida panther population and its habitat in south Florida and, if feasible, expand the known occurrence of Florida panthers north of the Caloosahatchee River to maximize the probability of the long-term persistence of this metapopulation.

The Service proposes to achieve this landscape scale effort through land management partnerships with private landowners, through coordination with private landowners during review of development proposals, and through land management and acquisition programs with Federal, State, local, private, and Tribal partners. The acreages of lands necessary to achieve this landscape scale effort, based on Kautz et al. (a) average density of 31,923 acres (12,919 ha) per panther is 2,553,840 acres (1,033,520 ha) for 80 panthers or 3,192,300 acres (1,291,900 ha) for 100 panthers.

The principle regulatory mechanism that allows the Service to work directly with private landowners during review of development and land alteration projects is section 10 of the Act. The Service coordinates with Federal agencies pursuant to section 7 of the Act. In August 2000, the Service, to assist the Corps in assessing project effects to the Florida panther in accordance with their 7a(1) responsibilities under the Act, developed the Florida panther interim Standard Local Operating Procedures for Endangered Species (SLOPES) (Service 2000)(update in 2007) (Service 2007b). The document is available on the Corps, web site at:

http://www.saj.usace.army.mil/regulatory/what/species/panther.htm

The Florida panther SLOPES provide guidance to the Corps for assessing project effects to the Florida panther and recommends actions to minimize these effects. The Florida panther SLOPES also includes a consultation area map that identifies an action area where the Service believes land alteration projects may affect the Florida panther.

In the original SLOPES, the consultation area map (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 most likely panther habitat usage profiles, although documentation clearly shows panther use of areas outside these locations. These documents are the publications by Kautz et al. (2006) and Thatcher et al. (2006). Based on the information in these documents, we clarified the boundaries of the Map to better reflect areas where Florida panthers predominate (Figure 6) and refer to these areas cumulatively as the Panther Focus Area (Service 2007b). As part of this review, we also made revisions in coordination with the Corps to components in the SLOPES documents that address actions that can be taken by the Service, Corps, and project applicants that may benefit panthers and minimize effects from proposed actions (Service 2007b).

The Panther Focus Area was determined from the results of recent panther habitat models south of the Caloosahatchee River (Kautz et al. 2006) and north of the Caloosahatchee River (Thatcher et al. 2006). 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. 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 be most important and comprise a landscape mosaic of cover types important to help 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.

The Panther Focus Area Map south of the Caloosahatchee River is divided into Primary, Secondary, and Dispersal Zones, and north of the Caloosahatchee River into the Primary Dispersal/Expansion Area. These zones are defined as follows:

Primary Zone: The area that 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: These lands are contiguous with the Primary Zone and although they 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: A known corridor between the Panther Focus Area south of the Caloosahatchee River and the Panther Focus Area north of the Caloosahatchee River that may facilitate future panther expansion north of the Caloosahatchee River (Kautz et al. 2006). 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 documented using this zone.

Primary Dispersal/Expansion Area: This is the Fisheating Creek/Babcock-Webb WMA 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.

Landscape Preservation Need and Compensation Recommendations

<u>Land Preservation Needs</u>: To further refine the land preservation needs of the Florida panther and to specifically develop a landscape-level program for the conservation of the Florida panther population in south Florida, the Service appointed a Florida Panther Subteam in February 2000. The Subteam was charged with developing a landscape-level strategy for the conservation of the Florida panther population in south Florida. The results of this collaborative effort are partially presented in Kautz et al. (2006). One of the primary population thresholds of this effort was to identify a strategically located set of lands containing sufficient area and appropriate land cover types to ensure the long-term survival of the south population of the Florida panther. Kautz et al. (2006) focused their efforts on the area south of the Caloosahatchee River, where the reproducing panther population currently exists.

Kautz et al. (2006) created an updated Florida panther potential habitat model based on the following criteria: (1) forest patches greater than 4.95 acres (2 ha); (2) non-urban cover types within 656 ft (200 meters) of forest patches; and (3) exclusion of lands within 984 ft (300 meters) of urban areas. The potential habitat map was reviewed in relation to telemetry data, recent satellite imagery (where available), and panther home range polygons. Boundaries were drawn around lands defined as the Primary Zone (Figures 4 and 5), defined as the most important area needed to support a self-sustaining panther population. Kautz et al. (2006) referred to these lands as essential; however, as observed in the two previous plans (Logan et al. 1993; Cox et al. 1994), lands within the boundaries of the Primary Zone included some urban areas and other lands not considered to be truly panther habitat (*i.e*., active rock and sand mines). The landscape context of areas surrounding the Primary Zone was modeled and results were used to draw boundaries of the Secondary Zone (Figures 4 and 5), defined as the area capable of supporting the panther population in the Primary Zone, but where habitat restoration may be needed (Kautz et al. 2006).

Kautz et al. (2006) also identified, through a LCP model, the route most likely to be used by panthers dispersing out of south Florida, crossing the Caloosahatchee River, and dispersing into south-central Florida. Kautz et al. (2006) used ArcView GIS© version 3.3 and ArcView Spatial Analyst© version 2 (Environmental Systems Research, Incorporated, Redlands, California) to construct the least-cost path models and identify optimum panther dispersal corridor(s). The least-cost path models operated on a cost surface that ranked suitability of the landscape for use by dispersing panthers with lower scores indicating higher likelihood of use by dispersing panthers. Those dispersal routes connecting lands between the Panther Focus Area south of the Caloosahatchee River and the Panther Focus Area north of the Caloosahatchee River, which may facilitate future panther expansion north of the Caloosahatchee River, were defined as the Dispersal Zone (Figures 4 and 5) (Kautz et al. 2006). The preservation of lands within this zone is important for the survival and recovery of the Florida panther, as these lands are the dispersal pathways for expansion of the south Florida panther population. The Primary Zone covers 2,270,590 acres (918,895 ha); the Secondary Zone covers 812,104 acres (328,654 ha); and the Dispersal Zone covers 27,883 acres (11,284 ha); providing a total of 3,110,578 acres (1,258,833 ha) (Kautz et al. 2006).

As part of their evaluation of occupied panther habitat, in addition to the average density estimate of one panther per 27,181 acres (11,000 ha) developed by Maehr et al. (1991), Kautz et al. (2006) estimated the present average density during the timeframe of the study, based on telemetry and other occurrence data, to average one panther per 31,923 acres (12,919 ha). In the following discussions of the number of panthers a particular zone may support, the lower number is based on the 31,923 acres (12,919 ha) value (Kautz et al. 2006) and the higher number is based on the 27,181 acres (11,000 ha) value (Maehr et al. 1991).

Based on these average densities, the Primary Zone could support 71 to 84 panthers; the Secondary Zone could support 8 to 10 panthers without habitat restoration and 25 to 30 panthers with habitat restoration (existing high quality panther habitat currently present in the Secondary Zone is estimated at 32 percent of the available Secondary Zone lands); and the Dispersal Zone could support 0 panthers. Taken together, the three zones in their current condition apparently have the capacity to support about 79 to 94 Florida panthers.

Kautz et al.'s (2006) assessment of available habitat south of the Caloosahatchee River determined that non-urban lands in the Primary, Secondary, and Dispersal Zones were not sufficient to sustain a population of 240 individuals south of the Caloosahatchee River. However, Kautz et al. (2006) determined sufficient lands were available south of the Caloosahatchee River to support a population of 79 to 94 individuals (although not all lands are managed and protected).

<u>Compensation Recommendations</u>: To achieve our landscape scale effort to locate, preserve, and restore sets of lands containing sufficient area and appropriate land cover types to ensure the long-term survival of a population of Florida panthers south of the Caloosahatchee River, the Service chose the midpoint (90 panthers) in Kautz et al.'s (2006) population guidelines that a population of 80 to 100 panthers is likely to be stable, although subject to genetic problems, through 100 years. In addition, a population of 90 individuals is eight individuals greater than a population of 82 individuals, which according to the best available PVA (Root 2004) is 95 percent likely to persist over 100 years (assuming a 50:50 male to female ratio). These eight individuals provide a buffer for some of the assumptions in Root's (2004) PVA. Our process to determine compensation recommendations for project affects that cannot be avoided in both our section 7 and section 10 consultations is based on the amount and quality of habitat that we believe is necessary to support a population of 90 panthers in south Florida.

The Service, based on Kautz et al.'s (2006) average panther population density of 31,923 acres per panther, determined 2,873,070 acres of Primary Zone "equivalent" lands need to be protected and managed. This equivalency factor is needed, since Secondary Zone lands are of less value than Primary Zone lands to the panther, to assure that additional acreage (special consideration) is required in the Secondary Zone to compensate for its lower quality panther habitat. In other words, more than 31,923 acres per panther would be needed, hypothetically, if this acreage were all in the Secondary Zone (see discussion of Primary Zone equivalent lands in the following section). The combined acreage of lands within the Primary, Dispersal, and Secondary Zones is 3,110,577 acres (1,258,833 ha) (Kautz et al. 2006). Currently, 2,073,865 acres of Primary Zone equivalent lands are preserved (Table 3), so 799,205 additional acres need to be preserved to support a population of 90 panthers in south Florida (2,873,070 minus 2,073,865 equals 799,205).

The Service also consults on lands outside of the Primary, Secondary, and Dispersal Zones that may affect panthers, such as agricultural lands adjacent to the Panther Focus Area and proposals in urbanized areas that could generate traffic in or adjacent to the Panther Focus Area or have other identifiable impacts.

<u>Primary Zone Equivalent Lands</u>: Kautz et al. (2006), through their habitat evaluation of lands important to the Florida panther, identified three categories of lands, *i.e.*, Primary Zone, Secondary Zone, and Dispersal Zone, and documented the relative importance of these lands to the Florida panther. These lands generally referred to as Kautz et al.'s panther core lands, include the majority of the home ranges of the current population of the Florida panther. The Service, in our evaluation of habitat needs for the Florida panther expanded the boundaries of the Kautz et al. (2006) lands to include those lands south of the Caloosahatchee River where additional telemetry points historically were recorded. These additional lands (about 819,995 acres), referred to as the "Other"

Zone, are added to the lands in Kautz et al. (2006) panther core lands and represent the lands within the Service's 2000 consultation area boundary south of the Caloosahatchee River as shown in Figure 6. These lands (core lands and other zone lands) together are referred to by the Service as the Panther Core Area (labeled on Figure 6 as "Original Panther Consultation Area South of the Caloosahatchee River"). The "Other" Zone lands, as well as the lands within the Secondary Zone, provide less landscape benefit to the Florida panther than the Primary and Dispersal Zones, but are important as a component of our strategy to preserve sufficient lands to support a population of 90 panthers in south Florida.

To account for the lower landscape importance of these lands in our preservation strategy and in our habitat assessment methodology, we assigned lands in the Other Zone a value of 0.33 and lands in the Secondary Zone a value of 0.69 to convert these lands to Primary Zone value, *i.e.*, Primary Zone equivalents (Table 3). Kautz et al. (2006) identifies the need for restoration in the Secondary Zone to achieve maximum benefits. To estimate the Primary Zone equivalent of Secondary Zone lands, we derived a relative habitat value (average PHU value) for each by comparing the habitat ranks estimated in Kautz et al. (2006) for each habitat type per zone. The average PHU value for the Primary Zone is 6.94 and for the Secondary Zone 4.79. Based on this analysis, the habitat value of the Secondary Zone is roughly 69 percent of the Primary Zone, and restoration is needed to achieve landscape function (4.79/6.94=0.69). Using this assessment, the 503,481 acres of Secondary Zone lands equate to 347,402 acres of Primary Zone equivalent lands. Dispersal Zone lands are considered equivalent to Primary Zone lands with a 1 to 1 value.

At-risk lands in the Other Zone total 819,995 acres. Actions on some of the Other Zone lands, such as actions in areas that have already been urbanized, will in most situations not have an impact on panthers or their habitat. We are considering that within the Other Zone lands, these types of actions will account for 20 percent of the available lands and that actions on the remaining 80 percent of available lands may have an impact on panthers and could affect our southwest Florida panther population strategy. We will monitor this consideration carefully as we review proposed actions within the Other Zone. To estimate the acres of Primary Zone equivalent lands the 819,995 acres of Other Zone lands represent, we applied the 80 percent factor and the 33 percent factor to the available acres, which equate to 216,479 acres of Primary Zone equivalent lands (819,995 times 0.8 equals 655,996 times 0.33 equals 216,479).

These equivalent values, 0.33 and 0.69, for Other and Secondary Zones, respectively, and 1 to 1 for the Dispersal Zone, are important components in our assessment of compensation needs for a project in the panther consultation area and are components of our habitat assessment methodology as discussed below.

Habitat Assessment Methodology

To evaluate project effects to the Florida panther, the Service considers the contributions the project lands provide to the Florida panther, recognizing not all habitats provide the same functional value. Kautz et al. (2006) also recognized not all habitats provide the same habitat value to the Florida panther and developed cost surface values for various habitat types, based on use by and presence in home ranges of panthers. The FWC (2006), using a similar concept, assigned likely use values of habitats to dispersing panthers. The FWC's habitats were assigned habitat suitability rank between 0 and 10, with higher values indicating higher likely use by dispersing panthers.

The Service chose to evaluate project effects to the Florida panther through a similar process. We incorporated many of the same habitat types referenced in Kautz et al. (2006) and FWC (2006) with several adjustments to the assigned habitat use values reflecting consolidation of similar types of habitats and the inclusion of Everglades Restoration water treatment and retention areas. We used these values as the basis for habitat evaluations and the recommended compensation values to minimize project effects to the Florida panther (Tables 4 and 7), as discussed below.

Base Ratio: To develop a base ratio that will provide for the protection of sufficient acreage of Primary Zone equivalent lands for a population of 90 panthers from the acreage of Primary Zone equivalent non-urban lands at risk, we developed the following approach.

The available Primary Zone equivalent lands are estimated at 3,276,563 acres (see Tables 3 and 8). Currently 2,073,865 acres of Primary Zone equivalent lands of non-urban lands are preserved. The remaining non-urban, at-risk, private lands are estimated at 1,202,698 acres of Primary Zone equivalent lands. To meet the protected and managed lands threshold for a population of 90 panthers, an additional 799,205 acres of Primary Zone equivalent lands are needed. The base ratio is determined by dividing the primary equivalents of at-risk habitat to be secured (799,205 acres) by the result of the acres of at-risk habitat in the Primary Zone (610,935 acres) times the value of the Primary Zone (1); plus the at-risk acres in the Dispersal Zone (27,883 acres) times the value of the Dispersal Zone (1); plus the at-risk acres in the Secondary Zone (503,481 acres) times the value of the Secondary Zone (0.69); plus the at-risk acres in the Other Zone (655,996 acres) times the value of the Other Zone (0.33); minus the at-risk acres of habitat to be protected (799,205 acres). The results of this formula provide a base value of 1.98.

$$799{,}205 / ((610{,}935 \times 1.0) + (27{,}883 \times 1) + (503{,}481 \times 0.69) + (655{,}996 \times 0.33)) – 799{,}205 = 1.98$$

In evaluating habitat losses in the consultation area, we used an estimate of 0.8 percent loss of habitat per year to predict the amount of habitat loss anticipated in south Florida during the next 5 years (*i.e.*, 6,000 ha/year; 14,820 acres/ year). We chose a 5-year time frame because we believe that a time period less (2 to 3 years) would not show a changing trend in habitat alterations and a period longer (7 to 10 years) would not allow the Service sufficient time to adjust for a changing trend. The Service intends to monitor this habitat loss and may periodically adjust our habitat methodology to reflect this change.

Based on an analysis of wetland permits issued for single-family residential projects in Northern GGE by DEP (167 over a 30-month period [DEP permit data- 2006 to 2008) and corresponding Collier County single-family residential building permits (267 permits [Collier County permit data – 2006 to 2008]) issued over the same time period (167/296=0.56), we conservatively assumed based on the joint Corps/DEP wetland application submittal process and the Corps consultation process with the Service in accordance with the Act that we would have the opportunity to review these wetland permits and provide species impact reviews. Based on these assumptions, we estimated that about 41,496 acres would be developed without Federal review over a 5-year period (14,820*5*0.56=41,496), or an average of 8,299 acres per year. As a result, we adjusted the base value from 1.98 to 2.23.

We also realize habitat losses from individual single-family residential developments will collectively compromise the Service's landscape scale effort to secure sufficient lands for a population of 90 panthers. We believe that, on an individual basis, single-family residential developments by individual lot owners on lots no larger than 2.0 ha (5.0 acres) will not result in take of panthers on a lot-by-lot basis; however, collectively these losses may affect the panther. Panthers are a wide-ranging species, and individually a 2.0 ha (5.0 acre) habitat change will not have a measurable impact. Compensation for such small-scale losses on a lot-by-lot basis is unlikely to result in meaningful conservation benefits for the panther versus the more holistic landscape level conservation strategy used in our habitat assessment methodology. To account for these losses, we estimated about another 12,950 acres over a 5-year period (2,590 acres per year or about 0.14 percent of the at risk lands), or an average of 2,590 acres per year would be developed through this avenue. This estimate for individual single-family development is based on the yearly average level of development combined in Northern GGE and Lehigh Acres in Lee and Collier Counties. To account for this loss, we further adjusted the base value from 2.23 to 2.48.

There is also a need for road crossings in strategic locations and we believe there are projects that may not have habitat loss factors but will have traffic generation factors. The Service considers increases in traffic as an indirect effect from a project, which can contribute to panther mortality. For assessment purposes, since our habitat methodology does not provide a mechanism to address this type of effect directly, we are providing a habitat surrogate of 500 acres per year of habitat loss for these types of projects, with a not to exceed value of 2,500 acres over the 5-year period. Therefore, we have added another 0.02 to the base ratio to address traffic impacts, which could provide an incentive to implement crossings in key locations. Following the same approach shown above, we adjusted the base ratio from 2.48 to 2.5. The Service intends to re-evaluate this base ratio periodically and adjust as needed to make sure all adverse effects are adequately ameliorated and offset as required under section 7 of the Act and to achieve the Service's landscape scale effort for the Florida panther.

The Service uses a very conservative density of panthers per area of habitat to calculate the compensation ratio for impacts south of the Caloosahatchee River. Specifically, the Service relied on the low estimate in the range presented in Kautz et al. (2006) to reach its factor of 2.5. This low estimate density value was calculated by dividing the documented number of panthers in 2000, or 62 panthers, by an estimate of the habitat in the Primary Zone that was most consistently occupied by panthers from 1981 to 2000. As previously mentioned, it is clear the panther population south of the river has increased notably since 2000, in 2001 = 78 panthers; in 2002 = 80; in 2003 = 87; in 2004 = 78; in 2005 = 82; in 2006 = 97; in 2007 = 117; and 2008=104. In 2007 more panthers were documented in south Florida than have been documented since current verified estimates have been collected. Furthermore, none of the panthers recorded south of the Caloosahatchee River lives exclusively outside of the Primary Zone, although some do venture outside of it on occasion (McBride 2007).

The average population size south of the Caloosahatchee River over the past 7 years is 86. If we were to use this number instead of 62 to calculate the compensation ratio and to use the entire acreage of the Primary Zone as the denominator, the revised compensation ratio requirement would be 0.32 acres protected for every acre developed. Furthermore, if we even excluded the “Other Zone” altogether from the analysis, the ratio would be 1.01, still lower than the Service’s current ratio. We believe this conservative approach is warranted because of the inherent importance of habitat protection to panther conservation.
Landscape Multiplier: As stated in the above section on Primary Zone Equivalent Lands, the location of a project in the landscape of the core area of the Florida panther is important. As we have previously discussed, lands in the Primary and Dispersal Zones are of the most importance in a landscape context to the Florida panther, with lands in the Secondary Zone of less importance, and lands in the Other Zone of lower importance. These zones affect the level of compensation the Service believes is necessary to minimize a project’s effects to Florida panther habitat. Table 9 provides the landscape compensation multipliers for various compensation scenarios. As an example, if a project is in the Other Zone and compensation is proposed in the Primary Zone, a Primary Zone equivalent multiplier of 0.33 is applied to the PHUs (see discussion below) developed for the project. If the project is in the Secondary Zone and compensation is in the Primary Zone, then a Primary Zone equivalent multiplier of 0.69 is applied to the PHUs developed for the project.

Panther Habitat Units – Habitat Functional Value: Prior to applying the base ratio and landscape multipliers discussed above, we evaluate the project site and assign functional values to the habitats present. This is done by assigning each habitat type on-site a habitat suitability value from the habitats shown in Tables 4 and 7. The habitat suitability value for each habitat type is then multiplied by the acreage of that habitat type resulting in a number representing PHUs. These PHUs are summed for a site total, which is used as a measurement of the functional value the habitat provides to the Florida panthers. This process is also followed for the compensation-sites.

As of January 2005, the Service has been using a panther habitat suitability ranking system based in part on methods in publications by Swainson et al. (2005) and Kautz et al. (2006) and adjusted by the Service to consolidate similar types of habitats and to include Comprehensive Everglades Restoration Plan water treatment and retention areas located in the panther’s range (Table 5). Since the implementation of this ranking system, the Service has received two additional, published habitat assessment studies (Cox et al. [2006] and Land et al. [2008]) that further assess habitat usage by the Florida panther. As it is the Service’s policy to incorporate the most current peer-reviewed science into our assessment and review of project effects on the Florida panther, we have revised the current habitat suitability ranking system.

To revise these values, the Service, in coordination with FWC, examined the habitat ranking values in the two new papers referenced above and Kautz et al. (2006) publication and developed a spreadsheet. The spreadsheet was developed to: (1) compare the results of each of these published analyses; and (2) provide a habitat ranking system for each of the assessments. On the first page of the spreadsheet, labeled “Panther Habitat Selection Analysis - Habitat Papers Comparison,” we summarized the types of analyses performed as to whether it was second order (selection of a home range with a large study area) or third order (selection of habitats within a home range). For each of these analyses, we then listed the habitat types reported in each paper and their order of selection by panthers (Table 5). We used the Cost Surface Scores and the Rank Differences from the Kautz et al. (2006) analyses as the selection order and for a measure of statistical differences among the habitat types. Selected habitat types are represented as bold black numbers and avoided habitats are bold red numbers. Habitats that were neither selected nor avoided are shown as normal font black numbers. Ranks with the same letter are not different from each other. Results from the Cox et al. (2006) and Land et al. (2008) papers using Euclidean analyses are shown in a similar fashion.

On the second page of the spreadsheet, labeled "Summary of Ranking Values," we ranked the habitat types on a scale from 0 to 10 according the results from each study and professional judgment (Table 6). We used our original ranking for the Kautz et al. analyses (with the ranking scale reversed such that the best habitat received a "10" and the lowest quality habitat was "0").

We developed similar rankings for the habitat analyses reported in Cox et al. (2006) and Land et al. (2008). Selected habitats fell in the range of 7 to 10; habitats that were used in proportion to availability were ranked from 4 to 6; and habitats that were avoided by panthers were ranked from 0 to 3. Ranks for habitats within each of the 3 outcomes began at the top of each of the ranges (selected = 10, used in proportion to availability = 6, avoided = 3). Some shifting of the ranks occurred based on the letter-coded statistical ranking. For instance, under *Land GPS Euclidean third order* both upland and wetland forests were selected by panthers and were not statistically different from each other (note the ranking of A and AB for upland and wetland forest, respectively). However, wetland forest and dry prairie also were not significantly different from each other. To show these relationships, we ranked upland forest as a 10, wetland forest as a 9, and we increased dry prairie from a 6 (top of the neither selected nor avoided ranking) to a 7 to reflect the interplay between dry prairie and wetland forest based on professional judgment.

To generate a new ranking of panther habitats for use as a habitat assessment measure, we simply averaged the ranks of the six different analyses presented in the spreadsheet to the first decimal place. Half of these results were second order habitat analyses (Kautz et al. compositional, Kautz et al. Euclidean and Cox et al. Euclidean) and the other half were third order analyses (Cox et al. Euclidean; Land et al. VHF Euclidean; Land et al. GPS Euclidean).

In our assessment, we noted several outlier habitat rankings that, based on our understanding of habitat needs of the Florida panther and our concern for human/panther interactions, appear to provide conflicting values. These habitats and their associated rankings are: (1) Barren/Disturbed – 5.2; (2) Urban – 5.0; (3) Open water – 3.3; and (4) Coastal wetlands – 1.0. We believe adjustments are warranted for these four categories and our adjusted values are based on the following:

1. <u>Barren/Disturbed</u>: Barren/Disturbed lands may include many temporary changes to land use, such as crop rotation and prescribed fires that likely have little impact on the value to panthers. Areas disturbed by human impact on a longer-term basis (*e.g.*, parking of equipment and material storage areas) have chronic effects on panthers that we judge

decrease the value of these lands for panthers. Barren/Disturbed lands include disturbed lands (Florida Land Use and Cover Classification System [FLUCCS] 740) and spoil areas (FLUCCS 733). Based on the above reasons, we assigned barren/disturbed land a value of 3.

2. Urban: Panther habitat models typically include urban in the "other" category that was neither avoided nor selected by panthers. Highly urbanized areas are not found in the panther core area that was used in assessing habitat use as panthers have already selected against these land use types by reducing their range. However, urbanizing areas in more rural settings may appear in the assessment of habitat use. Nevertheless, we believe that potential human/panther interactions are important conflict factors to consider as well. Therefore, we assigned both developed rural and highly urbanized areas a value of 0.

3. Open water: Open water has been found to be either avoided by panthers or included in the "other" category that was neither avoided nor selected by panthers. We believe open water in any setting provides little to no value to panthers. However, open water edges and berms can be a valuable foraging area or dispersal pathway in more rural settings, although these edges in an urbanized setting could promote human/panther conflicts. Therefore, we assigned open water in an urban setting, with or without emergent vegetation, and surrounding berms a value of 0. However, in rural settings, the littoral edges and berms may provide species benefit and are further addressed under the reservoir discussion below.

4. Coastal wetlands: There are few strictly coastal wetlands, such as salt marshes and mangrove swamps, within the panther focus area. Where these occur, they are closely interspersed with other upland habitats. In this context, we believe that these areas are of greater value to the panther than the models indicate. These areas may, for the most part, be avoided by panthers; but, they can be of value in the proper landscape context to higher value habitats. Therefore we assigned these areas a value of 3.

   We also note that three additional land uses and or habitat types referenced in our original habitat rankings were not components addressed directly in the model. These include: (1) Exotic/Nuisance plants; (2) Storm Water Treatment Areas (STAs); and (3) Reservoirs. We believe these categories are important in our assessment of panther habitat values and warrant consideration in our habitat ranking system.

5. Exotic/Nuisance plants: Although exotic plants can be suitable for providing denning cover and habitat connectivity between other land types for panthers and panther prey, they generally do not provide the preferred foraging base of plants consumed by deer and other herbivores (Fleming et. al. 1994). We believe that prey foraging value, or lack of, is an important constraint in our habitat assessments. Therefore, we assigned these habitats a value of 3. Likewise, some native plant species can become so dominant and dense, especially under altered hydrologic and fire suppression regimes, that they no longer provide high habitat value for the panther even though occasional use may occur. The most common example is dense, nearly monotypic cattail stands, which are of reduced value relative to less altered marsh communities. Another example of this type of nuisance species dominance is

dense stands of cabbage palm dominated communities. For systems represented by this habitat profile, we also assigned a value of 3.

6. STAs (Everglades Restoration): STAs are generally designed to provide a water quality treatment function for nutrient removal from received upstream discharges and may include multiple berms and adjacent littoral shelves. Depending on the design and mode of operation, they can become vegetated by dense monotypic stands of cattails or can incorporate a diverse mosaic of wetland communities and hydroperiods that support sawgrass and shrub/scrub species. Therefore, they can provide various levels of resource benefit to panthers and panther prey species as discussed below. For this reason, the final value of a Stormwater Treatment Area (STA) is determined in a case-by-case basis during project review.

   The Service participates in planning efforts that encourage location of STAs at sites with minimal areas of natural habitat, with a preference for sites that are currently in agriculture. Because these facilities by design are located in areas that currently provide a reduced value to panthers and panther prey species, the Service values these systems pre and post project development as a neutral effect on panthers. In these situations, the development of an STA from existing agriculture land uses would be evaluated as if the agriculture land use was present following project development, with no increase or decrease in habitat value to the panther.

   However, this neutral effect assessment is only applicable to land conversions from nonnative habitats to STAs. For those projects that remove natural habitats, the Service considers STA functional values to mimic the value of the natural system the STA is designed to achieve. As an example, a STA design that results in a dense monotypic stand of cattails would be appropriately evaluated following the exotic/nuisance species profile. Similarly, a system designed to provide a diverse mosaic of wetland communities and hydroperiods would be evaluated following the wet prairie/marsh profile. Another system design that incorporates internal and external berms could include an edge benefit evaluation identifying the berms and adjacent littoral shelves and their benefit to the Florida panther and panther prey species, and follow the values provided for improved pasture for the berms and or wet prairie/marsh values for the littoral shelves. An individual project assessment of pre and post habitat impacts will identify whether the project as designed results in loss of functional value or provides benefit to the Florida panther and panther prey species.

7. Reservoirs (Everglades Restoration, large water storage area, mines): Reservoirs were classified as their own category in our 2003 assessment method. They differ from open-water systems primarily with their location in the landscape. In urban areas, reservoirs have always been considered open water and given a value of 0. In rural areas, the open water portion of the reservoir provides no habitat value, although the edges and the berms can provide valuable foraging area or dispersal pathways for the panther and panther prey species. Therefore, the 2003 methodology assigned a value of 1.5 to reservoirs to attempt to account for these benefits.

After further consideration, we believe that a more appropriate way to evaluate the value of reservoirs is to evaluate the open water component separately from the reservoir edges and berms. Therefore, we are no longer assigning a value to reservoirs as their own habitat classification. When large-scale reservoir projects are proposed in the rural landscape, all open water areas should be classified as such (value = 0). Berms and edges should be classified as the habitat they will most resemble in the post-project condition. For example: a 1,000-acre reservoir with 50 acres of grassed berms and 50 acres of berms with roads along the top would be evaluated as 900 acres of open water, 50 acres of pasture, and 50 acres of urban.

We also recognized that the habitat matrix (Table 7) lists four native habitats similar in functional habitat value to panthers as non-native habitats: marsh/wet prairie – 4.7; xeric scrub – 4.5; shrub and brush – 5.5; and dry prairie – 6.3. These habitat ratings, which are between 4 and 6, are classified as being neither selected nor avoided by panthers. The Service's Florida panther draft recovery plan (Service 2008a) action 1.1.1.2.3., recommends habitat preservation and restoration within the Primary Zone be provided in situations where land use intensification cannot be avoided. We view this recommendation as a key parameter in our conservation goal to locate, preserve, and restore sets of lands containing sufficient area and appropriate land cover types to ensure the long-term survival of a population of Florida panthers south of the Caloosahatchee River.

Therefore, for assessment purposes, if a project is proposing restoration of non-native habitats (*e.g.*, pasture, row crops, groves, etc) to native habitats, we believe that a restoration lift to a value of 7 is appropriate. The functional value of 7 corresponds to that value found in the literature where panthers begin to select for that habitat attribute (Table 7). We also believe that a full functional lift credit for these restorations is appropriate as the time lag from restoration to full functional value is estimated to be relatively short (less than 5 years) for non-forested systems. However, the calculation of forested restoration values remains the same as in the previous methodology, which is one-half the difference between pre- and post-restoration.

In conclusion, we believe that appropriate adjustments to our original PHU values are warranted based on the most current peer-reviewed science and our category specific discussions above. Therefore, we have incorporated the above referenced values into our revised habitat assessment matrix and these values are the current basis for habitat evaluations and the recommended compensation values to minimize project effects to the Florida panther (Table 7).

<u>Exotic Species Assessment</u>: Since many habitat types in south Florida are infested with exotic plant species, which affects the functional value a habitat type provides to foraging wildlife species (*i.e.*, primarily deer and hog), we believe the presence of these species and the value these species provide to foraging wildlife needs to be considered in the habitat assessment methodology. As shown in Table 7 we have a habitat type and functional value shown for exotic species. This category includes not only the total acres of pure exotic species habitats present but also the percent-value acreages of the exotic species present in other habitat types.

For example, a site with 100 acres of pine flatwoods with 10 percent exotics would be treated in our habitat assessment methodology as 90 acres of pine flatwoods and 10 acres of exotics. Adding another 100 acres of cypress swamp with 10 percent exotics would change our site from 90 acres of pine flatwoods and 10 acres of exotics to 90 acres of pine flatwoods, 90 acres of cypress swamp, and 20 acres of exotics.

Habitat Assessment Methodology Application – Example: To illustrate the use of our habitat assessment methodology, we provide the following example. A 100-acre project site is proposed for a residential development. Plans call for the entire site to be cleared. The project site contains 90 acres of hydric pine flatwoods and 10 acres of exotic vegetation, and is located in the "Secondary Zone." The applicant has offered habitat compensation in the "Primary Zone" to minimize the impacts of the project to the Florida panther. To calculate the PHUs provided by the site, we multiply the habitat acreage by the "habitat suitability value" for each habitat type and add those values to obtain a value of 885 PHUs ((90 acres of pine flatwoods x 9.5 [the habitat suitability value for pine flatwoods] = 855 PHUs) + (10 acres of exotic vegetation x 3 [the habitat suitability value for exotics] = 30 PHUs) = 885 PHUs). The value of 885 PHUs is then multiplied by the 2.5 (the base ratio) and 0.69 (the landscape multiplier) resulting in a value of 1,527 PHUs for the project site. In this example, the acquisition of lands in the Primary Zone containing at least 1,527 PHUs is recommended to compensate for the loss of habitat to the Florida panther resulting from this project.

Analysis of the Species Likely to be Affected

The Florida panther is an endangered animal restricted to 2 to 3 million acres of land (6 to 9 percent of the total land area of Florida) in south Florida. The panther is a wide-ranging species that requires large areas exhibiting a diversity of habitat types to survive. Dispersing subadult males range widely through unforested and disturbed habitat. Human population in south Florida has dramatically increased, from 1 million in 1950 to almost 8 million in 2000, resulting in secondary disturbances such as increased human presence and noise, light, air, and water pollution. Increasing human population has resulted in increasing impacts on native habitat and flora and fauna. Resulting threats to panthers include road mortality, habitat loss, habitat fragmentation, and human disturbance.

ENVIRONMENTAL BASELINE

The environmental baseline includes the past and present impacts of all Federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of state or private actions, which occur simultaneously with the consultation in progress.

Past and ongoing joint Federal and State actions affecting wood stork habitat in the action area included the operation of the Central and South Florida Project (C&SF), the CERP, and consultations with the Corps under nationwide, general and individual project specific permits. The C&SF Project provided the South Florida ecosystem with flood control, regional water supply, prevention of saltwater intrusion, preservation of fish and wildlife, recreation, and navigation. In fulfilling these objectives since the mid-1960s, the C&SF Project has had unintended adverse effects on the natural environment that constitutes the Everglades and south Florida ecosystem. The C&SF Project was operational before the Act was authorized; therefore, no consultation was conducted for this Federal action.

In 2000, Congress authorized the CERP to restore, preserve, and protect the South Florida ecosystem while providing for other water-related needs of the region. CERP consists of structural and operational modifications to the C&SF Project and will be implemented over a 35-year period. Together, these modified components are expected to deliver benefits to improve the ecological functioning of over 2.4 million acres of the South Florida ecosystem, improve urban and agricultural water supply, improve deliveries to coastal estuaries, and improve regional water quality conditions, while maintaining the existing levels of flood protection.

As approved by Congress, CERP contains 68 major components that anticipate the creation of approximately 217,000 acres of reservoirs and wetland-based water treatment areas, wastewater reuse plants, seepage management, and the removal of levees and canals in natural areas. These components vastly increase storage and water supply for the natural system, as well as for urban and agricultural needs, while continuing to fulfill the original objectives of the existing C&SF Project. CERP will restore more natural flows of water (including sheetflow), improve water quality, and establish more natural hydroperiods in the South Florida ecosystem. Improvements to fish and wildlife habitat are expected to occur as a result of the restoration of hydrologic conditions as well as promote the recovery of native flora and fauna, including threatened and endangered species. The CERP or pre-CERP projects that may affect wood stork and/or Florida panther habitat in the action area, for which consultation has been completed, include:

<u>2000 Modified Water Deliveries-8.5 Square Mile Area (SMA) Project</u>: The proposed action is the restoration of flows and hydropatterns to NESRS in ENP while providing flood mitigation to the residents and landowners in the adjacent 8.5 SMA through the construction of a flood protection levee and drainage system. The Service concurred with the Corps' determination of "may affect, but is not likely to adversely affect" for the wood stork (Service 1999a).

<u>2001 Broward County Water Preserve Areas (WPA)</u>: The Broward County WPA Project is a CERP project consisting of the following components: (1) the 3A/3B Seepage Management Areas, (2) the C-1 1 Impoundment and (3) the C-9 Impoundment. The proposed actions associated with this multi-component project are the operation of water control structures and the construction of above ground impoundments to: (1) reduce seepage from WCA 3A and 3B and improve hydropatterns within the WCAs; (2) capture untreated runoff currently back pumped from the western C-1 1 basin into WCA 3A; and (3) pump excess storm runoff from the western C-9 basin into the impoundment and reduce loss of excess runoff to tide. The Service concurred with the Corps' determination of "may affect, but is not likely to adversely affect" for the wood stork (Service 2001).

<u>2006 Interim Operational Plan</u>: The proposed action is the continuation of the IOP and operations of the IOP structures and impoundments in the C&SF Project. Representing a

Reasonable and Prudent Alternative under the Service's 1999 jeopardy BO, the IOP was developed to avoid jeopardy to the Cape Sable seaside sparrow while meeting other needs and constraints of the region including restoration of flows to ENP and maintenance of flood control in adjacent urban areas. The Service concluded that IOP, as proposed, is not likely to jeopardize the continued existence of the wood stork or Florida panther. Incidental take for the wood stork in the form of harm, was exempted as a result of reductions in foraging habitat suitability as predicted by hydrologic modeling (Service 2006c).

2008 Modified Water Deliveries-Tamiami Trail Project: The proposed action is the creation of a 1-mile bridge span on US 41 (Tamiami Trail) between the S-333 and S-334 structures in western Miami-Dade County, Florida, by removing up to a mile of the existing highway, embankment, and associated culverts. The Service concurred with the Corps' determination that the Tamiami Trail feature of the Modified Water Deliveries Project "may affect, but is not likely to adversely affect" the wood stork (Service 2008b). The Service also concluded that the proposed construction of the project would not result in the direct take of Florida panthers, and that the habitat lost would be offset by the conservation/restoration of other, more functionally valuable habitat.

The District, in partnership with Miami-Dade and Broward Counties, is also undertaking restoration projects concurrent with CERP. These projects primarily include exotic species removal and hydrological restoration of impacted wetlands. According to the District, during the past several years, these programs through mechanical, chemical, and biological treatments have restored or improved habitat quality to systems throughout the region. Two recent projects are the Broward Water Preserve Area enhancements (BWPA) and the Rocky Glades/L31 Preserve Area enhancements (RGPA). The BWPA is an 8,313-acre preservation area bordering the adjacent WCAs. Restoration actions being undertaken in these lands are primarily exotic species removal. The RGPA is 5,922-acre restoration area also bordering the adjacent WPAs. Restoration actions in these lands included exotic species eradication, construction of tieback levees, backfilling borrow canals, and construction of several pump stations to improve area hydrology (District 2006).

Also in coordination with Miami-Dade and Broward Counties, the District is providing restoration of lands within the Pennsuco Wetlands above and beyond those proposed by the applicants associated with the pending action. Approximately 5,417 acres of District lands are included in this program with exotic species removal as the primary restoration benefit (District 2006). A similar program is in place for lands within the 8.5 SMA, an area of about 6,427 acres, of which the District currently owns about 541 acres (District 2006).

2009 Phase 1 Rock Mining in the LBMA: The proposed action would impact about 7,308 acres of wetlands (Service Biological Opinion - 7,351), while preserving and enhancing about 4,590 acres of wetlands. The Service determined in their Biological Opinion that the project would adversely affect the wood stork and exempted incidental take for the wood stork based upon the loss of 7,351 acres of wetlands and the estimated loss of 58 nests (75 nestlings) over the 20-year life of the alternative associated with losses specific to individual hydroperiods. The Service's Phase 1 Biological Opinion evaluated impacts to 7,351 acres, which includes about

43 acres of habitat in Kendall Properties and Miami-Dade Aviation that may not be jurisdictional Federal wetlands. The Service concluded in the Biological Opinion that the proposed action will not jeopardize the survival and recovery of the wood stork.

Climate Change

According to the Intergovernmental Panel on Climate Change Report (IPCC 2007), warming of the earth's climate is "unequivocal," as is now evident from observations of increases in average global air and ocean temperatures, widespread melting of snow and ice, and rising sea level. The IPCC Report (2007) describes changes in natural ecosystems with potential wide-spread effects on many organisms, including marine mammals and migratory birds. The potential for rapid climate change poses a significant challenge for fish and wildlife conservation. Species' abundance and distribution are dynamic, relative to a variety of factors, including climate. As climate changes, the abundance and distribution of fish and wildlife will also change. Highly specialized or endemic species are likely to be most susceptible to the stresses of changing climate. Based on these findings and other similar studies, the Department of the Interior requires agencies under its direction to consider potential climate change effects as part of their long-range planning activities (Service 2007c).

Climate change at the global level drives changes in weather at the regional level, although weather is also strongly affected by season and by local effects (*e.g.*, elevation, topography, latitude, proximity to the ocean. Temperatures are predicted to rise from 2^{o}C to 5^{o}C for North America by the end of this century (IPCC 2007). Other processes to be affected by this projected warming include rainfall (amount, seasonal timing and distribution), storms (frequency and intensity), and sea level rise. However, the exact magnitude, direction and distribution of these changes at the regional level are not well understood or easy to predict. Seasonal change and local geography make prediction of the effects of climate change at any location variable. Current predictive models offer a wide range of predicted changes.

Prior to the 2007 IPCC Report, Titus and Narayanan (1995) modeled the probability of sea level rise based on global warming. They estimated that the increase in global temperatures could likely raise sea level 6 inches by 2050 and 13 inches by 2100. While these estimates are lower than the estimates described in the IPCC Report (2007), Titus and Narayanan's (1995) modeling efforts developed probability-based projections that can be added to local tide-gauge trends to estimate future sea level at specific locations.

The Southwest Florida Regional Planning Council (SWFRPC) used Titus and Narayanan's (1995) worst-case scenario estimate of a 4-meters (13.1-foot) rise in 200 years to project sea level rise in southwest Florida by 2200. According to the GIS maps produced by SWFRPC, this 13-foot rise in sea level would inundate the entire surface area of the PSRP in Collier County, Florida. The loss of 55,391 acres of restored upland and wetland habitat to sea level rise by 2200 would have a negative effect on Florida panthers, red-cockaded woodpeckers, wood storks, bald eagles, American crocodiles, and West Indian manatees as well as migratory birds. When we consider lower sea level rise scenarios for the PSRP, a 1-meter (3.3-foot) rise would inundate

13,910 acres or 25 percent of the restored habitat; a 2-meters (6.6-foot) rise would inundate 41,978 acres or 76 percent; and a 3-meters (9.8-foot) rise would inundate 49,284 acres or 89 percent, respectively.

Whittle et al. (unpublished data 2008) applied several prominent climate change models to panther habitat in southwest Florida. Their review indicated a climate change-induced sea level rise of 1 meter (3 feet) will reduce southwest Florida panther habitat by 29 percent, at 3 meters (9.8 feet) by 62 percent, and at 5 meters (16.4 feet) by 90 percent. The consequences would be particularly dire for the panther which has no other populations outside of low-lying south Florida. Their cost surface analyses identified likely migration routes that would link the south Florida panther population to suitable habitat to the north. However, without rapid conservation actions that establish a population to the north, they predict that the Florida panther may go extinct in the wild due to climate change effects.

Climatic changes in south Florida could exacerbate current land management challenges involving habitat fragmentation, urbanization, invasive species, disease, parasites, and water management (Pearlstine 2008). Global warming will be a particular challenge for endangered, threatened, and other “at risk” species. It is difficult to estimate, with any degree of precision, which species will be affected by climate change or exactly how they will be affected. The Service will use Strategic Habitat Conservation planning, an adaptive science-driven process that begins with explicit trust resource population objectives, as the framework for adjusting our management strategies in response to climate change (Service 2006f).

It should be noted that Titus and Narayanan’s (1995) worst-case scenario was premised on a 1 percent chance that global warming would raise sea level that high. However, most climate change researchers agree with the findings in the IPCC Report (2007) which estimates a 90 percent probability of 7 to 23 inches of sea level rise by 2100. Scientific evidence that has emerged since the publication of the IPCC Report (2007) indicates an increase in the speed and scale of the changes affecting the global climate. Important aspects of climate change seem to have been underestimated and the resulting impacts are being felt sooner. For example, early signs of change suggest that the less than 1.0°C (1.8°F) of global warming that the world has experienced to date may have already triggered the first tipping point of the Earth’s climate system – the disappearance of summer Arctic sea ice. This process could open the gates to rapid and abrupt climate change, rather than the gradual changes that have been currently forecasted.

Wood Stork

Status of the species within the action area

As stated previously, the Service has defined the action area for the wood stork as the project footprint and all lands within the overlapping CFAs of all active wood stork nesting colonies. The action area encompasses about 1,628 square-miles (1,041,674 acres) of Broward, Collier, Miami-Dade and Monroe Counties, Florida (Figure 3). The proposed action may have direct and indirect effects on the ability of wood storks to breed, feed, and find shelter within the action area.

A complete census of the wood storks currently occurring within the action area has not been conducted. However, surveys of wading birds, including the wood stork, have been conducted in south Florida (South Florida Wading Bird Report [SFWBR] 2009). Data on wood stork nesting collected from 1985 through 2009 indicate the population of wood storks is increasing within south Florida. Wood stork nest production in 2009 was the greatest observed since the predrainage period with an estimated 6,452 wood stork nests in south Florida (SFWBR 2009). The high production observed in 2009 was likely due to improved nesting and foraging conditions resulting from the lack of dry season rainfall (SFWBR 2009).

The project corridor is located immediately north of 2 active wood stork nesting colonies. The Tamiami Trail East colony is located approximately 1000 ft south of the project footprint at Latitude 25.757616, Longitude -80.508016. The Tamiami Trail West colony (FWC 620313) is located approximately 300 ft south of the project footprint at Latitude 25.760000, Longitude -80.545000 (Figure 3). A third "ephemeral" colony was identified and unofficially named Tamiami East-2 during construction of the 1-mile bridge segment initiated by the Corps in 2009. This colony, if it were to make again in the future will not be directly affected by the proposed project because there will be a 1-mile bridge directly upstream and no construction in this area. The project corridor is located within the primary (all lands within 500 feet and up to 1,500 ft from the colony boundary) and secondary (all lands extending outward 1,000 ft to 2,000 ft from the primary management zone boundary) management zone of the Tamiami Trail West colony, and the primary management zone of the Tamiami Trail East colony. These management zones (Service 1990) have been proposed by the Service as a guide to avoid activities that are detrimental to a wood stork colony and to minimize disturbance to the colony. In addition, the Tamiami Trail East-2 colony (Latitude 25.795350, Longitude -80.524570) is located outside of the project corridor and adjacent to the 1-mile bridge currently under construction located west of the L31N Canal. The primary and secondary management zones of the Tamiami Trail East–2 colony will not be directly affected by the Tamiami Trail Modifications: Next Steps Project.

Aerial wood stork nest surveys have been conducted annually at these colonies by the FWC and the Service has obtained the nesting data for the years 2005 through 2009 for these colonies (Service 2009b). Data for the Tamiami Trail East colony indicate that 10 wood stork nests were observed in 2002, and nesting did not occur from 2005 through 2008. Data for the Tamiami Trail East-2 colony indicate that 20 wood stork nests were observed in 2002, and nesting did not occur from 2005 through 2008. The number of nests observed in the Tamiami Trail West colony from 2005 through 2009, were: 900 to 1,000 in 2009, 0 in 2008, 75 in 2007, 400 in 2006 and 0 in 2005. Applying the mean number of nestlings produced by a wood stork nest (1.21 nestlings per nest reported by Rodgers and Schwikert (1997)) to the 2009 nest data for each colony results in the production of 12.1 nestlings for the Tamiami Trail East colony, 24.2 nestlings for the Tamiami Trail East-2 colony, and 1,089 to 1,210 nestlings for the Tamiami Trail West colony.

Wood stork nesting was observed at two other nest colonies in the action area during 2009. The Grossman Ridge West nest colony, located approximately 10.6 miles southwest of the project site (Latitude 25.636266, Longitude -80.652766) produced 60 nests. An additional 7 nests were constructed at the 3B Mud East nest colony, located approximately 2.3 miles northeast of the project site (Latitude 25.798000, Longitude -80.494000), but all of these nests failed to produce young.

Factors affecting the species environment within the action area

The wood stork is known to forage within suitable wetland habitats located throughout the action area. Suitable wood stork foraging habitat consists of shallow wetlands with water depths of 2 to 15 inches. Studies 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 of variables 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 to forage or the tree canopy at the site is too dense for storks to land. Shallow water about 5 to 40 cm (2 to 16 inches) in depth and free of dense aquatic vegetation is optimal for wood stork foraging (Coulter and Bryan 1993).

The Service has identified four variables in assessing wood stork foraging:

1. The density of vegetation within habitats suitable for wood stork foraging;
2. The hydroperiod of the wetland, which includes two subcomponents (a) the fish density per hydroperiod and (b) the fish biomass per hydroperiod;
3. The suitability of prey size for the wood stork, which provides an adjustment to the fish biomass per hydroperiod and is referenced hereafter as the wood stork suitable prey base; and
4. The likelihood that wood storks are the species that actually consumes the concentrated prey. This number is referenced as the competition factor.

All four of these parameters when combined provide us with an estimate of the effect of wetland foraging losses and gains in kilograms of fish in our assessment of the effects of the action on wood storks.

Variable 1 - Density of vegetation within habitats suitable for wood stork foraging

As discussed previously, wetland suitability for wood stork foraging is partially dependent on vegetation density. 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 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

(Frederick 2006; Rodgers 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 quickly take flight to avoid predators.

Melaleuca-infested wetlands

In south Florida, melaleuca is a dense-stand growth plant species, effectively producing a closed canopy and a dense understory growth pattern that generally limits a site's accessibility to foraging by wetland dependant species. The primary mechanisms for control of exotic plant species infestations is the mechanical removal and/or chemical treatment of these plants and in some instances hydrological changes in wetland hydroperiods that benefit the recruitment of desirable native species. However, recent trial studies relied on biological controls to regulate the recruitment and survival of these exotic plant species in south Florida. The most promising proposal is the use of the curculionid weevil, *Oxyops vitiosa*, as a natural control of melaleuca. This weevil and its larvae feed aggressively on leaf foliage. Studies have shown that this produces a corresponding increase in growth tissue production and a substantial decrease in seed reproduction (Pratt et al. 2005). The authors state in their evaluation "Although herbivory by *O. vitiosa* can clearly reduce fruit and seed production of its host, it remains unclear how these impacts alter melaleuca abundance and invasion potential. The lack of a long-lived soil seed bank (approximately 2 years), however, makes melaleuca particularly vulnerable to herbivore-mediated reduction in fitness and delays in reproductive maturation. As canopy held seed banks continue to diminish over time, reproductive suppression is predicted to have direct, long-term effects on recruitment, invasion potential, and abundance." Additional studies are being proposed to evaluate this demographic transition and quantify the effects of herbivory in the context of the entire plant life cycle and its ability to expand or diminish over time.

Since the original release of the curculionid weevil (Pratt et al. 2005), the U.S. Department of Agriculture's, Invasive Plant Research Laboratory has also released psyllids (an insect) (*Boreioglycaspis melaleucae*) throughout melaleuca monocultures, primarily in Miami-Dade County. In locations where both weevil and psyllid populations have become well established, monitoring indicates that melaleuca seed production has declined by 80 percent (Rayamajhi et al. 2008). In addition, tree density decline has accelerated primarily due to mortality of the smaller trees (Rayamajhi et al. 2007). As a result, a significant increase (2 to 4 fold during 2001 through 2005) in plant species diversity has been noted at these sites (Rayamajhi et al. 2008).

The researchers note that the weevil does not establish well at permanently wet sites; because the weevil pupates in the soil and needs drier conditions for this stage of its life cycle. However, the psyllid has established at non-flooded, seasonally-flooded, and permanently-flooded sites. Additional herbivorous insects that induce galls on the developing vegetative and reproductive buds (the tip-gall midge, *Lophodiplosis trifida*; the bud-gall fly, *Ferfusionina* spp.) are currently in test locations and may be available for future release as a complement to the previously released biological control agents.

The results of these studies indicate that the incorporation of multiple agents may effectively control melaleuca re-growth and provide an important adjunct to mechanical and chemical controls since stumps of felled trees produce copious re-growths and would otherwise require treatment with herbicides (Rayamajhi et al. 2008). The importance of these factors in long-term management of exotics in south Florida is an evolutionary process that may provide resource value benefits to wetland-dependent species over time by increasing foraging efficiencies and prey access for these species.

The potential availability of bio-control for the long-term management of exotics does not alter our conclusions about the relative habitat value of melaleuca-infested wetlands or the ecological lift anticipated from the proposed mitigation during the projected time span of the proposed action.

Wood stork foraging potential

Wood storks will forage in melaleuca-dominated wetlands when the trees are non-continuous, in broken stands (blow-downs), in small islands, or sparsely distributed. However, they generally will not forage in melaleuca where the stem density is high and the canopy closed (Frederick 2006). O'Hare and Dalrymple (1997) suggest moderate infestations of melaleuca may have little effect on some species' production (*i.e.*, amphibians and reptiles) as long as critical abiotic factors, such as hydrology, remain. However, they also note that as the levels of infestation increase, usage by wetland-dependent species decreases. Their studies also indicate that the number of fish species present in a wetland system remains stable at certain levels of melaleuca infestation. However, the availability of the prey base for wood storks and other wetland dependant species is reduced by the restriction of access caused from dense and thick exotic vegetation. Wood storks and other wetland-dependant bird species 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).

Ceilley et al. (2005) provided an assessment of effects to aquatic fauna and wetland-dependent species from various densities of melaleuca infestation. In their study, the comparisons were between sites classified as free of exotic species (less than 1 percent), moderately infested with melaleuca (40 to 60 percent), and areas completely dominated (greater than 90 percent). Conclusions from their study noted that (1) the number of fish families collected in wet prairie habitats decreased at sites moderately infested and dominated by melaleuca; (2) fish abundance decreased with increasing melaleuca infestation; (3) the abundance in insect orders decreased with increasing melaleuca; and (4) macroinvertebrate family and species richness decreased with increasing melaleuca infestation. Their avian species data also noted that wetland-dependent, wading, and mixed habitat use species showed a decrease in the number of species and individuals with increased density of melaleuca, which corresponds with the habitat uses shown by O'Hare and Dalrymple (1997).

Foraging suitability value

To develop an estimate of the importance a particular wetland type may have to wetland-dependent species (based on density and aerial coverage from exotic species), we developed a foraging suitability value using observational data from O'Hare and Dalrymple (1997). In their study, O'Hare and Dalrymple (1997) identified five cover types and provide information on the number of wetland-dependant species and the number of individual birds observed within each of these vegetation classes. Their vegetation classes as defined by O'Hare and Dalrymple (1997) are:

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 are shown in columns 1, 2, and 3 of the following table of foraging suitability indices:

Foraging suitability indices – wetland-dependent (all birds) species.

Cover type	**No. of species (S)**	**No. 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

The foraging suitability value, as shown in column 5, 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. The results are shown below for each of the cover types in O'Hare and Dalrymple (1997). As an example, for the P50 cover type, the foraging suitability is calculated by multiplying 11 species by 92 individuals for a total of 1,012 (11 x 92 = 1,012). Divide this value by 1,584, which is the maximum number of species times the maximum number of individuals (12 x 132 = 1,584) and the result is 0.6389 or 64 percent (11 x 92 = 1,012 / 1,584 x 100 = 63.89).

This approach was developed to provide us with a method of assessing wetland acreages and their relationship to prey densities and prey availability. For assessment purposes, we consider use by wetland dependant species to be a general index of food availability. Based on this assessment, we developed the following index:

Foraging suitability percentages - wetland-dependent (all birds) species.

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

Both the O'Hare and Dalrymple (1997) and Ceilley et al. (2005) studies looked at various species and are the only studies conducted that we are aware of that attempt to quantify the number of birds as well as the number of bird species that are found in varying categories of melaleuca density. Although the study designs are slightly different, the general conclusions from the studies are similar and the studies note that as the extent (density) of exotics increases, the corresponding use by wading birds and wetland-dependent species decreases. Therefore, the Service continues to choose the data in the O'Hare and Dalrymple (1997) study as the basis to create an index as a surrogate for the degree to which wetlands may provide functional value to wetland dependant birds. It should be noted that, while this index has been newly developed by the Service, the scientific literature is rich with examples of habitat suitability indices used to measure the value of habitat and the use of habitat by various species. For example, Brower et al. (1990) discuss a variety of indices for use in analyzing species richness and diversity. In fact, both O'Hare and Dalrymple (1997) and Ceilley et al. (2005) use the number of species and individuals to measure species richness and diversity.

Variable 2 - Hydroperiod, fish density per hydroperiod, and fish biomass per hydroperiod

Hydroperiod: The hydroperiod of a wetland can affect the prey densities in a wetland. For instance, research on Everglades fish populations using a variety of quantitative sampling techniques (pull traps, throw traps, block nets) have shown that the density of small forage fish increases with hydroperiod. Marshes inundated for less than 120 days of the year average ± 4 fish/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).

Kushlan (1990), as referenced by the Service (1999), described short hydroperiod wetlands as wetlands flooded between 0 and 180 day (flooded less than 6 months); intermediate hydroperiod wetlands as wetlands flooded between 180 and 270 days (flooded 6 to 9 months); and long hydroperiod wetlands as wetlands flooded between 270 and 360 days (flooded more than 9 months). However, Trexler et al. (2002) defined short hydroperiod wetlands as systems with less than 300 days per year inundation. For our discussion of hydroperiods in this Biological Opinion, we are maintaining the same definitions as referenced by Kushlan (1990) and Service (1999), which define short hydroperiod wetlands to be those flooded between 0 and 180 days.

The most current information on hydroperiods in south Florida was developed by the District's 2x2 model for evaluation of various restoration projects throughout the Everglades Protection Area. In their modeling efforts, they identified the following seven hydroperiods:

District's hydroperiod classes – Everglades protection area.

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

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

As referenced above, Trexler et al.'s (2002) study included electrofishing data targeting fish greater than 8 cm, but the data is recorded in catch per unit effort and, in general, is not hydroperiod specific. However, Trexler et al. (2002) note in their assessment of the electrofishing data that the number of fish per unit effort is generally correlated to changes in water depth. In literature reviews of electrofishing data by Chick et al. (1999 and 2004), they note that electrofishing data provides a useful index of the abundance of larger fish in shallow, vegetated habitat, but length, frequency, and species compositional data should be interpreted with caution. Chick et al. (2004) also noted that electrofishing data for large fish (greater than 8 cm) provided a positive correlation of the number of fish per unit effort (abundance) with changes in hydroperiod. The data in general shows that as the hydroperiod decreases, the abundance of larger fishes also decreases accordingly. 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 noted in our analysis of prey consumption by wood storks in the Ogden et al. (1976) study (Figure 1 in Ogden's report, discussed below), that wood storks most likely consumed prey size fish measuring 1.5 to 9 cm; however, we acknowledged that wood storks consume fish larger than the limits discussed in the Ogden et al (1976) study. A similar assessment is referenced 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).

Because 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 size of fish prey consumed is fish measuring 1.5 cm to 9 cm and that empirical data on fish densities per unit effort correlated positively with changes in water depth, we believe that the Trexler et al (2002) throw-trap data represents a reasonable surrogate to predict the changes in total fish density and the corresponding biomass per hydroperiod for our wood stork assessment.

The Service used the data presented in the Trexler et al. (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 likely consumed by wood storks. In determining the biomass of fish per square meter per hydroperiod, the Service relied on the summary data provided by Turner et al. (1999), which provides an estimated fish biomass of 6.5 g/m^2 for a Class 7 hydroperiod for all fish and uses 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 District. Based on the throw-trap data and Trexler et al.'s (2002) hydroperiods, the square-root fish densities are:

Fish densities per hydroperiod from Trexler et al. (2002).

Hydroperiod class	Days inundated	Fish density
Class 1	0-120	2.0 fish/m^2
Class 2	120-180	3.0 fish/m^2
Class 3	180-240	4.0 fish/m^2
Class 4	240-300	4.5 fish/m^2
Class 5	300-330	4.8 fish/m^2
Class 6	330-365	5.0 fish/m^2

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 District. For example, Trexler et al.'s (2002) square-root density of a Class 2 wetland with three fish would equate to a District's Model Class 3 wetland with nine fish. Based on the above discussion, the following mean annual fish densities were extrapolated to the seven District's Model hydroperiods:

Extrapolated fish densities for District's 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

<u>Fish biomass per hydroperiod</u>: 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 were provided in g/m^2 dry-weight and 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 District, 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 as follows:

Extrapolated mean annual fish biomass for District's 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

Variable 3 - Wood stork suitable prey size and suitable prey base (biomass per hydroperiod)

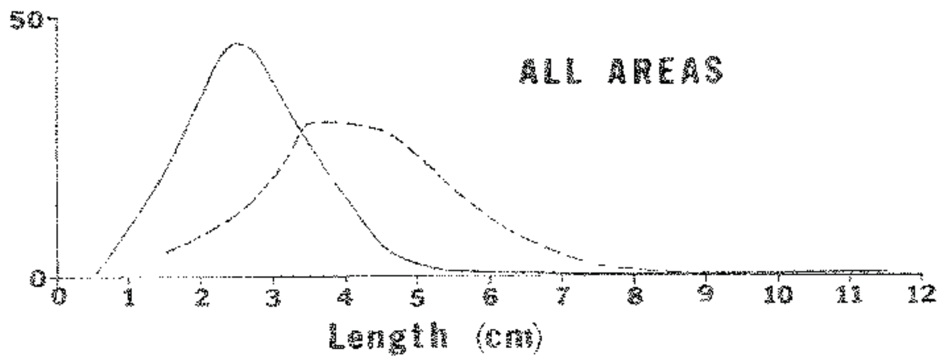
Wood stork suitable prey size: Wood storks are highly selective in their feeding habits and in studies on fish consumed by wood storks, five species of fish comprised over 85 percent of the number and 84 percent of the biomass of over 3,000 prey items collected from adult and nestling wood storks (Ogden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

Primary fish species consumed by wood storks from Ogden et al. (1976).

Common name	Scientific name	Percent individuals	Percent biomass
Sunfishes	*Centrarchidae* spp.	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.*, mosquito fish (*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 (greater than 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).

The following figure from Ogden et al. (1976) illustrates frequency (expressed as a percentage) plotted versus the total length (cm) of fish available to wood storks (solid line) and frequency plotted versus the total length of fish consumed by wood storks:



The area under the dotted line represents the lengths of fish most likely consumed by wood storks and is the basis of our determination of the amount of biomass that is within the total length range of fish most likely consumed by wood storks (1.5 to 9.0 cm).

<u>Wood stork suitable prey base (biomass per hydroperiod)</u>: The wood stork suitable prey base (biomass per hydroperiod) has two separate components. The first component is (1) what is the amount of biomass that is within the range of fish sizes likely to be consumed by wood storks and the second component is (2) what is the likelihood that this prey base is actually consumed by the wood stork.

<u>Amount of biomass that is within the range of fish sizes likely to be consumed by wood storks</u>: To estimate the fraction of the available fish biomass within the size range of fish 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)(Appendix A). Although Trexler et al.'s (2002) data was based on throw-trap data and representative of fish 8 cm or smaller, the Service believes the data set can be used to predict the biomass/m^2 for total fish (those both smaller and larger than 8 cm). This approach is also supported, based on our assessment of prey consumption by wood storks in the Ogden et al (1976) study (Figure 4 in Ogden's report), that the wood storks general prey consumption is 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 available fish biomass within the size range of fish 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 (see table on page 67). For example, Kushlan et al. (1986) lists the warmouth (*Lepomis gulosus*) with a mean average biomass of 36.76 g (Appendix A). 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.

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. 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) (Appendix A). Ogden et al. (1976) reported the sunfishes and the 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. 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 3.33 g/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 District 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:

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

Crayfish Biomass

Lauritsen (CREW 2007, 2009) noted that wood storks forage in mixed forested wetlands, coastal plains willow, and cypress. Lauritsen also noted the value of crayfish as part of the foraging base available to and consumed by wood storks. An injured wood stork transported to the Sanctuary regurgitated only crayfish from its stomach. However, efforts undertaken by Lauritsen in 2008 to gather more data on prey selection as part of an ongoing research project "*Wood Stork Foraging Habitat Assessment for Southwest Florida in Corkscrew Swamp*" (Audubon 2009) were hampered by the drought that year. Current year surveys are ongoing, although data are not yet available.

In our review of the literature on wood stork food habits, there is limited evidence of consumption of crayfish by wood storks. Studies by Depkin et al. (1992) of wood stork foraging at colonies in east-central Georgia also noted the presence of crayfish in the diets of wood storks. In their analysis, crayfish represented one percent of the biomass and 1.9 percent of the prey items. Fish represented 92 percent of all individual prey items and 93 percent of the biomass. A similar study conducted by Bryan and Gariboldi (1998) also noted the presence of crayfish in wood stork diets and noted a similar frequency of occurrence. In the foraging studies conducted by Ogden et al. (1976), Coulter et al. (1999), Carlson and Duever (1979), Turner et al. (1999) and Trexler et al. (2002), little information is provided on consumption of invertebrates. Ogden et al. (1976) summarized information from Kahl's publications (1962, 1964) on stomach contents of wood storks sampled in south Florida and southwest Florida and noted that all individuals examined contained only fish. Ogden et al.'s (1976) study also noted that the prey consumed were fish, although the average density of prawns was 2.5 times the density of the most abundant fish.

O'Hare and Dalrymple (1997) found that crayfish (*Procambarus alleni*) were most abundant in three of the five cover types of melaleuca-infested wetlands in their study of species richness and relative abundance in the SFM-HC: 10 to 50 percent melaleuca coverage, 50 to 75 percent melaleuca coverage, and 75 to 100 percent sapling dense melaleuca coverage. O'Hare and Dalrymple (1997) found that crayfish showed random distributions among cover types indicating that melaleuca coverage was not as important in the dispersion of the species as were other variables, such as standing water.

Lauritsen (Corkscrew Swamp Sanctuary 2007, 2009) noted that crayfish are present in dense melaleuca communities and, following seasonal drying of these communities, migrate to surrounding wetlands that are more open and available to foraging by wood storks. However, studies have noted that *P. alleni* typically burrow during the dry season, a behavior which provides persistence during droughts, while another species of crayfish (*P. fallax)* was typically found in habitat characterized by prolonged flooding (Hendrix and Loftus 2000). Studies by Depkin et al. (1992) and Bryan and Gariboldi (1998) documented crayfish as a foraging prey base for wood stork colonies on Georgia representing less than 2 percent of the wood stork's diet.

The Service's review of the literature identified no definitive studies that would suggest that crayfish are important components of the foraging biomass for wood storks (Deplin et al 1992; Bryan and Gariboldi 1998; and Kahl 1964). However, we do have evidence that wood storks consume crayfish (Lauritsen Corkscrew Swamp Sanctuary 2007, 2009; Depkin et al 1992; Bryan and Gariboldi 1998; and Kahl 1964). Therefore, in our assessment of biomass production per hydroperiod, we discuss data availability on crayfish populations and applicability to wetland production for wood stork foraging biomass. If we are to evaluate crayfish as an important food source for wood storks as suggested by Lauritsen (Corkscrew Swamp Sanctuary 2007, 2009), then we need to consider the crayfish data from Acosta and Perry (2002), who studied crayfish (*Procambarus alleni*) as a model organism to compare spatial and temporal patterns of density, biomass, and production in the seasonal wetlands of the Florida Everglades.

Because Acosta and Perry (2002) hydroperiods are defined in terms of months of inundation, |we converted these periods to days to match the hydroperiod classes used in this document. Consequently, Acosta and Perry's (2002) research provides crayfish densities and biomass information for hydroperiod Classes 2, 4, and 5. Although data were not provided in the Acosta and Perry (2002) study for hydroperiods 1, 3, 6, and 7, they did note that crayfish densities were not linked to fluctuations in water temperature or dissolved oxygen and were only artifactually associated with water depth. They also noted that long hydroperiod wetlands typically had densities two times greater than medium-range hydroperiods and five times greater than short-range hydroperiods.

The following table lists the total biomass of suitable prey for the wood stork (fish and crayfish) using crayfish data for hydroperiods referenced by Acosta and Perry (2002) and estimating the crayfish biomass for the remaining hydroperiods:

Hydroperiod class	**Fish biomass**	**Crayfish biomass**	**Total biomass**	**Percent change**
Class 1	0.26 gram/m2	0.05 gram/m2	0.31 gram/m2	19.2
Class 2	0.52 gram/m2	0.10 gram/m2	0.62 gram/m2	19.2
Class 3	1.19 grams/m2	0.13 gram/m2	1.32 grams/m2	10.5
Class 4	2.18 grams/m2	0.15 grams/m2	2.34 grams/m2	7.0
Class 5	2.70 grams/m2	0.23 grams/m2	2.93 grams/m2	8.4
Class 6	3.12 grams/m2	0.24 gram/m2	3.36 gram/m2	7.7
Class 7	3.38 grams/m2	0.25 gram/m2	3.63 gram/m2	7.4

We estimated the crayfish biomass for hydroperiod Class 3 as half the difference between hydroperiod Class 2 and Class 4 and added the difference to the fish biomass for hydroperiod Class 3. The Service estimated a Class 1 hydroperiod density of 0.05 (0.229/5=0.045), which is based on Acosta and Perry's (2002) comment that long hydroperiod wetlands typically had densities five times greater than short hydroperiod wetlands. To calculate the Class 1 hydroperiod value we used Acosta and Perry's (2002) average long hydroperiod value (0.229 grams/m^2). We are considering a Class 6 hydroperiod to be 3.36 g and a class 7 hydroperiod to be represented by a density of 3.63 grams. We based the Class 7 hydroperiod value on the maximum density recorded in the study (0.248 gram/m^2) added to the baseline class 7 fish density and hydroperiod 6 on one-half the difference between hydroperiod 5 and hydroperiod 7. The significance of this increased biomass will be considered later in this Biological Opinion.

Variable 4 - Is the wood stork the wetland species that actually consumes the concentrated prey?

Amount of suitable prey base (biomass) by size actually consumed by the wood stork (Competition Factor):

Service Approach*:* In 2006, the Service developed an assessment that suggested that 55 percent of the adjusted available biomass was actually consumed by wood storks (Service 2006g). 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 the adjusted prey base consumed by wood storks versus the adjusted prey base assumed available to wood storks and the factors included in the 90 percent prey reduction value.

In our original assessment, we stated 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 re-evaluating Fleming et al.'s (1994) report, we stated that the 10 percent reference is to prey available to wood storks, not prey consumed by wood storks. We also stated that 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 our approach, we identified four factors in the 90 percent biomass reduction and not two as we previously considered.

Since data are not available to determine the proportionality of the four factors in the 90 percent biomass reduction, we are considering these factors to be represented in equal proportions, which correspond to an equal split of 22.5 percent for each factor. Since we have accounted previously for three of these factors (prey size, habitat suitability, and hydroperiod) and they are treated separately in our assessment, we consider the remaining factor, the competition factor to be represented by the sum of Fleming et al.'s (1994) 10 percent value plus the remaining 22.5 percent from the 90 percent reduction discussed above. Following this revised assessment, our competition factor would be 32.5 percent (22.5+10=32.5), not the initial estimate of 55 percent. We believe this approach is a reasonable application of the best available scientific information.

Other comments reference the methodology's lack of sensitivity to limiting factors, *i.e.*, "is there sufficient habitat available across all hydroperiods during critical life stages of wood stork nesting and does this approach over emphasize the foraging biomass of long hydroperiod wetlands with a corresponding under valuation of short hydroperiod wetlands?" The Service's focus on individual hydroperiod class and the relative change in each is a key component of the analyses that recognizes the importance of different classes, including short hydroperiod wetlands. New science generated in the future may provide further information on these subjects.

Summary of the factors affecting vulnerability of wetland habitats to wood stork foraging in the action area

Through the above discussions, we have identified that there are essentially four variables in assessing wood stork foraging habitat.

1. The density of vegetation within habitats suitable for wood stork foraging, including two alternate approaches;

2. The hydroperiod of the wetland, including two subcomponents: (a) the fish density per hydroperiod (number of fish), and (b) the fish biomass per hydroperiod (g/m^2);

3. The wood stork suitable prey size, which provides an adjustment to the fish biomass per hydroperiod and is referenced as the wood stork suitable prey base; and

4. The likelihood that the wood stork is the wetland species that actually consumes the concentrated prey.

All four of these variables, when combined, provide us with an estimate of the effect of wetland foraging losses and gains in grams of fish per square meter in our assessment of the effects of the action on wood storks.

For our example, if a project affects a 50-acre wetland (25 acres of Class 3 hydroperiod and 25 acres of Class 4 hydroperiod), with 10 percent overall melaleuca coverage, the biomass value is shown below. The effect on wood stork nest production is based on the need for 50 kg of short and 151 kg of long hydroperiod biomass per nest.

In this example, 50 acres converts to 202,344 square meters. A Class 3 hydroperiod provides 1.196 g/m^2 of appropriate size fish biomass and a Class 4 hydroperiod provides 2.184 g/m^2 of appropriate size fish biomass (see table on page 70). Therefore, wood stork suitable prey base (biomass per hydroperiod) for a Class 3 hydroperiod is 121 kg and for a Class 4 hydroperiod is 221 kg for a total biomass value of 342 kg.

In this scenario, the 10 percent melaleuca coverage is 100 percent suitable for wood stork foraging and there is no distinction between short and long hydroperiod in wood stork competition for the prey base. In this assessment, the wood stork competition factor is 32.5 percent across all hydroperiods and the foraging suitability is 100 percent.

The assessment for the loss of 25 acres of short hydroperiod wetlands is 121 kg of short hydroperiod biomass times 100 percent foraging suitability times 32.5 percent competition factor which equals 39.3 kg of short hydroperiod biomass loss from the proposed project and would equate to a loss of 0.79 nest (39.3/50 = 0.79). The corresponding assessment for the loss of 25 acres of long hydroperiod wetlands is 221 kg of long hydroperiod biomass times 100 percent foraging suitability times 32.5 percent competition factor which equals 71.8 kg of long hydroperiod biomass loss from the proposed project and would equate to a loss of 0.48 nest (71.8/151 = 0.48).

Crayfish Contributions

If we adjust the fish baseline biomass value to include the crayfish contribution of 0.1265 gram/m^2 for a Class 3 hydroperiod and 0.153 gram/m^2 for a class 4 hydroperiod, the biomass baseline values per hydroperiod change from 1.196 to 1.3225 and 2.184 to 2.337, respectively for class 3 and 4 hydroperiods (see table on page 72). In the above estimates, the available biomass values change from 342 kg to 370 kg, an 8 percent increase in biomass value. The impact to wood stork nest production also changes accordingly and increases about 8 percent. In our assessment of project related impacts to wood stork foraging habitat, we are providing a comparison of biomass values considering crayfish contributions and fish-only contributions.

Wood stork foraging habitat methodology application

The Tamiami Trail Modifications: Next Steps Project will impact 100.5 acres of wetlands within the project corridor that may provide foraging habitat for the wood stork. Specifically, the 100.5 acres of wetlands to be impacted consist of 33.9 acres freshwater marsh, 48.8 acres of mixed wetland/hardwood shrub, and 17.8 acres of sawgrass marsh. The Service, in coordination with the NPS, has assessed the 100.5 acres of potential wood stork foraging habitat to be impacted by the project with the Methodology described in the previous section (Table 10). Based on hydrologic data collected from monitoring stations located in NESRS, the NPS has determined that the 33.9 acres freshwater marsh, 48.8 acres of mixed wetland/hardwood shrub, and 17.8 acres of sawgrass marsh to be impacted contain water approximately 252 days during the year. This translates to a Class 5 hydroperiod in the Service's Methodology. The NPS has also determined that wetlands to be impacted by the project contain 0 percent to 25 percent exotic vegetation. Applying the Methodology, the Service has calculated that the 100.5 acres of potential wood stork foraging habitat lost due to the project provides 387.29 kg of wood stork forage biomass. To compensate for the loss of wood stork foraging habitat, the NPS has noted that the proposed bridging of US 41 and future CERP projects made possible by this project will enhance thousands of acres of wetlands that provide potential foraging habitat for the wood stork. The Service finds that the enhancement of wood stork foraging habitat resulting from the project more than fully compensates for the loss of the 387.29 kg of stork forage biomass in the project area.

Florida Panther

Status of the species within the action area

As stated previously, for the purposes of this consultation, the action area includes the project footprint and surrounding lands frequently visited by panthers (Figure 4). The action area is a subset of the current geographic range of the panther and includes those lands that the Service believes may experience direct and indirect effects from the proposed development. Therefore, for both direct and indirect effects, the action area is defined as all lands within a 25-mile radius of the project. This action area does not include urban lands, lands east of the protective levee, and lands that are outside of the Service's panther consultation area. The proposed action may have direct and indirect effects on the ability of panthers to breed, feed, and find shelter, and to disperse within the population.

The Service used current and historical radio-telemetry data, information on habitat quality, prey base, and evidence of uncollared panthers to evaluate panther use in the action area. Panther telemetry data are collected 3 days per-week from fixed-wing aircraft, usually in early to midmorning. However, researchers have shown panthers are most active between dusk and dawn (Maehr et al. 1990a; Beier 1995) and are typically at rest in dense ground cover during daytime monitoring flights (Land 1994). Therefore, telemetry locations may present an incomplete picture of panther activity patterns and habitat use (Comiskey et al. 2002).

Although telemetry data may not provide a complete picture of panther activity patterns, since less than half of the panther population is currently collared, telemetry locations are a good indicator, due to the extensive data set, of the approximate boundaries of home ranges, panther travel corridors, and the range of Florida panthers south of the Caloosahatchee River. The FWC also uses observational data collected during telemetry flights to assess the yearly breeding activity of radio-collared panthers. Female panthers accompanied by kittens or male panthers within close proximity of an adult female were assumed to have engaged in breeding activity during that year. Documentation by McBride (Shindle et al. 2003) shows that between July 2002 and June 2003, three-collared panthers, two-uncollared females, and two-uncollared males had home ranges in or home ranges that overlapped or were immediately adjacent to the same survey unit as the Premier Airport Park Project. In addition, eight other panthers that used this same survey unit previously died during this time period (Shindle et al. 2003). This unit, designated as Unit 7, includes the Okaloacoochee WMA and adjacent private lands.

Within the 25-mile radius action area, based on telemetry data as of August 2010, at least 7 known radio-collared panthers have overlapping home ranges with the project area. These panthers are FP 61 (female), FP 88 (female), FP 94 (female), FP 95 (female), FP 124 (female), FP 125 (male), and FP 142 (female). It is unknown at this time whether these panthers are still alive. The closest documented telemetry location of a radio-collared panther is about 2 miles east of the project site. This telemetry point was recorded on September 22, 2004. In addition, McBride (2003) notes previous use of the action area by other panthers prior to their mortality. Four of these panthers were likely dispersing sub-adult males or sub-adult females without established territories.

Historically, there have been a total of 4 radio-collared male panthers recorded within 5 miles of the project site on 120 occasions based on telemetry data from June 7, 1987 through May 2, 2001 (Figure 9; Table 11). This translates to an average of about 9.17 occurrences per year or 0.76 occurrences per month since the first telemetry point was recorded within 5 miles of the site. All four of these panthers are known to have died prior to the date of this document (Table 11). Uncollared panthers are presumed to occur and cannot be confirmed or ruled out because there is documented use of the area by collared panthers so it would be impossible to determine whether any physical evidence came from collared panthers or uncollared panthers. The status and activities of non-collared Florida panthers within the action area are unknown. Based on the above information and because the site contains habitat types used by panthers and their prey, and the project vicinity has been used historically by panthers as indicated by telemetry locations, the Service believes the project site may be occasionally used by other non-collared panthers.

There have been 5 documented panther-vehicle collisions within the 25-mile action area (see Table 12 and Figure 10). The panther-vehicle collision closest to the project site occurred on US 41 (Tamiami Trail) about 2 miles east of the project site in 2004. The panther was an uncollared male.

Other activities within the action area have also benefited panthers. The land acquisition programs of Federal, State, and County resource agencies have preserved high quality panther habitat. Moreover, the management of public lands, including prescribed fire and eradication of exotic vegetation in the Everglades and Francis S. Taylor WMA including WCA-3A and 3B, BICY, ENP, and other conservation areas, is intended to improve habitat for panther prey species, which benefits panthers within these areas.

Factors affecting species environment within the action area

Factors that affect the species environment (positively and negatively) within the action area include, but are not limited to, the presence and construction of highways and urban development, agriculture, resource extraction, public lands management (prescribed fire, public use, exotic eradication, etc.), hydrological restoration projects, public and private land protection efforts, effects of genetic inbreeding, and genetic restoration. Development activities may result in avoidance or limited use of remaining suitable habitat by panthers as well as habitat loss, habitat fragmentation, habitat degradation, and also an increase in risk of vehicular collision (*e.g.*, injury or death). Public and private land management practices can have a positive, neutral, or negative effect, depending on the management goals. Land protection efforts will help to stabilize the extant population. Hunting of the panther is no longer sanctioned, although there still may be instances of intentional or unintentional shooting of individuals for various reasons.

Wildlife Value and Habitat Quality

As discussed previously in the status of the species, the Service believes the existing habitat conditions present on a site and the feeding value that a site provides to the Florida panther and panther prey species are important parameters in assessing the importance of the project site to the Florida panther and other wildlife species. In order to assess this importance, the Service typically reviews wildlife surveys and plant species compositions as part of the applicant's biological assessment prepared for the project.

<u>Wildlife Value</u>**:** Wildlife surveys specific to this project have not been conducted, however information exists from other surveys conducted in this area. The wetlands located within and adjacent to the project site are known to provide habitat for a diverse array of wildlife species including: American alligator, wood stork, great blue heron (*Ardea herodias*), little blue heron (*Egretta caerulea*), white ibis (*Eudocimus albus*), and a variety of other mammals, birds, reptiles, amphibians, fish, and invertebrates. Track surveys to quantify deer and feral hog tracks within and near the project site were not conducted by the applicant. However, white-tailed deer and feral hogs (*Sus scrofa*) have been observed in the project vicinity historically.

<u>Habitat Quality</u>: The 148.96-acre project site contains 100.5 acres of habitat types that provide habitat for the Florida panther. These lands consist of wetlands and disturbed upland areas associated with the roadway and various developed sites such as airboat concessions and Miccossukee camps. White-tailed deer densities and other panther prey species are influenced by the quality of the foraging habitat present in the project area. About 33 percent of the project site (48.46 acres) contains existing paved roadway and surface waters unsuitable as habitat for panthers and their prey. The proposed off-site mitigation at the PSRP site will provide high-quality permanent foraging areas to regional deer populations and other panther prey species.

Habitat Assessment Methodology Application

The application of the habitat assessment methodology including the base ratio, landscape multiplier, PHU determinations, and compensation recommendations, are presented below for the Tamiami Trail Modifications: Next Steps Project.

Table 13 illustrates the PHU calculations for the Tamiami Trail Modifications: Next Steps Project with impacts to 100.5 acres of panther habitat within the Primary Zone. The 100.5 acres expected to experience impacts currently provides 511.39 PHUs in the Primary Zone. The 511.39 Primary Zone PHUs are multiplied by the 2.5 Base Ratio and a landscape multiplier of 1 for a product of 1,278.48 PHUs. The proposed habitat compensation site is within the PSRP site located in Townships 50, 51, and 52 South, Ranges 27 and 28 East; Collier County, Florida. The PSRP is a component of the CERP and would restore more than 55,000 acres of land to near pre-development condition. Once the construction of this project is complete it will contain an estimated 473,112 Primary Zone PHUs comprised mostly of restored cypress swamp (37,563 acres), pine forest (11,928 acres), wet prairie (4,708 acres), coastal wetlands (850 acres) and hardwood forest (100 acres). This site lies within a large contiguous block of publicly-managed natural areas set aside for the benefit of a wide variety fish and wildlife resources including the panther. The NPS proposes to use a small portion (142.5 acres) of the approximately 55,247 acres of panther habitat that are being restored by the State of Florida and the Federal government as part of the PSRP and the equivalent 1,278.48 PHUs will be deducted from the PSRP compensation ledger and no longer available for use by other CERP projects. The Service notes that the Department of the Interior has contributed $38 million in funding to the initial purchase of these lands by the State of Florida and has strongly supported the planning and implementation of this important restoration project and will continue to monitor implementation efforts as the restoration is completed. Therefore, the Service believes the impacts associated with the habitat lost by the proposed project will be offset by the restoration at the PSRP site.

The lands proposed for the current project are on the eastern edge of the panther's range. The lands proposed for restoration are in the Primary Zone, adjacent to other natural lands, and are consistent with the Service's panther goal to strategically locate, preserve, and restore sets of lands containing sufficient area and appropriate land cover types to ensure the long-term survival of the Florida panther population south of the Caloosahatchee River. Further, the future CERP projects made possible by this project will enhance thousands of acres of wetlands that will improve overall habitat in the Everglades ecosystem, including areas in the eastern portion of the panther's range.

EFFECTS OF THE ACTION

Wood Stork

This section includes an analysis of the direct and indirect effects of the proposed action and its interrelated and interdependent activities on the wood stork.

Factors to be considered

Residential, commercial, and industrial development projects may have a number of direct and indirect effects on the wood stork and wood stork habitat. Direct impacts, which are primarily habitat based, may include: (1) the permanent loss of wood stork habitat; (2) the permanent loss of habitat that supports wood stork prey; (3) harassment of wood stork due to construction activities; and (4) enhancement, and restoration of wood stork foraging habitat resulting from the installation of the project. Indirect effects may include: (1) an increased risk of roadway mortality from vehicle collisions to wood storks flying to and from nearby nesting colonies due to the relocation of the roadway closer to the colonies; and (2) increased disturbance to breeding wood storks in the nearby nesting colonies due to the closer proximity of vehicle traffic and human activities due to the relocation of the roadway closer to the colonies.

This project site contains wood stork habitat and is located within the geographic range of the wood stork. Wood storks may be found on and adjacent to the proposed construction footprint year-round. The project will be constructed in a single, disruptive event, and result in permanent loss and alteration of a portion of the existing ground cover on the project site. The time required to complete construction of the project is estimated at 45 months, but it is likely that land clearing associated with the development will be undertaken in a single phase at the start of development activities. The disturbance associated with the project will be permanent and result in a loss of habitat currently available to the wood stork.

Analyses for effects of the action

The 148.96-acre Tamiami Trail Modifications: Next Steps Project currently provides 100.5 acres of foraging habitat for the wood stork. The project corridor is located near three known wood stork nesting colonies. The project site is located within publicly owned lands consisting primarily of wetlands. The project will result in the shading and filling of 100.5 acres of wood stork habitat due to the construction of bridges and associated roadway ramps, and the installation of fill and pavement associated with the relocation of an existing roadway. The project will result in the loss of 387.29 kg of wood stork forage from 100.5 acres of Class 5 hydroperiod wetlands. The Service finds that the enhancement of wood stork foraging habitat resulting from the bridging of the roadway will more than fully compensate for the loss of the 387.29 kg of stork forage biomass lost due to the project.

Direct effects

Direct effects are those effects that are caused by the proposed action, at the time of construction, are primarily habitat based, are reasonably certain to occur and include: (1) the permanent loss of wood stork habitat; (2) the permanent loss of habitat that supports wood stork prey; (3) harassment of wood storks due to construction activities; and (4) enhancement, and restoration of wood stork foraging habitat resulting from the installation of the project. The direct effects this project will have on the wood stork within the action area are discussed below.

Permanent Loss of Wood Stork Habitat: The project will adversely affect wetlands that may provide foraging habitat for the wood stork. The construction of bridges in association with the project will result in the shading of some of the wetlands in the project footprint. Shading from bridges reduces the light available to plants, and may prohibit or adversely affect their growth and production (Broome et al. 2005). The effects of shading on wood stork prey are not well studied or understood, but may reduce the prey available to the wood stork. The project design incorporates bridges and will result in less filling of wetlands than needed for the construction of a roadway with a fill base. However, some dredging and filling of wetlands will be required to construct the project. For the purposes of this Biological Opinion, the Service finds that the project will result in the permanent loss of 100.5 acres of wetlands that may provide foraging habitat for the wood stork.

The project will also result in the loss of wetlands that may provide potential nesting habitat for the wood stork. The project will permanently remove 3.04 acres of hardwood shrub containing pond apple trees. These wetlands occur within or near the core colony areas, recommended by the Service (Service 2004), of the Tamiami West and Tamiami East-1 nesting colonies. Information provided by the NPS indicates that the Tamiami West colony has historically supported the most nesters annually and nest construction has occurred as close as 50 feet to the existing Tamiami Trail (US 41) roadway (Figure 11). The proposed action will permanently remove 1.02 acres of nesting substrate just south of the Tamiami Trail in the Tamiami West colony and will temporarily impact another 1.66 acres. Although, the wetlands within the 1.02 acres are occasionally used for nesting wood storks, the Service believes that because this area represents only a small percentage of the total available nesting habitat, is located on the edge of the core colony area such that removal will not appreciably reduce the visual and/or sound barriers to the interior of the colony, and because it is rarely used by nesting storks, the loss of this habitat will be insignificant. Additionally, the temporarily impacted areas (1.66 acres) will be returned to their preconstruction state either by allowing the scraped areas to naturally revegitate or through the manual reseeding/planting of native vegetation. Through careful timing of construction activities, the Service does not believe that the project will result in the take of any active wood stork nests. Nonetheless, the Service finds that the project will result in the permanent loss of 3.04 acres of wood stork nesting habitat.

Permanent Loss of Habitat for Wood Stork Prey: The project will affect 100.5 acres of wetlands that provide foraging habitat for wood stork prey (*e.g.*, fish, crayfish, etc.). As discussed above, the proposed roadway design will consist largely of bridges and consequently result in less filling of wetlands then the construction of a roadway with a fill base. However, some dredging and filling of wetlands will be required to construct the project. Shading of wetlands due to the installation of bridges will likely have deleterious effects on wetland vegetation, and ultimately wood stork prey. However, the effects of shading on wood stork prey are difficult to quantify. Therefore, for the purposes of this Biological Opinion, the Service finds that the project will impact 100.5 acres of wetlands that may provide habitat for wood stork prey.

Degradation of Wood Stork Foraging Habitat from Shading: The construction of 5.5-miles of bridges in association with the project will result in the shading of some of the wetlands in the project footprint. The total acreage of wetlands affected by shading was not reported by the NPS. Shading from bridges reduces the light available to plants, and may prohibit or adversely affect the growth and production (Broome et al. 2005) of wetland plant species in the shaded area. The effects of shading on wood stork prey are not well studied or understood, but may reduce the prey available to the wood stork. The Service finds that shading from the project is likely to adversely affect wood stork prey in the project area, but the adverse affects are difficult to quantify.

Harassment by Construction Activities: Two known wood stork nesting colonies are located within 1,000 feet south of the project corridor. The noise and human activities resulting from the project's construction activities could result in harassment to nesting wood storks. Wood storks may respond by acclimating to the disturbance, or the disturbance may cause wood storks to abandon these nesting colonies either temporarily or permanently. Therefore, the project could result in the loss of wood stork nesting production. The NPS is proposing to schedule construction activities near these wood stork nesting colonies outside the wood stork nesting season. The Service finds that with proper safeguards in place (*e.g.*, the appropriate timing of construction activities) the probability of harassment of breeding wood storks is low.

Interrelated and interdependent actions

An interrelated activity is an activity that is part of the proposed action and depends on the proposed action for its justification. An interdependent activity is an activity that has no independent utility apart from the action under consultation. Interrelated or interdependent actions are not expected to result from the project.

Indirect effects

Indirect effects are those effects that result from the proposed action and are reasonably certain to occur. The indirect effects this project will have on the wood stork within the action area are discussed below and in the assessment of functional habitat values previously discussed. They include: (1) an increased risk of roadway mortality from vehicle collisions to wood storks flying to and from nearby nesting colonies due to the relocation of the roadway closer to the colonies; and (2) increased disturbance to breeding wood storks in the nearby nesting colonies due to the closer proximity of vehicle traffic and human activities due to the relocation of the roadway closer to the colonies.

Risk of Roadway Mortality: As discussed previously, two known wood stork nesting colonies (Tamiami East-1 and Tamiami West) are located within 1,000 feet south of the project corridor. In addition, the Tamiami East - 2 nest colony is located within close proximity to the project corridor. The proposed project will relocate Tamiami Trail approximately 50 to 75 feet south of its existing location. As such, the roadway will be located closer to the three nesting colonies described above. Upon completion, motor vehicles will travel along the roadway and pose a threat to wood storks flying in and out of the nesting colonies. The Service has no records of wood storks being killed due to collisions with motor vehicles on this section of the Tamiami Trail, but we acknowledge that deaths due to motor vehicles are possible. However, we find that the proposed new roadway is not appreciably closer to the nest colonies described above. Therefore, we believe that wood storks will acclimate to the roadway in its new location, and the probability of for vehicle collisions will be small.

Disturbance to Nesting Wood Storks: Although wood storks and other wading birds have become accustomed to colonizing these locations close to the Tamiami Trail, any increase in noise and/or construction related activity could cause abandonment of individual nests or the entire colony. Construction activities that could negatively affect storks just prior to and during the nesting season include blasting, pile driving, earth grubbing, etc. The NPS has agreed to manage all construction activities according to the Service's *Draft Supplemental Habitat Management Guidelines for the Wood Stork in the South Florida Ecological Services Area* which establishes protective zones around the colonies that restrict certain activities. The Service suggests that NPS consult directly with the Army Corp of Engineers and their contractors about what was learned during the construction of the 1-mile bridge (Corps 2008) with regards to disturbance impacts to nesting storks. The 1-mile bridge span is located between the Tamiami Trail West and East colonies and is currently under construction. During the first year of construction on this project (2009-2010 wood stork nesting season) an unexpected stork colony, referred to as East 2 established itself directly in the middle of the project area. Through careful coordination between the Service, Corps, and Corps' contractor, all activities within this area were suspended or reduced in order to allow the successful colonization of the site. While these efforts were successful, unusually cold and dry weather caused the storks in all of the Tamiami colonies to abandon colonization.

Species response to the proposed action

The proposed action is located within several hundred feet of both the Tamiami Trail West wood stork nesting colony and the Tamiami Trail East wood stork nesting colony. The project will relocate the existing Tamiami Trail (US 41) roadway slightly (approximately 50 to 100 ft) closer to wood storks at the two nesting colonies. The proposed action will also result in disturbance from construction activities and roadway operation (*i.e.*, motor vehicles) occurring closer to wood storks at the existing nest colonies. The increased disturbance could cause wood storks to abandon the nest colonies. The project also increases the probability for wood stork mortality from motor vehicle collisions with wood storks flying in and out of the colonies. However, nesting wood storks at these colonies are already subject to noise and disturbance from motor vehicle traffic and human activity on the existing Tamiami Trail (US 41). The Service believes that wood storks at the nesting colonies will likely acclimate to the disturbance resulting from the relocation of the roadway, and not abandon the nesting colonies.

The proposed action will impact 100.5 acres of wetlands within the project corridor that may provide foraging habitat for the wood stork. The Service has conducted an assessment of the wood stork foraging habitat to be affected by the project. Based on our Methodology, the project will result in the loss of 387.29 kg of wood stork forage from 100.5 acres of Class 5 hydroperiod wetlands. The Service finds that the eventual enhancement of wood stork foraging habitat in WCA-3A, 3B, and NESRS made possible by this project, will more than fully compensate for the loss of the 387.29 kg of stork forage biomass lost due to the project. This project represents the completion of the critical first step in integrating WCA-3A, 3B, and NESRS back into the historical Everglades flow way. The bridging of roadway will help alleviate higher water levels in WCA-3A and 3B due and increase hydrologic flow to the wetlands south of Tamiami Trail. The increased hydrologic flow to wetlands south of the roadway will improve conditions for wood stork prey and ultimately improve wood stork foraging opportunities in the project area. Hydrologic restoration of NESRS and eastern ENP is essential to the recovery of wading bird populations such as the wood stork in ENP (Tabb 1963; Service 1990, 1991, 1999a; Corps 1992, 1999; Ogden et al. 1992). The population declines observed throughout ENP in the 1960s coincide with the hydrologic isolation of NESRS and subsequent lowering of water levels in the upstream Everglades ecosystem by the compartmentalization of WCA-3 (Leach et al. 1972; Corps 1992; U.S. Department of Justice 1999). Augmentation of flows to NESRS would likely increase stages in the Rocky Glades and Taylor Slough areas. This movement toward historic seasonal flow distributions of water would likely increase water depths and hydroperiods within these areas that would improve the quality and quantity of forage fish that support wood stork nesting colonies in their current as well as historic locations.

Florida Panther

This section analyzes the direct and indirect effects of the proposed action and its interrelated and independent actions on the Florida panther.

Factors to be considered

Residential, commercial, and industrial development, as well as restoration projects, may have a number of direct and indirect effects on the Florida panther and panther habitat. Direct impacts, which are primarily habitat based, may include: (1) the permanent loss and fragmentation of panther habitat; (2) the permanent loss and fragmentation of habitat that supports panther prey; (3) the loss of available habitat for foraging, breeding, and dispersing panthers; and (4) a reduction in the geographic distribution of habitat for the species. Indirect effects may include: (1) an increased risk of roadway mortality to panthers traversing the area due to the increase in vehicular traffic; (2) increased disturbance to panthers in the project vicinity due to human activities; (3) the reduction in panther prey; and (4) a potential increase in intraspecific aggression between panthers (and an increase in mortality of subadult male panthers) due to reduction of the geographic distribution of habitat for the panther. These indirect effects are habitat based, with the exception of vehicular mortality, which could result in lethal impacts. Intraspecific aggression, though habitat based, could also result in lethal impacts

This project site contains marginal quality panther habitat, is located on the edge of occupied panther habitat, and panther habitat value has been diminished by the encroachment of exotic vegetation and its proximity to a major roadway. The timing of specific construction activities for this project, relative to sensitive periods of the panther’s lifecycle, is unknown. Panthers have the potential to be found on and adjacent to the proposed construction footprint year-round but are less likely during the rainy season when water levels could be considerably higher in NESRS. The project will be constructed in a single event and result in permanent loss and alteration of a portion of the existing ground cover on the project site. The project will also result in the conversion of roadway embankment back into usable panther habitat and also provide wildlife passage in the form of bridges. The time required to complete construction of the project is estimated to be 45 months.

Analyses for effects of the action

The 148.96-acre Tamiami Trail construction footprint is located along a 10.7-mile corridor just south of US 41 in the Florida panther Primary Zone as designated by Kautz et al. 2006, and is located inside the panther consultation area as defined by the Service (2000). The site currently provides 100.5 acres of habitat for the Florida panther consisting of wetlands. The project site is located in the eastern portion of the panther's known geographic range and entirely within publicly owned lands. The project will result in impacts to 100.5 acres of lands that provide 1,278.48 PHUs of panther habitat.

The Service believes that restoration of approximately 55,247 acres of Florida panther habitat at the PSRP site in Collier County, Florida will more than offset the 1,278.48 PHU's of panther habitat lost due to the project. The lands proposed for restoration are located in the core habitat area (Figure 6) and Primary Zone (Kautz et al. 2006) of the Florida panther. These "core area" lands include the majority of home ranges of the current population of the Florida panther (see definition of core panther area in Effects of the Action – Primary Equivalent Lands).

Direct effects

Direct effects are those effects that are caused by the proposed action, at the time of construction, are primarily habitat based, and are reasonably certain to occur. We have identified four types of direct effects that may result from the proposed action. The four types include: (1) the permanent loss and fragmentation of panther habitat; (2) the permanent loss and fragmentation of habitat that supports panther prey; (3) the loss of available habitat for foraging, breeding, and dispersing panthers; and (4) a reduction in the geographic distribution of habitat for the Florida panther. Panthers may also be subject to harassment by construction activities. The direct effects this project will have on the Florida panther within the action area are discussed below.

Permanent Loss and fragmentation of panther Habitat: The project will result in the loss of 100.5 acres of habitat available for occasional use by panthers. The project lands are located inside the panther Primary Zone. The land will be converted to roadway shoulder (as a result of widening) along the southern edge of the Tamiami Trail and bridge span.

Panthers, because of their wide-ranging movements and extensive spatial requirements, are particularly sensitive to habitat fragmentation (Harris 1984). Mac et al. (1998) defines habitat fragmentation as: "The breaking up of a habitat into unconnected patches interspersed with other habitat, which may not be inhabitable by species occupying the habitat that was broken up. The breaking up is usually by human action, as, for example, the clearing of forest or grassland for agriculture, residential development, or overland electrical lines." The reference to "unconnected patches" is a central underpinning of the definition. For panther conservation, this definition underscores the need to maintain contiguous habitat and protected habitat corridors in key locations in south Florida. Habitat fragmentation can result from road construction, urban development, and agricultural land conversions within migratory patterns of panther prey species and affect the ability of panthers to move freely throughout their home ranges. Construction of highways in wildlife habitat typically results in loss and fragmentation of habitat, traffic related mortality, and avoidance of associated human development.

Permanent Loss and Fragmentation of Habitat that Supports Panther Prey: A one-time Wetland Rapid Assessment Protocol and road mortality study did not document site utilization by white-tailed deer, a primary panther prey species; however, a few smaller prey items were identified in the road mortality study. Telemetry shows very little documented panther utilization of the site. Habitat quality is generally poor, as it consists of a mixture of exotic infested native and disturbed communities. Based on the above analysis, we believe the loss of the prey habitat associated with these lands is minimal.

Reduction in the Geographic Distribution of Habitat for the Species: The project will result in the loss of about 100.5 acres of non-developed land within the Panther Focus Area. This loss represents only 0.005 percent of the 1,962,294 acres of available non-urban private lands in south Florida in the Service's panther core area of the Florida panther (Table 8). The Service finds the habitat values lost by the development will be minimized by the preservation and restoration actions proposed by the applicant. The lands proposed for development are adjacent to an existing paved roadway, and active agricultural along most of the remainder of the project corridor. The lands proposed for preservation are consistent with the Service's panther conservation strategy to locate, preserve, and restore sets of lands containing sufficient area, access, and appropriate cover types to ensure the long-term survival of the Florida panther south of the Caloosahatchee River.

Harassment by Construction Activities: The timing of construction for this project, relative to sensitive periods of the panther's lifecycle, is unknown. However, land clearing associated with the road widening will be completed in a single phase at the start of development activities. There are no known den sites within the project boundaries and the quality and quantity of the habitat foraging base for prey species is low. Therefore, we find that panther usage of the property is limited and project construction will not result in direct panther mortality, but may result in temporary disturbance to resident or dispersing panthers.

Interrelated and interdependent actions

An interrelated activity is an activity that is part of the proposed action and depends on the proposed action for its justification. An interdependent activity is an activity that has no independent utility apart from the action under consultation. Interrelated or interdependent actions are not expected to result from the project.

Indirect effects

Indirect effects are those effects that result from the proposed action and are reasonably certain to occur. The indirect effects this project will have on the Florida panther within the action area are discussed below and in the assessment of functional habitat values previously discussed. They include: (1) an increased risk of roadway mortality to panthers traversing the area due to the increase in vehicular traffic; (2) increased disturbance to panthers and panther prey in the project vicinity due to human activities (human/panther interactions); and (3) a potential increase of intraspecific aggression between panthers due to reduction of the geographic distribution of habitat of the panther.

Increased Risk of Roadway Mortality: In evaluating a project's potential to increase roadway mortality to the Florida panther, we consider the location of the project in relation to surrounding native habitats, preserved lands, and wildlife corridors that are frequently used by the Florida panther. We also consider the current configuration and traffic patterns of surrounding roadways and the projected increase and traffic patterns expected to result from the proposed action. We evaluate the habitats present on-site, their importance in providing foraging needs for the Florida panther and panther prey species, and if the site development would further restrict access to surrounding lands important to the Florida panther and panther prey species.

The proposed project will not result in an increase in vehicular traffic during or after construction. Vehicular mortality data provided by the FWC indicate that collisions with motor vehicles are a potential source of panther mortality in the project vicinity (Figure 10); however, due to the lack of increased vehicular traffic associated with the project, it is unlikely that the construction of the Tamiami Trail modifications: Next Steps Project will increase the risk of roadway mortality to panthers. In actuality, the risk may be reduced as the project will provide a potential wildlife crossing in the form of bridges. The completion of future restoration projects which will completely remove the L-29 levee and canal may attract more panthers. Should the incidence of panther road mortality increase due to the attraction of more animals to the openings in the roadway, other means of deterrence such as fencing should be used to prevent the animals entering the roadway.

Panther and Prey Disturbance (Panther/Human Interactions) and Intraspecific Aggression: Potential increases in intraspecific aggression and disturbance to the Florida panther were evaluated. As discussed previously in our assessment of fragmentation, we considered habitat quality related factors and occurrence data for the Florida panther and panther prey species. This information is also the basis of our evaluation of disturbance and intraspecific aggression to the Florida panther and to panther prey species. The habitats on the construction footprint provide little forage value for prey species, which directly affects the frequency and duration of use of the property by panthers. Therefore, since we do not believe that Florida panthers utilize the property on a frequent basis, the loss of the limited use of the site by panthers will not significantly increase the risk of disturbance to panthers in the project action area due to human activities, will not increase mortality from intraspecific aggression between panthers, and will not significantly increase disturbance to panthers and panther prey species in the project action area.

Species response to the proposed action

The proposed action will result in increased human activity and noise in the project area during construction of the project. However, since panthers are not commonly known to use lands within and adjacent to the project site, activities associated with construction of the bridge and road modification is not anticipated to increase risk of disturbance to panthers.

The project will result in the loss of 100.5 acres of panther habitat, which represents about 0.04 percent of a female panther's home range (29,056 acres) and approximately 0.16 percent of a male panther's home range (62,528 acres). The project will result in the relocation of an existing paved roadway approximately 50 feet to 100 feet south of its current location, and much of the existing roadway footprint will restored to wetland habitat. Based on the small amount of habitat affected by the project, we do not expect that the project will significantly affect use of the area by the panther.

Panthers are sensitive to habitat fragmentation. However, the project site will bridge approximately 5.5 miles of the existing roadway corridor. The Service believes that the proposed bridges will allow panthers to cross under the highway and reduce the potential for motor vehicle collisions with panthers. Consequently, the project is expected to improve ecological connectivity between WCA-3B and NESRS. Therefore, fragmentation of panther habitat is not expected to result from project implementation.

CUMULATIVE EFFECTS

Wood Stork

Cumulative effects include the effects of future State, Tribal, local, or private actions that are reasonably certain to occur in the action area considered in this Biological Opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

For evaluation purposes, the Service is considering the action area for the wood stork to include the CFAs of all five nesting colonies as they encompass the project area (Figure 3). According to available information, from October 2004 through March 2006 (a period of 18 months), the Corps issued non-jurisdictional wetland determinations (for isolated wetlands) for 22 non-related rock mining projects in the action area outside of the direct footprint of the proposed Tamiami Trail project for a total of 119 acres. This equates to an average of almost 7 acres per month which when projected across the 44-month construction period for the current action would equal 308 acres that could potentially be filled without Corps regulatory review. The Corps' determinations for these projects were issued per guidance provided as a result of the Supreme Court decision, Solid Waste Agency of Northern Cook County vs. U.S. Army Corps of Engineers, 53 1 U.S. 1 59 (2001)(SWANCC) and will not require a Clean Water Act (CWA) section 404 wetland permit.

The Tamiami West CFA (approximately 457,300 acres) has 407,500 wetland acres located on public lands and are generally considered secure from alteration, 41,200 acres are in private ownership and subject to future section 7 consultations while the remaining 8,700 wetland acres are in private ownership outside the project foot print, but within the action area. The 3B Mud East CFA (approximately 396,700 acres) has 345,100 wetland acres located on public lands, 41,300 wetland acres are in private ownership and subject to future section 7 consultations while the remaining 10,300 wetland acres are in private ownership outside the project foot print, but within the action area. The Grossman Ridge CFA (approximately 562,100 acres) has 517,200 wetland acres located on public lands, 4,300 wetland acres are in private ownership and subject to future section 7 consultations while the remaining 4,600 wetland acres are in private ownership outside the project footprint, but within the action area.

Approximately 23,600 wetland acres of possible wood stork foraging habitat is within private ownership outside the project foot print, but within the action area. In south Florida, approximately 10 to 20 percent of the requests submitted to the Corps for wetland jurisdictional review on private lands are determined to be isolated wetlands and, thus, not subject to the Corps permitting requirements (Service 2006). To provide a reasonable estimate of the number of wetland acres likely to be outside of the Corps' jurisdiction, we conservatively assumed that 20 percent of the 23,600 privately-owned wetland acres within the action area might be isolated. Therefore, we estimate approximately 4,720 acres of wetlands may be developed without Federal review during the 44-month period of the proposed action. This acreage estimate represents the potential loss of wetlands due to future non-Federal actions.

To estimate the effects to wood stork production from the loss of these wetlands, we applied the wood stork foraging assessment method introduced in the programmatic consultation on the Lake Belt Mining Area (41420-2008-F-0921) dated January 11, 2010. Based on field inspections by the Corps and the Service of jurisdictional and non-jurisdictional wetlands on the project site and within the action area, the Service is considering these wetlands as a Class 2 (short) hydroperiod vegetated by exotic species densities between 50 and 75 percent. Using the All Bird competition factor of 32.5 percent, the Class 2 hydroperiod biomass (fish and crayfish) of 0.62 g/m2, and an exotic density foraging factor of 0.37, we determined that the 4,720 wetland acres would provide an estimated loss of almost 1,424 kg of wood stork foraging biomass (4720*4047*0.62*0.37*0.325/1000=1,424) for the 44-month construction period.

Florida Panther

Cumulative effects include the effects of future State, Tribal, local, or private actions reasonably certain to occur in the action area considered in this Biological Opinion. Future Federal actions unrelated to the proposed action but located in the action area are not considered in this section because they require separate consultations pursuant to section 7 of the Act.

A majority of the lands in and adjacent to the project footprint are publicly owned and managed in the form of WCA-3 to the north, ENP to the south, and BICY to the west. The only private lands in proximity are small parcels associated with the air boat concessions and Tribal lands located along the trail. Therefore, any impacts to Florida panthers as a result of non-federal actions are considered unlikely, and if occurred, would be of small size and result in negligible impacts to panthers.

CONCLUSION

Wood Stork

The Service believes that the proposed action may adversely affect the endangered wood stork. The NPS's proposed mitigation, which includes the hydrologic restoration and creation of wetland habitats in the project area, as a result of this project, will minimize adverse effects from the proposed action.

Recent population estimates indicate the stork population has reached its highest level since it was listed as endangered in 1984. About 11,232 nesting pairs nested within their breeding range in the southeastern United States in 2006. Several new colonies were located in 2006, including several in Florida. The number of colonies also continues to rise, and over 80 nesting colonies were reported in 2006 throughout the southeastern United States (Service, 2007), which is the highest to date in any 1 year. In 2009, wood storks produced approximately 6,452 nests in south Florida alone (Cook and Kobza 2009).

After reviewing the status of the wood stork, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the proposed action is not likely to jeopardize the continued existence of the wood stork.

No critical habitat has been designated for this species; therefore, none will be affected.

Florida Panther

The Service believes there will be no direct take in the form of mortality or injury of the Florida panther resulting from this project. The loss of habitat from implementing the project, taking into consideration the status of the species, remaining habitat, and other factors considered in this biological opinion, such as the overall recovery objectives and other cumulative effects from actions in the action area, will be offset by the conservation/restoration of other, more functionally valuable habitat. Therefore, the proposed construction of the Tamiami Trail Modification: Next Steps project is not likely to jeopardize the continued existence of the Florida panther.

No critical habitat has been designated for this species; therefore, none will be affected.

REASONABLE AND PRUDENT MEASURES

Wood Stork

The Service believes that the NPS has incorporated all reasonable and prudent measures necessary and appropriate to minimize impacts of incidental take of wood storks and Florida panthers into the design of the proposed action. In summary, the NPS will ensure that no more than 100.5 acres of wetlands will be lost as a result of implementation of the proposed action. The NPS will also ensure that the following occur: (1) the wood stork habitat management guidelines which outline the protection zones are followed; (2) the reclamation of all temporarily impacted lands to their pre-construction conditions; (3) the submission of annual reports indicating details on project implementation, the progress of wetland restoration and creation, and the land reclamation process; and (4) a report of dead or injured wood storks to the FWC and Service.

Florida Panther

The Service believes that the NPS has incorporated all reasonable and prudent measures necessary and appropriate to minimize impacts of incidental take of Florida panthers into the design of the proposed action. In summary, the Corps will ensure that no more than 100.5 acres of panther habitat will be lost as a result of implementation of the proposed action and that approximately 142.5 acres in the panther Primary Zone will be preserved to benefit the Florida panther and its prey.

INCIDENTAL TAKE STATEMENT

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

AMOUNT OR EXTENT OF TAKE ANTICIPATED

Wood Stork

The proposed action will relocate the existing roadway closer to two active wood stork nesting colonies. However, the relocation of the roadway will not result in additional motor vehicle traffic above what previously exists on the current roadway. The Service has no records of wood storks being killed due to collisions with motor vehicles on this section of the Tamiami Trail. Therefore, we believe that wood storks will adjust to the roadway in its new location, and the probability of vehicle collisions will remain small. Nesting wood storks at these colonies are already subject to noise and disturbance from motor vehicle traffic and human activity from Tamiami Trail (US 41). The Service believes that wood storks at the nesting colonies will likely acclimate to the disturbance resulting from the relocation of the roadway, and not abandon the nesting colonies. The project will also result in the loss of 3.04 acres of potential wood stork nesting habitat. However, with proper timing of construction activities, the Service does not believe that the project will result in the incidental take of any active wood stork nests. Therefore, the Service does not anticipate the proposed action will result in the direct mortality or injury of any wood storks. Accordingly, the Service is not anticipating any direct take in the form of mortality or harassment to the wood stork.

However, the Service does anticipate incidental take of wood storks in the form of harm associated with the loss of 100.5 acres of wood stork foraging habitat. Although wood storks nest colonially and often in the same site for many years, the ability to count individual wood storks and their young and attribute any changes from year to year as an effect of the action is complicated by many factors. Wood stork colonies are censused as estimates and do not reflect actual counts, not all wood storks return to the same colony every year even if the colonial site is used again (Kushlan and Frohring 1986), nesting sites may be abandoned if water levels recede too far (Rodgers et al. 1996) or there is disturbance to the site and the colony or individual birds may re-nest elsewhere (Ogden 1991, Borkhataria et al. 2004; Crozier and Cook 2004). In addition, new wood stork colonies are often discovered which may represent a shift from historic colonies due to environmental conditions or establishment of a new colony (Meyer and Frederick 2004). For these reasons, the Service feels it is adequate to address incidental take of wood storks in terms of lost acres and foraging biomass rather than individual birds. Based on the analysis provided in the previous sections, the Service believes this level of anticipated incidental take is not likely to jeopardize the continued existence of the species.

Florida Panther

The project is a relocation of an existing roadway and will not result in additional motor vehicle traffic or changes in traffic patterns. The bridges associated with the proposed action will allow panthers to cross underneath the proposed roadway and reduce the potential for panther/motor vehicle collisions. Therefore, the Service does not anticipate the proposed action will result in the direct mortality or injury of any Florida panthers. Accordingly, the Service is not anticipating any direct take in the form of mortality to the Florida panther.

However, the Service anticipates incidental take of panthers in the form of harm associated with the loss of 100.5 acres of panther habitat within the Primary Zone lands. The primary methods of determining the presence of panthers on a given area is through radio telemetry and by detecting physical evidence. The use of radio telemetry is limited to areas suitable to capturing panthers (less than a third of the panther population is radio collared at any one time), and, due to their large home ranges (resident males have a mean home range of 160,639 acres [65,009 ha] and females 97,920 acres [39,627 ha]) and the fact that they occur at low densities (1 to 8 per 100 mi^2), counting the exact number of panthers responsible for creating physical evidence can be problematic. The annual population count reflects the total number of panthers confirmed by physical evidence during one calendar year (McBride et al. 2008). This count serves as an indication of the population trend rather than an actual count since in any one 12-month period some of the panthers recorded will die, kittens previously documented at the den may become dependent-aged juveniles, and un-collared subadults, particularly males, may disperse into other areas. Based on these facts and the analysis provided in the previous sections, the Service believes the level of anticipated incidental take associated with this project is not likely to jeopardize the continued existence of the species.

EFFECT OF THE TAKE

Wood Stork

In the accompanying Biological Opinion, the Service determined this level of anticipated take is not likely to result in jeopardy to the species. The Service anticipates incidental take of wood storks in the form of harm from the loss of 100.5 acres of wetlands providing 387.29 kg of wood stork forage biomass production, and the loss of 3.04 acres of potential wood stork nesting habitat. Therefore, based on the evaluations provided above for the proposed action; direct, indirect, and cumulative effects in the action area; the status of the species; and the ecological lift resulting from construction and operation of the project, the Service believes that the proposed action will not jeopardize the survival and recovery of the wood stork.

Florida Panther

In the accompanying Biological Opinion, the Service determined this level of anticipated take is not likely to result in jeopardy to the species. The amount of panther habitat affected by the proposed action is a negligible percentage of an estimated 2 million acres of habitat occupied by the panther. The proposed action will result in the loss of 100.5 acres of panther habitat. The proposed action will increase the impacts from direct and indirect effects to panther habitat from residential and commercial developments, mining, and agriculture by an insignificant amount (< 0.14 percent).

Mitigation for the proposed action will be roughly 142.5 acres (1278.48 PHU's) out of the more than 55,000 acres of Florida panther Primary Zone habitat restored and preserved in the PSRP in western Collier County. The lands proposed for compensation/preservation from the proposed incidental take of panther habitat are lands adjacent to other larger tracts of natural and preserved lands and are consistent with the Service's panther goal to locate, preserve, and restore sets of lands containing sufficient area and appropriate land cover types to ensure the long-term survival of the Florida panther south of the Caloosahatchee River. Therefore, based on the evaluations provided above for the project's direct, indirect and cumulative effects, the status of the species, and the compensation proposed by the Corps, the Service believes that the proposed construction and operation of the Tamiami Trail modifications will not jeopardize the survival and recovery of the Florida panther.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the NPS must comply with the following terms and conditions, which implement the reasonable and prudent measures, described above and outline reporting/monitoring requirements. The terms and conditions described below are non-discretionary, and must be undertaken by the NPS for the exemption in section 7(o)(2) to apply. The NPS has a continuing duty to regulate the activity covered by this Incidental Take Statement. If the NPS (1) fails to assume and implement the terms and conditions or (2) fails to adhere to the terms and conditions of the Incidental Take Statement through enforceable terms that are added to the permit or grant document, the protection coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the NPS must report the progress of the action and its impact on the species to the Service as specified in the Incidental Take Statement (50 CFR § 402.14(i)(3)).

1. The NPS will adhere to the conservation measures listed below and the description of the proposed action that commits the NPS to obtain and ensure the management of high quality panther habitat, which is necessary and appropriate to minimize incidental take of panthers by the proposed action. Specifically, to compensate for impacts to 100.5 acres of Florida panther habitat, the NPS proposes to use 142.5 acres of panther primary zone habitat restored as part of the PSRP, located in western Collier County;

2. The NPS will monitor the permit conditions regarding conservation measures to minimize incidental take of panthers by providing the Service a report on implementation and compliance with the conservation measures within 1 year of the start of construction;

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

CONSERVATION RECOMMENDATIONS

1. The NPS should continue to implement the Service's SLOPES guidance whenever covered species could be encountered within or near a construction area.

2. The NPS should consult with the Service and FWC if any federal or state listed species nests within the project area while construction is taking place, even if the nests occur in area not previously considered in this Biological Opinion.

3. Should it become apparent that adult or juvenile wood storks, or other wading bird species, are having difficulty traversing the elevated bridges thus raising the risk of vehicle strikes the NPS should consult with the Service and FWC on ways to prevent this from occurring.

4. The NPS should place caution signs on Tamiami Trail, a reasonable distance from both ends of the project corridor, to alert motorists to the possibility of encountering panthers in the roadway.

5. Should panthers be sighted in and around the project area after construction is complete, the NPS should consider fencing the road embankments at the ends of appropriate bridge segments. This will serve to funnel panthers under the bridge rather than up onto the roadway. The NPS should contact the Service for specifics regarding the latest fencing specifications.

REINITIATION NOTICE

This concludes formal consultation on the Tamiami Trail Modifications: Next Steps Project. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; (3) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

Thank you for your cooperation and effort in protecting fish and wildlife resources. If you have any questions regarding this project, please contact Kevin Palmer at 772-562-3909, extension 280.

Attachment (Appendix A)

cc: electronic copy only
Corps, Jacksonville, Florida (Stu Applebaum, Susan Conner)
DEP, Tallahassee, Florida (Greg Knecht, Inger Hansen)
District, West Palm Beach, Florida (Paul Linton)
DOI, Miami, Florida (Dennis Duke)
DOI, Washington, D.C. (Don Jodrey)
ENP, Homestead, Florida (Dan Kimball)
EPA, Jacksonville, Florida (Eric Hughes)
FWC, Vero Beach, Florida (Joe Walsh, Tim Towles)
Miccosukee Tribe of Indians, Miami, Florida (Chairman)
Service, Atlanta, Georgia (Mark Musaus)
Service, Jacksonville, Florida (Miles Meyer)
Service, Vero Beach, Florida (Chris Belden)

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Table 1. Targeted and acquired acreage totals of conservation lands in south Florida directly affecting the panther within the panther focus area.

Name	Targeted[1] Acreage	Acquired Acreage	Indian Reservatio
Federal Conservation Lands			
Everglades National Park	1,508,537	1,508,537	--
Big Cypress National Preserve	720,000	720,000	--
Florida Panther National Wildlife Refuge	26,400	26,400	--
Subtotal	**2,254,937**	**2,254,937**	--
State of Florida: Florida Forever Program			
Belle Meade	28,505	19,107	--
Corkscrew Regional Ecosystem Watershed	69,500	24,028	--
Twelvemile Slough	15,653	7,530	--
Panther Glades	57,604	22,536	--
Devil's Garden	82,508	0	--
Caloosahatchee Ecoscape	18,497	2,994	--
Babcock Ranch	91,361	0	--
Fisheating Creek	176,760	59,910	--
Subtotal	**540,388**	**136,105**	**--**
State of Florida: Other State Acquisitions			
Water Conservation Area Number 3	491,506	491,506	--
Holey Land Wildlife Management Area	33,350	33,350	--
Rotenberger Wildlife Management Area	25,019	20,659	--
Fakahatchee Strand State Preserve	74,374	58,373	--
Picayune Strand State Forest	55,200	55,200	--
Okaloacoochee Slough State Forest and	34,962	34,962	--
Babcock-Webb Wildlife Management Area	79,013	79,013	--
Subtotal	**793,424**	**773,063**	**--**
Indian Reservations[2]			
Miccosukee Indian Reservation	--	--	81,874
Big Cypress Seminole Indian Reservation	--	--	68,205
Brighton Seminole Indian Reservation	--	--	37,447
Subtotal	**--**	**--**	**187,52**
GRAND TOTALS	**3,588,749**	**3,164,105**	**187,52**

[1]Targeted acres not available for all lands. In Such cases, targeted equals acquired acreage.
[2] Indian lands are included due to their mention in the MSRP. Acreages taken from GIS data.
*Table 1 was excerpted from the Brief of Amicus (2003). However, the lands shown as acquired in this table may include some private in-holdings and may include lands currently under sales negotiations or condemnation actions.

Table2. List of development projects affecting Florida panther habitat consulted on the by the Service from March 1984 through October 2010 and acres of habitat impacted and preserved.

Date	Service Log No.	Corps Application No.	Project Name	County	Habitat Impacts (Acres)	Habitat Preserved On-site (Acres)	Habitat Preserved Off-site (Acres)	Total Habitat Preserved (Acres)
03/29/84	4-1-83-195	83M-1317	CMC Development Corporation (Ford Test Track)	Collier	530	0	0	0
02/21/85	4-1-85-018	FAP #?	USDOT, FHA (conversion of Hwy 84 to I-75)	Broward, Collier	1,517	0	0	0
10/17/86	4-1-87-016/4-1-87-017	unknown	NPS, BICY (Exxon Master Plan Modification)	Collier	9	0	0	0
01/07/87	4-1-86-303	86IPM-20130	Collier Enterprises (citrus grove)	Collier	11,178	0	0	0
01/11/88	4-1-88-029	unknown	NPS, BICY (NERCO - Clements Energy, Inc.)	Collier	3	0	0	0
02/23/88	4-1-88-055	unknown	NPS, BICY (Shell Western E&P, Inc.)	Collier Miami-Dade Monroe	0	0	0	0
02/10/89	4-1-89-001	FAP IR-75-4(88)81	USDOT, FHA (SR 29/I-75 Interchange)	Collier	350	0	0	0
08/15/90	4-1-90-289	unknown	NPS, BICY [I-75 Rec. Access Plan (MM 31, 38, 49)]	Collier	150	0	0	0
09/24/90	4-1-90-212	89IPD-20207	U.S. Sugar Corp (46 mi2 ag conversion)	Hendry	28,740	700	0	700
03/12/91	4-1-91-229	90IPO-02507	Lourdes Cereceda (commercial rock mine)	Dade	97	0	0	0
01/14/92	4-1-91-325	199101279 (IP-HH)	Dooner Gulf Coast Citrus (32 acre citrus grove)	Collier	40	40	0	40
09/25/92	4-1-92-340	unknown	BIA, STOF, BCSIR (1,995 acre citrus grove)	Hendry	1,995	0	0	0
06/18/93	4-1-93-217	199200393 (IP-SL)	Lee County DOT (Corkscrew Road)	Lee	107	0	0	0
02/25/94	4-1-94-209	199301131 (IP-KC)	Lee County DOT (Daniels Road extension)	Lee	65	0	0	0
05/09/94	4-1-93-251	199202019 (IP-KA)	Corkscrew Enterprises (The Habitat)	Lee	900	100	100	200
10/27/94	4-1-94-430	199302371 (IP-BB) 199400807 (IP-BB) 199400808 (IP-BB)	Timberland and Tiburon Florida Gulf Coast University Treeline Boulevard	Lee	1,088	526	0	526
05/24/95	4-1-95-230	199302130 (IP-TB)	FDOT, I-75 (Turner River access @ MM 70)	Collier	1,936	0	0	0
08/07/95	4-1-95-274	199405501 (IP-AW)	Bonita Bay Properties, Inc. (golf course)	Collier	509	491	0	491
08/15/95	4-1-94-214	199301495 (IP-MN)	SWFIA, Northeast Access Road	Lee	14	0	0	0
09/19/96	4-1-95-F-230	199302052 (IP-TB) 199301404 (IP-TB)	FDOT, I-75 (Central and West Broward access) FDOT, I-75 (Miami Canal Access)	Broward	116	0	0	0
03/10/98	4-1-98-F-3	L30(BICY)	NPS, BICY (Calumet Florida, Inc. seismic testing)	Collier Miami-Dade Broward	0	0	0	0
03/27/98	4-1-97-F-635	199604158 (IP-SB)	Bonness, Joseph D., Jr. Trustee (Willow Run Quarry)	Collier	359	190	0	190
06/11/99	4-1-98-F-398	199800622 (IP-SS)	STOF, BCSIR (water conservation plan)	Hendry	1,091	0	0	0
09/27/99	4-1-98-F-310	199130802 (IP-SB)	Lee County DOT (Daniels Parkway extension)	Lee	2,093	0	94	94

Table 2 (continued)

Date	Service Log No.	Corps Application No.	Project Name	County	Habitat Impacts (Acres)	Habitat Preserved On-site (Acres)	Habitat Preserved Off-site (Acres)	Total Habitat Preserved (Acres)
12/08/99	4-1-98-F-517	199607574 (IP-MN)	Kaufmann Holdings, Inc. (Cypress Creek Farms)	Collier	239	0	24	24
04/17/00	4-1-98-F-428	199507483 (IP-AM)	Miromar Development, Inc. (Miromar Lakes)	Lee	1,323	0	194	194
06/09/00	4-1-99-F-553	199900619 (IP-SB)	Vineyards Development Corp. (Naples Reserve GC)	Collier	833	0	320	320
02/21/01	4-1-00-F-135	199803037 (IP-SR)	Wortzel & Landl, Co-Trustees (Corkscrew Ranch)	Lee	106	0	0	0
04/17/01	4-1-00-F-584	200001436 (IP-MN)	WCI Communities, Inc. (Sun City - Ft. Myers)	Lee	1,183	0	408	408
07/30/01	4-1-94-357	199003460 (IP-TB)	Naples Golf Estates	Collier	439	175	0	175
08/31/01	4-1-00-F-183	199900411 (IP-SR)	Worthington Communities, Inc. (Colonial G&CC)	Lee	1,083	0	640	640
12/14/01	4-1-00-F-585	199301156 (IP-MN)	SWFIA, Mid-field Terminal Expansion	Lee	8,058	0	6,986	6,986
01/30/02	4-1-98-F-372	199402492 (IP-ML)	Florida Rock Industries, Inc. (Fort Myers Mine #2)	Lee	2,913	1,959	0	1,959
03/07/02	4-1-00-F-178	199901251 (IP-MH)	Benton, Charles (Southern Marsh GC)	Collier	121	75	80	155
04/24/02	4-1-01-F-148	199901378 (IP-SR)	Schulman, Robert, Trustee (Hawk's Haven)	Lee	1,531	267	0	267
09/24/02	4-1-01-F-135	200001574 (IP-DY)	State Road 80, LLC (Verandah)	Lee	1,456	0	320	320
10/08/02	4-1-02-F-014	199602945 (IP-DY)	Barron Collier Company (Winding Cypress)	Collier	1,088	840	1,030	1,870
05/19/03	4-1-02-I-1741	200200970 (IP-DEY)	Apex Center	Lee	95	10	18	28
06/10/03	4-1-01-F-1955	200003795 (IP-DY)	Walnut Lakes	Collier	157	21	145	166
06/18/03	4-1-01-F-136	199701947 (IP-SR)	Twin Eagles Phase II	Collier	593	57	98	155
06/23/03	4-1-01-F-143	199905571 (IP-SR)	Airport Technology Center	Lee	116	55	175	230
07/02/03	4-1-98-F-428	199507483 (IP-MN)	Addition to Miromar Lakes	Lee	342	158	340	498
09/04/03	4-1-02-F-1486	200206725 (IP-MN)	State Road 80 Widening	Lee	33	2	12	14
10/06/03	4-1-02-F-0027	200102043 (IP-MN)	Bonita Beach Road Development	Lee	1,117	145	640	785
12/29/03	4-1-02-F-1743	200202926 (IP-MGH)	The Forum - Saratoga Investments	Lee	650	0	310	310
01/18/05	4-1-04-F-4259	199702228 (TWM)	Bonita Springs Utilities	Lee	79	0	108	108
03/31/05	4-1-04-F-5656	200306759 (NW-MAE)	Gateway Shoppes II	Collier	82	0	122	122
04/08/05	4-1-04-F-8176	2004-5312 (AEK)	Big Cypress Rock Mine	Broward	110	0	220	220
04/29/05	4-1-04-F-5780 4-1-04-F-5982	2003-5331 (IP-TWM) 2003-6965 (IP-TWM)	Worthington Holdings - Arborwood Worthington Holdings - Treeline Avenue Extension	Lee	2,330	0	1,700	1,700
06/06/05	4-1-03-F-7855	2003-11156 (IP-RMT)	Collier Regional Medical Center	Collier	44	0	64	64
02/25/05 03/16/05 06/29/05 04/04/06	4-1-04-F-6866	200309416 (NW-MAE)	Ava Maria University	Collier	5,027	0	6,114	6,114
06/29/05	4-1-03-F-3915	199806220 (IP-MAE)	Wenthworth Estates - V.K. Development	Collier	917	0	458	458
07/15/05	4-1-04-F-5786	199405829 (IP-CDC)	Land's End Preserve	Collier	231	0	61	61
09/26/05 10/26/05	4-1-04-F-9348	2004-1122 (IP-RMT)	Super Target/Brentwood Land Partners	Collier	34	0	20	20
11/23/05	4-1-04-F-6043	20039414	Waterways Join Venture IV	Collier	108	0	61	61

Table 2 (continued)

Date	Service Log No.	Corps Application No.	Project Name	County	Habitat Impacts (Acres)	Habitat Preserved On-site (Acres)	Habitat Preserved Off-site (Acres)	Total Habitat Preserved (Acres)
11/29/05	4-1-04-F-8847	20048995	Seminole Tribe of FL Administrative Complex	Collier	6	0	8	8
12/06/05	4-1-03-F-3483	200302409	Southwest Florida Investment Property, LLC	Lee	207	0	305	305
12/6/05	4-1-04-F-6691	200310689	Rattlesnake Hammock Road	Collier	47	0	23	23
01/04/06	4-1-04-F-8388	2004554	Immokalee Regional Airport - Phase I	Collier	163	0	43	43
01/04/06	4-1-04-F-9777	20048577	Logan Boulevard Extension	Collier	40	0	10	10
01/13/06	4-1-04-F-6707	20042404	Journey's End	Collier	66	0	34	34
01/26/06	4-1-04-F-8940	20047053	The Orchard	Lee	93	0	81	81
02/09/06	4-1-05-11724	2005384	Firano at Naples	Collier	24	0	19	19
02/22/06	4-1-04-F-6505	200101122	Corkscrew Road	Lee	63	0	47	47
02/23/06	4-1-04-F-5244	200312276	Summit Church	Lee	10	0	13	13
03/31/06	4-1-05-PL-11343	20051909	Coral Keys Homes	Dade	31	0	61	61
05/05/06	41420-2006-I-0274	2005-6176	Santa Barbara , Davis to Radio Road, Widening	Collier	6	0	3	3
05/09/06	41420-2006-I-0263	2005-6298	Santa Barbara and Radio Road Widening	Collier	29	0	20	20
05/09/06	41420-2006-F-0089	200403248	Collier Boulevard, Immokalee Rd. to Goldengate Blvd.	Collier	14	0	16	16
05/16/06	4-1-05-F-10309	19971924	Sabal Bay	Collier	1,017	1,313	223	1,536
06/05/06	4-1-05-PL-8486	20041688	Seacrest School	Collier	31	0	16	16
06/09/06	4-1-05-PL-10965	200303733	HHJ Development	Dade	3	0	4	4
06/14/06	4-1-05-F-11855	200411010	Keysgate School Site	Dade	39	0	62	62
06/15/06	41420-2006-I-0362	20056176	Collier County Wellfield	Collier	29	0	36	36
07/12/06	41420-2006-F-0282	200311150	Cypress Shadows	Lee	244	0	160	160
07/28/06	4-1-05-F-12330	20047920	Hamilton Place	Dade	10	0	50	50
07/28/06	4-1-04-F-7279	20041695	Raffia Preserve	Collier	131	0	119	119
08/15/06	41420-2006-I-0151	20031963	Naples Custom Homes	Collier	10	0	9	9
08/21/06	41420-2006-I-0540	20041813	ASGM Business Park	Dade	41	0	25	25
08/21/06	4-1-03-F-3127	19956797	Atlantic Civil Ag Permit Extension	Collier	981	0	1,553	1,553
09/12/06	41420-2006-F-0554	20057414	Miccosukee Government Complex	Dade	17	0	37	37
09/22/06	41420-2006-I-0355	20040047	Immokalee Seminole Reservation Road Improvements	Collier	17	0	35	35
10/05/06	41420-2006-I-0616	20065295	New Curve on Corkscrew Road	Lee	12	0	18	18
10/16/06	41420-2006-F-0667	199507483	Miromar Addition	Lee	366	0	390	390
10/18/06	41420-2007-F-0026	2004777	Treeline Preserve	Lee	97	0	95	95
10/25/06	41420-2006-F-0442	20047046	Koreshan Boulevard Extension	Lee	14	0	31	31
10/26/06	41420-2006-F-0787	200306755	Jetway Tradeport	Collier	38	0	52	52
10/26/06	41420-2006-I-0849	20055702	Marina Del Lago	Lee	49	0	36	36
10/27/06	41420-2006-I-0203	20057180	Living Word Family Church	Collier	18	0	35	35
10/27/06	41420-2006-I-0607	20064878	Seminole Reservation Access Road	Hendry	2	0	5	5

Table 2 (continued)

Date	Service Log No.	Corps Application No.	Project Name	County	Habitat Impacts (Acres)	Habitat Preserved On-site (Acres)	Habitat Preserved Off-site (Acres)	Total Habitat Preserved (Acres)
11/15/06	41420-2006-TA-0727	N/A	Liberty Landing	Collier	27	0	19	19
11/15/06	41420-2007-FA-0222	200412415	Barry Goldmeier 5th Avenue Estates	Dade	15	0	18	18
11/16/06	41420-2006-TA-0060	N/A	Collier County Elementary School K	Collier	26	0	17	17
12/05/06	41420-2006-FA-1179	20057179	The Roberts Group CPD	Lee	58	0	29	29
12/07/06	41420-2006-FA-0781	20041689	Cypress Landing	Collier	46	0	18	18
01/19/07	41420-2006-I-0871	20061359	Brighton Veterans Center	Glades	9	0	8	8
03/09/07	4-1-04-F-6112	20021683	Alico Airpark (Haul Ventures)	Collier	241	75	315	390
03/09/07	41420-2006-F-0850	200312445	Airport Interstate Commerce Park	Lee	323	0	371	371
04/13/07	41420-2007-TA-0618	NA	Collier County School Site J - Everglades Blvd.	Collier	39	0	56	56
02/21/03 03/9/05 03/02/07 05/03/07	4-1-01-F-607	200001926 (IP-SB)	Mirasol	Collier	773	940	182	1,122
03/09/07	41420-2007-TA-0623	NA	Abercia North	Collier	25	0	31	31
03/09/07	41420-2007-I-0581	1999-4313	Savanna Lakes	Lee	124	0	140	140
05/01/07	41420-2006-I-0992	20045223	Seminole Motocross	Hendry	58	5	19	23
06/19/07	41420-2007-I-0997	2006-2583	Caloosa Reserve	Collier	111	0	139	139
07/03/07	41420-2007-TA-0818	NA	Woodcrest Development	Collier	11	0	15	15
07/17/07	41420-2007-I-0330	2006-6377	Faith Landing	Collier	35	0	18	18
07/30/07	41420-2007-I-0866	2006-7022	Collier county School Site L	Collier	32	0	21	21
09/05/07	41420-2006-I-0051	2005-4186	Gulf Coast Landfill Expansion	Lee	123	0	65	65
06/14/04 03/21/05 08/24/07	4-1-04-F-5744	199603501 (IP-TWM)	Terafina	Collier	437	210	261	471
10/31/07	41420-2007-F-1035	2004-3931	Big Cypress Regional General Permit - 83	Hendry Broward	2,357	4,144	0	4,144
11/13/07	41420-2006-FA-1430	2005-782	Summit Lakes	Collier	139	0	134	134
9/8/2005 02/15/08	4-1-04-F-5260 41420-2008-F-0112	200106580	Parklands Collier	Collier	487	157	434	591
02/7/2008	41420-2007-FA-1120 41420-2007-I-0862	1993-0862	Poinciana Parkway	Polk	187	0	236	236
01/30/2008	41420-2008-FA-0009 41420-2008-I-003	2007-4884	I-75 from Corkscrew Road to Daniels Parkway	Lee	7	0	12	12
01/22/2008	41420-2008-FA-0021 41420-2008-I-005	2007-4503	I-75 from Collier County Line to South of Corkscrew Rd	Lee	7	0	44	44

Table 2 (continued)

Date	Service Log No.	Corps Application No.	Project Name	County	Habitat Impacts (Acres)	Habitat Preserved On-site (Acres)	Habitat Preserved Off-site (Acres)	Total Habitat Preserved (Acres)
6/26/2008	41420-2007-FA-1150 41420-2007-F-1144	2007-2175	Immokalee Master Plan	Collier	506	0	1,015	1,015
7/02/2008	41420-2007-FA-0592 41420-2007-F-0491	2005-7439	Kaicasa	Collier	72	0	183	183
07/14/2008	41420-2008-I-0508	2005-6488	Amerimed Medical Center	Collier	19	0	14	14
04/28/2008	41420-2008-I-0313	2007-6414	Immokalee Rd Substation	Collier	1	0	1	1
07/14/2008	41420-2008-I-0509	2007-4314	Gridley Medical Building	Collier	4	0	2	2
07/23/2008	41420-2006-FA-0165 41420-2006-F-0846	2004-182	Premier Airport Park	Lee	180	0	211	211
09/04/2008	41420-2008-FA-0415 41420-2008-I-0211	1984-4913	Colonial Boulevard Widening	Lee	35	0	39	39
09/25/08	41420-2008-FA-0702 41420-2008-I-0806	1988-1061	Alligator Alley Commercial Center	Collier	41	0	18	18
12/17/2008	41420-2006-FA-0023 41420-2008-F -0018	1999-4926	Sembler Partnership McMullen Parcel	Collier	40	0	49	49
01/13/09	41420-2007-FA-1111 41420-2007-I-1083	2007-1264	Big Corkscrew Island Fire Control & Rescue	Collier	5	2	5	7
01/30/02 02/12/09	4-1-98-F-372 41420-2006-F-0267	199402492 (IP-ML)	Florida Rock Industries, Inc. (Fort Myers Mine #2)	Lee	2,913	1,959	0	1,960
02/24/2009	41420-2006-FA-0548 41420-2006-F-1011	2006-7018	Oil Well Road Widening	Collier	329	0	356	356
06/10/2009	41420-2008-FA-0804 41420-2008-I-0253	Not applicable	Greenfrog Electrical Substation	Miami-Dade	3	0	12	12
09/**?**/2010	41420-2010-FA-0265 41420-2010-F-0164	SAJ-2010-00191 (IP-JPF)	SR 80 from CR 833 to US 27 Widening	Hendry	40	0	41	41
10/08/2010	41420-2010-CPA-0388 41420-2010-F-0164	Not known at time of issuance	Tamiami Trail Modifications: Next Steps Project	Miami-Dade	101	0	143	143
				Total:	96,151	12,583	29,373	41,955

Table 3. Land protected for conservation within the Florida panther core area.

	Acres	Primary Equivalent Factor	Primary Equivalent Acres
Primary	1,659,65	1.00	1,659,657
Dispersal	(	1.00	0
Secondary	308,62	0.69	212,950
Other	609,87	0.33	201,258
TOTAL	2,578,15	**TOTAL**	2,073,865

Table 4. Original panther habitat unit values for use in assessing habitat value to the Florida panther.

Land Cover Type	Value	Land Cover Type	Value	Land Cover Type	Value
Water	0	STA	4.5	Cypress swamp	9
Urban	0	Shrub swamp	5	Sand pine scrub	9
Coastal strand	1	Shrub and brush	5	Sandhill	9
Reservoir	1.5	Dry prairie	6	Hardwood-Pine forest	9
Mangrove swamp	2	Grassland/pasture	7	Pine forest	9
Salt marsh	2	Freshwater marsh	9	Xeric oak scrub	10
Exotic/nuisance plants	3	Bottomland hardwood	9	Hardwood forest	10
Cropland	4	Bay swamp	9		
Orchards/groves	4	Hardwood swamp	9		

Table 5. Comparison of panther habitat selection analyses.

Panther Habitat Selection Analyses – Habitat Papers Comparison

Habitats	Kautz compositional second order	rank	Kautz Euclidean second order	rank
Hardwood swamp	1	A	3	A
Pineland	2	A	2	AB
Cypress swamp	3	AB	1	BC
Upland forest	1	B	4	CD
Dry prairie	5	B	5	DE
Shrub and brush	4	C	7	EF
Xeric scrub	3	CD	9	F
Marsh	5	CD	9	F
Unimproved pasture	7	DE	7	G
Barren	6	E	9	G
Improved pasture	9	EF	6	G
Urban	8	F	8	G
Cropland	9	F	8	H
Citrus	10	G	8	H
Coastal wetlands	11	G	8	H
Open water	10	H	10	I
Exotic plants				
STA				
Reservoir				

Habitats	Cox Euclidean second order	rank	Cox Euclidean third order	rank
Coniferous forest	1	A	1	A
pineland				
Hardwood forest	3	C	2	A
hardwood hammock				
mixed pine/hardwood				
palm/oak				
tropical hammock				
Forested wetland	2	B	3	A
cypress swamp				
mixed forest				
shrub swamp				
hardwood swamp				
other wet forest				
Dry prairie/grass	4	C	4	B
dry prairie				
grassland				
Open wetland	7	E	7	C
marsh and wet prairie				
sawgrass				
cattail				
Agricultural	5	D	5	B
improved pasture				
citrus				
row crop				
other agriculture				
Urban/barren	6	E	6	B
bare soil				
high-impact urban				
low-impact urban				
extractive				

Habitats	Land VHF Euclidean third order	rank	Land GPS Euclidean third order	rank
Upland forest	1	A	1	A
pine/hardwood				
hardwood hammock				
pinelands				
tropical hammock				
palm/hardwood				
Wetland forest	2	A	2	AB
cypress swamp				
cypress/pine/palm				
mixed swamp				
hardwood swamp				
Dry prairie/grass	3	B	3	BC
grassland				
unimproved pasture				
improved pasture				
Marsh/shrub	6	B	4	C
marsh/wet prairie				
sawgrass				
cattail				
shrub swamp				
Other	4	B	5	C
open water				
shrub/brush				
barren				
high impact urban				
low impact urban				
extractive				
Agriculture	5	B	6	C
citrus				
row crop				
other agriculture				

second order - selection of home range with entire study area
third order - selection of habitats within home range
Bold (black) - habitat used more than availability (selection)
Bold (red) - habitat used less than availability (avoidance)
rank - habitats with same letters did not differ in preference

Table 6. Summary of ranking values.

Habitats	Kautz compositional second order	Kautz Euclidean second order	Cox Euclidean second order	Cox Euclidean third order	Land VHF Euclidean third order	Land GPS Euclidean third order	Average
Hardwood swamp	10	7	9	10	10	9	9.2
Pineland	9	8	10	10	10	10	9.5
Cypress swamp	8	9	9	10	10	9	9.2
Upland forest	10	6	8	10	10	10	9.0
Dry prairie	6	5	8	6	6	7	6.3
Shrub and brush	7	3	no data	no data	6	6	5.5
Xeric scrub	8	1	no data	no data	no data	no data	4.5
Marsh	6	1	6	3	6	6	4.7
Unimproved pasture	4	3	8	6	6	7	5.7
Barren	5	1	7	6	6	6	5.2
Improved pasture	2	4	7	6	6	6	5.2
Urban	3	2	7	6	6	6	5.0
Cropland	2	2	7	6	6	6	4.8
Citrus	1	2	7	6	6	6	4.7
Coastal wetlands	0	2	no data	no data	no data	no data	1.0
Open water	1	0	no data	no data	6	6	3.3
Exotic plants							
STA							
Reservoir							

habitat selection	7,8,9,10
neither selected nor avoided	4,5,6
habitat avoidance	0,1,2,3

Table 7. Revised panther habitat unit values for use in assessing habitat value to the Florida panther.

Land Cover Type	Value	Land Cover Type	Value	Land Cover Type	Value
Reservoirs	*	Xeric scrub	4.5	Dry prairie	6.3
STAs	**	Orchards/groves	4.7	Upland Hardwood Forest	9.0
Urban	0	Marsh/ wet prairie	4.7	Cypress swamp	9.2
Water	0	Cropland	4.8	Hardwood swamp	9.2
Barren/Disturbed lands	3	Improved pasture	5.2	Hardwood-Pine	9.3
Coastal wetlands	3	Shrub swamp/brush	5.5	Upland-Hydric Pine forest	9.5
Exotic/nuisance plants	3	Unimproved pasture	5.7		

*PHU values for reservoirs are evaluated based on open water for the main water areas and the appropriate categories for berms and other non-water sections. Refer to page 39 for the accompanying text for guiding criteria for these systems.
**PHU values for stormwater treatment areas vary depending on design criteria, mode of operation, location in native or non-native habitats, and other landscape features. Refer to page 38 for the accompanying text for guiding criteria for these systems.

Table 8. Undeveloped privately owned land within Florida panther core area.

Zones	Acres	Primary Equivalent Factor	Primary Equivalent Acres
Primary	610,935	1.00	610,935
Dispersal	27,883	1.00	27,883
Secondary	503,481	0.69	347,402
Other	655,996*	0.33	216,479
TOTAL	1,962,294	**TOTAL**	1,202,699

*About 819,995 acres are at-risk in the other zone with about 80 percent with resource value. Total acres of at-risk privately owned lands are 1,962,294 acres.

Table 9. Landscape compensation multipliers.

Zone of Impacted Lands	Zone of Compensation Lands	Multiplier
Primary	Secondary	1.45
Secondary	Primary	0.69
Other	Secondary	0.48
Other	Primary	0.33

Table 10. Results of the wood stork foraging habitat assessment* for wetlands within the project corridor.

Wetland Type	Acres	Wetland Hydroperiod Class **	Forage Fish Biomass (Kilograms)
Freshwater Marsh	33.9	5	130.64
Mixed Wetland/Hardwood Shrub	48.8	5	188.06
Sawgrass Marsh	17.8	5	68.59
			387.29

*The wood stork foraging habitat methodology can be found in the Service's letter to the Corps dated May 18, 2010, (Service Federal Activity Code Number 41420-2007-FA-1494).

Table 11. Radio-collared panthers recorded within 5 miles of the west of Tamiami Trail Modifications: Next Steps Project.

Panther	Count	Sex	Years	Death Cause - Year
FP20	1	M	1987	Heart Defect - 1988
FP28	1	M	1989	Intraspecific Agression - 1992
FP84	18	M	2000	Unknown - 2000
FP130	130	M	2004	Vehicle - 2007

Table 12. Panther-Vehicle Collisions within the Tamiami Trail Modifications: Next Steps Project site action area as of September 2010.

ID	Distance from Project	Roadway	Year	Sex	Result
FP-21	23.0 Miles South	Palm Drive,1 Mile East of U.S. Highway	1988	F	INJURY
UCFP62	16.7 Miles West	U.S. Highway 41 near 40-Mile Bend	2004	F	DEATH
UCFP71	22.3 Miles West	U.S. Highway 41 Just East of 11 Mile Road	2005	M	DEATH
UCFP96	24.0 Miles South	U.S. Highway 41 ½ Mile South of Intersection with Card Sound Road	2007	F	DEATH
UCFP101	7.8 Miles East	U.S. Highway 41 1 Mile East of Krome Avenue	2007	M	DEATH

Table 13. Panther habitat units provided by the Tamiami Trail Modifications: Next Steps Project site.

Land Cover Type	Score	Acres in Panther Primary Zone	PHUs
Urban (Existing Roadway)	0	0	0
Open Water (canal)	0	0	0
Freshwater Marsh	4.7	33.9	159.33
Mixed Wetlands/Hardwood Shrub	5.5	48.8	268.40
Sawgrass Marsh	4.7	17.8	83.66
	Total	100.5	511.39

Total PHUs at Project Site: (511.39 x 2.5 base ratio x 1.0 landscape multiplier) = 1278.48 PHUs

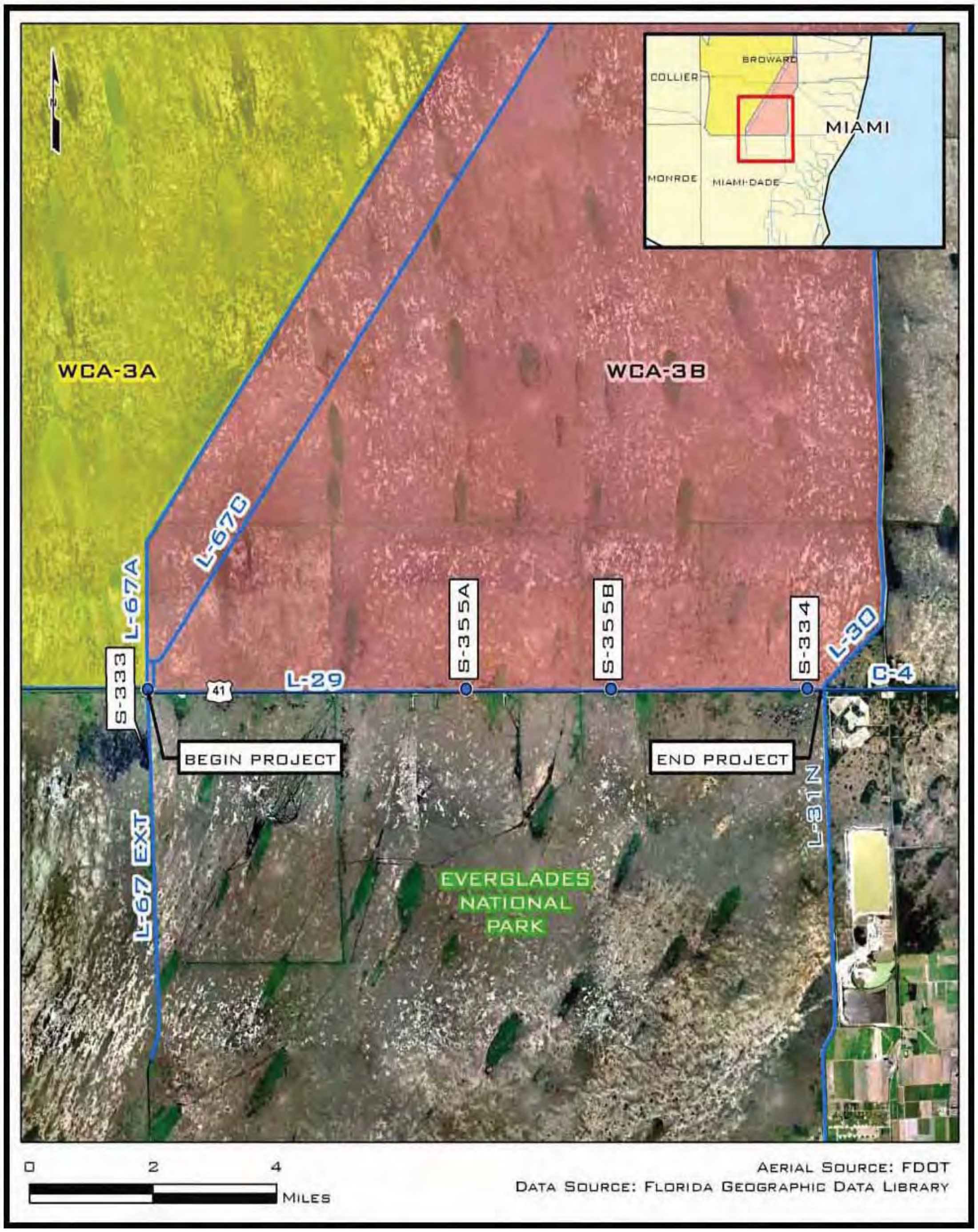

Figure 1. Location map of Tamiami Trail Modifications: Next Steps Project in Miami-Dade County, Florida (ENP 2010).

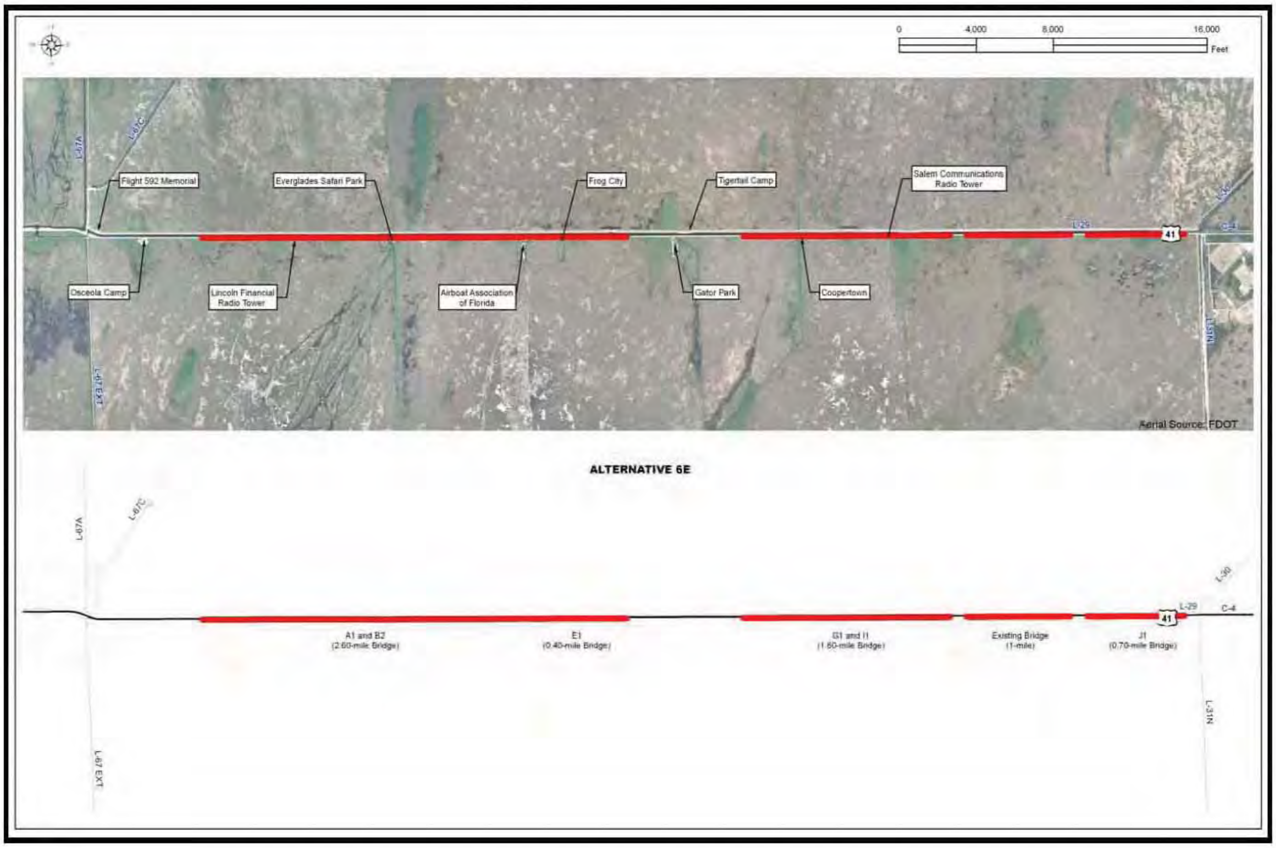

Figure 2. Map indicating sections of Tamiami Trail (US 41) proposed for improvements (indicated in red) by the proposed action.

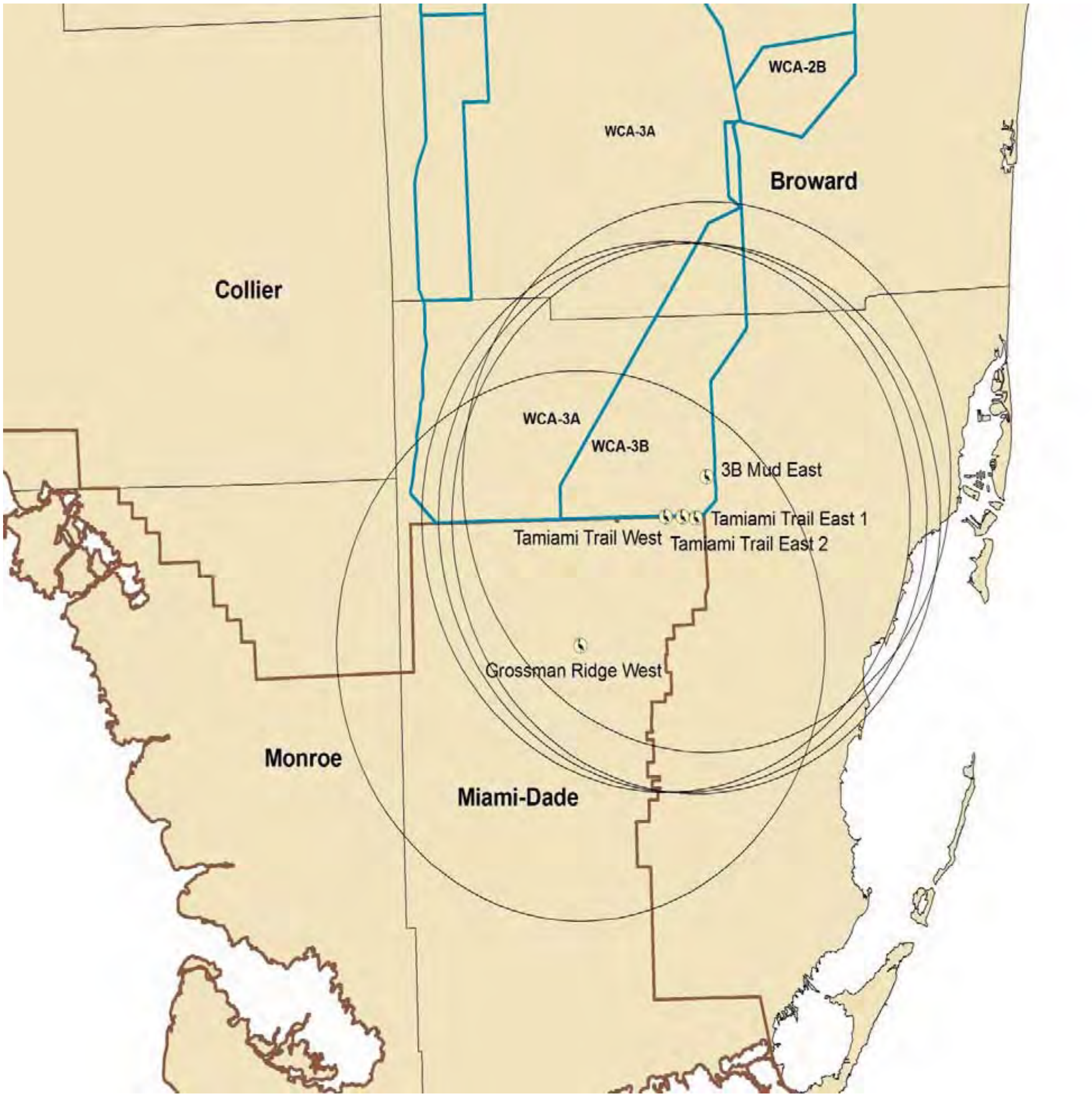

Figure 3. Map of wood stork action area and Tamami Trail East-1 and Tamiami Trail West nest colonies for the wood stork.

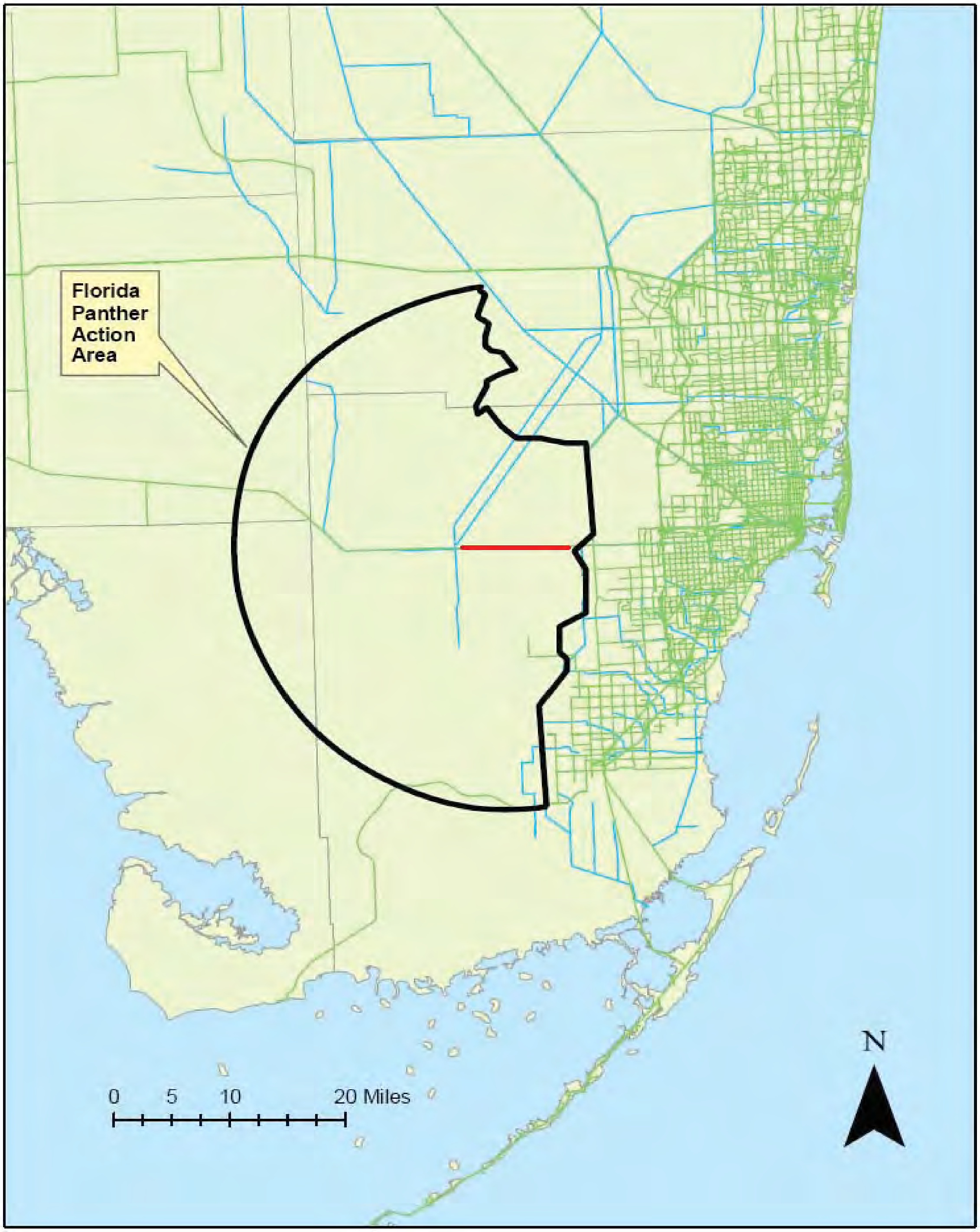

Figure 4. Map of Florida panther action area in Miami-Dade, Broward, and Collier Counties for the Tamiami Trail Modifications: Next Steps Project (project site indicated by red line).

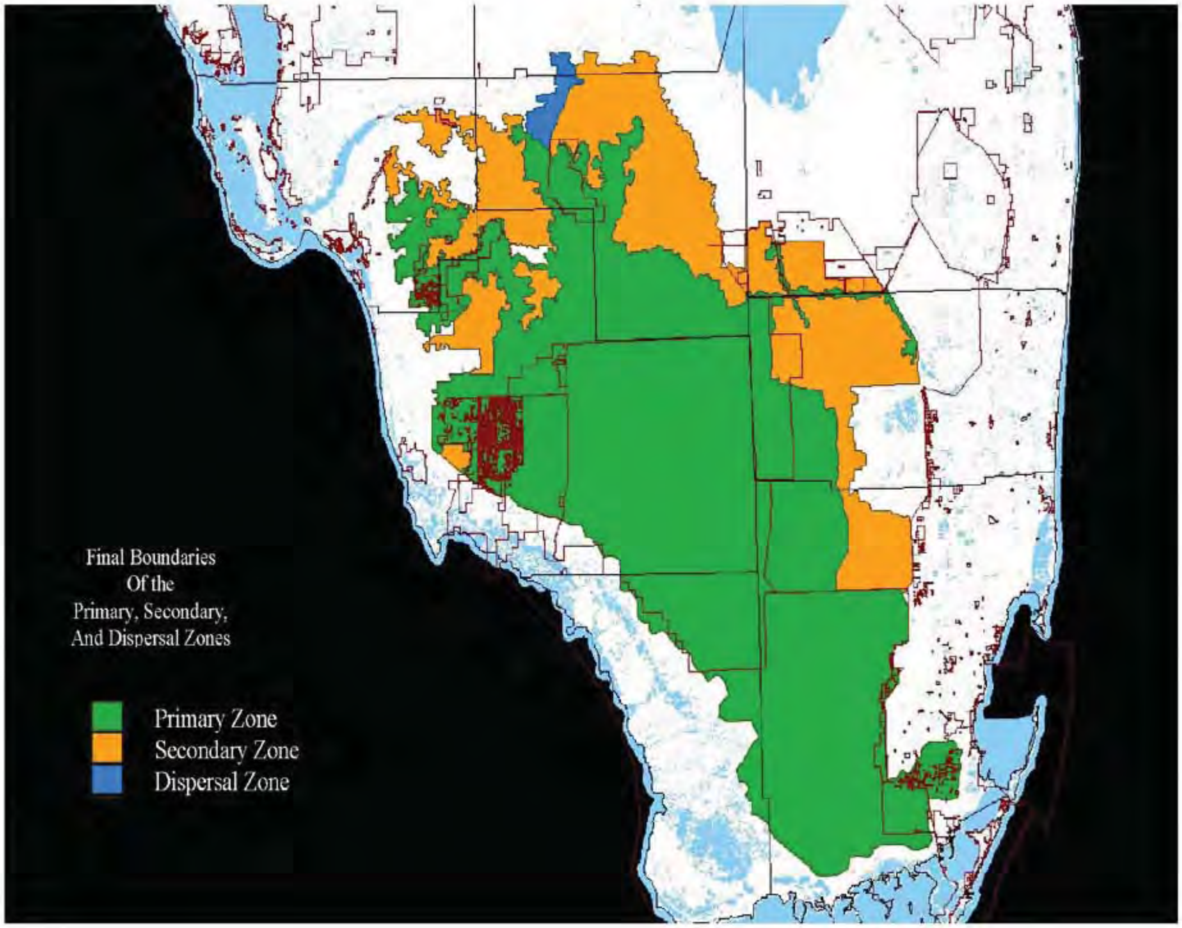

Figure 5. Primary, Secondary, and Dispersal Zones from Kautz et al. (2006).

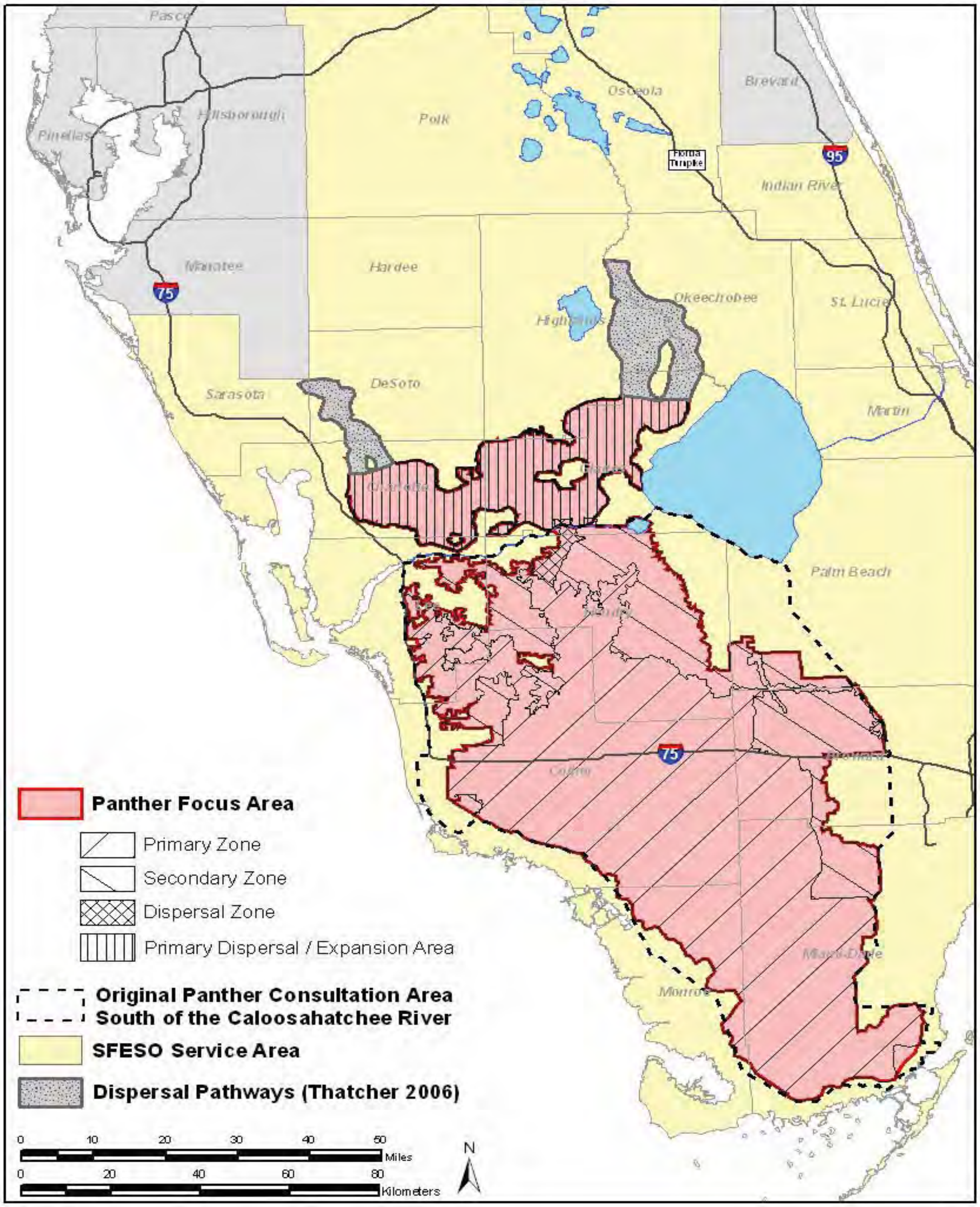

Figure 6. Florida panther focus area and original panther consultation area.

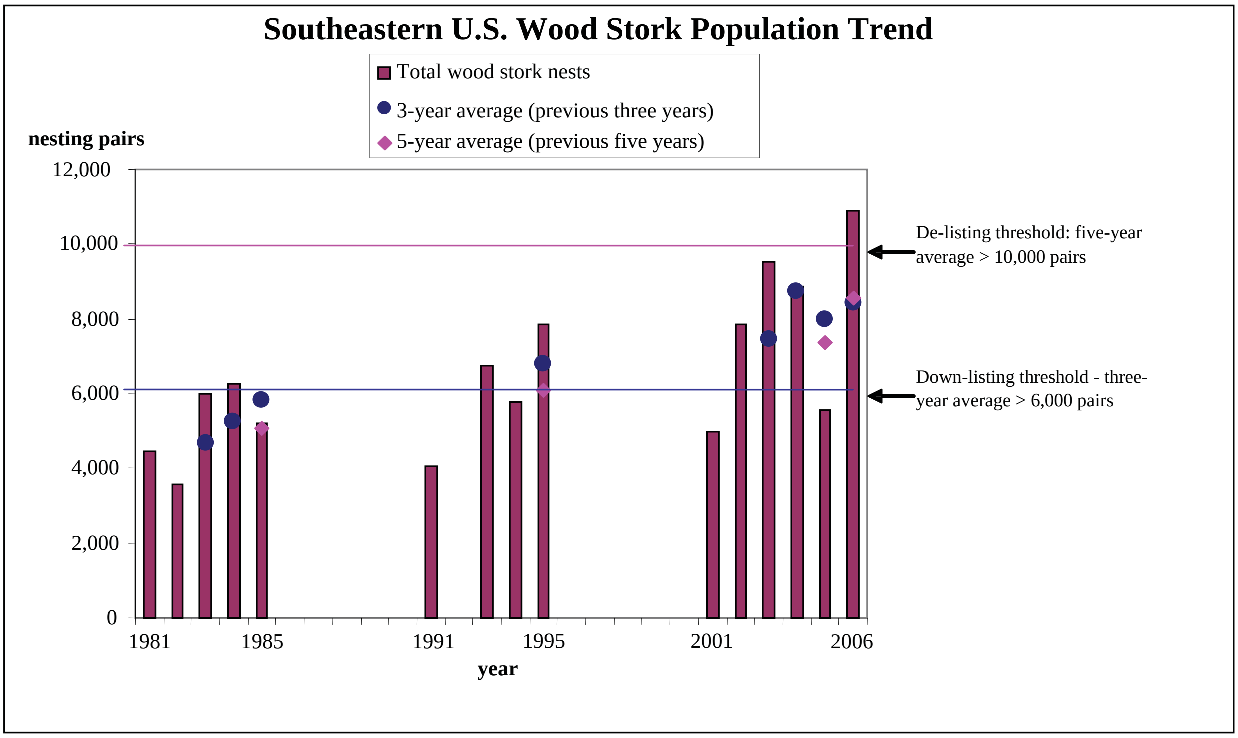

Figure 7. Total wood stork nesting in the Southeastern United States in relation to recovery criteria.

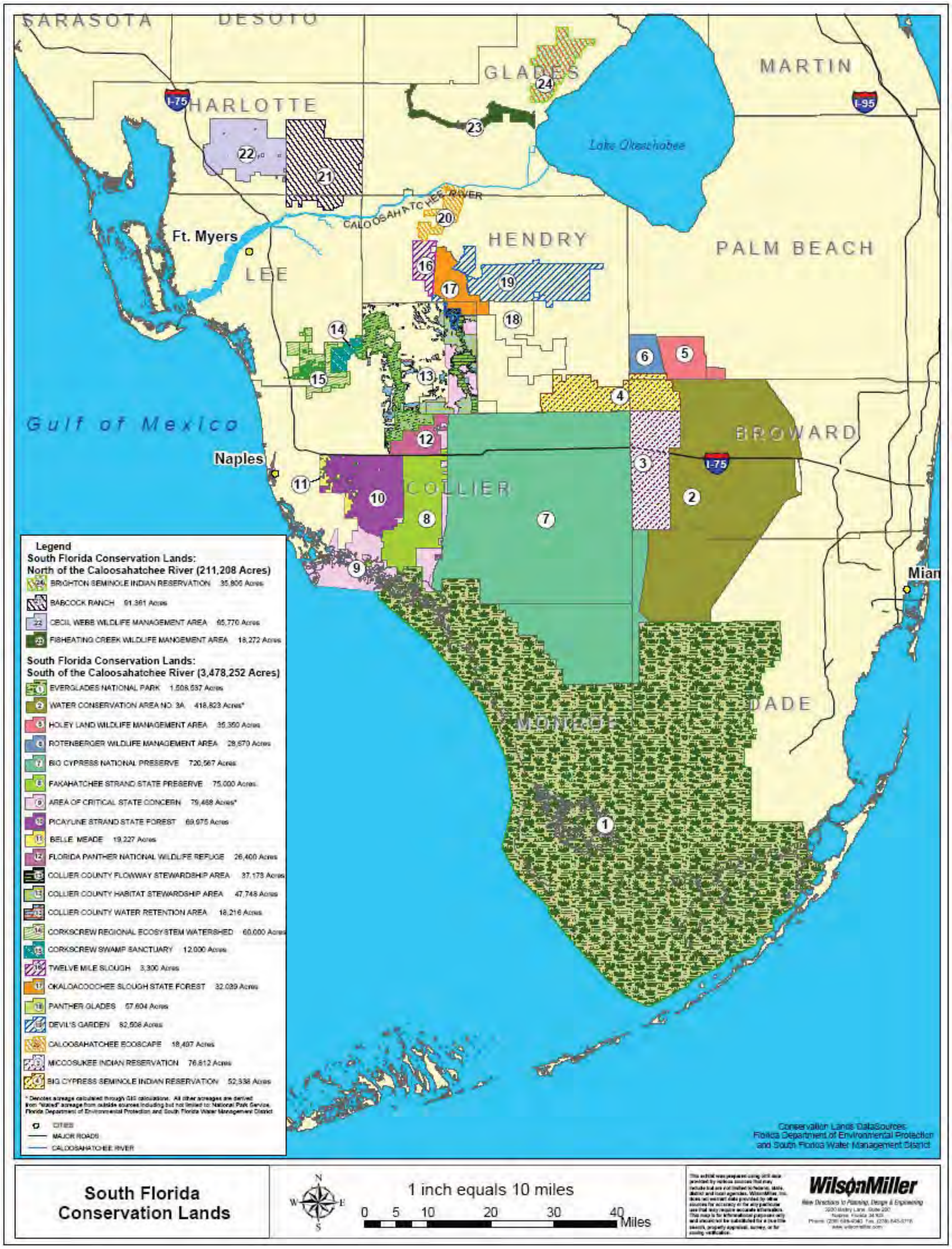

Figure 8. Southwest Florida conservation lands.

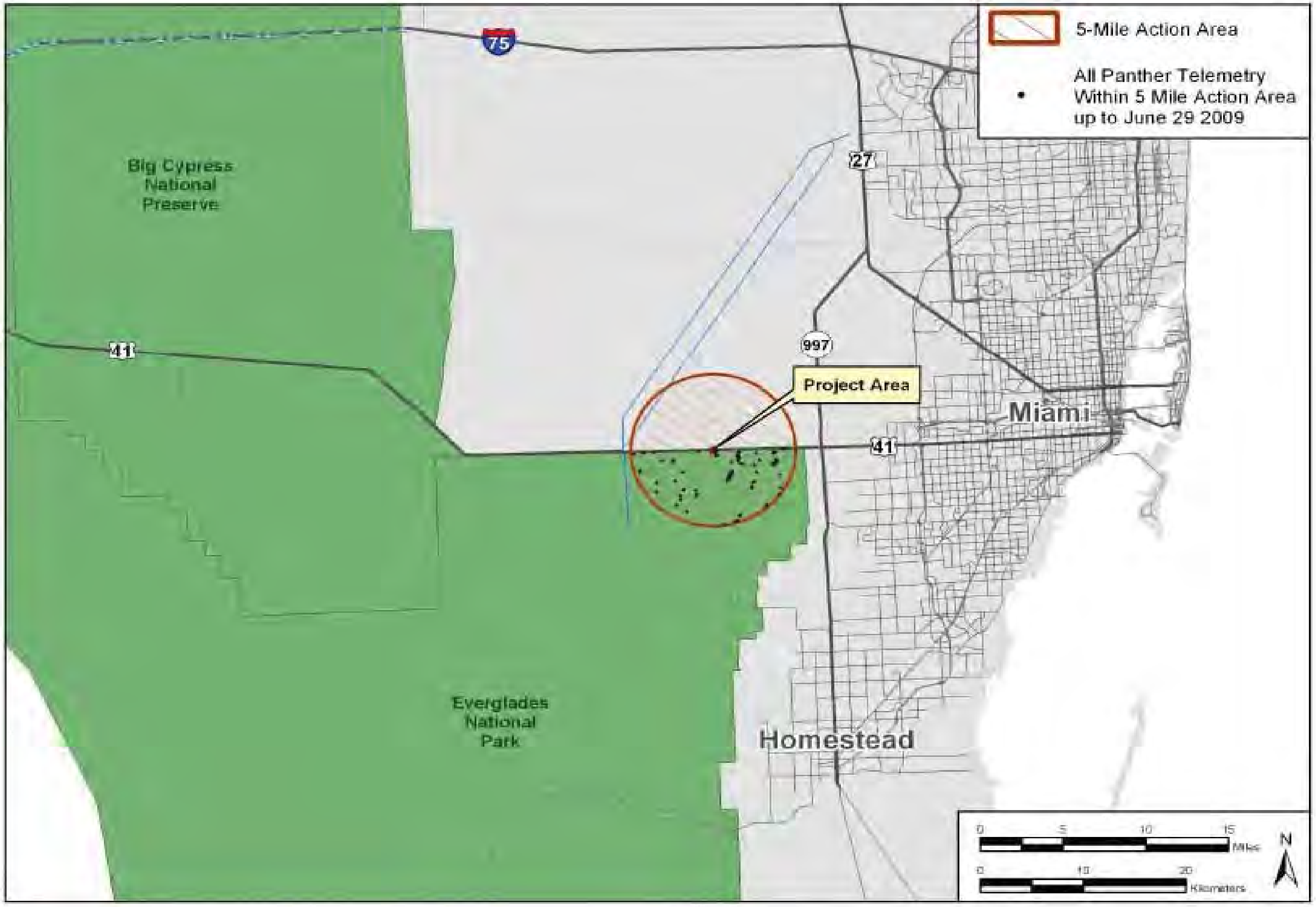

Figure 9. Map indicating Florida panther telemetry points within 5 miles of the Tamiami Trail Modifications: Next Steps Project site.

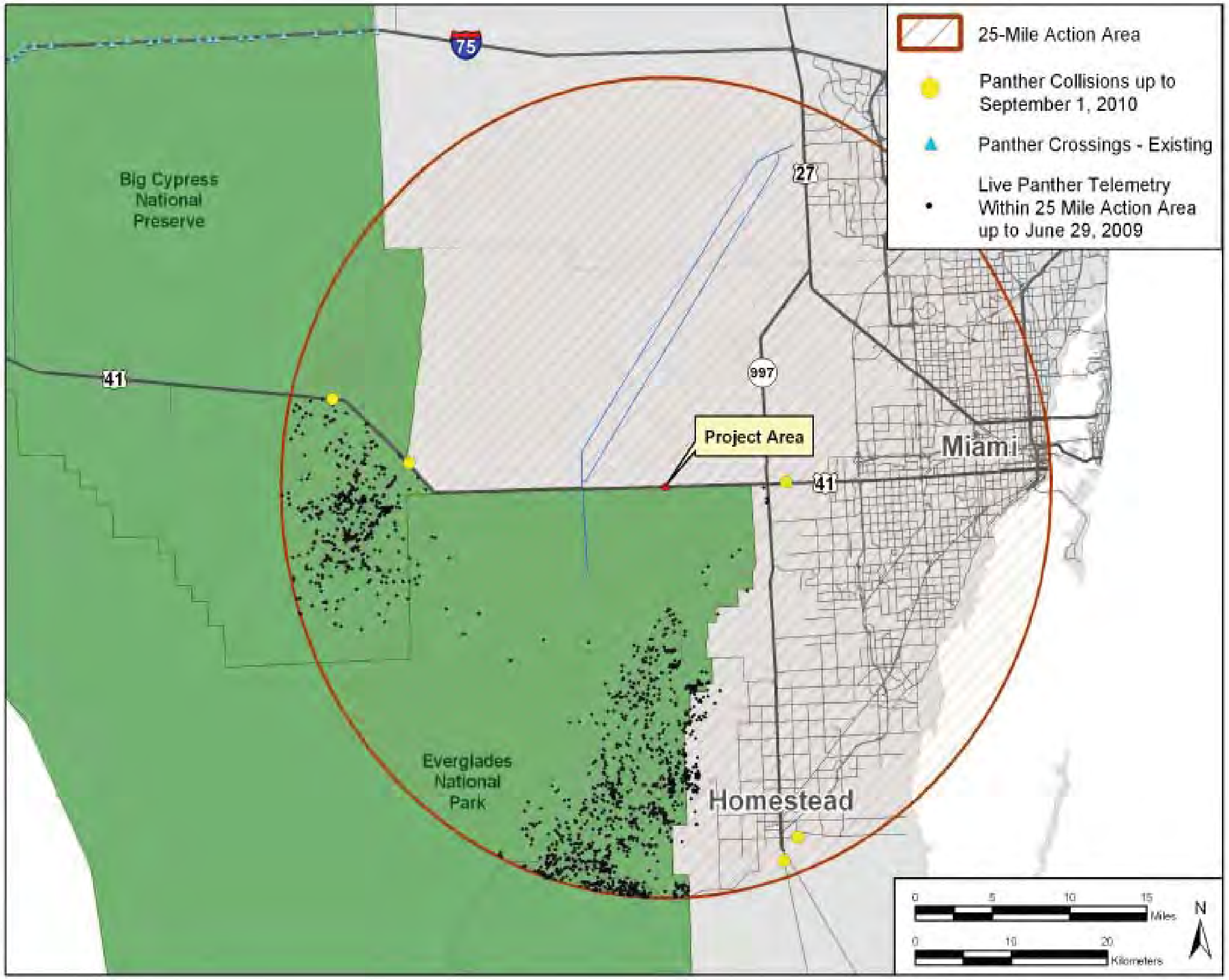

Figure 10. Locations of Florida panther/vehicle collisions within Florida panther action area of the *Tamiami Trail Modifications: Next Step* project site.

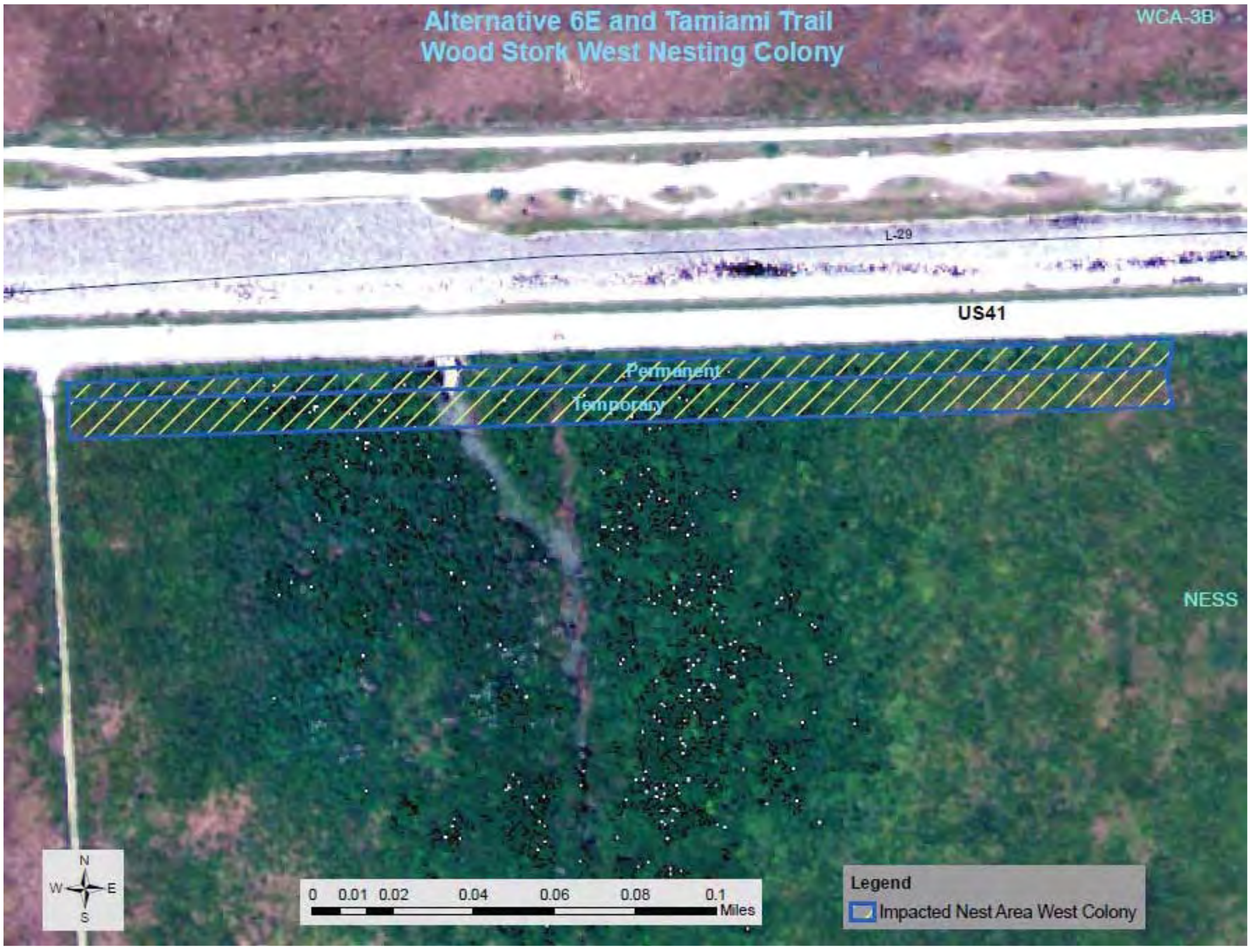

Figure 11. Aerial photograph showing the core colony area (pond apple) and temporary and permanent impact zones in the Tamiami West colony (ENP 2010).

Appendix A. Data from Kushlan et al. (1986), Ogden et al. 1986, and Trexler et al. (2002) used by the Service to estimate the fraction of the available fish biomass within the size range of fish that may be consumed by wood storks**.**

		Kushlan et al. (1986)				Ogden et al. (1976)		Everglades - Trexler et al. (2002)				
Species	Common name	Mean Mass (g)	Proportion of fish < 15mm	Proportion of fish > 90mm	Proportion within 15-90 mm wood stork preference	% items consumed by stork	% biomass consumed by stork	Total collected	% of total collected	Mean mass based on % collected	Mass within 6 g/m2	Mass within stork prey size
Osteichtheyes												
Amia calva	Bowfin	1307.3	0.000	0.997	0.002	0.1	0.1		0.000	0.000	0.000	0.000
Lepisosterus platyrhincus	gar	182.5	0.012	0.948	0.039	0.2	2.8	1	0.003	0.484	0.109	0.004
Elops saurus	lady fish	346.7	0.000	1.000	0.000				0.000	0.000	0.000	0.000
Notemigonus crysoleucas	golden shiner	2.5	0.086	0.028	0.885	0.1	0.2		0.000	0.000	0.000	0.000
Notropis petersoni	coastal shiner	0.3	0.029	0.000	0.971			60	0.159	0.046	0.010	0.010
Notropis maculatus	taillight shiner					0.2	0.1	1	0.003	0.000	0.000	0.000
Erimuzon sucetta	Lake cubsucker	20.5	0.300	0.211	0.489				0.000	0.000	0.000	0.000
Ictalurus natalis	yellow bullhead catfish	29.0	0.063	0.438	0.499	1.7	11.8	29	0.077	2.228	0.500	0.250
Ameiurus nebulosus	brown bullhead catfish								0.000	0.000	0.000	0.000
Noturus gyrinus	tadpole madtom	1.4	0.052	0.000	0.948	0.2	0.1	8	0.021	0.029	0.007	0.006
Clarias batrachus	walking catfish	40.5	0.016	0.796	0.188			4	0.011	0.429	0.096	0.018
Bagre marinus	gafftopsail catfish	464.4	0.000	0.997	0.003				0.000	0.000	0.000	0.000
Opsanus beta	gulf toadfish	14.9	0.001	0.339	0.660				0.000	0.000	0.000	0.000
Strongylura notata	redfin needlefish	3.9	0.034	0.669	0.297				0.000	0.000	0.000	0.000
Adinia xenica	diamond killfish	0.7	0.002	0.000	0.998				0.000	0.000	0.000	0.000
Cyprinidon variegatus	sheepshead minnow	0.3	0.278	0.000	0.722	4.1	2.7	41	0.109	0.035	0.008	0.006
Floridichthylys carpio	goldspotted killfish	1.1	0.033	0.000	0.967				0.000	0.000	0.000	0.000
Fundulus chrysotus	golden topminnow	0.4	0.273	0.000	0.727	1.3	0.8	1844	4.889	1.750	0.393	0.286
Fundulus confluentus	marsh killifish	0.5	0.188	0.000	0.812	18.0	10.7	87	0.231	0.120	0.027	0.022
Fundulus grandis	gulf killfish	9.9	0.001	0.118	0.881				0.000	0.000	0.000	0.000
Fundulus seminolis	seminole killifish	5.8	0.000	0.110	0.890	0.7	3.1	1	0.003	0.016	0.003	0.003
Jordanella floridae	flagfish	0.3	0.260	0.000	0.740	32.0	7.0	1783	4.728	1.480	0.332	0.246
Lucania goodei	bluefin killifish	0.1	0.280	0.000	0.720	0.1	0.1	8391	22.248	2.759	0.620	0.446
Lucania parva	rainwater killifish	0.2	0.150	0.000	0.850	0.3	0.1	1	0.003	0.001	0.000	0.000
Gambusia affinus	mosquitofish	0.1	0.464	0.000	0.536	6.3	0.5	9825	26.051	2.214	0.497	0.266
Heterandria formosa	least killifish	0.0	0.917	0.000	0.083	0.5	0.1	12713	33.708	1.315	0.295	0.025
Poecilia latipinna	sailfin molly	0.2	0.292	0.000	0.708	19.8	10.6	1699	4.505	1.081	0.243	0.172
Labidesthes sicculus	brook silverside	0.5	0.002	0.000	0.998	0.1	0.1	5	0.013	0.007	0.002	0.002
Menidia beryllina	tidewater silverside	0.8	0.000	0.000	1.000	0.1	0.1		0.000	0.000	0.000	0.000
Elassoma evergladei	everglades pygmy sunfish	0.2	0.250	0.000	0.750			487	1.291	0.200	0.045	0.034
Enneacanthus gloriosus	bluespotted sunfish	0.5	0.155	0.000	0.845	0.8	0.9	238	0.631	0.321	0.072	0.061
Lepomis gulosus	warmouth	36.8	0.006	0.484	0.510	4.8	27.2	18	0.048	1.754	0.394	0.201
Lepomis macrochirus	bluegill	21.2	0.047	0.283	0.670	0.3	0.7	6	0.016	0.337	0.076	0.051
Lepomis marginatus	dollar sunfish	2.1	0.046	0.000	0.954			14	0.037	0.077	0.017	0.016
Lepomis microlophus	redear sunfish	30.8	0.052	0.362	0.586	2.3	5.4	55	0.146	4.490	1.008	0.591
Lepomis punctatus	spotted sunfish	7.0	0.182	0.030	0.787	2.8	8.7	197	0.522	3.661	0.822	0.647
Lepomis	unidentified sunfish	12.6	0.137	0.134	0.729	2.5	1.0	16	0.042	0.534	0.120	0.087
Sunfish	unidentified sunfish	9.8	0.175	0.070	0.754	2.5	1.0		0.000	0.000	0.000	0.000
Micropterus salmoides	largemouth bass	104.0	0.007	0.855	0.138	0.3	4.4	4	0.011	1.103	0.248	0.034
Etheostoma fusiforme	swamp darter	0.4	0.002	0.000	0.998			2	0.005	0.002	0.001	0.001
Astronotus ocellatus	oscar								0.000	0.000	0.000	0.000
Hemichromis bimaculatus	jewelfish	4.2	0.092	0.000	0.908				0.000	0.000	0.000	0.000
Spilotum nicaraguense	Nicaraguan cichlid								0.000	0.000	0.000	0.000
Eucinostomus gula	jenny mojarra	2.9	0.000	0.000	1.000				0.000	0.000	0.000	0.000
Haemulon plumieri	white grunt	6.2	0.000	0.011	0.988				0.000	0.000	0.000	0.000
Lagodon rhomboides	pinfish	7.1	0.001	0.039	0.960				0.000	0.000	0.000	0.000
Bairdiella chrysoura	silver perch	7.1	0.000	0.047	0.953				0.000	0.000	0.000	0.000
Cichlasoma bimaculatum	black acara	13.0	0.000	0.005	0.995			7	0.019	0.242	0.054	0.054
Cichlasoma urophthalmus	mayan cichlid							21	0.056	0.000	0.000	0.000
Mugil curema	white mullet					0.1	0.8		0.000	0.000	0.000	0.000
Rivulus marmoratus	rivulus					0.1	0.1		0.000	0.000	0.000	0.000
Esox niger	chain pickerel					0.1	0.1	5	0.013	0.000	0.000	0.000
Erimyzon sucetta	lake chubsucker							145	0.384	0.000	0.000	0.000
Belonesox belizanus	pike killifish							3	0.008	0.000	0.000	0.000
Tilapia mariae	spotted tilapia							4	0.011	0.000	0.000	0.000
Total								**37715**	**100.000**	**26.715**	**6.000**	**3.539**

*Shaded estimate of average mass from length-weight relationship given for species on www.fishbase.org with average length assumed to be 5 cm (FLMNH). The proportion of fish length less than 1.5 cm was set to be the average of all sunfish.