ENVIRONMENTAL ASSESSMENT AND PROPOSED FINDING OF NO SIGNIFICANT IMPACT

PICAYUNE STRAND RESTORATION PROJECT

NOVEMBER 2014

DESIGN REFINEMENTS

U.S. Army Corps of Engineers
Jacksonville District

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PROPOSED FINDING OF NO SIGNIFICANT IMPACT

Design Refinements for the Picayune Strand Restoration Project
Collier County, Florida

Based on the information analyzed and presented in the Environmental Assessment (EA) attached hereto, dated October 2014, reflecting pertinent information obtained from agencies having jurisdiction by law and/or special expertise, I conclude that the proposed actions will not significantly impact the quality of the human environment and do not require an Environmental Impact Statement (EIS). The proposed actions are minor activities that are not similar to any action normally requiring an EIS. There are no significant effects anticipated as a result of these design refinements to the Picayune Strand Restoration Project (PSRP) as described in the 2004 PSRP Final Project Implementation Report (PIR) and EIS. Reasons for this conclusion are, in summary:

a. A PIR and EIS were completed for the PSRP in 2004. The PSRP was authorized in the 2007 Water Resources Development Act. The primary purpose of the PSRP is to restore and enhance wetland habitat over approximately 55,000 acres in Southwest Florida and provide flood protection for Northern Golden Gate Estates, adjacent private lands, the 6L's agricultural area, and Port of the Islands community located near the PSRP area (per 33 C.F.R. § 385.37 Flood Protection). Although consultation under the Endangered Species Act was not complete at the time of project authorization, the project is essentially unchanged compared to the 2004 PIR and EIS.

b. The proposed actions would facilitate movement of freshwater sheetflow to the estuaries thereby improving the water quality as it passes through the restored system. The PSRP would be in compliance with the conditions of a State Water Quality Certification.

c. The U.S. Army Corps of Engineers (Corps) is coordinating a consistency determination with the Florida Department of Environmental Protection under the guidelines of the Coastal Zone Management Act through the circulation of this EA. The Corps has determined that the proposed actions are consistent with the State of Florida's Coastal Management Program through compliance with all applicable chapters of the Coastal Zone Management Act (Appendix B).

d. Endangered Species Act (ESA) consultation has been completed for the tieback levee and is described in the 2009 Biological Opinion (BO) for the PSRP. ESA and Marine Mammal Protection Act consultation for the endangered West Indian Manatee are being revisited based on new scientific information and will be addressed in a supplemental Biological Assessment (Appendix E). A manatee mitigation feature to ensure the continued existence of the refugium at Port of the Islands Basin is described in this EA.

e. The proposed actions would have no effect on any resources of cultural or historical significance. Monitors will be present during construction activities to ensure archeological sites are not affected by the PSRP. This project is in compliance with the National Historic Preservation Act.

f. Implementation of the proposed actions will follow the guidelines outlined in the PSRP Nuisance and Exotic Vegetation Management Plan.

g. The proposed actions would not substantially alter any other environmental or social impacts from those previously described in the 2004 PSRP Final PIR/EIS for the PSRP and in any other National Environmental Policy Act compliance documents related to the PSRP.

h. The proposed actions are consistent with the authorized purpose of the PSRP and will not adversely affect anticipated restoration benefits.

i. This finding is being coordinated with the public and agencies through a written Notice of Availability in accordance with 40 CFR 1501.4(e) and Engineer Regulation 200-2-2 (part 11 and Appendix A). The point of contact is Mr. Brad Tarr at 904-232-3582 or bradley.a.tarr@usace.army.mil.

In view of the above, and after consideration of public and agency comments received on the project, I have concluded that the proposed actions will not result in a significant effect on the human environment nor present significant environmental consequences. This finding incorporates by reference all discussions and conclusions contained in the EA attached hereto.

Alan M. Dodd
Colonel, U.S. Army
District Commander

Date

PICAYUNE STRAND RESTORATION PROJECT
ENVIRONMENTAL ASSESSMENT

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APPENDICES*

1.0 INTRODUCTION

The Picayune Strand Restoration Project (PSRP) encompasses an area of sensitive environmental land located in southwestern Collier County, Florida. It is located southwest of the Florida Panther National Wildlife Refuge, north of Ten Thousand Islands National Wildlife Refuge, east of the South Belle Meade State Conservation and Recreation Lands (CARL) project, west of the Fakahatchee Strand State Preserve, and northeast of Collier Seminole State Park. The South Belle Meade CARL project known as "Belle Meade" and the Southern Golden Gate Estates (SGGE) CARL project were combined to create the Picayune Strand State Forest. The central location of the PSRP among these nature preserves and wildlife areas reflects its importance to ecosystem connectivity of the region. For more information on the SGGE history and area, please see Section 1 of the 2004 PSRP Final Project Implementation Report (PIR) and Environmental Impact Statement (EIS) (U.S. Army Corps of Engineers [Corps] 2004). The PSRP consists of removing the infrastructure of a 55,247 acre subdivision and restoring its pre-development hydrology and ecology (Figure 1-1). The PRSP was authorized by Section 1001(15) of the Water Resources Development Act (WRDA) of 2007.

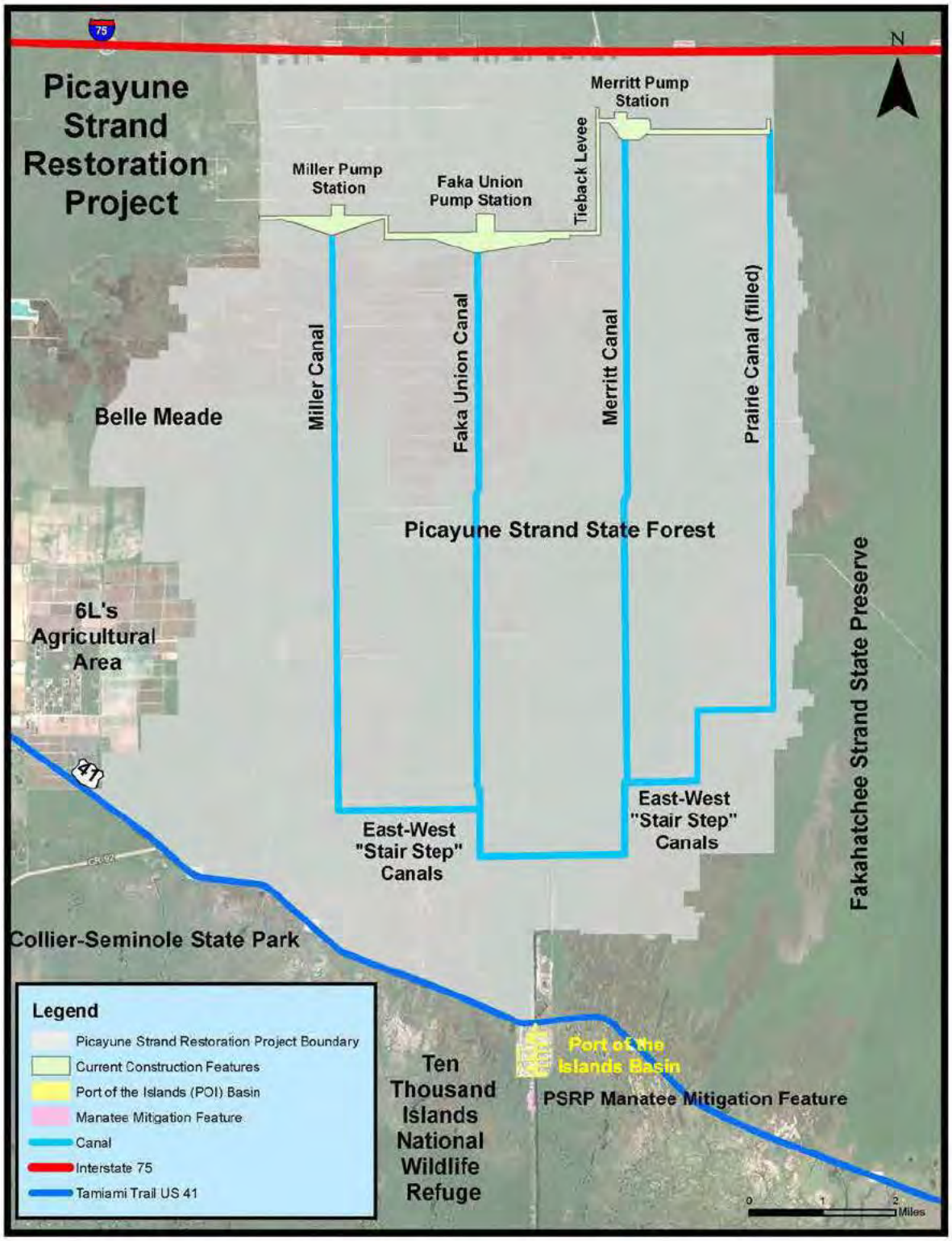

Figure 1-1. Picayune Strand Restoration Project Features and Location

During detailed project design, it was determined that refinements were necessary to adhere to current regulations and realize benefits as described in the 2004 PSRP Final PIR/EIS. These design refinements resulted in the project infrastructure encompassing a larger area than envisioned in the 2004 PSRP Final PIR/EIS and thus further evaluation under the National Environmental Policy Act (NEPA) was warranted. However, since these refinements are necessary to achieve project goals and there will be no change in benefits as described in the 2004 PSRP Final PSRP PIR/EIS, additional Congressional authorization of the updated project design is not necessary.

This Environmental Assessment (EA) addresses components that are considered refinements of the original design as described in the 2004 PSRP Final PIR/EIS. One such component described is the replacement of individual berms for the Merritt, Faka Union and Miller Pump Stations with a single full width tieback levee for each pump station. This project component was authorized as part of the PSRP and is needed to achieve full restoration benefits. The second component described in this EA is a manatee mitigation feature located south of the PSRP near the Port of the Islands (POI) Basin. This feature has been negotiated through informal Endangered Species Act (ESA) consultation with the U.S. Fish and Wildlife Service (USFWS) to mitigate for potential adverse effects due to PSRP project implementation on the existing thermal refugium in the POI Basin.

1.1 STUDY AUTHORITY

The 2004 PSRP Final PIR/EIS was completed in September 2004 as part of the Comprehensive Everglades Restoration Plan (CERP) under the authority of Section 601(d) of the WRDA 2000, which states:

(d) AUTHORIZATION OF FUTURE PROJECTS –

(1) IN GENERAL–Except for a project authorized by subsection (b) or (c), any project included in the Plan shall require a specific authorization by Congress.

(2) SUBMISSION OF REPORT–Before seeking congressional authorization for a project under paragraph (1), the Secretary shall submit to Congress –

(A) a description of the project; and

(B) a project implementation report for the project prepared in accordance with subsections (f) and (h).

The 2004 PSRP Final PIR/EIS was approved by the Office of the Chief of Engineers on September 15, 2005. The project was authorized for construction by Section 1001(15) of WRDA 2007. The 2004 PSRP Final PIR/EIS presents the results and recommendations of investigations into restoration of natural water flow across 85 square miles of western Collier County that were drained for an extensive residential development.

The potential need for a manatee mitigation feature was identified in the 2004 PSRP Final PIR/EIS (Sections 9.6.8 and 11.2). At that time, it was unclear as to whether the PRSP would adversely affect the thermal refugium utilized by manatees within the POI Basin and it was recognized that additional information was needed to make this determination. Subsequent investigations conducted by the U.S. Geological Survey (USGS), funded by the Corps and South Florida Water Management District (SFWMD), determined that a feature was required to ensure the continuance of the POI Basin as a manatee thermal refugium, thereby avoiding adverse impacts to manatees as a result of PSRP implementation. Incidental take of marine mammals, in this case, manatees, is prohibited under the Marine Mammal Protection Act (MMPA) of 1972. The Corps, Jacksonville District, has determined that the manatee mitigation feature can be approved under the Chief of Engineers discretionary authority and does not require further congressional authorization.

1.2 PURPOSE AND NEED

The project components portrayed in the 2004 PSRP Final PIR/EIS were conceptual and required significant refinement during detailed project design. Detailed modeling information obtained through design phase investigations provided more accurate details and highlighted the need to replace the individual berms for the Merritt, Faka Union and Miller Pump Stations with a single full width tieback levee. The changes to the pump stations were made according to the SFWMD *Major Pump Station Engineering Guidelines.* These components represent a design refinement to ensure continued flood protection level of service and were authorized under the original PSRP authority cited in Section 1.1 above. The manatee mitigation feature is required to ensure continued compliance with the MMPA and ESA. This EA describes the need for, and evaluates potential environmental effects of the tieback levees and proposed manatee mitigation feature.

As stated in the 2000 CERP, the SGGE restoration, now known as the PSRP, is "to restore and enhance the wetlands in Golden Gate Estates and in adjacent public lands by reducing over-drainage. Implementation of the restoration plan would also improve the water quality of coastal estuaries by moderating the large salinity fluctuations caused by freshwater point discharge of the Faka Union Canal. The plan would also aid in protecting the City of Naples' eastern Golden Gate well field by improving groundwater recharge." Refer to Section 1 of the 2004 PSRP Final PIR/EIS for more information on the purpose and need of the PSRP.

1.2.1 TIEBACK LEVEE

The 2004 PSRP Final PIR/EIS included a berm and spreader canal for each of the three pump stations, Merritt, Faka Union and Miller, to ensure movement of water southward to restore previously drained wetlands. Further hydraulic and hydrologic analyses determined that the individual berms were not sufficient to prevent recirculation of water to the north side of the pump station and an engineered levee spanning the width of the restored project area would be required (Figure 1-2). This longer tieback levee is necessary to prevent recirculation of water and ensures the restorative water is transferred south into the project area to realize the benefits envisioned in the 2004 PSRP Final

PIR/EIS. The tieback levee falls within the original project footprint, but was not part of the original design. The tieback levee runs generally east to west directly south of the pump stations. The single, redesigned tieback levee will be approximately 54,000 feet long across the width of the PSRP. The tieback levee design consists of approximately 231,000 cubic yards of excavation, 386,000 cubic yards of fill, and 1,000 acres of clearing.

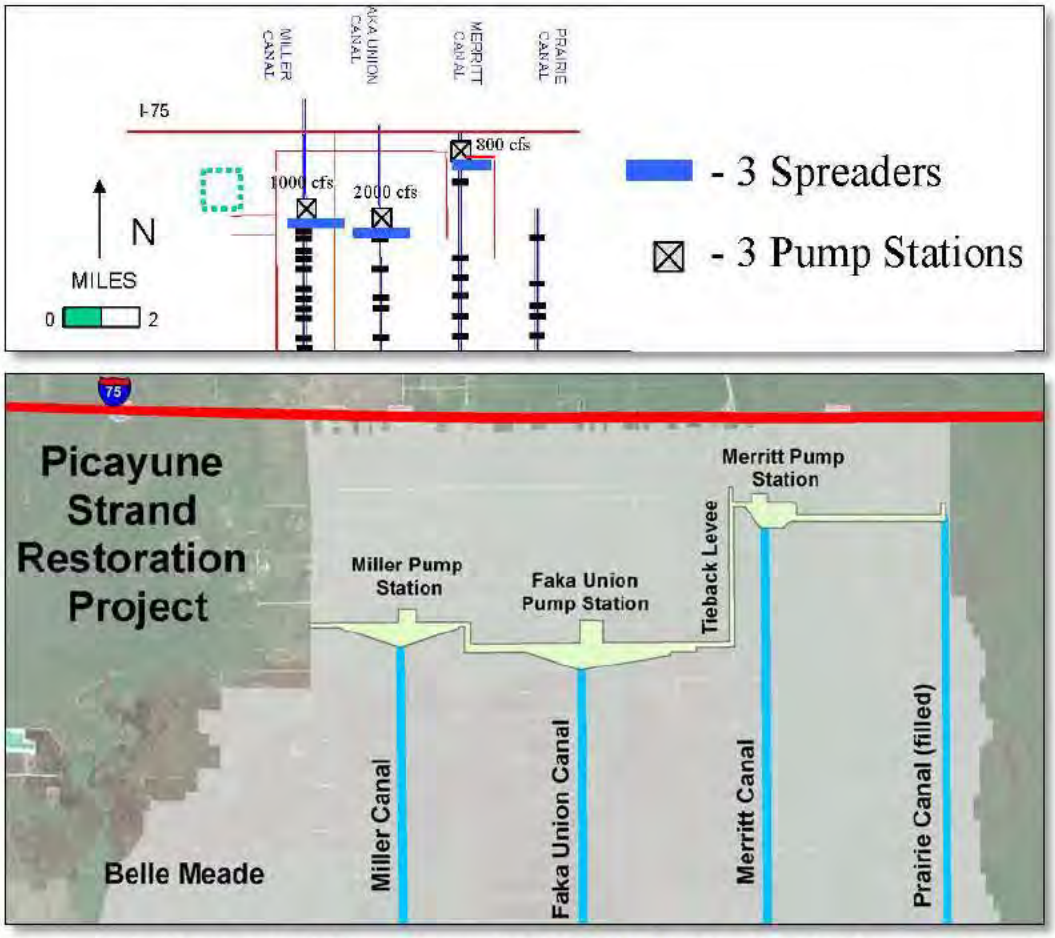

Figure 1-2. Alternative 3D as shown in 2004 PSRP Final PIR/EIS (Top) versus Preferred Alternative (Bottom)

1.2.2 MANATEE MITIGATION FEATURE

Approximately 300 manatees from the Southwest Florida manatee population currently use the POI Basin as a warm water refugium during the colder months of the year. The passive thermal refuge or "refugium" appears to be maintained by freshwater discharged from the canal system in the PSRP site that routes water through the Faka-Union Canal and over Faka Union Weir Number 1 located immediately north of US-41 (Tamiami Trail) and the POI Basin (Figure 1-1, Figure 1-3). The anticipated reduction in flow from the PSRP to the POI Basin resulting from plugging of project canals raised concern for the continued viability of the refugium under restored conditions and the potential for increased winter manatee mortality (U.S. Geological Survey, 2008). The 2004 PSRP

Final PIR/EIS acknowledged that an additional source of water, most likely groundwater, may be needed in the POI Basin to maintain the existing refugium (Section 9.6.8 and 11.12 of 2004 PSRP Final PIR/EIS).

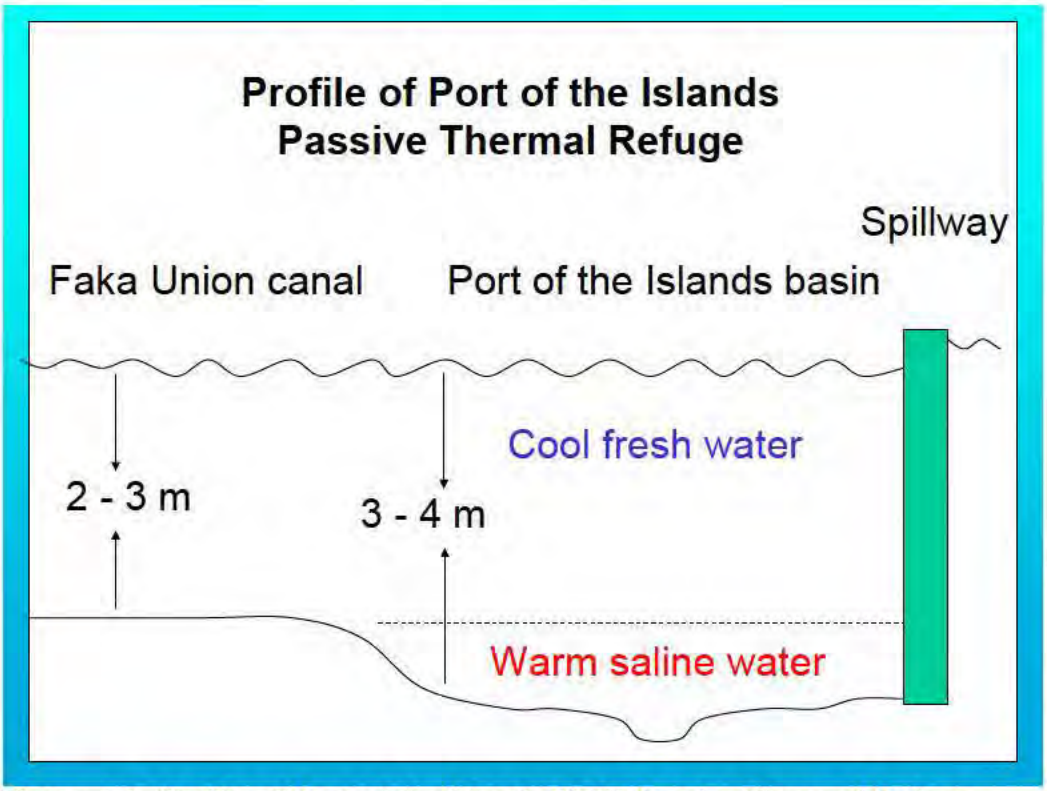

Figure 1-3. Profile of Port of the Islands (POI) Passive Thermal Refuge

The PSRP was authorized for construction in the WRDA 2007. Prior to construction authorization, informal consultation with the USFWS for West Indian manatee under the ESA was determined to be incomplete based on insufficient information for a manatee effects' determination. The 2009 USFWS Biological Opinion (BO) determination that the project "may affect, but was not likely to adversely affect" the manatee was contingent upon the results of detailed studies by the USGS of manatee use of the POI Basin. Subsequent analysis of best available data (Stith et al. 2011) indicated that a reduction of freshwater flow to the refugium resulting from the PSRP construction and operation may result in additional manatee stress, injury or mortality during the cold, dry season when manatees are dependent on the refugium for shelter. Based on the information provided by these studies, it was determined that the PSRP had the potential to negatively affect the existing manatee refugium at the POI Basin during the cooler winter months as a result of freshwater flow reduction to the POI Basin due to backfilling of canals within the project.

Manatees are protected under the MMPA of 1972 which prohibits "take" of marine mammals in U.S. waters. Under the MMPA "take" is defined as "*harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill.*" Manatees are also listed under the

ESA of 1973 as endangered. Under the ESA, "take" is "*to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct*." Based on the best available scientific information, the PSRP may have an adverse effect on the manatee refugium at POI Basin; therefore, the USFWS has determined that a manatee mitigation feature must be implemented to ensure continued existence of the POI Basin refugium to protect (avoid take) manatees to comply with both the MMPA and the ESA.

An interagency team with representatives from the Corps, SFWMD, USFWS, USGS, Florida Fish and Wildlife Commission (FWC), and the Florida Department of Environmental Protection (FDEP) met regularly between February 2011 and August 2014 to formulate alternatives to maintain the function of the refugium. This EA will evaluate potential environmental effects of each proposed manatee mitigation feature alternative.

The preferred alternative consists of creating a deep water oxbow in an existing spoil berm located within the POI Basin with two connections to the Faka Union Canal. Approximately 110,000 cubic yards of material would be excavated and be placed on the Faka Union Canal spoil berm both north and south of the construction feature. The excavated material will be placed appropriately on the spoil berm to prevent erosion into the adjacent canal and mangrove ecotone. Approximately eight acres of upland and two acres of wetlands would be cleared for the construction of the manatee mitigation feature.

1.3 LOCATION

Development of the PSRP area, previously known as SGGE, began in the early 1960's within Collier County in Southwest Florida. Private interests planned to develop a 173 square mile (111,000 acre) residential subdivision. Today this development is split into two entities by Interstate 75. Northern Golden Gate Estates (NGGE) remains a residential subdivision; SGGE had very limited development and was acquired by the State of Florida (FDEP) from private owners for restoration. The SGGE area is now known as the Picayune Strand State Forest.

The PSRP consists of approximately 94 square miles located between Interstate 75 and US Highway 41. It is situated southwest of the Florida Panther National Wildlife Refuge, north of Ten Thousand Island National Wildlife Refuge and Collier-Seminole State Park, east of the Belle Meade Conservation and Recreation Lands Project Area, and west of the Fakahatchee Strand State Preserve.

The manatee mitigation feature is located just south of US-41 (Tamiami Trail), adjacent to the Faka Union Canal and the POI Basin (Figure 1-1).

1.4 PROJECT HISTORY

A detailed project history can be found within Section 1 of the 2004 PSRP Final PIR/EIS and is incorporated into this document by reference. The PSRP was authorized for construction in WRDA 2007. Under the Acceler8 initiative, the SFWMD started design

and construction in 2003. The upper two miles of the Prairie Canal were plugged in early 2004 and the lower five miles plugged in 2006-2007. The Corps took over the construction of the remaining project phases after the completion of Prairie Canal.

The Merritt Pump Station construction contract was awarded in October 2009 with construction beginning in December 2009. This phase includes the Merritt Pump Station, tieback levee, spreader canal, road removal, and Merritt Canal plugging. The construction on the Merritt Pump Station was completed in September 2014 with Merritt canal plugging scheduled to commence in November 2014.

The Faka Union Pump Station construction contract was awarded in November 2010 with construction starting in January 2011. The Faka Union construction phase includes the Faka Union Pump Station, tieback levee, spreader canal, road removal, and Faka Union Canal plugging. The Faka Union construction contract is scheduled to be completed in April 2015.

The Miller Pump Station construction contract was awarded in September 2013. The project is currently scheduled for completion in 2017. Hydrological analyses have shown flood protection features would be needed before the Faka Union and Miller Canals could be plugged. Therefore, the Faka Union and Miller Canals will not be plugged until the completion of the western (6L's agricultural area) flood protection feature in order to maintain current levels of flood protection for adjacent lands when the project is complete. The Faka Union Canal is the largest canal within the project area and thereby conveys the largest amount of freshwater to the POI Basin. Since the majority of flows into the POI Basin are from the Faka Union Canal, the manatee mitigation feature must be complete before this canal can be plugged. Implementation of the western protection feature and the manatee mitigation feature are contingent upon approval of an increased project cost which is currently being sought through a Limited Reevaluation Report (LRR) to Congress.

1.5 PRIOR REPORTS AND ENVIRONMENTAL DOCUMENTS

A number of studies related to the Golden Gate Estates development and canal network, have been conducted over the past 30 years. These studies have been reviewed and were referenced for hydrological, biological, and ecological information related to the study area and the progression of this project. All of these studies assumed some limited development in SGGE. Brief summaries of these studies can be found in Section 1.5 of the 2004 PSRP Final PIR/EIS. The pertinent Corps studies are listed below:

- 1978 Authorization of Golden Gate Estates Feasibility Study by Congress, House Document No. 39, 90th Congress
- 1980 U.S. Army Corps of Engineers, Golden Gate Estates Reconnaissance Report
- 1986 U.S. Army Corps of Engineers, Golden Gate Estates Feasibility Report
- 1999 Central and Southern Florida Project Comprehensive Review Study Integrated Feasibility Report and Programmatic Environmental Impact Statement, Comprehensive Everglades Restoration Plan

- 2004 Picayune Strand Restoration Project Final Project Implementation Report and Environmental Impact Statement

1.6 DECISION TO BE MADE

This EA, meeting the requirements of the National Environmental Policy Act, describes the evaluation of alternatives for the tieback levees, which are considered design refinement to the PSRP. The tieback levees are required to prevent recycling of outfall from the pump stations. In order to determine the most appropriate and efficient design of the tieback levee, alternatives were evaluated during the design phase to determine their effectiveness.

The EA will also describe the need and conceptual design for a manatee mitigation feature south of the PSRP near the POI Basin. This feature is required to prevent adverse effects on the West Indian manatee thermal refugium in the POI Basin.

1.7 PERMITS, LICENSES, AND ENTITLEMENT

This section identifies some of the environmental, regulatory, construction (including blasting), and operational authorizations required for the PSRP flood protection levees, canal backfill, pump station, and road removal features. A list of currently obtained project permits is below. The SFWMD or construction contractor is ultimately responsible for identifying any and all applicable permits and for obtaining those that have not already been obtained by the Corps.

1.7.1 COMPREHENSIVE EVERGLADES RESTORATION PLAN REGULATION ACT (CERPRA) PERMIT FOR WATER QUALITY CERTIFICATION AND COASTAL ZONE CONSISTENCY CONCURRENCE

The construction, operation, modification or maintenance of the PSRP features requires water quality certification pursuant to 33 U.S.C. Section 1341 as well as a determination that the project is consistent to the maximum extent practicable with the Florida Coastal Zone Management Plan under 16 U.S.C. Section 1456. A Comprehensive Everglades Restoration Plan Regulation Act (CERPRA) permit pursuant to Chapter 373.1502 of the Florida Statues serves those purposes. This is a five year permit issued by the FDEP which requires that the project discharges do not pose a danger to public health, safety or welfare and provides assurances of the avoidance, minimization and mitigation of any impacts to the wetlands or endangered species realized as a result of both construction and/or operational activity. As part of the CERPRA permit application process, the design of the PSRP features are reviewed for compliance with stormwater management regulations that address flood control and water quality. These regulations are included in Part IV, Chapter 373, Florida Statutes and the program implementing the Stormwater Rule, Chapter 62-25, Florida Administrative Code. For the remaining PSRP features that the Corps will be responsible for constructing, the Corps will obtain the construction CERPRA permits and the SFWMD (project sponsor) will be responsible for obtaining the long-term operational CERPRA permits for each phase of the project. On features where the SFWMD is doing construction activity, a Section 404, Department of the Army

permit is also required to be obtained by the SFWMD. To date, a CERPRA permit has been obtained for the tieback levees, spreader canals, canal plugs and road removal features. The Corps or the SFWMD must obtain a CERPRA permit (permit number 0288313-008) from the FDEP for compliance with Section 401 of the Clean Water Act for the manatee mitigation features as well as any future planned phases.

Jurisdictional delineation of wetlands in accordance with state criteria must be performed on the areas required for construction of all PSRP features. Delineation is needed to identify areas where site specific impact could occur and establish appropriate protective construction best management practices. Due to the project size and anticipated acreage of wetlands to be restored, it is anticipated that wetland impact for construction of this project will be determined to be "self mitigating" as has been the case for the Merritt, Faka Union, and Miller project phases.

1.7.2 AIR PERMIT (EMISSIONS PERMIT)

The contractor(s) are responsible for obtaining the necessary permit(s) prior to construction and/or operations and pay any fees required as part of the permit process. The contractor shall become familiar with the FDEP requirements and determine which are applicable. The contractor shall submit the necessary Permit Notification Form to the FDEP according to Rule 62-210.300, Florida Administrative Code. Clean Air Act permits will be acquired for the Miller and Faka Union construction phases.

1.7.3 PERMIT FOR DISCHARGE OF WATER

Construction site operators and owners have a legal responsibility to comply with the Section 202 (p) of the Clean Water Act and to keep sediment and other pollutants from leaving the construction site. These materials must be kept out of onsite preserve areas and storm sewer system components. Therefore, construction of the PSRP features may require a National Pollutant Discharge Elimination System (NPDES) Generic Permit for Stormwater Discharge in accordance with Rule 62-621.300(4), Florida Administrative Code administered by FDEP.

2.0 ALTERNATIVES

2.1 MANATEE MITIGATION FEATURE

2.1.1 DESCRIPTION OF ALTERNATIVES

One goal of the PSRP is to reduce the point discharge from the Faka Union Canal at the POI Basin; however, by doing this, the manatee refugium at POI Basin may be threatened. An interagency team of managers and biologists, meeting regularly between February 2011 and August 2014, formulated 27 initial alternatives to consider which could potentially mitigate for impacts to the manatee refugium at the POI Basin. The initial array of alternatives is shown in Table 2-1. These alternatives evaluated different methods to mitigate for the loss of freshwater input in the POI Basin, including supplementing freshwater flows, connections with warm saline groundwater, and improving other natural refugium within the Ten Thousand Islands region. Meeting minutes, documenting discussions and decisions at the interagency meetings are included as Appendix F.

Table 2-1. Initial Array of Alternatives

Alternative	Description	Screening/Reason for Screening
1	Groundwater well at POI marina site	Loss of PSRP wetland rehydration benefits if groundwater well is freshwater
2	Groundwater well north of POI site	Loss of freshwater for PSRP wetland rehydration
3	Pipe fresh water from canal north of pump station	Would require approximately 10 miles of pipelines from the pump stations to POI Marina Basin. Loss of PSRP wetland rehydration benefits
4	Construct watershed detention/retention basin (either inside PSRP project within Faka Union canal and above pumps or on previously identified parcel in SWFCWP)	Loss of freshwater for PSRP wetland rehydration, therefore eliminated from further consideration. Freshwater would be stored in a detention basin.
5	Use existing Hardy borrow pits for detention/retention basin	Loss of PSRP wetland rehydration benefits, therefore eliminated from further consideration.
6	Excavate existing canal basin above Faka Union-1 weir (at U.S. 41) to greater depth	Deepening the basin alone would not maintain the refugium in the POI Basin; freshwater would also be

Alternative	Description	Screening/Reason for Screening
		needed to maintain halocline, therefore, eliminated from further consideration.
7	Leave east-west "T" canal open (eliminate backfill)	Loss of PSRP wetland rehydration benefits, therefore eliminated from further consideration.
8	Excavate one or more POI Basins to deeper depth	Enhances manatee habitat
9	Excavate deeper holes in existing POI Basin	Deeper areas alone may not provide adequate refugia for manatees
9a	Excavate deeper holes in southeast POI Basin with restriction that would allow manatees to enter. Would still require freshwater flow. Creating smaller basin would require less flow. Pipe in Canal starting at weir	Deeper areas alone may not provide adequate refugia for manatees and preliminary modeling indicates that large amounts of freshwater would still be needed.
10a	Deepen existing basin northwest of POI marina site - pipe from Faka Union Canal under us-41 to pit, may require small pump	Concerns with conveying water under US-41 and high implementation cost.
10b	Deepen existing basin northwest of POI marina site - canal from Faka Union Canal to existing culvert and canal back to pit on south side of US-41	Concerns with conveying water under US-41 and high implementation cost.
11	Excavate channel of old Faka Union River to the east of Faka Union Canal	Loss of PSRP wetland rehydration benefits, therefore, eliminated from further consideration.
12	Enlarge existing refugium in Everglades National Park or other locations	Manatees unlikely to move to other refugiums, therefore, eliminated from further consideration.
13	Artificial heaters in POI Basin	Unlikely to work therefore, eliminated from further consideration.
14	Solar Heating of POI Basin	Unlikely to work therefore, eliminated from further consideration.
15	Manatees move to smaller natural refugium in project area after restoration during cold, dry season	Manatees unlikely to move to other refugiums therefore, eliminated from

Alternative	Description	Screening/Reason for Screening
		further consideration..
16	Increases in post-project groundwater will be sufficient to produce enough fresh water in basin to maintain refugium	Unlikely to work therefore, eliminated from further consideration.
17	Along the remaining open section of Faka Union Canal, construct berms with control structures (gates). Open gates as needed to allow surface flow to enter Faka Union Canal to supplement winter, dry season flows at Faka Union Weir Number 1	Included in alternatives. Minimal loss of PSRP wetland rehydration benefits if gates were closed. May also provide needed freshwater to manatees by opening gates during cold dry events.
18	Modify the plugs in Faka Union Canal by constructing weirs and gates control structures to allow for direct canal conveyance from Faka Union Pump Station to Faka Union Weir Number 1	Included in alternatives. Minimal loss of PSRP wetland rehydration benefits if gates were closed. May also provide needed freshwater to manatees by opening gates during cold dry events.
19	Stormwater/Aquifer Storage and Recovery Well	Included in alternatives. No loss of PSRP wetland rehydration benefits and positive impact to manatees.
20	Move Faka Union Number 1 Weir North of crescent pond and create restriction at US-41 bridge to allow manatees to enter. Would still require freshwater flow. Creating smaller basin would require less flow.	Preliminary modeling indicated large amounts of freshwater would be needed to maintain refugium.
21	Replace existing FU-1 weir as operable weir and add 1.5 feet to increase storage capacity in canal. SFWMD will operate for flood protection. Gate designed to produce refugium and not impact water.	If extra capacity was released there would be no back up for the next event.
22	Deepen borrow pit in TTINWR enough so do not have to rely on freshwater flows (currently 4-5 feet deep), connect to POI marina (similar to 10 above)	Would cause loss of mangrove to create entrance canal from POI Basin.
23	Create a groundwater connection within the POI Marina Basin through excavation (southeast corner)	Area is in private ownership
24	Improve access (removal of shoal) to Big	Would not support the

Alternative	Description	Screening/Reason for Screening
	Cypress, location off of Rookery Bay (Henderson Creek), and continue with PSRP. Evaluate existing refugia	refugium in the POI Basin.
25	Create hole in southeast basin, improve access at Big Cypress and Henderson Creek. Combination of Alternatives 23 and 24	High cost for implementation of both alternatives and southeast corner of POI Basin is in private ownership.
26	In addition to #21 - Pump water over the new operable Faka Union Weir when water no longer flows over the weir	Reduce freshwater available for hydrologic restoration and additional cost of pumping
27	Deep oxbow (20 feet) in western spoil berm along the Faka Union Canal just south of the POI Marina	Included in final array of alternatives with 3 options. These options are not dependent on freshwater flow into the POI Basin and therefore would not reduce available freshwater for hydrologic restoration within

Alternatives were added and refined throughout the plan formulation process to ensure all alternatives were fully considered. The interagency team evaluated alternatives based on feasibility and potential impacts to PSRP restoration benefits. During the formulation efforts, the interagency team determined which alternatives to carry forward to design considering the likelihood the alternative would be successful. The final array of alternatives is shown in Table 2-2.

Table 2-2. Final array of alternatives for manatee mitigation feature

Alternative	Description
No Action	Freshwater flows into the POI Basin will be significantly reduced, jeopardizing the thermal refugium in the POI Basin.
27 – Option 1	Deep oxbow (20 feet) in western spoil berm along the Faka Union Canal just south of the POI Marina (all upland) with connection to existing oxbows (Figure 2-1)
27 – Option 2	Deep oxbow (20 feet) in western spoil berm along the Faka Union Canal just south of the POI Marina (mostly upland, small mangrove loss) (Figure 2-2)

27 – Option 3	Deep oxbow (20 feet) in western spoil berm along the Faka Union Canal just south of the POI Marina (Larger footprint within mangroves) (Figure 2-3)

2.1.2 INITIAL ALTERNATIVES ELIMINATED FROM DETAILED EVALUATION

Many of the initial alternatives were screened out early in the plan formulation process because they were unlikely to be effective (Table 2-1) due to the reasons outlined below. The remaining alternatives focused on maintaining the thermal refugium at the POI Basin while not reducing the PSRP restoration benefits through the loss of freshwater for restoration.

- Alternatives 1, 2, and 3 were eliminated from the final array due to the high cost of implementation and the loss of the PSRP benefits as a result of the loss of water that would have contributed to restored sheetflow.
- Alternative 9 consisted of excavating deeper holes in the southeast corner of the POI Basin and adding a freshwater discharge point. This alternative was eliminated based on a number of logistical issues regarding the addition of freshwater flows in the southeast corner and the estimated high cost of implementation. Water would need to be brought to the basin via pipe from the Faka Union Weir Number 1.
- Alternatives 10a and 10b, which utilized a borrow pit west of the POI Basin, were eliminated based on concerns regarding the conveyance of flows under US-41 from the Faka Union Canal and the need to create a new canal to connect with the POI Basin. Alternatives 10a and 10b also had a higher estimated cost of implementation.
- Alternatives 17 and 18 were also eliminated from the final array due to loss of PSRP restoration benefits. In addition, these two alternatives did not eliminate the point discharge in the POI Basin from the Faka Union Canal.
- Alternative 19 was eliminated from the final array because of the low feasibility associated with a stormwater/aquifer storage recovery well. For Alternative 19 to be effective, it is very likely that a large reservoir would be needed to ensure adequate storage.
- Alternative 20 consisted on relocating the Faka Union Weir Number 1 north in the Faka Union Canal and possibly deepening the area to recreate the thermal refugium in a smaller area. Preliminary analysis indicated that this method would not be effective considering the reduced flow anticipated over the Faka Union Weir.
- Alternative 21 and 26 were eliminated because they would reduce the PSRP restoration benefits and would not be guaranteed to provide freshwater when needed to maintain the refugium.
- Alternative 22 which included a groundwater connection was eliminated since it would cause a loss of mangrove habitat through the creation of a channel into the

Ten Thousand Islands National Wildlife Refuge and may also increase saltwater intrusion in the area.

- Alternative 23 and 23a, also based on a groundwater connection, were eliminated because acquisition of private property would be required.
- Alternative 24, improving other refugia in the southwest Florida, was eliminated because manatees may still seek refuge in the POI Basin and therefore, could be negatively impacted. Alternative 25, which was a combination of Alternatives 23 and 24, was eliminated due to the high cost to implement both alternatives.

The No Action Alternative and Alternative 27, Options 1, 2, and 3 were carried forward for more detailed consideration. Figure 2-1, Figure 2-2, and Figure 2-3 below depict schematics of the final array of alternatives. Each alternative consists of creation of an oxbow with two connections to the Faka Union Canal. The different colors on the figures represent increasing depth, with red being approximately 20 feet in depth.

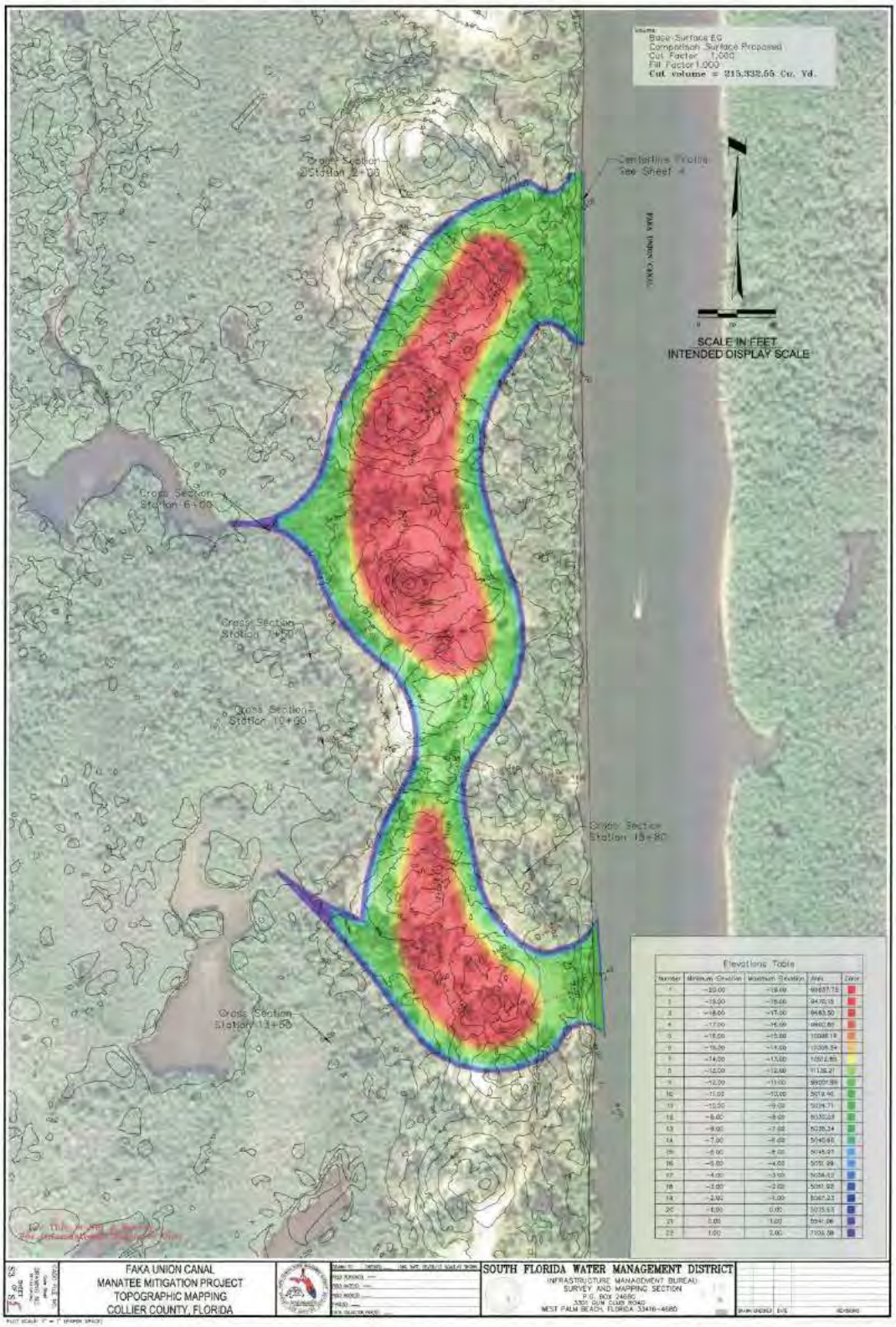

Figure 2-1: Alternative 27 Option 1, Placement of Manatee Mitigation Feature on Upland Spoil Berm with Connection to Natural Oxbows

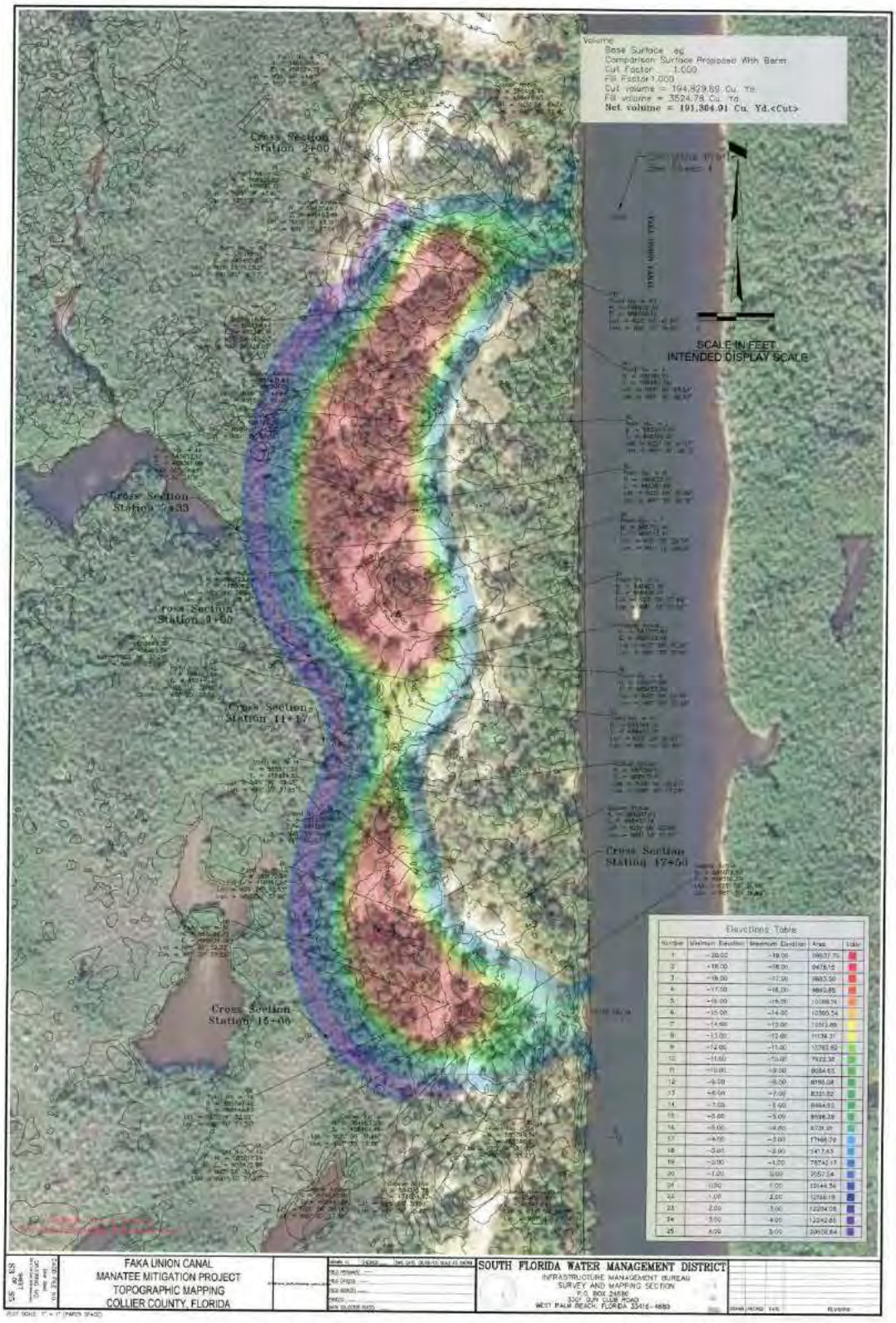

Figure 2-2: Alternative 27 Option 2, Placement of Manatee Mitigation Feature on Upland Spoil Berm with Small Mangrove Loss (approximately 2 acres)

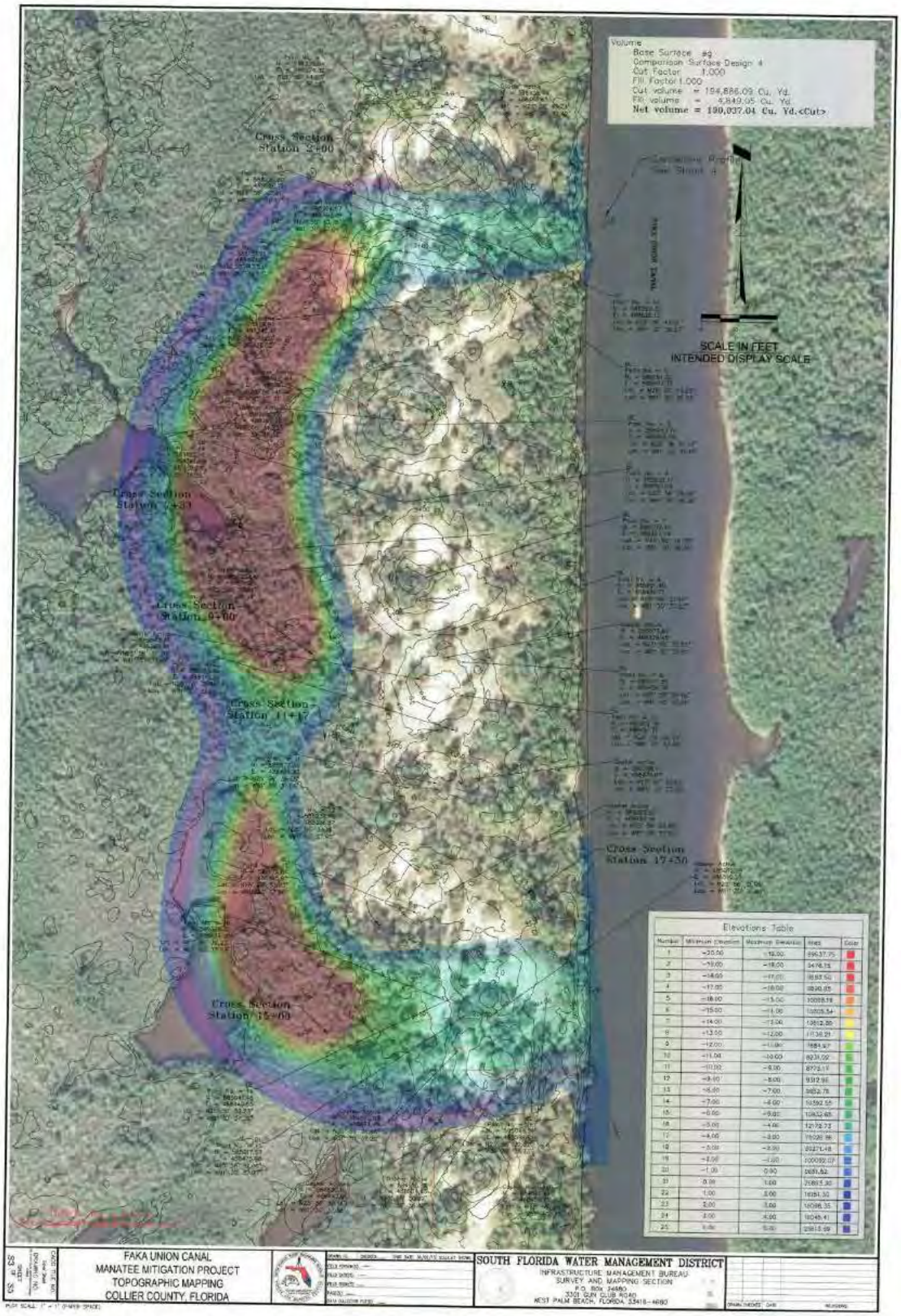

Figure 2-3: Placement of Manatee Mitigation Feature west of Spoil Berm within Wetland Mangrove Habitat

2.1.3 ISSUES AND BASIS FOR CHOICE

The alternatives were evaluated based on their ability to maintain a thermal refugium in the POI Basin as well as their ability to reduce impacts to mangrove habitat and reduce the amount of material for disposal. It was understood through coordination and alternative formulation with the interagency team that blasting would be required for the refugium construction.

2.1.4 PREFERRED ALTERNATIVE

Based on the analysis provided in this EA, the potential issues identified, and the ability to maintain the refugium in the POI Basin, Alternative 27, Option 2 is recommended for implementation. Alternative 27, Option 2 is preferred because it is not reliant upon the availability of freshwater to maintain the refugium in the POI Basin. The new refugium will be fed by warm saline groundwater. Of the alternatives evaluated, Alternative 27, Option 2 reduces the amount of material to be excavated and has minimal impact on surrounding mangroves and uplands. Alternative 27, Option 2 would require disposal of 191,000 cubic yards of spoil material that would be placed within the limits of the current Faka Union Canal spoil berm up to 14 feet NGVD in height. Alternative 27, Option 1 would require a greater amount of material disposal and disturb a greater area of upland habitat. Alternative 27, Option 3 would cause a greater loss of wetland mangrove habitat. Alternative 27, Option 2 is the best balance between effects to the upland and wetland mangrove habitat. Discussion of effects related to implementation of Alternative 27, Option 2 is included in Section 1.0. The footprint of the preferred manatee mitigation feature alternative is shown in Figure 2-4. The summary of environmental effects for the preferred alternative is shown in Table 2-3. The estimated cost for implementing the preferred alternative is approximately $11 million.

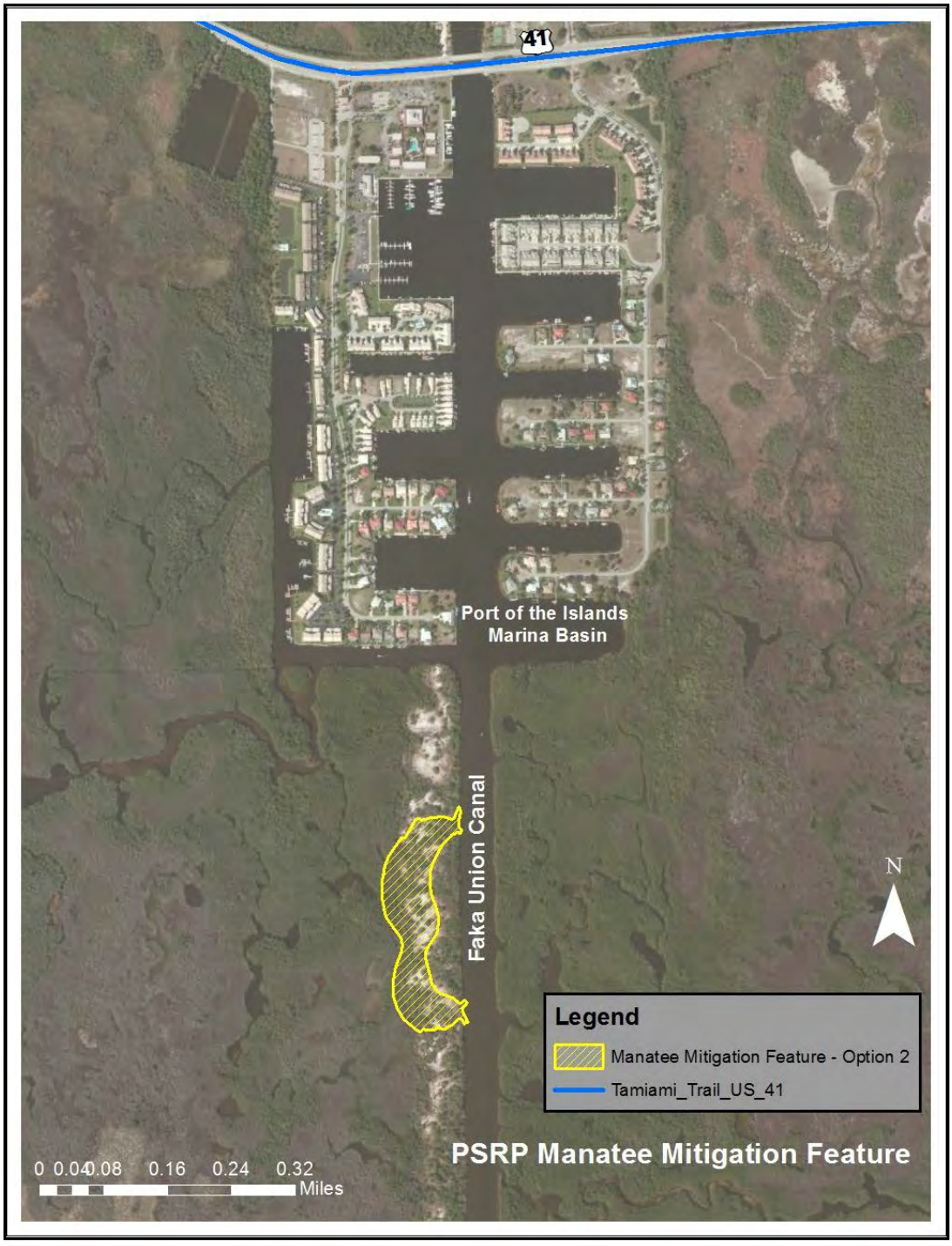

Figure 2-4. Manatee Mitigation Preferred Alternative, Alternative 27 Option 2, Footprint

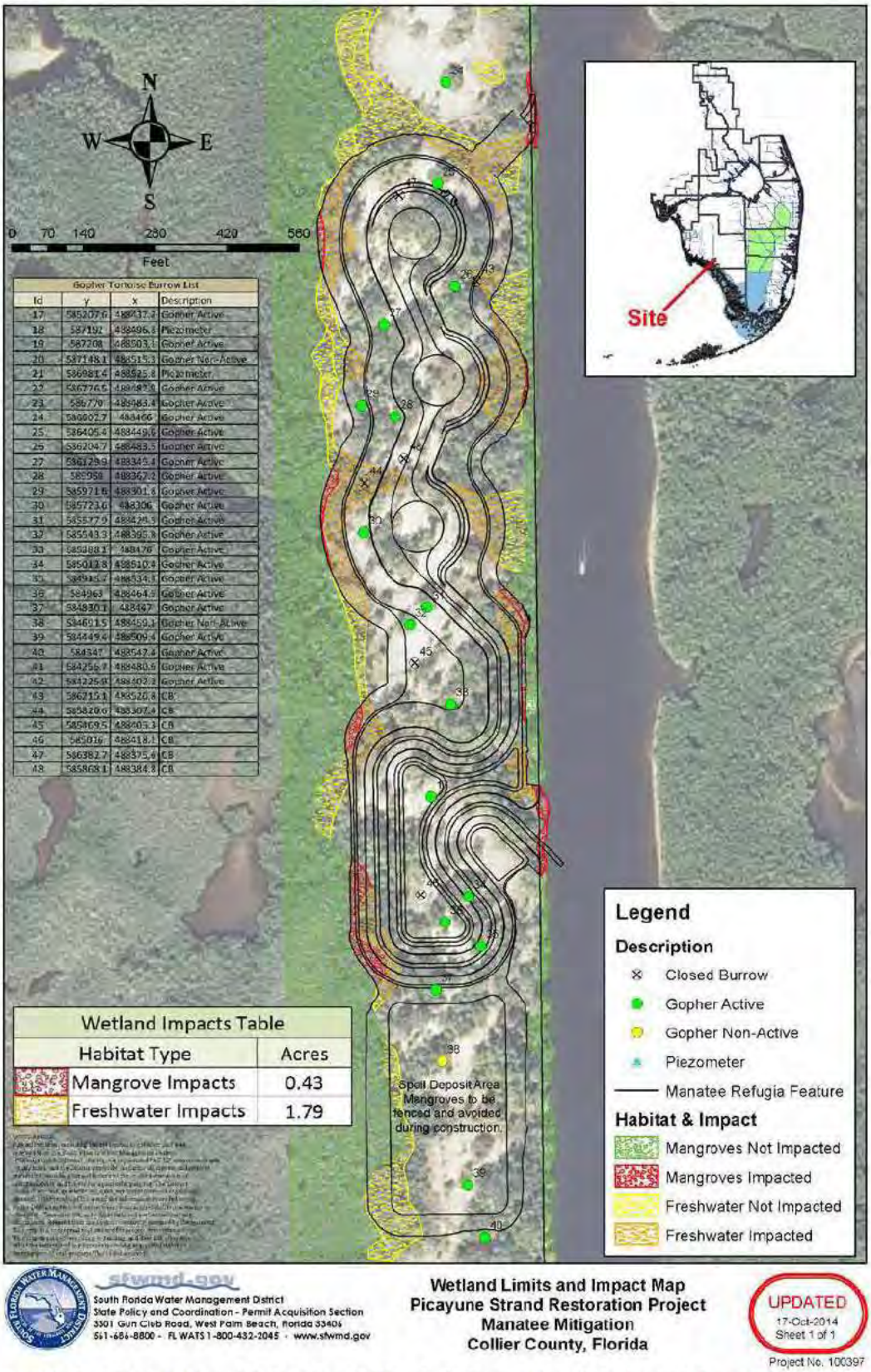

Figure 2-5. Alternative 27 Option 2 Draft Schematic of Oxbow Manatee Refugium

Table 2-3. Summary of Environmental Effects for Manatee Mitigation Feature

Resource	No Action Alternative	Alternative 27 – Option 2
Hydrology	No effect.	No effect.
Vegetation	No effect.	Approximately eight (8) acres of the Faka Union Canal spoil berm, consisting of upland pine flatwood habitat would be impacted. Additionally, two (2) acres of wetland mangrove habitat could potentially be impacted.
Wetlands	No effect.	Potential loss of two (2) acres of wetland mangrove on the west side of the Faka Union Canal spoil berm.
Fish and Wildlife Resources	No effect.	Potential impacts to Gopher totoises will require relocation efforts.
Threatened and Endangered Species	Negative effect to temperature inverted halocline in the POI Basin utilized by manatees during cold season.	Maintains thermal refugium for manatees in the POI Basin. A “may affect, but not likely to adversely affect” determination has been reached for the manatee and a “no effect” determination for the smalltooth sawfish and designated critical habitat .
Essential Fish Habitat	No effect.	Potential loss of two (2) acres of essential fish habitat on the west side of the Faka Union Canal spoil berm.
Socioeconomic	Possible impact to local manatee sightseeing companies.	Possible impact to local manatee sightseeing companies.
Aesthetics	No effect.	Disposal will be placed on the Faka Union Canal spoil berm, increasing the height up to 14 feet.
Recreation	Potential negative impact from the loss of manatee sightseeing opportunities.	Slight potential for reduction in recreational opportunities since the new refugium will be located south of POI in an oxbow restricting boat access to the new refugium.

Water Quality	No effect.	May be slight effect during construction if dredging is required.
Hazardous, Toxic, and Radioactive Waste	No effect.	No effect.
Air Quality	No effect.	No effect.
Noise	No effect.	May be slight effect during construction.
Historic Properties	No effect.	When the Faka Union Canal was created, the spoil was placed over several small hammocks that have the potential to have cultural resources sites.
Native Americans	No effect.	When the Faka Union Canal was created, the spoil was placed over several small hammocks that have the potential to have native American artifacts.

2.1.5 FINAL ALTERNATIVES ELIMINATED FROM DETAILED EVALUATION

- Alternative 27, Option 3 – This option was eliminated from detailed evaluation because it would cause a significant loss of mangrove wetland habitat adjacent to the Faka Union Spoil Berm. This habitat is considered Essential Fish Habitat (EFH) for a number of migratory fish species.
- Alternative 27, Option 1 – This option was eliminated from detailed evaluation because of the significant cost of excavating and disposing of additional upland material (approximately 216,000 cubic yards). The additional upland material to be disposed is a result of placement of the feature in the footprint of the current spoil berm.

2.1.6 MONITORING PLAN

The Corps is currently conducting ESA consultation on the West Indian manatee with the USFWS. A Supplemental Biological Assessment (BA) including the impacts of the PSRP on the West Indian manatee and impacts of the manatee mitigation feature on threatened and endangered species is included in this report as Appendix E. As discussed in the BA, a monitoring plan has been developed to monitor the maintenance of a thermal refugium in the POI Basin. The current monitoring proposed by the Corps and SFWMD is included in Appendix D, Manatee Monitoring Plan.

2.2 TIEBACK LEVEE

2.2.1 DESCRIPTION OF ALTERNATIVES

Tieback levees are needed to prevent pumped waters from returning to the upstream side of the pump stations, causing water to be recycled through the pump stations. In order to determine the most appropriate and efficient design of the tieback levee, alternatives were evaluated to determine their effectiveness. The following alternatives were considered:

- Alternative 1 (No Action) - Three individual berms, one for each pump station as originally shown in the 2004 PSRP FinalPIR/EIS
- Alternative 2 – A single tieback levee would extend from just east of Merritt Pump Station to the west of the Miller Pump Station measuring approximately 10 miles.
- Alternative 3 – Multiple tieback levees would run parallel (north-south) along the banks of the Merritt, Faka Union, and Miller canals from the pump stations to Interstate 75.
- Alternative 4 – Pump stations would be placed just south of Interstate 75 preventing the need for tieback levees.

The tieback levee alternatives were screened using best professional judgment by the Corps and SFWMD staff.

2.2.2 ISSUES AND BASIS FOR CHOICE

The alternatives were evaluated based on their ability to prevent the return of pumped water to the upstream side of the pump stations, preventing the recycling of water and ensuring the rehydration of the downstream wetland areas to achieve hydrologic restoration.

2.2.3 PREFERRED ALTERNATIVE

Alternative 2 is the preferred alternative to prevent the return of pumped water to the upstream side of the pump stations. The placement of the pump stations further from Interstate 75 prevents flooding impacts to the Interstate 75 roadbed and residential areas north of Interstate 75. The proposed footprint includes construction of over half of the tieback levee on existing roads, therefore effects on upland and wetland habitat due to construction will be less with this alternative. The additional habitat affected by the tieback levee with this alternative would be approximately 53 acres.

As stated above, the tieback levee would extend from just east of Merritt Pump Station to the west of the Miller Pump Station measuring approximately ten miles. The tieback levee will have crest width of 14 feet, and an average height of six feet with one vertical and three horizontal side slopes for an average width of 50 feet. The summary of environmental effects of Alternative 2 is shown in Table 2-4. In the 2004 PSRP Final PIR/EIS, the cumulative cost estimate for the individual spreader berms was approximately $2 million. The estimated cost for implementing the preferred tieback levee design, Alternative 2, is approximately $9.5 million.

Table 2-4. Summary of Environmental Effects for Addition of Tieback Levee

Resource	No Action Alternative	Alternative 2
Hydrology	Recirculation of pumped water to the upstream side of the pump stations.	No significant impacts. Facilitates the conveyance of pumped water to the south, restoring sheetflow through the project area.
Vegetation	No effect.	Loss of approximately 53 acres of upland and wetland habitat within the footprint of the tieback levees.
Wetlands	No effect.	No significant impacts. Over half of tieback levees will be constructed in existing roadway. Impacts to existing wetlands will be minimized.
Fish and Wildlife Resources	No effect.	Loss of approximately 53 acres of upland and wetland habitat within the footprint of the tieback levees.
Threatened and Endangered Species	No effect.	The determinations reached in the 2009 BO are maintained in this EA; however, the Corps acknowledges that more information may be required to assess the impacts of the Miller tieback levee on red-cockaded woodpecker.
Essential Fish Habitat	No effect.	No effect.
Socioeconomic	Potential for pumped water to return to the upstream side of the pump station. This could potentially affect private lands west of the Miller Pump Station.	No effect.
Aesthetics	No effect.	Temporary effects during construction.
Recreation	No effect.	Temporary effects during construction.
Water Quality	No effect.	No effect.
Hazardous, Toxic, and Radioactive Waste	No effect.	No effect.
Air Quality	No effect.	Temporary effects during construction.
Noise	No effect.	Temporary effects during blasting and construction.

Historic Properties	No effect.	No effect.
Native Americans	No effect.	No effect.

2.2.4 ALTERNATIVES ELIMINATED FROM DETAILED EVALUATION

The layout of the tieback levees in Alternative 3 is less efficient as compared with the other alternatives as more levees would be required since both banks of the canal would require tieback levees. Approximately 48,000 feet of levee would be needed for this alternative. An additional east-west levee would be required just south of Interstate 75 to prevent flooding impacts to the Interstate 75 road bed and the residential area to the north of the interstate, adding approximately 34,000 additional feet of levees. Private lands on the western border would also require levees for flood mitigation purposes. The tieback levee design in Alternative 3 would increase the downstream conditions such that water upstream could stagnate until the pumps stop discharging, allowing for downstream flows to resume. Alternative 3 would also require additional property to be impacted north of Interstate 75, since this design would require water to be stored to increase pump efficiency. One goal of the original project formulation was to avoid the need to acquire land north of Interstate 75. For the reasons stated above, Alternative 3 was eliminated from further consideration.

Alternative 4 would eliminate the need to construct a tieback levee by moving the pump stations just south of Interstate 75. To prevent impacts to Interstate 75, a 34,000 foot levee would be needed to prevent flooding impacts to the roadbed. An additional levee around the western private lands would also be needed for flood mitigation. Relocating the pump stations adjacent to Interstate 75 would likely create adverse flooding impacts north of Interstate 75 at the 100 year flood level, requiring additional flood mitigation levees north of Interstate 75 or the acquisition of additional real estate. Alternative 4 may also require additional flood protection measures on the east side of PSRP, adjacent to Fakahatchee Strand. For the reasons stated above, Alternative 4 was eliminated from further consideration.

2.3 MONITORING PLAN

The tieback levee is within the original project area as outlined in the 2004 PSRP Final PIR/EIS. The monitoring of the tieback levee falls within the scope of the overall PSRP Environmental Monitoring Plan developed by a multi-agency team; therefore, the original monitoring plan will be implemented during the construction of the tieback levee.

3.0 CULTURAL RESOURCES

3.1 HISTORIC PROPERTIES

As part of the PSRP planning and pre-construction process, the Corps and the SFWMD have conducted a number of cultural resource surveys and site evaluations. These were designed to provide a sampling of the cultural resources that could potentially be affected by the PSRP. Some of these surveys were designed to address specific ground disturbing activities. Others were designed to provide a representative sample of the type and distribution of cultural resources located within the PSRP. A few prehistoric sites had been identified by Florida's Bureau of Archaeological Research CARL) Cultural Resource Management Program and other archeologists prior to the PSRP planning effort. These earlier investigations were limited to identification of sites, based on surface materials. The PSRP specific cultural resource investigations used a combination of surface reconnaissance, shovel testing, and formal archeological testing in identification and evaluation of the cultural resources. During construction (specifically road removal) additional historic properties have been identified. A list of cultural resources surveys and reports related to the project area are shown in Table 3-1. A full description of historic and cultural resources can be found in the 2004 PSRP Final PIR/EIS and is incorporated by reference.

There have been 16 cultural resource investigations in the Picayune Strand Restoration Project Area. These include incidental surveys conducted by the Florida Bureau of Archaeological Research, project specific surveys and site evaluations conducted under contract to the South Florida Water Management District and the Jacksonville Corps of Engineers as well as construction monitoring. These efforts also identified two three historic sites, a mid 20th century farm, a 1960's saw mill, and an extensive log tram system associated with the 1960's logging of the area. The construction monitoring also identified 12 archeological occurrences. These surveys represent a small portion of the project area. As such the 71 prehistoric archeological sites which have been recorded within the PSRP area of potential effects should be considered a representative sample. Most of the 71 prehistoric sites have been determined eligible for listing on the National Register of Historic Places (NRHP). Only a few of the prehistoric sites were determined not NRHP eligible, many, including most identified as a result of monitoring, have insufficient information for a determination of eligibility. All of the historic sites were determined not NRHP eligible.

A determination of no adverse effect has been made for the construction of the PSRP Pump Stations and Road removal. This determination includes the requirement for avoiding NRHP eligible or potentially monitoring of all ground disturbing activity as well as monitoring of ground disturbing activity. Unanticipated archeological discoveries made during construction will be addressed in accordance with 36 CFR Part 800.13.

The Project is designed to restore natural hydrology to the area, as such impounding of water is not anticipated. Based on this design a no adverse effect determination has been made for the PSRP operations as long as water levels in the monitoring wells established in 2003 and 2006 does not exceed the maximum water level prior to operation. If water levels exceed the pre-operation maximum any archeological sites potentially affected will

be examined for effects. If sites are being adversely affected by high water during operations then Section 106 consultation will be re started.

Section 106 consultation has not been completed for the proposed 6Ls levee. A cultural resource survey is planned for that component of the Project.

3.2 NATIVE AMERICANS

Native American resources in the project area have not changed significantly from the discussion in Section 3.15 of the 2004 PSRP Final PIR/EIS. Known cultural resource sites in the project area can be found in Table 3-1 below. Cultural resource investigations and consultations were conducted prior to the construction of each project phase. Cultural resources investigations and coordination have been completed for the Merritt and Faka Union phases; however, consultation for the construction of the 6L's protection levee and manatee mitigation feature has not been completed. Proper surveys and coordination will be completed prior to the construction of these features and further consultation with Native American tribes will be conducted.

The construction of the tieback levee will have no additional effect on Native American resources than what was discussed in the 2004 PSRP Final PIR/EIS. SFWMD will complete surveys for Native American resources within the footprint of the manatee mitigation feature and coordinate with the Corps and the SHPO prior to the start of construction activities. The Corps has consulted with Federally recognized Tribes and the SHPO on the Merritt and Faka Union construction, including the tieback levees. The Corps will be conducting specific consultation on the 6L's protection levee with final design.

Table 3-1. PSRP Cultural Resource Reports

TITLE	DATE	AFFILIATION	PSRP Sites discussed	FMSF Number	SPONSOR
An Archaeological Inventory of the Golden Gate State Forest	1994	C.A.R.L. Archeological Survey	8CR184, 8CR185, 8CR712, 8CR713, 8CR720, 8CR721, 8CR722, 8CR723, 8CR724, 8CR729, 8CR739, 8CR740, 8CR742	4013	Florida Bureau of Archaeological Research
Picayune Strand State Forest CARL Survey 2003	2003	C.A.R.L. Archeological Survey	8CR809, 8CR853	8929	Florida Bureau of Archaeological Research
A Phase I Cultural Resource Assessment Survey of Miccosukee Tribal Lands, Collier County, Florida	2003	Janus Research	8CR852	8916	Miccosukee Tribe of Indians of Florida
Archaeological Survey of High Probability Areas Along Prairie Canal, Southern Golden Gates Restoration Project, Collier County, Florida	2003	New South Associates, Inc.		9669	South Florida Water Management District
Survey of Miccosukee Tribal Lands: Additional Excavations at Site 8CR852	2004	Janus Research	8CR852	9773	Miccosukee Tribe of Indians of Florida
Cultural	2005	R. Christopher	8CR184, 8CR185,	12449	US Army

TITLE	DATE	AFFILIATION	PSRP Sites discussed	FMSF Number	SPONSOR
Resources Investigation of the Picayune Strand Cultural Resources Survey Project Collier County, Florida		Goodwin & Associates, Inc.	8CR712, 8CR713, 8CR720, 8CR721, 8CR722, 8CR723, 8CR724, 8CR729, 8CR739, 8CR740, 8CR742, 8CR780, 8CR809, 8CR853, 8CR902, 8CR903, 8CR904, 8CR905		Corps of Engineers, Jacksonville District
Cultural resource Assessment Survey for the Picayune Strand Restoration Pump Stations Project, Collier County	2005	Janus Research		11949	South Florida Water Management District
Cultural Resource Assessment Survey of the Hardy Tract Project Area Collier County	2005	Janus Research		12864	South Florida Water Management District
Cultural Resources Survey, Picayune Strand Restoration Project, Collier County, Florida	2006	New South Associates, Inc.	8CR183, 8CR185, 8CR556, 8CR557, 8CR712, 8CR713, 8CR721, 8CR722, 8CR723, 8CR729, 8CR742, 8CR809, 8CR824, 8CR825, 8CR826, 8CR852, 8CR853, 8CR907, 8CR908, 8CR909, 8CR910, 8CR911, 8CR912, 8CR913,	12951	US Army Corps of Engineers, Jacksonville District

TITLE	DATE	AFFILIATION	PSRP Sites discussed	FMSF Number	SPONSOR
			8CR914, 8CR915, 8CR916, 8CR917, 8CR918, 8CR919, 8CR920, 8CR921, 8CR922, 8CR923, 8CR924		
Cultural Resource Assessment Survey of the Picayune Geotechnical Survey Project Area Collier County	2006	Janus Research		12950	South Florida Water Management District
Cultural Resource Assessment Survey of Additional Parcels for the Picayune Strand Soil Remediation areas Project Collier County	2006	Janus Research		12985	South Florida Water Management District
Phase II Cultural Resources Survey, Picayune Strand Restoration Project Collier County, Florida	2007	New South Associates, Inc.	8CR713, 8CR721, 8CR722, 8CR724, 8CR729, 8CR852, 8CR903, 8CR904, 8CR905, 8CR907, 8CR910, 8CR912, 8CR913, 8CR914, 8CR915, 8CR918, 8CR920, 8CR921, 8CR922, 8CR923, 8CR924, 8CR934, 8CR935, 8CR936, 8CR937, 8CR938, 8CR939, 8CR940, 8CR941, 8CR942, 8CR943, 8CR944,	13915	US Army Corps of Engineers, Jacksonville District

TITLE	DATE	AFFILIATION	PSRP Sites discussed	FMSF Number	SPONSOR
			8CR945, 8CR946. 8CR971		
Determining the Elevation of Selected Sites Within The Picayune Strand Restoration Project, Collier County, Florida	2008	New South Associates, Inc.	8CR824, 8CR825, 8CR855, 8CR856, 8CR867, 8CR868, 8CR712, 8CR713, 8CR721, 8CR722, 8CR723, 8CR724, 8CR780, 8CR809, 8CR852, 8CR903, 8CR905, 8CR907, 8CR910, 8CR913, 8CR914, 8CR915, 8CR916, 8CR917, 8CR918, 8CR922, 8CR923, 8CR934, 8CR935, 8CR936, 8CR937, 8CR938, 8CR939, 8CR940, 8CR941, 8CR942, 8CR943	15005	US Army Corps of Engineers, Jacksonville District
Archaeological Reconnaissance Survey of the Picayune Strand Restoration Project, Southern Protection Feature, Collier County, Florida	2011	US Army Corps of Engineers, Jacksonville District	No CR	18194	US Army Corps of Engineers, Jacksonville District
Phase I Historical and Archaeological Survey of Portions of the Picayune Strand Restoration	2012	Panamerican Consultants, Inc.	8CR1167, 8CR1168		US Army Corps of Engineers, Jacksonville District

TITLE	DATE	AFFILIATION	PSRP Sites discussed	FMSF Number	SPONSOR
Project and Ten Thousand Islands National Wildlife Refuge, Collier County, Florida					
Monitoring during construction		Southeastern Archeological Research, Inc.	8CR1159, 8CR1160, 8CR1297, 8CR1257, 8CR1260, 8CR1261, 8CR1298,8CR1299, 8CR1300		US Army Corps of Engineers, Jacksonville District

4.0 AFFECTED ENVIRONMENT

The 2004 PIR/EIS and 2004 Biological Assessment included assessment of potential environmental effects, including effects to listed threatened and endangered species for this project, and are incorporated herein by reference. Any changes from the 2004 affected environment are described in the following sections.

4.1 GENERAL ENVIRONMENTAL SETTING

The PSRP is located in Collier County, Florida. It lies east of the city of Naples, between Interstate 75 and U.S. Highway 41. Combined with the Belle Meade State CARL area to the west, the project area constitutes the heart of what is now called the Picayune Strand State Forest (under Lease Agreement number 3927 from the Board of Trustees of the Internal Improvement Trust Fund of the State of Florida (the land owner). This forest is located south of Northern Golden Gate Estates and Interstate 75, southwest of the Florida Panther National Wildlife Refuge, north of the marine preserves and refuges that constitute the Ten Thousand Islands Region, and west of the Fakahatchee Strand State Preserve. It contains some of the most diverse plant and wildlife communities on the North American continent and provides habitat for several federally listed endangered species, including the critically endangered Florida panther.

In the late 1950s, Gulf American Corporation began purchasing an area of 173 square miles (110,620 acres) in Collier County, Florida for a vacation and retirement community. The Golden Gate Estates subdivision was approved in 1960, and included 183 miles of drainage canals with 25 water control structures and 813 miles of roads spaced at intervals of one-quarter mile. The area is characterized by nearly flat terrain with cypress wetlands, pine islands, wet and dry prairies, and several deeper wetland strands and sloughs including the adjacent Camp Keais and Fakahatchee Strands. Most of the land is inundated from at least July 1 to October 1 after the onset of the rainy season. Historically, the area drained to the downstream estuaries of the Gulf of Mexico through surface water movement in the form of shallow sheet flow. Two major canal systems, Golden Gate and Faka Union, were constructed in the early 1960s and between 1968 and 1971, respectively, to drain this area into Naples and Faka Union Bays (Corps 1980). These drainage systems channelized surface water runoff and altered each sub-basin's hydrologic response to rainfall. The canals also circumvented drainage to downstream estuaries of the Blackwater, Pumpkin, Wood, and Little Wood Rivers. On December 16, 1966, a Corps permit was issued to dredge an entrance channel connecting the Faka Union Canal with the mouth of the Faka Union River. The construction of this canal generated a major point source freshwater discharge in Faka Union Bay which has altered estuarine resources in portions of the Ten Thousand Islands.

The major effects of the drainage associated with the existing canal and water management infrastructure within the project are the loss of cypress forest and herbaceous wet prairies. Historically, small areas of pine flatwoods normally designated as uplands were located in narrow strands in elevated areas of the project and in the northwest project corner. The majority of the remaining flatwoos consisted of hydric flatwoods, which often have water at or above the ground surface for at least short

periods during wetter portions of the year. Due to the variable nature of shallow wetland hydroperiods and site topography over time, many on-site plant communities historically contained elements of both uplands and wetlands which were periodically affected by fire, freeze, drought, flood, and hurricane events. After drainage, upland pines, cabbage palms, and hardwoods invaded many of the cypress forests. Severe and frequent fires eliminated many of the pine and cypress trees, furthering the conversion of these lands to earlier successional shrubby states of upland or shallow wetland plant communities. Exotic plant species, particularly Brazilian pepper, have changed the character of many habitats, especially adjacent to the site's extensive canal and roadway network (Duever 2004).

A large portion of the Faka Union Canal watershed is part of the Golden Gate Estates development, zoned for single-family residential land use. The residential zoning in the Golden Gate Estates is low density with a minimum lot size of 1.25 acres. The remaining area is used for agriculture, predominantly vegetable farming, except in areas of persistent flooding. The most populated areas of Golden Gate Estates are north of Interstate 75 and west of Everglades Boulevard in Northern Golden Gate Estates. An exception is a small urban area, the POI, located south of the PSRP adjacent to the northern portion of the main Faka Union Canal (USFWS 2009). The manatee mitigation feature will be constructed in the Faka Union Canal just north of the POI and US-41.

The POI marina, originally known as Remuda Ranch, was initially constructed by the Gulf American Corporation, who also developed Golden Gate Estates. The construction of the Faka Union Canal began in 1966, under a dredge and fill permit issued by the Corps on December 14, 1966 under the jurisdiction of Section 10 of the Rivers and Harbors Act of 1899; however, at the time of issuance, no permitting systems were in place to issue permits for the discharge of refuse under Section 13 of the Rivers and Harbors Act of 1899.

4.2 GROUNDWATER AND SURFACE WATER HYDROLOGY

Hydrologic monitoring across the main Fakahatchee flowway has shown seasonal pre-restoration water table drawdowns of almost six and a half feet in the vicinity of the eastern-most canal in the PSRP that borders the western edge of Fakahatchee Strand. The water table has been significantly lowered for a distance of over one mile from the canal during the wet season when water levels are naturally above ground and to almost three miles from the canal during dry periods when the water table is naturally below ground. Filling of the upper two miles of the Prairie canal was completed in early 2004. The remaining five miles were filled in 2006-2007. During the past four wet seasons, there has been partial restoration of wet season overland flows in the eastern portion of the PSRP. Based on a comparison of data from monitoring wells near a filled canal and other wells near an unfilled canal that is approximately two miles west of the filled canal, hydroperiods have increased and groundwater levels have risen in both Fakahatchee and Picayune Strands. However, because of the distance over which canals affect water levels in this area, there will not be complete hydrologic recovery of this area until the nearby Merritt, Faka Union, and Miller Canals are filled (Duever, 2010).

4.3 VEGETATION

A discussion of the plant communities in the PSRP area can be found in Section 3.3 of the 2004 PSRP Final PIR/EIS and is incorporated into this document by reference.

4.4 WETLANDS

Wetlands within the PSRP have been severely degraded as a result of the SGGE infrastructure built in the 1960s and 70s. Some low quality wetlands exist within the project area but have been severely impacted by the canals constructed to drain the area. Areas that once supported large populations of fish and aquatic invertebrates have been severely impaired in their ability to serve as foraging habitat for wading birds. A wetland assessment performed in June 2012 identified a wetland consisting of red bay (Persea borbonia), bald cypress (*Taxodium distichum*), swamp fern (*Blechnum serrulatum*), St. John's wort (*Hypericum perforatum*), saltbush (*Baccharis halimifolia*), arrowhead (*Sagittaria* spp.), and other plant species indicative of wetland habitats located on the western side of the PSRP area near Belle Meade. Please see Figure 2-2 of the 2004 PSRP Final PIR/EIS which displays the historic flowways that cross through the PSRP area.

4.5 FISH AND WILDLIFE RESOURCES

A discussion of the fish and wildlife resources in the PSRP area can be found in Section 3.5 of the 2004 PSRP Final PIR/EIS and is incorporated into this document by reference.

4.6 THREATENED AND ENDANGERED SPECIES

In accordance with Section 7 of the ESA, the USFWS provided a BO in 2004. Since that time, coordination with the USFWS concerning Federal threatened and endangered species within PSRP has been on-going. A supplemental BO for the PSRP was completed in 2009, including determinations for the endangered Eastern indigo snake, endangered wood stork, and endangered Florida panther. The 2009 BO included the analysis of potential impacts from the addition of the manatee mitigation feature and the tieback levee. The waters of the Ten Thousand Islands region directly south of the PSRP are critical for the endangered smalltooth sawfish (*Pristis pectinata*). Critical habitat for the smalltooth sawfish was designated in 2009. Separate consultation with the National Oceanic and Atmospheric Administration National Marine Fisheries Service has been conducted through a programmatic CERP consultation (National Marine Fisheries Service 2013). A supplemental BA is included in this report that addresses the addition of the manatee mitigation feature and complete consultation on the West Indian manatee for the PSRP. The BA also includes completed consultation for the newly listed Florida bonneted bat as well as species effect determinations on listed species resulting from the construction and operation of the manatee mitigation feature (Appendix E).

Federally listed species that are known to occur or potentially occur in the vicinity of PSRP include the endangered American crocodile (*Crocodylus acutus)*, candidate species, gopher tortoise (*Gopherus polyphemus*), threatened Eastern indigo snake (*Drymarchon corais couperi*), endangered Florida panther [*Felis* (=*Puma*) *concolor*

coryi], endangered red-cockaded woodpecker (*Picoides borealis*), endangered Everglade snail kite *(Rostrhamus sociabilis plumbeus)*, endangered wood stork (*Mycteria Americana)*, endangered Florida bonneted bat (*Eumops floridanus*) and endangered West Indian manatee (*Trichechus manatus).* The PSRP also contains designated critical habitat for the Everglade snail kite, American crocodile, and the West Indian manatee. In recent discussions with USFWS, it is recognized that critical habitat for the Florida bonneted bat is under development and it is anticipated that since PSRP is a focal area for the species, future designated critical habitat may fall within PSRP and would be coordinated with USFWS as appropriate.

A discussion of threatened and endangered species within the PSRP can be found in section 9.6 of the 2004 PSRP Final PIR/EIS and is incorporated into this document by reference. Following the 2004 PSRP Final PIR/EIS, a second supplemental BA discussing design refinements in this EA for the PSRP was completed in 2008 with the USFWS BO completion in 2009. The following sections discuss threatened and endangered species within the affected environment for the manatee mitigation feature and the tieback levee for the Merritt, Faka Union, and Miller phases.

4.6.1 AMERICAN CROCODILE

The USFWS and the FWC list the American crocodile as endangered. This species occurs in extreme South Florida primarily in Biscayne and Florida Bays. Crocodiles have been observed as far north as the coasts of Lee and Collier Counties, but Collier County is not thought to support a significant resident population of crocodiles. The PSRP area does not include designated American crocodile critical habitat. A description of the American crocodile is included in the 2004 PSRP Final PIR/EIS and 2004 BO and remains relevant.

4.6.2 GOPHER TORTOISE

The gopher tortoise, an upland dwelling reptile, is currently listed as a candidate species in the Eastern United States by the USFWS (USFWS, 2013) and is listed as threatened by the State of Florida. The gopher tortoise shell can be from 5.9 to 14.6 inches long, is dark-brown to grayish-black terrestrial turtle, has large hind feet, and shovel-like forefeet (Ernest & Barbour, 1972). In Florida, individuals from coastal areas are generally darker than more central populations. Gopher tortoises excavate deep burrows that provide shelter from weather extremes and refuge from predation (Diemer et al., 1989). The gopher tortoise commonly occupies habitats with a well-drained sandy substrate, ample herbaceous vegetation for food, and sunlit areas for nesting (Landers, 1980; Landers et al., 1980; Diemer, 1989). Diemer (1992) found that gopher tortoise activity increased in April, peaked in July, and remained high through October. Many vertebrate and invertebrates species are known to seek refuge in gopher tortoise burrows, including protected species like the Eastern Indigo snake (Franz, 1986; Jackson & Milstrey, 1989; Lips, 1991; Witz et al., 1991).

Currently less than 30 relocated individuals reside on the Faka Union Canal spoil berm, which acts as an island. Comparisons of tortoise populations on true islands with

populations on the mainland suggested that tortoises live successfully on relatively small, isolated habitats (Mushinsky & McCoy, 1994). This study found that the density of burrows decreased as area increased on the mainland, but density of burrows was not related to area on the islands. Findings suggest that tortoises have a greater selection of habitats on the mainland than on islands. Tortoises on islands are confined and may be forced to live in less than ideal conditions. The implications of these findings are profound for tortoises living in small, fragmented "habitat islands" on the mainland. As the quality of their habitat island is degraded; mature adults may be forced to abandon a site in search of better habitat quality. From a practical perspective, prior to this study (Mushinsky & McCoy, 1994), observations of large numbers of active and inactive gopher tortoise burrows in a confined area likely would have been viewed as indicators of a "healthy" population; however, these findings suggest just the opposite. Rather than a signal of a healthy population, large numbers of active and inactive gopher tortoise burrows, relative to the actual number of tortoises, may signal a stressed population (Stewart et al., 1993). If populations on small islands are moved to larger mainland sites, it is possible that they would have greater access to resources and increase the population size.

4.6.3 EASTERN INDIGO SNAKE

The threatened Eastern indigo snake is present throughout the state, but its abundance is reduced to a point where it is uncommon. It was listed as a threatened species due to dramatic population declines caused by over-collecting for domestic and international pet trade, as well as mortalities caused by rattlesnake collectors. Because of its relatively large home range, this snake is especially vulnerable to habitat loss, degradation, and fragmentation. Residential and commercial expansions within the PSRP study area have become very significant threats to the snake.

There is no quantitative data with which to evaluate the trend of Eastern indigo snake populations in South Florida. The population, as a whole, is most likely declining because of current rates of habitat destruction and degradation. Even with continued habitat destruction in southwest Florida, this species will probably persist in most localities where large, unfragmented pieces of natural habitat remain. Unfortunately, current and anticipated future habitat fragmentation may result in a large number of isolated small groups of indigo snakes that potentially could not support a sufficient number of individuals to ensure viable populations. A thorough description of the Eastern indigo snake is included in the 2004 PSRP Final PIR/EIs and is still relevant.

4.6.4 FLORIDA PANTHER

The Florida panther, listed as endangered throughout its range in 1967 (32 FR 4001), received Federal protection under the passage of the ESA of 1973, as amended (16 U.S.C. 1531 *et seq.*). The Florida panther is also listed as endangered by the State of Florida. Since the panther was designated as an endangered species prior to enactment of the ESA, there was no formal listing package identifying threats to the species as required by Section 4(a)(1) of the ESA. No critical habitat has been designated for the panther. An extensive description of life history traits of the Florida panther is included in the

2009 BO. A description of the Florida panther is included in the 2004 PSRP Final PIR/EIS and 2009 BO and is still relevant. Monitoring of the project area during construction has noted the occurrence of panthers within the project area.

4.6.5 RED-COCKADED WOODPECKER

The red-cockaded woodpecker was federally listed as endangered in 1970 and is currently classified as a "species of special concern" by the State of Florida. The Belle Meade area, west of the PSRP, serves as a mitigation site for private development projects which may threaten the species. In September 2012, the PSSF had 13 active red-cockaded woodpecker clusters, 10 with potential breeding groups and the remaining three with solitary birds; however, only one of these clusters occurs within the footprint of the PSRP (Sowell, 2012). A thorough description of the red-cockaded woodpecker is included in the 2004 PSRP Final PIR/EIS and is still relevant.

4.6.6 EVERGLADE SNAIL KITE

The Florida subspecies of snail kite was first listed as endangered pursuant to the Endangered Species Conservation Act in 1967. The common name used in the original listing was "Everglade snail kite." This remains unchanged in the USFWS Code of Federal Regulations, even though the official name for the species is now simply "snail kite" (American Ornithologists' Union [AOU], 1983). Both the USFWS and the FWC list the snail kite as endangered. Snail kite habitat consists of freshwater marshes and the shallow vegetated edges of lakes (natural and man-made), where apple snails can be found. Drainage of Florida's interior wetlands has reduced the extent and quality of habitat for both the snail and the kite. The severely altered hydrology of the present day PSRP area has drained most of the freshwater marshes that provided habitat for the snail kite. A thorough description of the Everglade snail kite is included in the 2004 PSRP Final PIR/EIS and is incorporated in to this document by reference.

4.6.7 WOOD STORK

The USFWS listed the wood stork population in Florida as endangered in 1984. It is also designated as endangered by State of Florida. The listing occurred because wood stork populations had declined by more than 75 percent since the 1930s. The original listing recognized the relationship between the declining wood stork population, the loss of suitable foraging habitat, and colony nesting failures, particularly in the breeding colonies in South Florida, where human actions have reduced wetland areas by about 35 percent (Ogden and Nesbitt, 1979). A thorough description of the wood stork is included in the 2004 PSRP Final PIR/EIS and is incorporated into this document by reference.

4.6.8 WEST INDIAN MANATEE

Both the USFWS and the FWC list the West Indian manatee as endangered. The 1960s and early 1970s development of the PSRP area disrupted the historic seasonal timing and discharge of sheetflow into Faka Union Bay. What was once a slow discharge across a broad front is now a point source surge at the mouth of the Faka Union Canal system.

Aerial surveys conducted in the mid 1970s through the early 1980s documented manatee distribution throughout the region, particularly in the Faka Union Canal below US-41 (Beeler and O'Shea, 1985). Radio tracking data for manatees shows animals traveling extensive distances (10's of miles) to and from the Faka Union Canal area to forage on offshore seagrass beds (USFWS, 2002). These animals show a pattern of multiple days of feeding on seagrass beds followed by rapid, directed movement to a distant source of freshwater, where manatees remain only briefly before moving back to offshore areas. These movements suggest that the availability of freshwater may be an important determinant of manatee distribution and abundance in this region.

The POI Basin, located within the Faka Union Canal system directly south of the last weir structure and including areas underneath and slightly north of U.S. 41, is the second largest warm water refugium in southwest Florida. This marina basin can support up to 300 manatees during periods of cold stress. The basin's freshwater input from the Faka Union Canal creates a salinity and temperature stratification. This stratification and the depth of the basin are the key features responsible for creating a "passive" thermal refugium for this species (Stith, et al., 2011). A thorough description of the West Indian manatee life history is included in the 2004 PSRP Final PIR/EIS and the 2009 BO and is incorporated in to this document by reference.

4.6.9 FLORIDA BONNETED BAT

The Florida bonneted bat is Florida's largest bat, weighing approximately 1.1 to 2.0 ounces, with a 19 to 21 inch wingspan, and a body length of 5.1 to 6.5 inches. The species has dark brown fur and large broad ears that join together and slant forward over the eyes. Relatively little is known regarding the ecology and habitat requirements of this species (USFWS, 2013). In general, bats will forage over ponds, streams and wetlands and require roosting habitat for daytime roosting, protection from predators and rearing of young (Marks & Marks, 2008). Florida bonneted bats roost in tree cavities, rocky outcrops and dead palm fronds. In residential communities, the bats roost in Spanish tile roofs, but have also been found in attics, rock or brick chimneys and fireplaces of old buildings (NatureServe, 2013). Colonies are small, with the largest reported as just a few dozen individuals. The bat is a nocturnal insectivore and relies upon echolocation to navigate and detect prey. Females give birth to a single pup from June through September (Marks & Marks, 2008; Florida Bat Conservency, 2005); however limited data suggests that a female may undergo a second birthing season possibly in January or February (USFWS, 2013).

The Florida bonneted bat is Florida's only endemic bat and as of November 1, 2013 was federally listed under the ESA as endangered. It is also listed by the FWC as endangered. The range of this species is limited to southern Florida, although this species was encountered in 2008 in two locations within the Kissimmee River Wildlife Management Area north of Lake Okeechobee. Records indicate that it was once common in the 1950s and early 1960s near Coral Gables and Miami (Belwood, 1992). The Florida bonneted bat has only been documented in 12 locations within Florida, including areas within Coral Gables, Homestead, Naples, Everglades City and North Fort Myers. Seven of the locations are under public ownership with the Florida bonneted bat found in discrete and

specific areas within Big Cypress National Preserve, Fakahatchee Strand Preserve State Park, Kissimmee River Wildlife Management Area, Babcock Ranch and Fred C. Babcock and Cecil M. Webb Wildlife Management Area (USFWS 2013). The capture of a juvenile male at Picayune Strand State Forest on December 17, 2009 indicated that breeding was occurring in the area (Smith 2010). Loss of suitable habitat is believed to be the primary cause of population declines. Other perceived threats include pesticide and herbicide use, which decrease populations of insects, the bats primary prey.

4.6.10 ESTUARINE FISHES AND SEA TURTLES

NMFS designated critical habitat for the smalltooth sawfish in September 2009. The smalltooth sawfish and its critical habitat, the goliath grouper (*Epinephelus itajara*), mangrove rivulus (*Rivulus marmoratus*), sand tiger shark (*Odontaspis taurus*), the threatened loggerhead sea turtle (*Caretta caretta*), endangered Kemp's ridley sea turtle (*Lepidochelys kempi*), endangered Atlantic green sea turtle (C*helonia mydas mydas*), and the endangered Hawksbill sea turtle (*Eretmochelys imbricate*) are being addressed under a CERP programmatic consultation with NMFS. The Programmatic CERP Biological Assessment was submitted to NOAA-NMFS on July 2, 2013. A concurrence of determination letter was provided to the Corps on 17 December 2013.

The above listed marine species use habitats in shallow coastal areas and estuaries of the Ten Thousand Islands Region, with some species moving upriver to freshwater areas. Although these species are excluded from entering the Faka Union Canal system by a weir located just north of US-41, they are affected by the concentration of freshwater drainage from the PSRP Area into the Faka Union Canal system. This concentration lowers salinity as it discharges into Faka Union Bay. The canal system also affects the area of optimum-salinity habitat in nearby bays of the Ten Thousand Islands Region by diverting to Faka Union Bay the freshwater that otherwise would have entered these other systems as surface or groundwater flows. Browder and Wang (1989) noted a reverse salinity gradient into Pumpkin Bay (a neighboring bay to the west) during part of the year, probably due to the large amount of freshwater exiting the Ten Thousand Islands Region through Faka Union Bay. These alterations in the timing and quantity of freshwater flowing into the estuaries has an impact on natural biodiversity by affecting food availability, predation pressure, reproductive success, and most likely has caused chronic and acute stress to these fishes and turtles. A full description is included in the 2004 PSRP Final PIR/EIS and is incorporated into this document by reference.

4.7 ESSENTIAL FISH HABITAT

A discussion of the EFH near the PSRP is included in Section 3.6.11 of the 2004 PSRP Final PIR/EIS. These areas consist of mangroves in the Faka Union Bay and Ten Thousand Islands Region. The manatee mitigation feature, located adjacent to the Faka Union Canal south of the POI Basin, will be adjacent to mangrove wetlands, identified by the Gulf of Mexico Fishery Management Council as the EFH for postlarval, juvenile and subadult shrimp; postlarval, juvenile and adult red drum; postlarval, juvenile and adult gray snapper; juvenile red and gag groupers; and juvenile and adult yellowtail and lane snappers. The area has also been designated as the EFH by the NMFS for highly

migratory species including bull, lemon, and bonnethead sharks (NMFS, 2013). Approximately two acres of EFH, that include 0.43 acres of mangrove habitat, may be affected through the implementation of the manatee mitigation feature (Figures 2-5 and 4-1). These effects are further discussed in Section 5.1.7 of this EA.

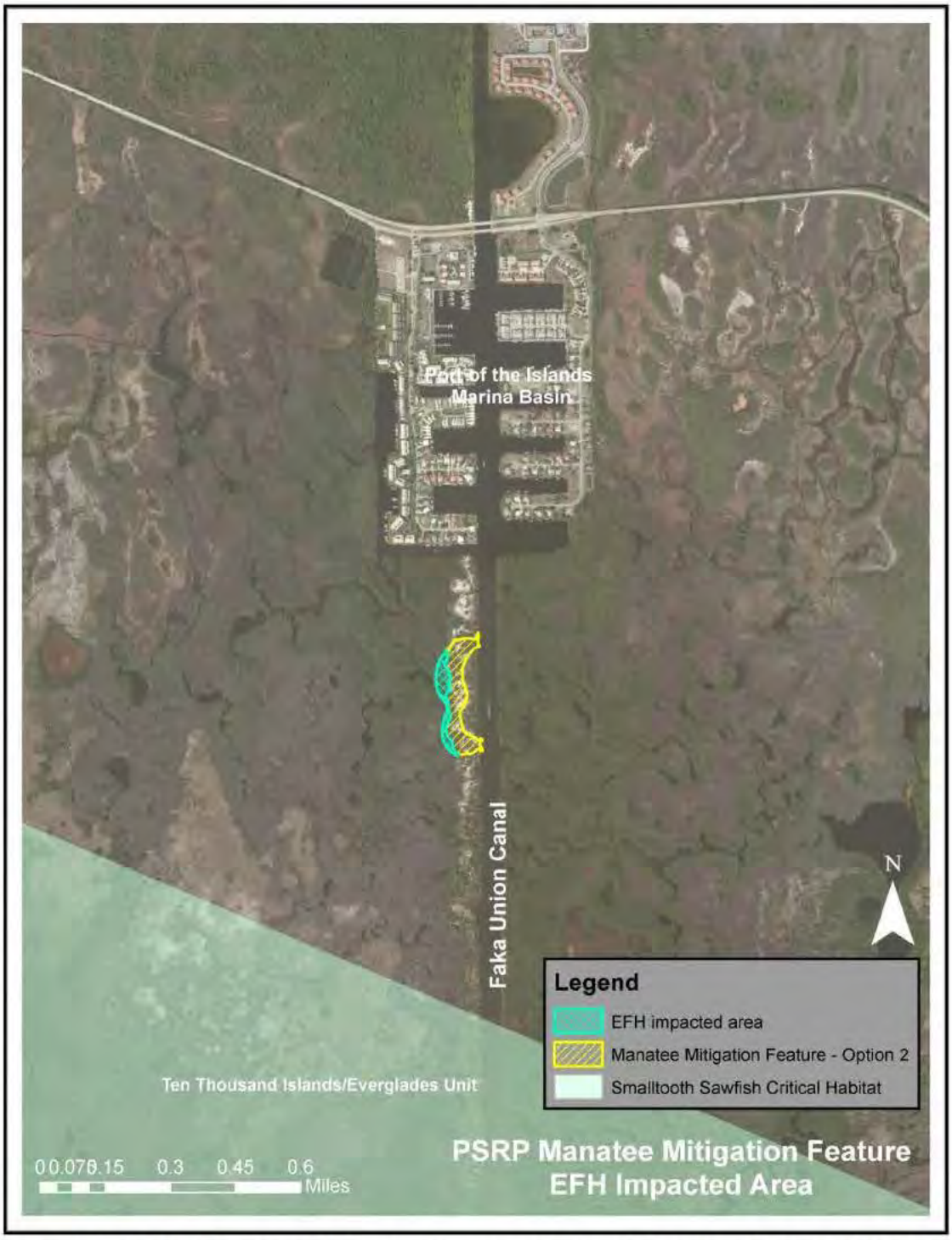

Figure 4-1. PSRP Manatee Mitigation Feature EFH and Smalltooth Sawfish Critical Habitat Location

Socio-economic considerations

4.7.1 LAND USE AND POPULATION

Collier County comprises approximately 2,032 square miles and is the second largest county in the State of Florida. In the county, rapid population growth began in the 1950s. By the 1970s, Collier County was distinguished as the fastest growing county in the state, as well as the nation.

Growth in Collier County has been much faster than in the state as a whole. The Hispanic population percentages are greater than on a statewide basis. For the census tract in the immediate area of the project site, the percentage of African Americans in residence there is greater than for the rest of the county. The census tract was located using the Census Bureau's *American Fact Finder* software.

Describing the demographic characteristics for the project site's census tract, Collier County, and the State of Florida, helps to provide a basis for understanding the existing socio-economic context. Some of these characteristics are outlined in Table 4-1 and Table 4-2.

Based on the comparative profile data delineated below, people at the poverty level make up a smaller share of the population in the PSRP area than in the State of Florida as a whole. The Hispanic population percentage is very close to the state average as a whole (higher at the county level, lower at the census tract level). The non-white population share is similar but lower in the project area.

Table 4-1. Collier County population changes.

Collier County Population 1950-2010*		
Year	Population	Percent (%) Increase
1950	6,488	-----
1960	15,753	143 %
1970	38,040	141 %
1980	85,971	126 %
1990	152,099	77 %
2000	251,377	66 %
2010	321,520	28 %

*SOURCE: U. S. Census Bureau

Table 4-2. Florida and Collier County Population Demographics in 2010

	Florida	Collier County
Population, 2010	18,801,310	321,520
Change in Population (2000-2010)	15%	21.90%
Below Poverty Level, 2010	13.80%	12.20%
White, 2010	78.50%	90.20%
Black, 2010	16.50%	6.90%
Other, 2010	5.00%	2.90%
Hispanic Origin, 2010	22.90%	26.30%

4.7.2 WATER DEMAND

A discussion of water demand related to the PSRP can be found in Section 3.12.2 of the 2004 PSRP Final PIR/EIS.

4.8 AESTHETICS

A discussion of the aesthetics related to the PSRP can be found in Section 3.13 of the 2004 PSRP Final PIR/EIS and is incorporated by reference.

4.9 RECREATION

A discussion of the recreational use of the PSSF can be found in section 3.16 of the 2004 PSRP Final PIR/EIS and is incorporated by reference.

4.10 WATER QUALITY

A discussion of the water quality of the PSRP can be found in Section 3.10.2 of the 2004 PSRP Final PIR/EIS and is incorporated by reference.

Changes to the FDEP classification system have been made since the time the 2004 PSRP Final PIR/EIS was published. The new classification lists the PSRP project under the Faka Union Canal South Water Body Identification Number (WBID) which is listed as impaired for dissolved oxygen. The Ten Thousand Islands receiving estuaries are identified under WBID 3259M and are also listed as impaired for dissolved oxygen. Considering no causative pollutant has been identified to date, no Total Maximum Daily Loads have been developed for this area.

4.11 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTES

A discussion of the hazardous, toxic and radioactive waste (HTRW) related to the PSRP can be found in Section 3.14 of the 2004 PSRP Final PIR/EIS.

Since 2004, the non-federal sponsor and the FDEP have continued to acquire project lands. Acquisition of these lands has generally ceased activities that might result in new

HTRW contamination that had not been identified at the time of the 2004 PSRP Final PIR/EIS. Since 2004, the SFWMD has worked, and continues to work, with the environmental agencies to complete the required environmental site investigations and remediation necessary for construction and operations of the project. To date, all remediation efforts located within the tieback levee and construction area footprints have been completed. Anticipated remediation activity still remains for the Belle Meade area, located within the project operational flowway, pending completion of ongoing Phase I/II Remediation analyses by the SFWMD.

4.12 AIR QUALITY

A discussion of the air quality of the PSRP can be found in Section 3.8 of the 2004 PSRP Final PIR/EIS and is incorporated into this document by reference.

4.13 NOISE

A discussion of noise pollution related to the PSRP can be found in Section 3.17 of the 2004 PSRP Final PIR/EIS and is incorporated by reference.

5.0 ENVIRONMENTAL EFFECTS

This section is the scientific and analytic basis for the comparisons of the alternatives for the features added as a result of detailed design. This section only covers potential effects that were not covered in the 2004 PSRP Final PIR/EIS for the PSRP. The cumulative impacts section will discuss the larger picture of past, present, and future potential impacts.

5.1 MANATEE MITIGATION FEATURE

5.1.1 GENERAL ENVIRONMENTAL SETTING

The objective of the manatee mitigation feature, Alternative 27, is to ensure the continuance of the existing manatee refugium at the POI Basin. This feature consists of creating a groundwater connection in an oxbow adjacent to the Faka Union Canal, just south of the POI Basin. This feature will assist in maintaining the POI Basin as a manatee refugium following the expected reduction of flows associated with plugging in the Faka Union Canal as a result of PSRP. See Table 2-3 for a summary of effects.

5.1.2 GROUNDWATER AND SURFACE WATER HYDROLOGY

5.1.2.1 No Action Alternative

The implementation of the PSRP as defined in the 2004 PSRP Final PIR/EIS will reduce the amount of freshwater flows that reach the POI Basin through the Faka Union Canal. These flows will be redistributed across the PSRP area to establish wetland rehydration and eliminate point source freshwater discharge in the Faka Union Canal. Restoration will positively affect the estuarine communities in the Ten Thousand Islands region due to reduction in point source discharge. Groundwater levels will also be increased in the PSRP area due to increased sheetflow of water across the landscape. The implementation of the PSRP will cause a reduction of flows through the Faka Union Canal to the POI Basin, resulting in a negative effect on the manatee passive thermal refugium (Stith et al. 2001).

5.1.2.2 Alternative 27 Option 2

Impacts to groundwater and surface water hydrology will be the same as under the No Action Alternative. The PSRP will restore the appropriate quantity, timing and distribution of flows over the project area and the estuarine communities. A connection to warm saline groundwater will be created through placement of an oxbow approximately 20 feet deep in the Faka Union Canal spoil berm to create a thermal refugium for manatees just south of the POI marina.

5.1.3 VEGETATION

5.1.3.1 No Action Alternative

No additional impacts to vegetation in excess of those described in the 2004 PSRP Final PIR/EIS will occur under the No Action Alternative.

5.1.3.2 Alternative 27 Option 2

The implementation of Alternative 27, Option 2 will have a small effect on upland vegetation and mangrove habitat. There are known uplands within the footprint of the manatee mitigation feature. Approximately eight (8) acres of uplands consisting mainly of pine flatwoods will be lost on the Faka Union Canal spoil berm. Additionally, two (2) acres of wetland mangrove habitat may also be impacted by the creation of the manatee mitigation feature. Other uplands areas along the spoil berm will serve as a disposal site for excavated material. Vegetation will be allowed to re-establish in these areas following construction, and exotics will be removed and treated to minimize recurrence.

5.1.4 WETLANDS

5.1.4.1 No Action Alternative

No additional impacts to wetlands in excess of those described in the 2004 PSRP Final PIR/EIS will occur.

5.1.4.2 Alternative 27 Option 2

The majority of the work will be performed on the Faka Union Canal spoil berm. A wetland analysis using the Uniform Mitigation Assessment Method will be performed with an interagency team prior to implementation to identify any wetlands that may be impacted by the construction of the manatee mitigation feature; however, any wetland impacts to this area will be compensated by the hydrologic restoration resulting from the PSRP. Initial analyses indicate that approximately two (2) acres of wetland mangrove habitat may be affected by the creation of the manatee mitigation feature; however, these effects are expected to be mitigated by the overall improvement of mangrove conditions south of US 41 through hydrologic restoration of the PSRP area.

5.1.5 FISH AND WILDLIFE RESOURCES

A discussion of the fish and wildlife resources and the overall effects due to the PSRP can be found in Section 9.5 of the 2004 PSRP Final PIR/EIS and is incorporated into this document by reference. The following sections related to fish and wildlife resources will specifically address the feature being proposed.

5.1.5.1 No Action Alternative

The No Action Alternative will result in a negligible impact to fish and wildlife resources in the POI Basin, with the exception of the West Indian manatee. The No Action Alternative will result in elimination of the passive thermal refugium, thereby negatively impacting manatees. However, the reduction of the freshwater point discharge into the POI Basin would be beneficial to nearby estuarine communities due to reduction in freshwater point source discharge to the Faka Union Canal.

5.1.5.2 Alternative 27 Option 2

The implementation of the manatee mitigation feature will not have an adverse impact on fish and wildlife resources in the POI Basin. The Faka Union spoil berm is currently home to a number of wildlife species, including gopher tortoises, Florida black bears, and other small mammals. Gopher tortoises found within the footprint of the manatee mitigation feature will be relocated prior to construction. As stated in Section 4.2.6, large numbers of active and inactive gopher tortoise burrows, relative to the actual number of tortoises, may signal a stressed population (Stewart et al., 1993). Therefore, if populations on small islands are moved to larger mainland sites, it is possible that they would have greater access to resources and increase the population size. Additionally, wildlife surveys will be completed prior to the start of construction. The proposed manatee mitigation feature will ensure the continuance of the POI Basin as a thermal refugium for West Indian manatees, and will not negatively affect fish and wildlife resources in the area.

5.1.6 THREATENED AND ENDANGERED SPECIES

A discussion of threatened and endangered species within the PSRP can be found in section 9.6 of the 2004 PSRP Final PIR/EIS and the 2004 USFWS BO and is incorporated into this document by reference. Following the 2004 PSRP Final PIR/EIS, a second supplemental BA discussing design refinements in this EA, including the tieback levee, for the PSRP was completed in 2008 with the USFWS BO completion in 2009.

The USFWS in their 2009 BO determined that there was insufficient information to make a determination on potential project effects to West Indian manatee. Since the PRSP will reduce the point discharge from the Faka Union Canal at the POI Basin, the manatee refugium at POI Basin will no longer function at its current capacity. Stith et al. (2011) found that implementation of the PSRP caused a significant loss of flows over the Faka Union Weir Number 1 into the POI Basin. The reduction in freshwater flows would cause the temperature inverted halocline to be present at a much lower rate, potentially resulting in increased levels of cold-stress for manatees in the region. In accordance with Section 7 of the 1973 ESA, the Corps and the USFWS are in informal consultation to determine a manatee mitigation feature to address the potential loss of a refugium at the POI Basin. Overall effects from the PSRP on the West Indian manatee will also be addressed through this coordination.

ESA consultation on potential PSRP impacts to species within the purview of with NMFS was conducted during the formulation of the 2004 Final PIR/EIS. On October 20, 2004, the Corps requested and subsequently received concurrence from NMFS on a no effect determination to the smalltooth sawfish, green sea turtle, Kemp's ridley sea turtle, and loggerhead sea turtle. Several years later on 2 September 2009, smalltooth sawfish critical habitat was officially designated, requiring a re-initiation of consultation for potential impacts from the PSRP. In a letter dated 17 December 2013, the NMFS concurred on the Corps' no effect determination, by stating: "A recent potential project feature would remove up to two acres of mangrove habitat approximately one-half mile north of the smalltooth sawfish critical habitat along the Faka Union Canal. These effects

will be discountable because the mangroves are likely located above the Mean High Water Line and inaccessible to sawfish because they are only hydrated during extreme storm events".

An interagency team with representatives from the Corps, SFWMD, USFWS, FWC and the FDEP refined potential mitigation options in order to maintain the function of the POI Basin as a manatee refugium. These options are described in this EA (refer to Section 2.1.1). The preferred alternative must be implemented prior to plugging the Faka Union Canal.

Table 5-1. Federally listed threatened (T), endangered (E), or candidate (C) species that might occur within the manatee mitigation area under the purview of the USFWS.

Common Name	Scientific Name	Federal Status	Effect Determination
Reptiles			
American crocodile	***Crocodylus acutus***	**E**	**No effect**
Gopher tortoise	***Gopherus polyphemus***	**C**	**May affect, but not likely to adversely affect**
Eastern indigo snake	***Drymarchon corais couperi***	**T**	**No effect**
Birds			
Everglade snail kite	***Rostrhamus sociabilis plumbeus***	**E**	**No effect**
Red-cockaded woodpecker	***Picoides borealis***	**T**	**N/A (not found in area)**
Wood stork	***Mycteria americana***	**E**	**No effect**
Mammals			
Florida panther	***Puma concolor coryi***	**E**	**May affect, but not likely to adversely affect**
West Indian manatee	***Trichechus manatus***	**E**	**May affect, but not likely to adversely affect**
Florida bonneted bat	***Eumops floridanus***	**E**	**May affect, but not likely to adversely affect**

5.1.6.1 West Indian Manatee

5.1.6.1.1 No Action Alternative

The PSRP could have an adverse affect on the manatee thermal refugium at the POI Basin under the No Action Alternative. A determination of effect was not reached under the 2004 PSRP Final PIR/EIS due to insufficient information available. A determination

of "may affect, but not likely to adversely affect" was reached in the 2009 USFWS BO contingent upon the studies conducted by the USGS. Stith et al. (2011) found that the implementation of the PSRP caused a significant loss of flows over the Faka Union Weir Number 1 into the POI Basin. The reduction in freshwater flows would cause the temperature inverted halocline to be present at a much lower rate, potentially resulting in increased levels of cold-stress for manatees in the region.

5.1.6.1.2 Alternative 27 Option 2

The manatee mitigation feature, Alternative 27 Option 2, is designed to mitigate for the loss of flows over the Faka Union Weir Number 1 resulting from the implementation of the PSRP. Alternative 27 Option 2 creates an oxbow adjacent to the Faka Union Canal that would provide a warm groundwater connection for manatees to seek refuge in during cold, dry periods. With the implementation of this alternative, the Corps determined that the PSRP and manatee mitigation feature "may affect, but are not likely to adversely affect" the West Indian manatee. See Appendix E, Supplemental BA for more information on the effects of the preferred alternative.

5.1.6.2 Everglade Snail Kite

5.1.6.2.1 No Action Alternative

As discussed in the 2004 PSRP Final PIR/EIS and 2009 BO for the PSRP, effects to the Everglade snail kite are not expected within the project area.

5.1.6.2.2 Alternative 27 Option 2

The implementation of the manatee mitigation feature, Alternative 27 Option 2, is unlikely to affect the Everglade snail kite since the majority of this work is located in an existing canal with nearby residential areas. However, as discussed, in the 2004 PSRP Final PIR/EIS, overall the PSRP may restore primary and secondary wetlands habitats for the Everglade snail kite. The Corps maintains the 2004 determination that there would be "no effect" on the Everglade snail kite or its critical habitat with the addition of the manatee mitigation feature, specifically, Alternative 27 Option 2.

5.1.6.3 Wood Stork

5.1.6.3.1 No Action Alternative

Effects to wood storks would be limited to what was previously discussed in the 2004 PSRP Final PIR/EIS and the 2009 USFWS BO under the No Action Alternative.

5.1.6.3.2 Alternative 27 Option 2

The implementation of the manatee mitigation feature, Alternative 27 Option 2, will not significantly effect wetlands that may be utilized by wood storks for foraging; therefore, the Corps determined that the manatee mitigation feature "may affect, but is not likely to adversely affect" the wood stork.

5.1.6.4 Florida Panther

5.1.6.4.1 No Action Alternative

Effects to Florida panthers would be limited to what was previously discussed in the 2004 PSRP Final PIR/EIS and the 2009 BO under the No Action Alternative.

5.1.6.4.2 Alternative 27 Option 2

The project area is known to support the Florida panther, panther prey, and to include panther habitat as discussed in the 2004 Final PIR/EIS, 2008 BA, and 2009 BO. However, the manatee mitigation feature is constructed outside of the Florida Panther Focus Area or ESA consultation area as described in the 2009 BO. The inclusion and implementation of the manatee mitigation feature will not significantly affect panther habitat and most of the effect will be temporary. Therefore, the Corps determines the manatee mitigation feature "may affect, likely to adversely affect" the Florida panther.

5.1.6.5 Florida Bonneted Bat

5.1.6.5.1 No Action Alternative

No effects to Florida bonneted bats would occur as a result of the No Action Alternative for manatee mitigation.

5.1.6.5.2 Alternative 27 Option 2

Due to the potential for suitable habitat for the Florida bonneted bat in the project area, the Corps has determined that construction of Alternative 27, Option 2 for the manatee mitigation feature "may affect but is not likely to adversely affect" the species. This determination applies to the manatee mitigation feature only, not the entire PSRP area, as stated in the Supplemental Biological Assessment (Appendix E).

5.1.6.6 Eastern Indigo Snake

5.1.6.6.1 No Action Alternative

Effects to Eastern indigo snakes would be limited to what was previously discussed in the 2004 PSRP Final PIR/EIS and the 2009 BO under the No Action Alternative.

5.1.6.6.2 Alternative 27 Option 2

The 2009 BO made the determination that the overall PSRP "may affect, likely to adversely affect" the Eastern Indigo snake; however, the addition of the manatee mitigation feature would not affect large areas of connected upland habitat in which the Eastern Indigo snake is known to occur. The Corps determined that the manatee mitigation feature has "no effect" on the Eastern indigo snake.

5.1.6.7 Gopher Tortoise

5.1.6.7.1 No Action Alternative

No additional effects to gopher tortoises or their habitat would occur as a result of the No Action Alternative.

5.1.6.7.2 Alternative 27 Option 2

A small population of gopher tortoises has been relocated to the Faka Union Canal spoil berm just south of the POI Basin. These tortoises would be relocated prior to construction of the manatee mitigation feature and would be moved to suitable habitat in a nearby location. A gopher tortoise relocation plan will be coordinated with the USFWS and FWC prior to construction. The Corps determined that the manatee mitigation feature "may affect, but is not likely to adversely affect" the gopher tortoise during and following the construction of the manatee mitigation feature and may actually benfit this isolated island population (Mushinsky & McCoy, 1994).

5.1.6.8 American Crocodile

5.1.6.8.1 No Action Alternative

As discussed in the 2004 PSRP Final PIR/EIS and the 2009 USFWS BO for the PSRP, effects on the American crocodile are not expected within the project area.

5.1.6.8.2 Alternative 27 Option 2

The implementation of the manatee mitigation feature, Alternative 27 Option 2, will have no additional effect on the American crocodile. The Corps maintains the determination of "no effect" on the crocodile with the addition of the manatee mitigation feature.

5.1.7 ESSENTIAL FISH HABITAT

5.1.7.1 No Action Alternative

No additional effects to the EFH would occur as a result of the No Action Alternative. Discussions of the EFH and estuarine resources can be found in Section 4 of the 2004 PSRP Final PIR/EIS and are still relevant.

5.1.7.2 Alternative 27 Option 2

The manatee mitigation feature will be constructed in the Faka Union Canal spoil berm adjacent to the Faka Union Canal on the east and mangrove wetlands on the west. Approximately two (2) acres of EFH within the Ten Thousand Islands region, which include 0.43 acres of mangrove habitat, may be affected with the implementation of Alternative 27 Option 2 (Figure 5-1). However, due to the overall expected project benefits of restored wetland communities, sheetflow towards the coastal estuaries, reduction of harmful surge flows through the Faka Union Canal into Faka Union Bay, improved freshwater overland flow and seepage into other bays of the Ten Thousand Islands Region, improved aquifer recharge, improved habitat for fish and wildlife and threatened and endangered species, reduced invasion of exotic species, and increased spatial extent of wetlands; it is the conclusion of the Corps that restoring a more natural

hydrology to the Study Area will have a significant positive effect on Essential Fish Habitat.

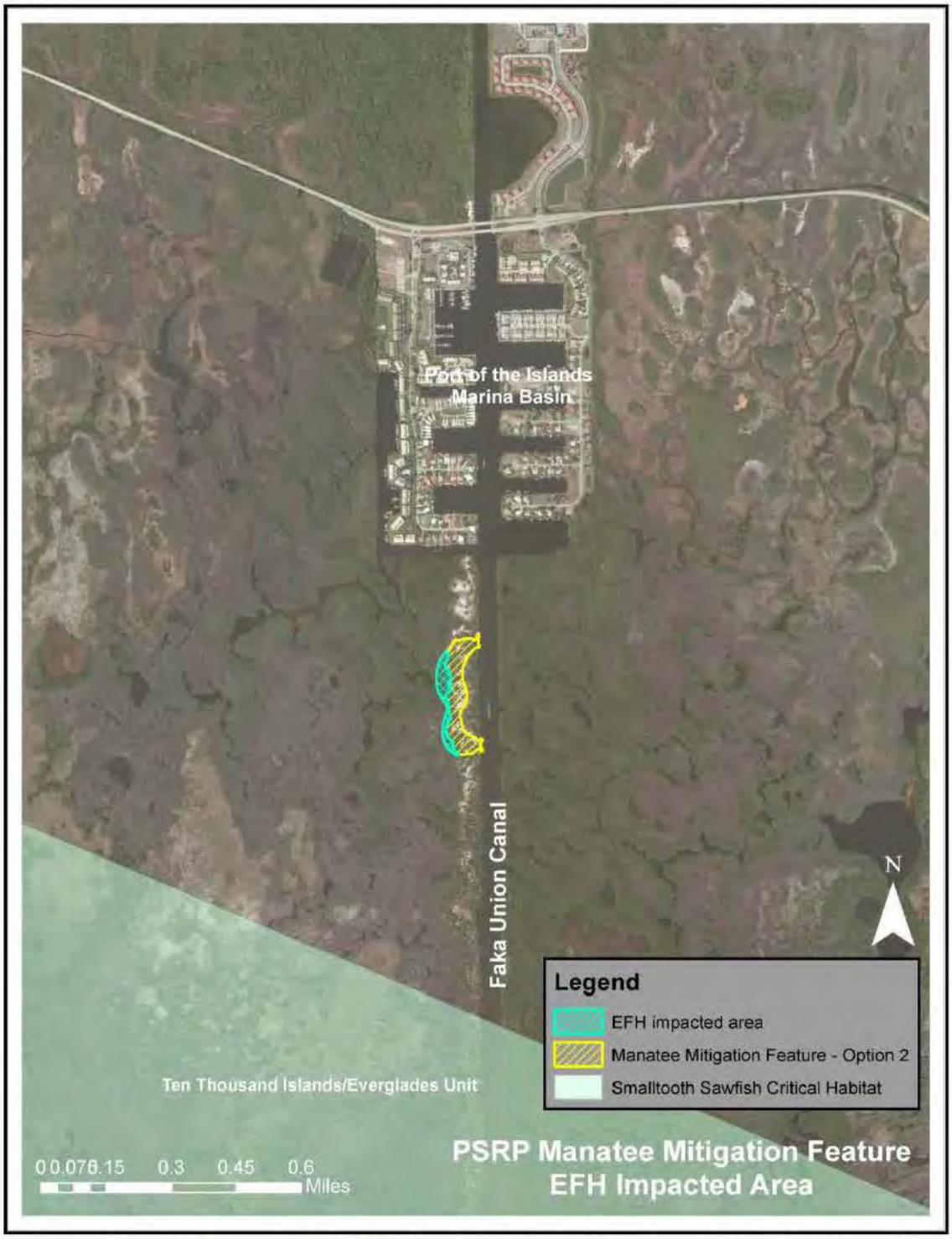

Figure 5-1. Area of Essential Fish Habitat Lost with Implementation of Alternative 27 Option 2.

5.1.8 SOCIO-ECONOMIC

5.1.8.1 No Action Alternative

The population of manatees in the POI Basin could be significantly reduced under the No Action Alternative. Several manatee sightseeing tour companies that operate in the marina could be negatively effected by the loss of the refugia in the POI Basin.

5.1.8.2 Alternative 27 Option 2

The implementation of the manatee mitigation feature will help ensure the continued existence of the POI Basin as a refuge for manatees in the cold season, therefore no effects to local sightseeing tour companies are anticipated with implementation of the recommended plan.

5.1.9 AESTHETICS

5.1.9.1 No Action Alternative

Aesthetic effects would be limited to what was previously discussed in the 2004 PSRP Final PIR/EIS under the No Action Alternative.

5.1.9.2 Alternative 27 Option 2

The excavated material from the construction of the manatee mitigation feature will be deposited in designated areas on the Faka Union Canal spoil berm up to 14 feet high. These areas will be allowed to reestablish vegetation and should only have a short term effect to aesthetics during construction.

5.1.10 RECREATION

5.1.10.1 No Action Alternative

The manatee refugium at the POI Basin could be compromised under the No Action Alternative. This would reduce recreational opportunities for tourists that visit the area for manatee sightseeing tours.

5.1.10.2 Alternative 27 Option 2

Alternative 27 Option 2 would assist in maintaining the current level of recreational opportunities in the POI Basin. Alternative 27 Option 2 consists of creating a manatee refugium adjacent to the Faka Union Canal which would restrict boat traffic in the manatee mitigation feature. However, manatees are still expected to occur within the POI Basin. Therefore, there may be a slight negative effect on recreational activities in the POI Basin with the restriction of public access to the manatee mitigation feature. Recreational activities within the POI Basin may be affected during construction of the manatee mitigation feature.

5.1.11 WATER QUALITY

5.1.11.1 No Action Alternative

The water quality at the POI Basin would have no change or impairment as a result of a No Action Alternative.

5.1.11.2 Alternative 27 Option 2

The water quality at the POI Basin would have no change or impairment as a result of the implementation of Alternative 27 Option 2. Only temporary construction related effects are anticipated such as elevations in turbidity readings which will be minimized through the use of best management practices as well as regulatory monitoring. Any elevation in turbidity will be required to comply with the state water quality criteria. Therefore, there will be no long-term effects from construction.

5.1.12 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTES

5.1.12.1 No Action Alternative

The No Action Alternative would not require any remediation for HTRW substances.

5.1.12.2 Alternative 27 Option 2

Implementation of Alternative 27 Option 2 may require a HTRW assessment that would recommend remediation for any sites that may be identified within the construction footprint. The SFWMD) is responsible for conducting an investigation and performing any required remediation action identified. It is not expected that there would be any HTRW substances within the proposed feature location.

5.1.13 AIR QUALITY

5.1.13.1 No Action Alternative

The air quality at the POI Basin would have no change or impairment as a result of a No Action Alternative.

5.1.13.2 Alternative 27 Option 2

The air quality at the POI Basin would have no long-term change or impairment as a result of the implementation of Alternative 27 Option 2. The only anticipated effects that may be considered are short-term particulate dust emissions from land clearing and moving operations during construction; however, best management practices will be used to control such emissions.

5.1.14 NOISE

5.1.14.1 No Action Alternative

The noise at the POI Basin would have no change or impairment as a result of a No Action Alternative.

5.1.14.2 Alternative 27 Option 2

The air quality at the POI Basin would have no long-term change or impairment as a result of the implementation of Alternative 27 Option 2. During construction activity, short-term noise will be generated from the operation of construction equipment. All local and state noise regulations for construction will be adhered to during the construction phase.

5.2 TIEBACK LEVEES

5.2.1 GENERAL ENVIRONMENTAL SETTING

The tieback levee is located within the PSRP as shown in the 2004 PSRP Final PIR/EIS. The original design included three (3) separate berms just south of each pump station. The need for a single full project width tieback levee was identified during the detailed design phase. The environmental setting detailed in the 2004 PSRP Final PIR/EIS is still applicable and is incorporated into this EA by reference as stated in Section 4.0.

The objective of the tieback levee is to prevent pumped water from returning to the upstream side of the pump station, thus, having to be double-pumped or create "recycle pumping." The tieback levee will be constructed over several small remnant wetlands west of the Miller Pump Station and on upland habitat and existing roadway.

5.2.2 GROUNDWATER AND SURFACE WATER HYDROLOGY

5.2.2.1 Alternative 1 – No Action

The No Action Alternative would result in recirculation of pumped water to the upstream side of the pump stations through surface water flanking the original berm design, reducing the efficiency of the project and potentially resulting in a partial loss of restoration benefits.

5.2.2.2 Alternative 2 – East-West Tieback Levee

The addition of the full width tieback levee to the PSRP will prevent the recirculation of pumped water to the upstream side of the pump station. This will facilitate the restoration of sheetflow southward through the project area. However, implementation of the tieback levee may also create a barrier which could disrupt surface water flows from north of the pump stations, causing water to accumulate on the upstream side of the levee. If this occurs, culverts could be installed along the tieback levee to alleviate ponding on the upstream side of the levee.

5.2.3 VEGETATION

5.2.3.1 Alternative 1 – No Action

No additional effects to vegetation will occur in excess of those described in the 2004 PSRP Final PIR/EIS under the No Action Alternative, except as described below for wetlands.

5.2.3.2 Alternative 2 – East-West Tieback Levee

Effects to vegetation with the implementation of Alternative 2 will be minimized by constructing over half of the tieback levee on existing roads. Approximately 53 additional acres will be affected by the tieback levee, most of which is upland habitat consisting of plant species such as sabal palm (*Sabel palmetto*) and south Florida slash pine (*Pinus elliotti*).

5.2.4 WETLANDS

5.2.4.1 Alternative 1 – No Action

If the tieback levee is not implemented, the PSRP would not achieve all wetland benefits anticipated in the 2004 PSRP Final PIR/EIS since water would be recycled through the pump stations and not redistributed as sheetflow.

5.2.4.2 Alternative 2 – East-West Tieback Levee

Over half of the tieback levee under Alternative 2 would be constructed on existing roadways; therefore, any effects to existing wetlands would be minimized. A wetland analysis using the Uniform Mitigation Assessment Method was performed in June 2011 by an interagency team to identify wetlands that may be affected by the construction of the tieback levee.

5.2.5 FISH AND WILDLIFE RESOURCES

As stated in Section 4.0, a discussion of the fish and wildlife resources for the overall PSRP can be found in Section 9.5 of the 2004 PSRP Final PIR/EIS and is incorporated into this document by reference. The following sections related to fish and wildlife resources will specifically address the feature being proposed.

5.2.5.1 Alternative 1 – No Action

Without the addition of the tieback levee, the anticipated hydrologic restoration benefits as outlined in the 2004 PSRP Final PIR/EIS would not be fully realized due to the recirculation of flows through the pump station. This would mean that there would be less foraging habitat and less prime habitat for wildlife species.

5.2.5.2 Alternative 2 – East-West Tieback Levee

The construction of the tieback levee will eliminate approximately 53 acres of upland habitat. The tieback levees will help facilitate flow of water south, increasing the efficiency and likelihood of hydrologic restoration; however, any freshwater flows from north of the pump stations will be cut off by the tieback levees. This could be considered an example of habitat fragmentation for some species based on scale. For example, the tieback levee could potentially be an obstacle to dispersal for amphibians, but would not impede movement of larger mammals. Any loss of habitat for fish and wildlife resources will be compensated for by the hydrologic restoration of Picayune Strand.

5.2.6 THREATENED AND ENDANGERED SPECIES

A discussion of threatened and endangered species within the PSRP can be found in section 9.6 of the 2004 PSRP Final PIR/EIS and is incorporated into this document by reference. Following the 2004 PSRP Final PIR/EIS, a second supplemental BA discussing design refinements in this EA for the PSRP was completed in 2008 with the USFWS BO completion in 2009. The following sections discuss the tieback levee for the Merritt, Faka Union, and Miller phases. The potential effects to threatened and endangered species as a result of the addition of the tieback levee were included in the 2008 Corps BA and the 2009 USFWS BO and are incorporated by reference in to this document. A summary of the effects determinations for the proposed action, as coordinated through the 2008 Corps BA and 2009 USFWS BO, is shown in Table 5-2 below. Detailed information on the threatened and endangered species located in the project area can be found in the PSRP 2009 USFWS BO. The Corps is in full compliance with requirements of the ESA with the addition of the tieback levee.

Table 5-2. Federally listed threatened (T), endangered (E), or candidate (C) species that might occur within the tieback levee footprint under the purview of the USFWS.

Common Name	Scientific Name	Federal Status	Effect Determination
Reptiles			
American crocodile	***Crocodylus acutus***	**E**	**No effect**
Gopher tortoise	***Gopherus polyphemus***	**C**	**No effect**
Eastern indigo snake	***Drymarchon corais couperi***	**T**	**May affect, not likely to adversely affect**
Birds			
Everglade snail kite	***Rostrhamus sociabilis plumbeus***	**E**	**No effect**
Red-cockaded woodpecker	***Picoides borealis***	**T**	**May affect, not likely to adversely affect**
Wood stork	***Mycteria americana***	**E**	**May affect, not likely to adversely affect**
Mammals			
Florida panther	***Puma concolor coryi***	**E**	**May affect, not likely to adversely affect**
West Indian manatee	***Trichechus manatus***	**E**	**No effect**
Florida bonneted Bat	***Eumops floridanus***	**E**	**No effect**

5.2.6.1 Everglade Snail Kite

5.2.6.1.1 Alternative 1 – No Action

As discussed in the 2004 PSRP Final PIR/EIS and 2009 USFWS BO for the PSRP, effects to the Everglade snail kite are not expected within the project area.

5.2.6.1.2 Alternative 2 – East-West Tieback Levee

As discussed in the 2004 PSRP Final PIR/EIS and 2009 USFWS BO for the PSRP, effects to the Everglade snail kite are not expected within the project area. The Corps maintains the determination of "no effect" to the Everglade snail kite.

5.2.6.2 Wood Stork

5.2.6.2.1 Alternative 1 – No Action

Effects to the wood stork would be limited to what was previously discussed in the 2004 PSRP Final PIR/EIS and the 2009 USFWS BO under the No Action Alternative.

5.2.6.2.2 Alternative 2 – East-West Tieback Levee

Effects to the wood stork would be limited to what was previously discussed in the 2004 PSRP Final PIR/EIS and the 2009 USFWS BO. The Corps determined that the addition of the tieback levee "may affect, not likely to adversely affect" the wood stork.

5.2.6.3 Florida Panther

5.2.6.3.1 Alternative 1 – No Action

Effects to the Florida panther would be limited to what was previously discussed in the 2004 PSRP Final PIR/EIS and the 2009 USFWS BO under the No Action Alternative.

5.2.6.3.2 Alternative 2 – East-West Tieback Levee

As previously discussed, the tieback levee will affect approximately 53 acres of upland habitat; however, this loss will be offset by the restoration of approximately 55,000 acres of Picayune Strand. The Corps maintains the determination of "may affect, not likely to adversely affect" the Florida panther and will adhere to the terms and conditions within the 2009 USFWS BO.

5.2.6.4 Florida Bonneted Bat

5.2.6.4.1 Alternative 1 – No Action

Effects to the Florida bonneted bat without the conversion of the individual berms to a single full width tieback levee would be very minimal. Without the full width tieback levee surface water may re-circulate to the upstream side of the pump station by flanking the berm thereby reducing the success of hydrological restoration with would provide increased suitable habitat for the bat.

5.2.6.4.2 Alternative 2 – East-West Tieback Levee

Alternative 2, the single full width tieback levee, would reduce the re-circulation of surface flows around the edges of the berms. This would increase the success of hydrological restoration and improve available suitable habitat for the Florida bonneted bat. The Corps determined that the PSRP and tieback levee have "no effect" on the Florida bonneted bat.

Evidence of direct effects to the Florida bonneted bat as a result of the implementation of the PSRP is lacking, although negative effects to the species are unlikely. The restoration of natural hydrology in Picayune Strand and the surrounding protected public lands would likely increase available nesting and foraging habitat for the Florida bonneted bat. Therefore, the overall PSRP as described in the 2004 PSRP Final PIR/EIS, including the addition of the tieback levee, would have no effect on the Florida bonneted bat.

5.2.6.5 Eastern Indigo Snake

5.2.6.5.1 Alternative 1 – No Action

Effects to Eastern indigo snakes would be limited to what was previously discussed in the 2004 PSRP Final PIR/EIS and the 2009 BO under the No Action Alternative.

5.2.6.5.2 Alternative 2 – East-West Tieback Levee

As discussed in the 2009 USFWS BO, the USFWS determined that the PSRP "may affect, is likely to adversely affect" the Eastern Indigo snake. The addition of the tieback levee will not cause a significant change to the previous analysis; therefore, the Corps determined that the tieback levee for Merritt, Faka Union, and Miller Pump Stations "may affect, not likely to adversely affect" the Eastern Indigo snake. Terms and conditions outlined in the 2009 USFWS BO will be followed with the construction of the tieback levee.

5.2.6.6 Gopher Tortoise

5.2.6.6.1 Alternative 1 – No Action

No additional effects to gopher tortoises or their habitat would occur under the No Action Alternative.

5.2.6.6.2 Alternative 2 – East-West Tieback Levee

The footprint of the tieback levee under Alternative 2 would lead to a small increase in the permanent loss of upland habitat. However, this loss will be minimal and will not cause long-term detrimental effects to the gopher tortoise. The Corps determined that Alternative 2 will have "no effect" on the gopher tortoise.

5.2.6.7 Red-cockaded Woodpecker

5.2.6.7.1 Alternative 1 – No Action

Effects to the red-cockaded woodpecker would be limited to what was previously discussed in the 2004 PSRP Final PIR/EIS and the 2009 USFWS BO under the No Action Alternative.

5.2.6.7.2 Alternative 2 – East-West Tieback Levee

The tieback levee for the Merritt and Faka Union Pump Stations and the eastern portion of Miller Pump Station tieback levee will not affect the red-cockaded woodpeckers or their habitat; however, the western Miller Pump Station section of the tieback levee is located near an active colony. This colony is located in a mesic pine flatwood, west of the PSRP.

The South Florida Multi-species Recovery Plan (1999) states "Water depths in mesic pine flatwoods vary throughout the seasonal hydrologic cycle. Extreme ranges are from just below the surface to eight feet below ground surface. Typical ranges are from six inches to one foot below ground surface at the height of the wet season to six feet below ground surface in the late dry season. For most of the year, undrained mesic pine flatwoods have water within four feet below the ground surface (Abrahamson and Hartnett 1990)."

Modeling of Alternative 3D in the 2004 PSRP Final PIR/EIS showed that areas west of Miller Canal could remain dominated by mesic pine flatwoods in some areas and be converted to hydric pine flatwoods, wet prairie, or even cypress forests in some areas. However, it is important to note that the tieback levees were not included in the original design of Alternative 3D. Recent modeling indicated that the tieback levee would not effect private lands west of the Miller Pump Station. The tieback levee will terminate approximately 6,000 feet west of the Miller Pump Station. The Corps determined that the tieback levee "may affect, not likely to adversely affect" red-cockaded woodpeckers located in the mesic pine flatwoods west of the Miller Canal.

5.2.6.8 American Crocodile

5.2.6.9 Alternative 1 – No Action

As discussed in the 2004 PSRP Final PIR/EIS and 2009 USFWS BO for the PSRP, effects to the American crocodile are not expected within the project area.

5.2.6.10 Alternative 2 – East-West Tieback Levee

The placement of the tieback levee will not affect the American crocodile or its habitat. The Corps maintains the determination reached in the 2004 PSRP Final PIR/EIS of "no effect" for the American crocodile.

5.2.7 ESSENTIAL FISH HABITAT

5.2.7.1 Alternative 1 – No Action

Effects to the EFH would be limited to what was previously discussed in the 2004 PSRP Final PIR/EIS and the 2009 BO under the No Action Alternative.

5.2.7.2 Alternative 2 – East-West Tieback Levee

The placement of the tieback levee will not adversely affect the EFH. The tieback levee will help facilitate flows to the south through the project area and restore flows to the Ten Thousand Islands Region creating an indirect beneficial effect to the EFH. The Corps maintains that the restoration of a more natural hydrology to the estuaries will have a positive effect on the EFH in the Ten Thousand Islands Region.

5.2.8 SOCIO-ECONOMIC

5.2.8.1 Alternative 1 – No Action

There is the potential for pumped flows to return to the upstream side of the pump station under the No Action Alternative. In the Belle Meade area, west of the Miller Pump Station, private lands could possibly be effected by these recycled flows.

5.2.8.2 Alternative 2 – East-West Tieback Levee

The construction and inclusion of the tieback levee will cause no additional socioeconomic effects over those described in the 2004 PSRP Final PIR/EIS. A ring levee was included in the 2004 PSRP Final PIR/EIS design. The intent of the ring levee was flood protection for the private land northwest of the Miller Pump Station. This can be achieved by the design of the western (Miller) portion of the tieback levee; therefore the ring levee was removed from the design.

5.2.9 AESTHETICS

5.2.9.1 Alternative 1 – No Action

Effects on aesthetics would be limited to what was previously discussed in the 2004 PSRP Final PIR/EIS under the No Action Alternative.

5.2.9.2 Alternative 2 – East-West Tieback Levee

The implementation of Alternative 2 would cause no additional effects to aesthetics over what was previously discussed in the 2004 PSRP Final PIR/EIS, other than the addition of the view of the levees from the pump stations.

5.2.10 RECREATION

5.2.10.1 Alternative 1 – No Action

Effects on recreation would be limited to what was previously discussed in the 2004 PSRP Final PIR/EIS under the No Action Alternative.

5.2.10.2 Alternative 2 – East-West Tieback Levee

The implementation of Alternative 2 would have no additional effect on recreation over what was previously discussed in the 2004 PSRP Final PIR/EIS.

5.2.11 WATER QUALITY

5.2.11.1 Alternative 1 – No Action

There would be a change or impairment to water quality as a result of a No Action Alternative.

5.2.11.2 Alternative 2 – East-West Tieback Levee

The water quality within wetlands in or adjacent to the tieback levee feature would have no change or impairment as a result of the implementation of Alternative 2. Only temporary construction-related effects are anticipated such as temporary slight increases in turbidity which will be minimized through the use of best management practices during construction as well as regulatory monitoring.

5.2.12 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTES

5.2.12.1 Alternative 1 – No Action

The No Action Alternative would not require any remediation for HTRW.

5.2.12.2 Alternative 2 – East-West Tieback Levee

All remedial activity has been completed within the tieback levee footprint. Implementation of Alternative 2 would cause no additional HTRW concerns.

5.2.13 AIR QUALITY

5.2.13.1 Alternative 1 – No Action

Implementation of the No Action alternative for the tieback levee feature would have no change or impairment to air quality.

5.2.13.2 Alternative 2 – East-West Tieback Levee

The air quality at the PSRP would have no change or impairment as a result of implementation of Alternative 2. The only anticipated effects that may be considered are short-term particulate dust emissions from land clearing and moving operations during construction; however, best management practices will be used to control such emissions.

5.2.14 NOISE

5.2.14.1 Alternative 1 – No Action

Implementation of the No Action Alternative for the tieback levee feature would have no change or impairment to noise.

5.2.14.2 Alternative 2 – East-West Tieback Levee

The noise at the PSRP would have no change or impairment as a result of implementation of Alternative 2. During construction activity, short-term noise will be generated from the operation of construction equipment. All local and state noise regulations for construction will be adhered to during the construction phase.

5.3 CONFLICTS AND CONTROVERSY

A detailed discussion of conflicts and controversy for the PSRP can be found in Section 10 of the 2004 PSRP Final PIR/EIS. The following sections will discuss only conflicts and controversy relevant to the specific features identified since the overall PRSP, as described in the 2004 PSRP Final PIR/EIS, was deemed consistent during the public and agency review process.

Over the life of the PSRP, numerous meetings and discussions have focused on the potential effects on the West Indian manatee through the reduction of fresh water flows to the POI Basin. Various agencies have provided information and input relevant to potential effects and mitigation for the West Indian manatee.

Initial meetings were held with residents of the POI Marina and Orchid Cove prior to the selection of Alternative 27, Option 2. Residents were very concerned that changes to the location of the Faka Union Weir Number 1 would have a negative effect on their community and property values. This concern factored into the decision to eliminate alternatives that may alter the current Faka Union Weir Number 1.

5.4 CLIMATE CHANGE

The features discussed in this EA, when considered separately from the overall PSRP, will be insignificantly affected by climate change. The tieback levee is located just south of Interstate 75, approximately ten miles inland. Intermediate projections of sea level rise at 100 years post project estimate sea levels will rise approximately two feet in south Florida. This would cause a loss of approximately nine percent of the southern PSRP area. The manatee mitigation feature is also unlikely to be influenced by sea level rise since the preferred alternative will establish a connection with saline groundwater; however, freshwater for manatees to drink at the Faka Union Weir number 1 may

decrease with increasing sea level rise. As weather patterns change and more extreme weather events occur (i.e. more frequent cold periods), manatees are likely to become more reliant on artificial refugium like the POI Basin.

5.4.1 GREEN HOUSE GAS EMISSIONS

The Council on Environmental Quality (CEQ) has provided a draft guidance memorandum dated February 18, 2010 to help explain how agencies of the Federal government should analyze the environmental effect of greenhouse gas (GHG) emissions and climate change when they describe the environmental effects of a proposed agency action in accordance with Section 102 of NEPA and CEQ Regulations for Implementing the Procedural Provisions of NEPA, 40 C.F.R. Parts 1500-1508. CEQ proposes to advise Federal agencies to consider the effects of a proposed agency action on GHG emissions and consideration of current or projected effects of climate change on proposals for agency action. The draft guidance memorandum states that if a proposed action would be reasonably anticipated to cause direct emissions of 25,000 metric tons of Carbon Dioxide (CO_2)-equivalent GHG emissions on an annual basis, agencies should consider this as an indicator of a minimum level of GHG emissions that may warrant a quantitative or qualitative assessment. The proposed action is not anticipated to cause direct emissions of 25,000 metric tons of CO_2-equivalent GHG emissions on an annual basis. GHG emissions associated with the construction of tieback levee would occur from operation of diesel powered construction equipment and will be temporary in nature.

5.4.2 CHANGES IN WEATHER PATTERNS

The erratic and unusual shift in normal weather patterns due to climate change could potentially effect the proposed action. Rainfall amounts, including frequency and intensity, resulting from the effects of climate change are unknown and are projected to increase or decrease up to 20 percent (SFWMD, 2009).

5.4.3 SEA LEVEL RISE

5.4.3.1 General Effect of Sea Level Rise on PSRP

Corps planning guidance (EC 1165-2-211) calls for evaluating the effects of sea level rise (SLR) under multiple scenarios. The multiple scenarios recommended include analysis of SLR at low, intermediate and high levels at 20, 50, and 100 years following the completion of project construction. The historic SLR as measured at the National Oceanic and Atmospheric Administration (NOAA) Key West tide station is 2.24 mm/yr. SLR has been calculated by the Corps for the low, intermediate and high scenarios at five year intervals per Engineering Circular (EC) 1165-2-211 guidance (Table 5-5 and Figure 5-2).

Table 5-3. Low, intermediate, and high projections of sea level rise over 100 year span post construction (assumes project completion by 2017)

Year of Analysis	Low Projection (Based on Historic Rate at Key West)	Intermediate (Based on NRC Curve I)	High (Based on NRC Curve III)	Low Projection (Based on Historic Rate)	Intermediate (Based on NRC Curve I)	High (Based on NRC Curve III)
	(mm)	(mm)	(mm)	(inches)	(inches)	(inches)
2017	0	0	0	0.0	0.0	0.0
2022	11	19	45	0.4	0.7	1.8
2027	22	39	94	0.9	1.5	3.7
2032	34	60	149	1.3	2.4	5.9
2037	45	83	209	1.8	3.3	8.2
2042	56	106	274	2.2	4.2	10.8
2047	67	131	343	2.6	5.2	13.5
2052	78	157	418	3.1	6.2	16.5
2057	90	184	498	3.5	7.3	19.6
2062	101	213	583	4.0	8.4	22.9
2067	112	242	673	4.4	9.5	26.5
2072	123	273	768	4.9	10.7	30.2
2077	134	305	868	5.3	12.0	34.2
2082	146	338	973	5.7	13.3	38.3
2087	157	372	1083	6.2	14.6	42.6
2092	168	407	1198	6.6	16.0	47.2
2097	179	444	1318	7.1	17.5	51.9
2102	190	482	1443	7.5	19.0	56.8
2107	202	521	1573	7.9	20.5	61.9
2112	213	561	1708	8.4	22.1	67.2
2117	224	602	1848	8.8	23.7	72.8

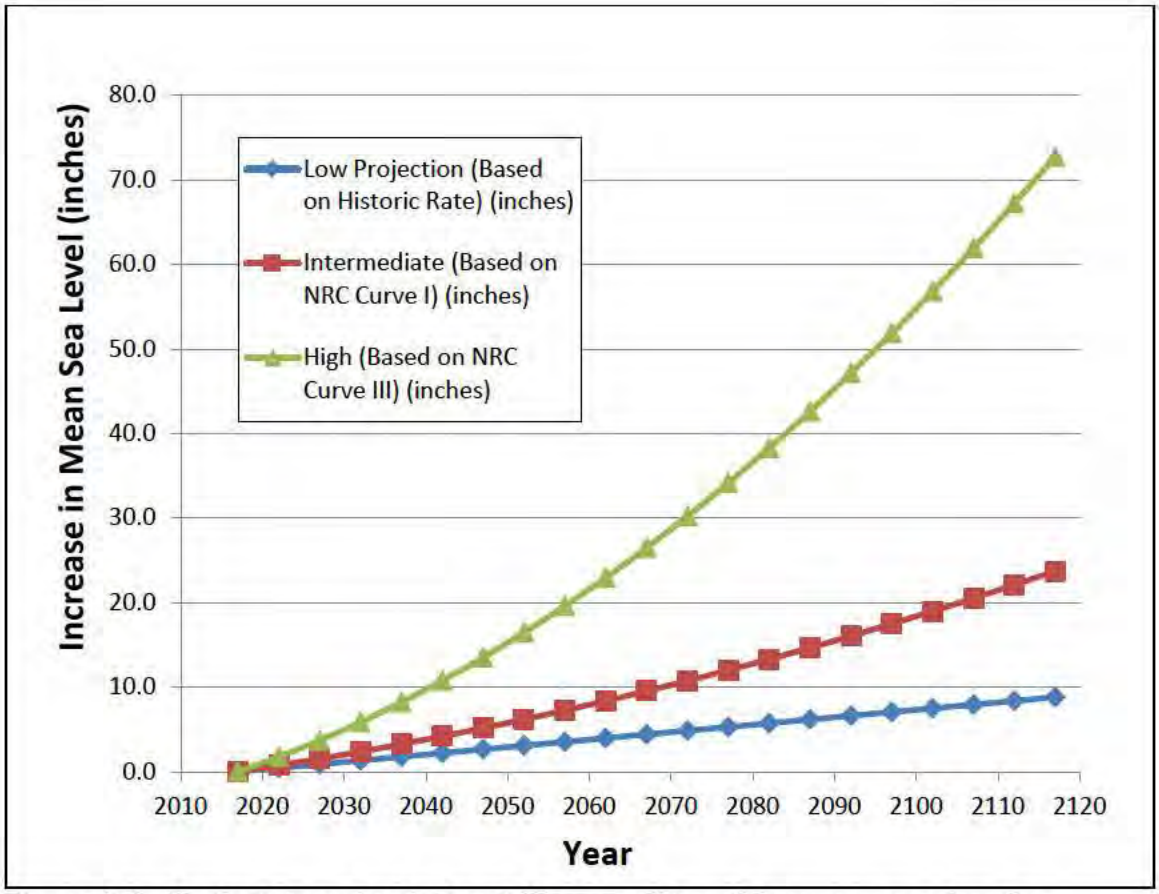

Figure 5-2. Projected sea level rise at Picayune Strand (assumes construction completed in 2017)

The Picayune Strand watershed is a sub-basin within the Big Cypress Basin. The highest elevation in the project area is about 10 feet North American Vertical Datum (NAVD) at Interstate 75, and the lowest elevation is about 3 feet NAVD at U.S. Highway 41. There are several sloughs that are 0.5 to 2 feet lower in elevation. Major freshwater plant communities in the project area include mesic hammock, mesic pine flatwoods, hydric hammock, hydric pine flatwoods, wet prairie, dwarf cypress forest, freshwater marsh, and mixed cypress and hardwood swamp forest. Salt marsh, mangrove forest, and estuarine habitats are found downstream of the project area in the Ten Thousand Islands National Wildlife Refuge. For long term sustainability, the major inland freshwater plant communities are dependent on an appropriate hydroperiod and depth of inundation during the growing season (Table 5-4). The numbers in the table represent long term average conditions and natural year to year variability would result in significant overlap between values for some of these communities.

Table 5-4. PSRP Hydroperiods of Plant Communities

Picayune Plant Communities	Hydroperiod (months)	Water Level (in) Wet
Mesic Pine Flatwood, Mesic Hammock	</= 1	</= 2
Hydric Pine Flatwood, Hydric Hammock	1-2	2-6
Wet Prairie, Dwarf Cypress	2-6	6-12
Freshwater Marsh	6-10	12-24
Cypress Swamp Forest	8-10	18-24
Open Water	>10	>/= 24
Saltwater Marsh, Mangrove Forest	Tidal	Tidal

5.4.3.2 Acres of Mean High Higher Water Mark (MHHW) Affected in Project Area

The PSRP project area covers about 55,440 acres. Table 5-5 shows the acres of mean high higher water (MHHW) within the project area, and the percentage of acreage that would potentially be affected by SLR at the corresponding levels in feet.

Table 5-5. Acres of MHHW affected in Project Area

Depths	Acres of MHHW in Project boundary	Percentage affected in Project Area
MHHW	673	1
MHHW plus 1 FT	2582	5
MHHW plus 2 FT	4765	9
MHHW plus 3 FT	8507	15
MHHW plus 4 FT	13840	25
MHHW plus 5 FT	19308	35
MHHW plus 6 FT	26702	48

5.4.3.3 Project Area Affected by SLR at 20 Years Post Construction

The low projection for SLR at 20 years post construction is 1.8 inches, the intermediate projection is 3.3 inches and the high projection is 8.2 inches. Due to limitations in topographic map accuracy, the low and medium projections will be rounded down and the high projection will be rounded to one foot. With the increase of one foot SLR under high projections, approximately five percent of the project area will be inundated.

5.4.3.4 Project Area Affected by SLR at 50 Years Post Construction

Note that 50-years post-construction extends beyond the authorized lifespan of the project, which ends in 2050. The low projection for SLR at 50 years post construction is 4.4 inches, the intermediate projection is 9.5 inches and the high projection is 26.5 inches. With the increase of two feet SLR under high projections, approximately nine percent of the project area will be inundated. Assuming that 50% of the anticipated project benefits will be achieved 10 years post construction and 100% achieved 20 years

post construction (Figure 5-3), the average annual loss of project benefits, as depicted on the blue line below, is approximately 5%.

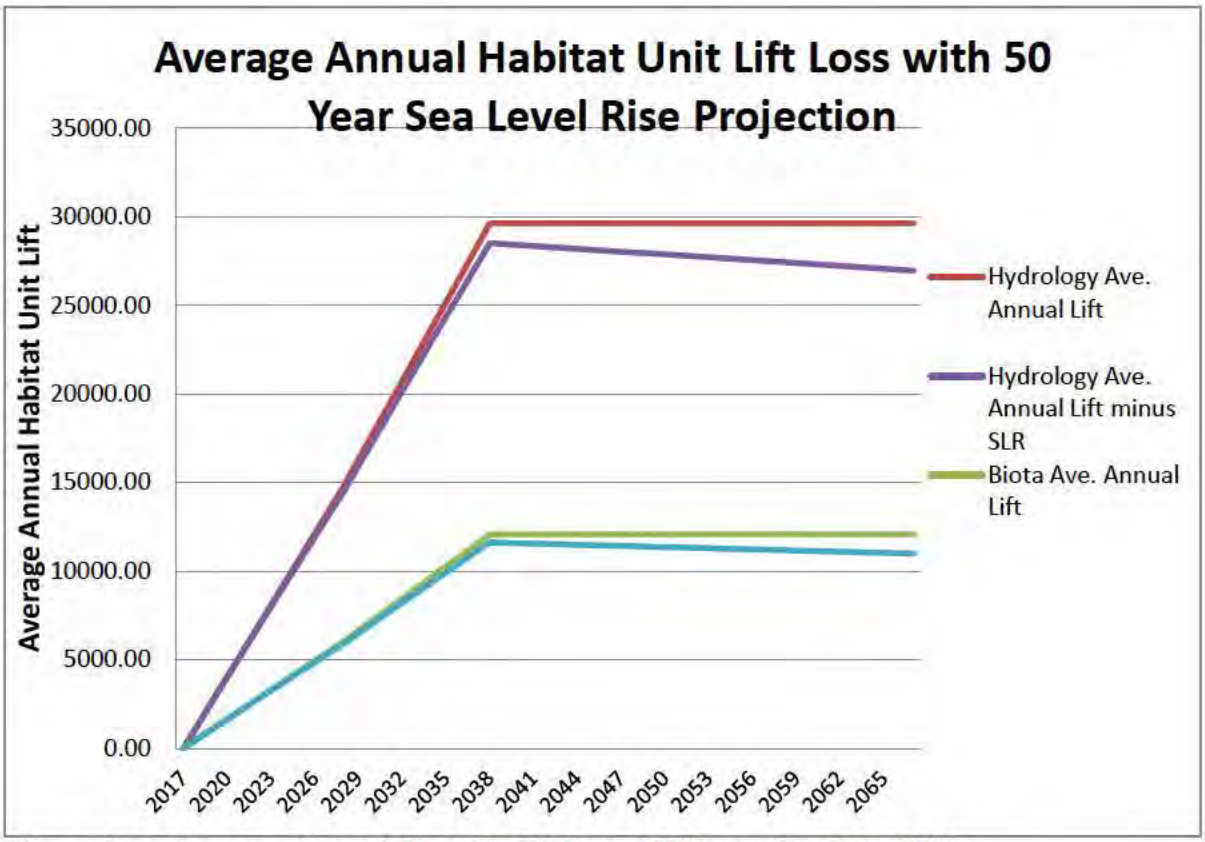

Figure 5-3. Average Annual Benefits With and Without Sea Level Rise

In addition to a loss of anticipated project benefits there would be a conversion of freshwater marsh to productive estuarine habitat resulting in a migration of inland habitat. A study conducted in the Ten Thousand Islands National Wildlife Refuge estimated a 35% increase in mangrove cover at the expense of marsh habitat from 1927 to 2005 (Krauss, et al., 2011). In areas where the coastline is unable to move inland, due to sea walls or other topography, a severe loss of wading bird habitat may occur (Galbraith, et al., 2002).

5.4.3.5 Project Area Affected by SLR at 100 Years Post Construction

Note that 100-years post-construction extends far beyond the authorized lifespan of the project, which ends in 2050. The low projection for SLR at 100 years post construction is 8.8 inches, the intermediate projection is 23.7 inches and the high projection is 72.8 inches. With the increase of six ft SLR under high projections, approximately 48 percent of the project area will be inundated.

5.4.3.6 Climate Change Conclusions

The analysis looked at the effect of SLR on the project area for the selected alternative, per the guidance provided in EC 1165-2-211. Inundation maps were generated to estimate approximately where seawater levels are projected to be in 20, 50 and 100 years after the completion of project construction. These inundation maps were then used to calculate percentages of the project area that would potentially be inundated by SLR. Note that any SLR effects happening beyond the year 2050 would occur after the authorized lifespan of the project.

The project area would likely be adversely affected by SLR if intermediate to high SLR rates were to occur for 50 years post-construction (year 2067) and beyond. Saltwater intrusion would result in a loss of freshwater plant communities; however, the acreages of affected plant communities cannot be accurately determined without more information and hydrological modeling. More information is needed to predict how SLR would affect freshwater plant communities and wildlife habitat. For a more accurate forecast of SLR effects, modeling of inundation levels and groundwater and surface water salinity levels would be required.

5.4.3.7 Limitations/Recommendations on Climate Change

Without quantitative models, many types of potential hydrologic effects cannot be estimated. In some cases general hydrologic trends are known but rates and magnitude of change cannot be reliably estimated without advanced tools. Models are needed in order to ensure greater accuracy of potential effects to project benefits. Some of the hydrologic effects that cannot be reliably estimated without modeling include: changes in groundwater salinity, changes in groundwater seepage rates and directions, backwater effects in coastal canals and estuarine rivers or creeks, estuarine circulation, salinity, and tidal dynamics, flooding produced by a combination of rain and elevated groundwater tables (due to sea level rise), and storm surge affected by higher sea levels.

5.5 CUMULATIVE EFFECTS

Cumulative effects are defined in 40 Code of Federal Regulations (CFR) 1508.7 as those effects that result from:

> ...the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Cumulative environmental effects for the proposed project were assessed in accordance with guidance provided by the CEQ. The tieback levee and manatee mitigation feature are only two components of the PSRP. The PSRP as a whole provides hydrologic restoration for over 55,000 acres and provides additional benefits to the estuaries through the reduction of the freshwater point discharge in the Faka Union Canal as stated in the 2004 PSRP Final PIR/EIS. Several other ecosystem restoration projects that are being considered or have been completed will provide even greater benefit to the region. The

Southwest Florida Comprehensive Watershed Plan recommends the implementation of many important ecosystem restoration projects in Southwest Florida. The Tamiami Trail Critical Project involved road resurfacing and the construction of new culverts under US 41 to facilitate the more natural redirected flows through the PSRP. Although this project had overall beneficial effects, it could potentially increase overall vehicle use, which in turn, may pose long-term consequences to the Florida panther in the form of increased automobile-animal interactions.

Fish and wildlife resources, as well as threatened and endangered species, are vulnerable throughout the larger region. Urbanization, rural subdivisions, timbering, agriculture, and other land-clearing activities continue to destroy, degrade, and fragment their habitat. Lack of fire or infrequent fire that maintains habitat quality, invasion by exotic vegetation, and short-circuiting of the natural hydrology would persist as problems for all plant and animal species.

Eutrophication of water bodies and wetlands occur in southwest Florida through inappropriate disposal of domestic sewage and runoff of nutrient-laden water from urban and agricultural lands. The development of Northern Golden Gate Estates and other acreage in the region may cause long-term degradation of water quality entering the PSRP.

The hydrologic conditions most favorable to one species may not be the most favorable to another; however, all animals in this region have evolved to survive the hydrologic variability characteristic of the natural system. The reduced heterogeneity and extent of the present Picayune Strand State Forest habitat make certain species more vulnerable to natural and man-caused threats. Management actions may be required on a temporary basis to protect a particular species from a high risk of extinction, but long-term management goals should not be driven by the protection of a single species, but rather geared toward the sustainability of the entire ecosystem.

5.6 COMPATIBILITY WITH FEDERAL, STATE, AND LOCAL OBJECTIVES

The Corps has partnered with the SFWMD on this project. The proposed actions are consistent with the overall goals and objectives of the PSRP. It is expected that the proposed actions will be consistent with Federal, state, and local plans and objectives.

5.7 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

Coordination and evaluation of required compliance with specific Federal Acts, Executive Orders (E.O.) and other policies for the proposed actions were achieved, in part, through the coordination of this document with appropriate agencies and the public. Compliance for many of the environmental requirements was established with the 2004 PSRP Final PIR/EIS and is still applicable for this EA.

5.7.1 National Environmental Policy Act of 1969, As Amended

Environmental information on the proposed actions has been compiled and this EA has been prepared in compliance with the NEPA. A notice of availability of this EA will be

mailed to interested stakeholders describing the 30 day comment period. This EA will comply with all the NEPA requirements upon completion of the public review process.

5.7.2 Endangered Species Act of 1973, As Amended

Consultation with USFWS occurred for the Final PIR/EIS in 2004 and a finding of "no effect" was determined for the Everglade snail kite and American crocodile and a "may affect, not likely to adversely affect" for the Eastern Indigo snake and red-cockaded woodpecker. At the time of the 2004 PSRP Final PIR/EIS, there was insufficient information to make a determination on the wood stork, Florida panther, and West Indian manatee. These determinations were deferred to a later date.

In 2008 the Corps submitted a supplemental BA to USFWS with determinations for the wood stork, Florida panther, and West Indian manatee. The USFWS responded with the BO in 2009 with the determinations of "may affect, not likely to adversely affect" the wood stork and "may affect, likely to adversely affect" the Florida panther and the Eastern Indigo snake based on new information; however, more information was needed to make a determination for the West Indian manatee. A baseline study conducted from 2009 to 2011 by USGS indicated that the PSRP would have a negative effect on the thermal refugium in the POI Basin. The manatee feature proposed in this EA will be implemented to ensure the maintenance of a thermal refugium in the POI Basin. A Supplemental BA on the effects of the PSRP on the West Indian manatee and the effects of the manatee mitigation feature on other threatened and endangered species is included in Appendix E.

The placement of the tieback levee was also addressed during consultation with USFWS. The Corps maintains the determinations reached in the 2004 PSRP Final PIR/EIS and 2009 BO for this feature. USFWS provided concurrence in an email dated May 20, 2013 stating that the ESA consultation for the Merritt, Faka Union, and Miller tieback levees were completed as part of the 2009 USFWS BO. A copy of this email can be found in Appendix C (Correspondence). Any future changes to the original plan as outlined in the Final PIR/EIS and 2009 BO will undergo additional consultation under the ESA.

The ESA Consultation with the NMFS on the potential effects of the PSRP to species' under their jurisdiction occurred in October 2004. The updated PSRP will be included in a NMFS Programmatic Biological Opinion for the CERP.

5.7.3 Fish and Wildlife Coordination Act of 1958, As Amended

A discussion of the PSRP compliance with the Fish and Wildlife Coordination Act of 1958 can be found in Section 11.3 of the 2004 PSRP Final PIR/EIS. The USFWS Biologists have worked cooperatively with the Corps and SFWMD in the development of the proposed actions. This project is in compliance with this Act.

5.7.4 National Historic Preservation Act of 1966 (INTER ALIA)

The PSRP has coordinated with the SHPO and federally-recognized tribes and a determination of "no adverse effect" has been reached for all construction activity, including the tieback levee. Since the manatee mitigation feature was not included within the original project design, consultation with the SHPO will be completed prior to implementation.

5.7.5 Clean Water Act of 1972, As Amended

All state water quality standards will be met. A Section 404(b)(1) evaluation has been prepared and included as Appendix A. The Water Quality Certification will be met by obtaining a CERPRA permit. The project is in compliance with this Act.

5.7.6 Clean Air Act of 1972, As Amended

This project is in compliance with Clean Air Act General Conformity Rules. No air quality permits would be required for the features proposed within this EA.

5.7.7 Coastal Zone Management Act of 1972

A Federal consistency determination in accordance with 15 CFR 930 Subpart C is included in this report as Appendix B. State consistency review of the Corps determination will be performed during the public review of this EA.

5.7.8 Farmland Protection Policy Act of 1981

Coordination with the Natural Resource Conservation Service (NRCS) was completed for the 2004 PSRP Final PIR/EIS and for the addition of the manatee mitigation feature. This project is in compliance with this Act.

5.7.9 Wild and Scenic River Act of 1968, As Amended

No designated wild and scenic river reaches would be affected by project related activities. This Act is not applicable.

5.7.10 Marine Mammal Protection Act of 1972

Informal consultation to address the potential effects of the PSRP on the West Indian manatee was conducted in 2009 and a determination of "may affect, but not likely to adversely affect" was reached pending additional information. The PSRP is in the process of conducting consultation for the West Indian Manatee based on new information that the project may have an adverse effect on manatees at the POI Basin. The manatee mitigation feature proposed within this EA is a product of informal consultation with USFWS to ensure the continuance of a thermal refugium in the POI Basin. This project is in compliance with this Act.

5.7.11 Estuary Protection Act of 1968

In the 2004 PSRP Final PIR/EIS, the Corps considered the effects of the PSRP on the estuaries and bays of the Ten Thousand Islands Region. Most anticipated project effects are expected to be beneficial. The U.S. Environmental Protection Agency, which administers this law, has accepted the 2004 PSRP Final PIR/EIS as adequate. Please refer to Section 3.11 and 9.11 of the 2004 PSRP Final PIR/EIS for more information. This project is in compliance with this Act.

5.7.12 Federal Water Project Recreation Act of 1965, As Amended

The Florida Department of Agriculture and Consumer Services, Florida Forest Service will manage the PSRP as part of the PSSF. Outdoor recreation and fish and wildlife enhancement will be a large part of the forest management plan. This project is in compliance with this Act.

5.7.13 Submerged Lands Act of 1953

This project does not adversely affect submerged lands of the State of Florida. The project is in compliance with this Act.

5.7.14 Coastal Barrier Resources Act and Coastal Barrier Improvement Act of 1990

There are no designated coastal barrier resources within the project area. The project is in compliance with this Act.

5.7.15 Rivers and Harbors Act of 1899

The proposed actions would not obstruct navigable waters of the United States currently regulated by the Rivers and Harbors Act of 1899. Any modifications of navigable capacity caused by changes in water level in the canal system and its connections with tidal waters are authorized by the Congressional approval of the 2004 PSRP Final PIR/EIS. The project is in compliance with this Act.

5.7.16 Resource Conservation and Recovery Act (RCRA), As Amended by the Hazardous and Solid Waste Amendments (HSWA) of 1984, Comprehensive Environmental Response Compensation and Liability Act (CERCLA), Toxic Substances Control Act (TSCA) of 1976

This project is in compliance with this act. All remediation for hazardous, toxic, radioactive and waste, identified in the 2004 PSRP Final PIR/EIS, have been and will be identified and addressed by the project sponsor (land owner) prior to construction of these features.

5.7.17 Safe Drinking Water Act of 1974, As Amended

Implementation of the recommended alternatives will cause no change to the groundwater aquifer. Neither project alternative would have any effect on drinking water sources, thus, the project would remain in compliance with this Act.

5.7.18 Anadromous Fish Conservation Act

The PSRP would not affect anadromous fish species. The 2004 PSRP Final PIR/EIS was coordinated with the NOAA and the NMFS. The manatee mitigation feature is being coordinated with the NOAA National Marine Fisheries Service. This project is in compliance with this Act.

5.7.19 Migratory Bird Treaty Act and Migratory Bird Conservation Act

The PSRP, along with the proposed actions in this EA, should enhance natural habitat for migratory birds. The hydrologic restoration from the PSRP should also increase available forage species such as amphibians, fish and aquatic invertebrates for wading birds. This project is in compliance with this Act.

5.7.20 Marine Protection, Research and Sanctuaries Act

The PSRP does not involve any ocean dumping nor does it establish any marine sanctuaries. This project is in compliance with this Act.

5.7.21 Magnuson-Stevens Fishery and Conservation Management Act

This law addresses conversation of marine fish species of commercial importance, and requires consultation with the administrating agency, NMFS, on potential effects of proposed Federal projects in essential marine habitat for such species. Both the species and the habitat are defined by each Regional Fisheries Council. Information consultation with NMFS in 2004 determined that the PSRP is not likely to have a negative effect on EFH in the PSRP area. The net effect of the PSRP is expected to be beneficial through the rehydration of several estuaries to the west of the Faka Union estuary, with an improvement to the fish nursery habitats. The updated project components which include the tieback levees and manatee mitigation feature are outlined in this EA and have been coordinated with NMFS for potential impacts to recently designated critical habitat for the smalltoooth sawfish and EFH. The manatee mitigation feature is located north of designated smalltooth sawfish critical habitat above the Mean High Water Line, and inaccessible to sawfish because they are only hydrated during extreme storm events. This project is in compliance with this Act.

5.7.22 UNIFORM RELOCATION ASSISTANCE AND REAL PROPERTY ACQUISITION POLICIES ACT OF 1970 (PUBLIC LAW 91-646)

Acquisition of real estate is not required for the proposed actions. This project is in compliance with this Act.

5.7.23 E.O. 11990, Protection of Wetlands

The purpose of the PSRP is to restore wetland habitats. Wetlands assessments will be completed prior to the construction of the action. The project is in compliance with the intent of this Executive Order.

5.7.24 E.O. 11988, Flood Plain Management

The objective of the PSRP is to reestablish the natural floodplain hydrology. Flood hazards to NGGE were considered during the development of the 2004 PSRP Final PIR/EIS. Existing flood levels in NGGE and areas south of the PSRP will not be significantly or adversely affected. This project is in compliance with the intent of this Executive Order.

5.7.25 E.O. 12898, Environmental Justice

E.O. 12989 provides that each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority or low-income populations. No adverse effects to human health or the environment are anticipated as the result of the PSRP or additional features. Effects to "subsistence consumption of fish and wildlife resources" are not anticipated as a result of the proposed actions. See Section 10 of the 2004 PSRP Final PIR/EIS for more information. The project is in compliance with the intent of this Executive Order.

5.7.26 E.O. 13089, CORAL REEF PROTECTION

Those species, habitats, and other natural resources associated with coral reefs are not found in close enough proximity to the project area to be likely to derive either benefit or adverse effects from the implementation of the proposed action. This project is in compliance with the intent of this Executive Order.

5.7.27 E.O. 13112, Invasive Species

The PSRP has developed an aggressive Nuisance and Exotic Vegetation Control Plan. This plan is a part of the overall PSRP Monitoring Plan and can be found in the 2009 BO. This project is in compliance with the intent of this Executive Order.

5.7.28 E.O. 13045, Protection of Children

Executive Order 13045, requires each Federal agency to "identify and assess environmental risks and safety risks [that] may disproportionately affect children" and ensure that its "policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks." This project has no environmental health or safety risks that may disproportionately affect children. This project is in compliance with the intent of this Executive Order.

5.7.29 E.O. 13186, Migratory Birds

A monitor will be required to be on site during construction activities to provide pre-construction surveys and monitor for migratory birds. The project is in compliance with the intent of this Executive Order.

6.0 PUBLIC INVOLVEMENT

6.1 PUBLIC COORDINATION

The EA and Proposed Finding of No Significant Impact (FONSI) will be made available to the public, tribes, Federal, and state agencies by Notice of Availability. All correspondence pertaining to this EA will be included in Appendix C. Public coordination for the 2004 PSRP Final PIR/EIS is included in Section 10 of that document and is available at www.evergladesplan.org. A previous version of this EA including the tieback levee was released for public review on May 30, 2013. The May 2013 EA included a LRR) to address project cost increases. This supplemental EA includes the tieback addition and addresses the addition of the manatee mitigation feature. Further, this EA incorporates comments submitted during the review of the May 2013 EA/LRR. The LRR portion of the report has been removed from this EA in an effort to allow adequate time for public review.

6.2 AGENCY COORDINATION

The Corps is in continuous coordination with other Federal and state resource agencies, business organizations, environmental organizations, and private citizens groups for the PSRP. The Corps will also coordinate with the federally recognized Tribal interests to ensure their participation with the design refinements discussed in this EA. This extensive coordination is a result of the magnitude of the Corps and the SFWMD efforts to implement the components of the PSRP. Previous related coordination undertaken for the PSRP is included in the 2004 PSRP Final PIR/EIS. Agency coordination letters for this EA will be included in Appendix C.

6.3 LIST OF RECIPIENTS

The following stakeholders were provided Notice of Availability of this EA.

Native American Tribes
Miccosukee Tribe of Florida
Seminole Tribe of Florida

Federal Agencies
Bureau of Indian Affairs
Natural Resources Conservation Service
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
U.S. Department of Agriculture
U.S. Department of the Interior
U.S. Environmental Protection Agency
U.S. Department of Justice
Federal Highway Administration
U.S. Fish and Wildlife Service
Big Cypress National Preserve

State Agencies
Governor, State of Florida
Florida State Clearinghouse
Florida Department of Community Affairs
Florida Department of Environmental Protection
Florida Fish and Wildlife Conservation Commission
Florida Department of Health
Florida Department of State
Florida Department of Transportation
Florida Department of Agriculture and Consumer Services, Florida Forest Service
South Florida Water Management District

Regional Governments
South Florida Regional Planning Council

County Governments
Collier County

Municipal Governments
City of Marco Island
Mayor, Everglades City

Universities
Florida Gulf Coast University

Libraries
Collier County Public Library

Groups
Golden Gate Landowners, Inc.
Max Hasse Community Park
Port of the Islands Homeowner Association
Orchid Cove Homeowners Association

Individuals
A list of individuals who received notification of the release of the EA and Proposed FONSI is on file in the Jacksonville District, Planning Division and available upon request.

6.4 COMMENTS RECEIVED AND RESPONSE

A table summarizing comments received on the May 2013 LRR/EA (tieback levee) during the public review period and Corps' response is shown below in Table 6-1. The Draft LRR/EA released in May 2013 only described the addition of the tieback levee and not the manatee mitigation feature. Therefore, this supplemental EA is being released for a second public review period to allow the public time to provide comment on these

features. Agency coordination letters for the May 2013 LRR/EA can be found in Appendix C.

Table 6-1: Comments Received on May 2013 Draft Limited Reevaluation Report and Environmental Assessment on Tieback Levee

Agency/Public	Comment	USACE Response
Florida Department of Agriculture and Consumer Services, Florida Forest Service – August 2, 2013	Thank you for the opportunity to comment. We recommend all references in the document to either the "Florida Department of Forestry" or the "Florida Division of Forestry" be changed to indicate "Florida Department of Agriculture and Consumer Services, Florida Forest Service." We also suggest references to the "Fakahatchee Strand State Forest" be changed to "Fakahatchee Strand Preserve State Park." Another suggestion is that references to the "Picayune Strand State Forest" include the following "Picayune Strand State Forest (under Lease Agreement number 3927 from the Board of Trustees of the Internal Improvement Trust Fund of the State of Florida (the land owner)." Please remember management goals in the Picayune Strand State Forest are based upon Management Plans created with input from many various interested organizations as well as the public. A final comment on this draft document relates to the Red-Cockaded Woodpecker (RCW) populations that this document indicates could be impacted by the project. If this project might impact RCW populations in the Picayune Strand State Forest and the Florida Forest Service is expected to undertake the monitoring of RCW populations for impact, additional funding should be provided to help cover these costs. We look forward to working with the U.S. Army Corps of Engineers and other partners on this and other projects. Thank you!	All References to either the "Florida Department of Forestry" or the "Florida Division of Forestry" were changed to indicate "Florida Department of Agriculture and Consumer Services, Florida Forest Service" and references to the "Fakahatchee Strand State Forest" were changed to "Fakahatchee Strand Preserve State Park. Picayune Strand State Forest (under Lease Agreement number 3927 from the Board of Trustees of the Internal Improvement Trust Fund of the State of Florida (the land owner) was added to first reference to PSSF. No additional monitoring of RCW's has been identified within the PSRP. Thank you for your continued support of the PSRP.

Agency/Public	Comment	USACE Response
Florida Department of Environmental Protection – July 31, 2013	The DEP has long supported the Picayune Strand Project. It was placed on the Conservation and Recreation Acquisition List in 1985. Unprecedented staff time and resources have been committed for the acquisition of over 55,000 acres of land over the period of a decade, and staff continues to actively participate in the project delivery team. The DEP submitted comments on the draft and final EIS demonstrating support 0f the project in 2004. In addition, the DEP formally approved what was then known as the CERP Southern Golden Gate Estates project pursuant to Section 373.026(8)(b), F.S., which directs the DEP to approve each CERP project component before it is submitted to Congress for federal authorization or receives an appropriation of state funds. The State of Florida has invested significant financial and staff resources towards this important hydrologic and ecologic restoration project and is committed to continuing restoration efforts.	Thank you for your comments and continued support of the PSRP. The FDEP is an important and valued partner on the PSRP.

Agency/Public	Comment	USACE Response
FDEP-2	The Department recently (May 2, 2013) issued a permit modification for the final major phase of the project, construction of the Miller Canal Pump station and road removal. The draft LRR/EA states on Page 1-5, Section 1.8.1, that "To date, state water quality certification has been obtained for the tieback levees, spreader canals, canal plugs, and road removal features." Please note that while the features described in the EA are covered by the permit (which includes state water quality certification), it only includes conceptual authorization of canal plugging and demolition of weirs and bridges in the Faka Union and Miller canals. In order to plug the Faka Union and Miller Canals, the protection features (earthen levees to maintain existing levels of flood protection to adjacent private lands) must be completed, as acknowledged in the draft LRR/EA. There are additional hydrologic and hydraulic modeling efforts that are ongoing and associated with project assurances needed by the Department to issue authorization for features under state law. Consultation with the Department is required to determine whether or not a permit modification is necessary prior to the implementation of these features. Please review CERPRA Permit (File No. 0288313-008) and revise the relevant text throughout the document accordingly.	Concur. For brevity, the statement was written in general terms appropriate for an LRR to describe the overall project while not distracting from the main purpose of the document. To be strictly accurate, the permit does authorize canal plugs within the Merritt Canal as well as the "Special" plugs located at the tieback levee and spreader berm canal crossings for all three phases. While the LRR does not constitute a compliance document and the Corps acknowledges that the CERPRA permit most accurately defines the authorized features, this sentence will be revised to try and be more specific to the distinction of the canal plugging authorization. However, it is important to acknowledge that the currently permitted features do allow for the potential to realize some project benefits if not all during this phased implementation approach. Canal plugging is essential for this, as with even limited canal plugging, some benefits are expected.

Agency/Public	Comment	USACE Response
FDEP-3	The draft LRR/EA states that remaining project components to be constructed are the protection features and the manatee mitigation feature. Please note that, in addition to the conceptual authorizations described above, these features will also require additional review and permit authorizations from the Department. The draft LRR/EA states on Page 2-7, Section 2.5.2, that "In the 2004 PSRP Final PIR/EIS cost estimate, the cost for the construction of the 6Ls Farm, Port of the Islands (POI), and protection features assumed that all earthen material would be obtained from the construction site. However, subsequent geotechnical investigations revealed that a majority of the onsite material is unsuitable for levee construction. Therefore, current LRR/EA estimates for each of the three protection features assume that the foundations for the levees will be excavated and replaced with suitable quarry material hauled in from offsite." This statement implies that a levee at 6Ls Farm, Port of the Islands and other private lands (presumably the northwest private lands) are needed. It is the Department's understanding that modeling has confirmed that there is no need for a levee at Port of the Islands nor at the northwestern privates lands (a re-location of a canal is planned to maintain levels of flood protection here). The only levee protection feature currently under design is the 6Ls protection feature. Please revise the above text to eliminate confusion on these points. As acknowledged in the draft LRR/EA, the restoration benefits will be realized when all identified roads are degraded and the Merritt, Faka Union and Miller Canal plugs can be installed. In order to plug the Faka Union and Miller Canals, the needed protection features must be completed.	Section 2, Design and Cost Changes, was included in the original LRR) and EA) but has since been removed from this EA. However, this comment will be addressed in the separate revised LRR.

Agency/Public	Comment	USACE Response
FDEP-4	The draft LRR/EA states on Page 4-7, Section 4.12, that "Anticipated remediation actively still remains for the Belle Meade area, located within the project operational flowway, pending completion of ongoing Phase I/II Remediation Reports." The Department received a copy of the Corrective Actions Report for the Belle Meade project area based on the results of the Phase I/II Environmental Site Assessment (July 2012) on January 14, 2013. The Department's Waste Cleanup Section provided a letter on February 22, 2013, stating that the assessment is complete and no further assessment is warranted. Please coordinate with the Department's Division of Waste Management and revise your records and the text accordingly.	Concur; however, it is the Corps understanding that there are still lands located to the north of the 6Ls that will need an HTRW evaluation and/or remediation before construction can commence. Text will be updated in the LRR.
FDEP-5	The draft LRR/EA states on Page 5-7, Section 5.1.5.5.1, that "Modeling is currently being conducted to confirm the need for the western portion of the Miller tieback levee to prevent impacting private lands." It is the Department's understanding that the modeling results clearly indicate that the original levee design can be shortened to approximately 6,000 feet west of the Miller Pump Station. Elimination of this unneeded portion of the tieback levee will avoid impacts to wetlands that exist beyond the 6,000 feet. The USACE determined that the tieback levee "may affect" the Red Cockaded Woodpecker located in the mesic pine flatwoods west of the Miller Canal." It is important to note that the permit authorization only includes construction of the Miller tieback levee to approximately 6,000 feet west of the pump station, based on the plans on file with the Department. Please revise the text to make these points clear.	Statement was revised to clarify that the Miller tieback levee would end approximately 6,000 feet west of the Miller Pump Station.

Agency/Public	Comment	USACE Response
FDEP-6	The Department has several comments regarding the Coastal Zone Management Consistency in Appendix D. While the section appropriately recognizes that the Department must review the draft EA under Chapter 403, F.S., it does not appear there has been a thorough review or adequate documentation to support the conclusions made regarding other chapters of Florida Statutes that the Department is responsible for administering:	Coastal Zone Management Consistency determinations will be reviewed to ensure a thorough review has been conducted. See responses to subsequent comments.

Agency/Public	Comment	USACE Response
FDEP-7	Chapter 253, State Lands. Please note that as staff to the Board of Trustees of the Internal Improvement Trust Fund (i.e., Governor and Cabinet), the Department is required to review activities for a determination of effects of state-owned lands. There may be activities which affect state-owned lands within the Picayune Strand State Forest subject to Board of Trustees Lease No. 3927 to the Florida Department of Agriculture and Consumer Services, Florida Forest Service. As such, additional coordination with the Florida Forest Service may be required, as noted in Specific Condition No. 34 of the CERPRA Permit (File No. 0288313-008) issued to the USACE for construction and interim operation of the project. The activities may also affect state-owned lands within Collier-Seminole State Park and, as such, additional coordination with the Department's Division of Recreation and Parks, who manages Collier-Seminole State Park, may be required. Right of Entry from the SFWMD may also be required. There is also a Cooperative Agreement between the SFWMD and Board of Trustees of the Internal Improvement Trust Fund for the CERP Central and Southern Florida, Picayune Strand Restoration Project. As such, activities outside of the scope of the Cooperative Agreement may require additional coordination and/or authorization.	The LRR phase does not signify the commencement of activity. As the comment states, Specific Condition #34 in the referenced permit requires coordination with and notification to the Florida Forest Service of the commencement of activity of all project phases. The Corps intends to continue this coordination prior to the start of construction and operations as has been done for all previous activities. The Project Sponsor, the SFWMD, is responsible for obtaining all Real Estate Certifications and/or Rights of Entry as well as coordination with all other land owners for any other authorizations and/or cooperative agreements that may be needed.

Agency/Public	Comment	USACE Response
FDEP-8	Chapter 258, State Parks and Aquatic Preserves. Some of the activities (i.e., 6Ls protection feature) described in the EA are adjacent to Collier-Seminole State Park, and it has been determined that other activities associated with the project may also affect state-owned lands within Collier-Seminole State Park. As such, additional coordination with the Department's Division of Recreation and Parks, who manages Collier-Seminole State Park will be required. Although modeling performed thus far may be interpreted to suggest additional conveyance under US-41 may not be needed, it is recognized by project partners that additional conveyance under US-41 may in fact be needed under US-41 in order to restore natural sheetflow and realize potential hydrologic benefits within and near Collier-Seminole State Park. The state lands within the Park are home to diverse biological communities as well as threatened and endangered species that may be affected by changes in water levels and hydroperiods. The Park also includes public facilities that may be impacted by changes in hydrologic conditions. Continued coordination with the Department's Division of Recreation and Parks is necessary to ensure that potential hydrologic benefits within the Park are realized and potential impacts to Park facilities are minimized. Right of Entry from the SFWMD may also be required.	Please reference the response to comment number FDEP-7 that addresses the Real Estate and coordination concerns. As the comment acknowledges, at this time, modeling indicates that additional conveyance is not necessary under US-41. Additionally, any such need for conveyance would extend the project outside of the authorized boundaries and outside of the congressional authorizations. The focus of this LRR is to request additional funds for features that have already been designed and/authorized.

Agency/Public	Comment	USACE Response
FDEP-9	Chapter 373, Water Resources. Please note that the authorities provided by this chapter are much broader than what is summarized. The Department's determination of consistency with CZMA includes a review and determination of consistency with state law, including, but not limited to, the permit authorization required by Section 373.1502, F.S., for CERP projects.	The Corps understands that this authority is broader for CERP projects; Chapter 373 will be reviewed to ensure this Chapter is summarized correctly.
Florida Department of State, Division of Historical Resources and State Historic Preservation Officer – July 12, 2013	This office reviewed the referenced draft limited reevaluation report and environmental assessment to identify issues for possible concerns regarding impact to historic properties listed, or eligible for listing, in the *National Register of Historic Places*, that should be addressed in the final statement. Our review was conducted in accordance with Section 106 of the *National Historic Preservation Act of 1966* as amended, the National Environmental Policy Act (NEPA), and their implementing regulations. We reviewed the information provided, and note that the U.S. Army Corps of Engineers is implementing a monitoring plan in which will be present during all construction activities to ensure that archeological sites are not affected by the Picayune Strand Project. Conditioned upon this monitoring, this agency concurs with the finding of no significant impact on historic properties.	Monitoring Plan will be implemented prior to and during all construction activities. Thank you for your continued support.

Agency/Public	Comment	USACE Response
Southwest Florida Regional Planning Council (SWFRPC) – July 11, 2013	The staff of the Southwest Florida Regional Planning Council reviews various proposals, Notifications of Intent, Pre-applications, permit applications, and Environmental Impact Statements for compliance with regional goals, objectives, and policies, as determined by the Strategic Regional Policy Plan. The staff reviews such items in accordance with the Florida Intergovernmental Coordination and Review Process (Chapter 291-5, F.A.C.), and adopted regional clearinghouse procedures. These designations determine Council staff procedure in regards to the reviewed project. The four designations are: Less Than Regionally Significant and Consistent – No further review of the project can be expected from Council. Less Than Regionally Significant and Inconsistent – Council does not find the project of regional importance, but will note certain concerns as part of its continued monitoring for cumulative impact within the noted goal area. Regionally Significant and Consistent – Project is of regional importance, and appears to be consistent with Regional goals, objectives, and policies. Regionally Significant and Inconsistent – Project is of regional importance and does not appear to be consistent with Regional goals, objectives, and policies. Council will oppose the project as submitted, but is willing to participate in any efforts to modify the project to mitigate the concerns. The SWFRPC has determined that the Draft Limited Reevaluation Report (LRR) and Environmental Assessment (EA) and request for additional funding from Congress is **Regionally Significant and Consistent with the Southwest Florida Regional Strategic Policy Plan**.	Thank you for your continued support of the PSRP. We look forward to coordinating with the SWFRPC in the future.

7.0 LIST OF PREPARERS

The people who are responsible for contributing to this Environmental Assessment (EA) for the PSRP are listed in the table below (Table 7-1). In addition to the individuals listed below, this EA and proposed FONSI were reviewed by the supervisory chain of the Environmental Branch and Planning Division of the U.S. Army Corps of Engineers, Jacksonville District.

Table 7-1. Preparers

Name	Role in EA	Email Address
Grady Caulk	Archeologist	Grady.H.Caulk@usace.army.mil
Barbara Cintron	Plan Formulation Review	Barbara.B.Cintron@usace.army.mil
Angela Dunn	Biologist/NEPA review	Angela.E.Dunn@usace.army.mil
Tamela Kinsey	Environmental Engineer/Water Quality Certification	Tamela.J.Kinsey@usace.army.mil
Matt Donaldson	Office of Counsel Review	Matthew.B.Donaldson@usace.army.mil
Gina Ralph	Biologist/NEPA Review	Gina.P.Ralph@usace.army.mil
Lacy Shaw	Project Manager	Lacy.E.Shaw@usace.army.mil
Amy Thompson	Biologist/NEPA Preparation	Amy.D.Thompson@usace.army.mil
Brad Tarr	Biologist/NEPA Preparation	Bradley.A.Tarr@usace.army.mil
Rob Tucker	Hydraulics and Hydrology	Robert.C.Tucker@usace.army.mil

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Appendix A

Section 404 (b) Evaluation

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APPENDIX A
SECTION 404(b) EVALUATION

Picayune Strand Restoration Project
Tieback Levee
COLLIER COUNTY, FLORIDA

I. Project Description

a. Location

The Picayune Strand Restoration Project (PSRP) is located in Collier County, Florida, between I-75 and US-41 (Tamiami Trail). It is east of the Belle Meade State Conservation and Recreation Lands (CARL), west of Fakahatchee Strand State Forest, southwest of the Florida Panther National Wildlife Refuge and north of the Ten Thousand Islands National Wildlife Refuge. The tieback levees will be located directly south of the pump stations in the PSRP area. The manatee mitigation feature will be located west of the Faka Union Canal in the existing spoil berm just south of the Port of the Islands marina.

b. General Description

The tieback levee is considered a refinement of the original design, but increased the footprint of the project. The component described is the substitution of a single full width tieback levee for the Merritt, Faka Union, and Miller Pump Stations in place of individual berms for each pump station. The manatee mitigation feature has been included in the project through informal ESA consultation to ensure the continuance of the POI Basin as a thermal refugium for manatees.

c. Authority and Purpose

The PSRP was authorized for construction by the Water Resources Development Act of 2007. The purposes of the tieback levees are to prevent the recycling on pumped water to the upstream side of the pump stations. The purpose of manatee mitigation feature is to ensure a thermal refugium in the POI Basin and has been determined to be within the Chief of Engineers discretionary authority.

d. General Description of Dredged or Fill Material

(1) General Characteristics of Material

Duever et al. (1986) classified four major soil groups (rock, sand, marl, and organics) in the Big Cypress National Preserve. These major soil groups are also found in the Southern Golden Gate Estates area. Fractured limestone rock is generally found at shallow depth with outcrops occurring throughout the Project Area. Spoil materials from the original construction of the canals and roads are a combination of the above soils and limestone rock. The fill material for the tieback levee is classified per project specifications as random fill. The excavated material from the construction of the manatee mitigation feature will be disposed of onsite and will likely consist of limestone rock similar to material found within the PSRP.

(2) Quantity of Material (cubic yards)
Table 1. Fill, Excavation, and Clearing

PSRP	Fill (cubic yards)	Excavation (cubic yards)	Clearing (acres)
Tieback levee	386,000	231,000	1,000
Manatee Mitigation Feature	3,500	195,000	10

(3) Source of Material.
Fill and levee material will be recovered from road subsurfaces and road/canal spoil generated during the original construction. If additional material is required, material will be hauled in from an approved off-site source. The Miller Pump Station construction phase specifies that material be brought in from offsite since significant onsite material shortages were encountered during the construction of the tieback levee in the Faka Union and Merritt construction phases.

e. Description of the Proposed Discharge Site(s)

(1) Location.
The location of the project is shown in Figure 1-1 of the Environmental Assessment.

(2) Size.
Tieback levee footprint is approximately 62 acres. The manatee mitigation feature is approximately 10 acres.

(3) Type of Site.
The tieback levee and manatee mitigation feature are located mostly on uplands, however, isolated pockets of hydrated wetlands may be encountered. Approximately 2 acres of mangrove wetlands may be impacted with the implementation of the manatee mitigation feature.

(4) Type(s) of Habitat.
The tieback levee area is primarily disturbed woodland pine habitat. The manatee mitigation feature is located primarily on woodland pine habitat created by the placement of spoil from the creation of the Faka Union Canal. A small portion of this feature may be located on mangrove wetlands but it is likely that is footprint may be reduced.

(5) Timing and Duration of Discharge.
No effect.

f. Description of Disposal Method.
Fill material will be disposed of within the project area.

II. Factual Determinations

a. Physical Substrate Determinations.

(1) Substrate Elevation and Slope.
The project lies within Florida's coastal lowlands, in a region that is less than 13 feet above sea level. Small depressions having no surface drainage are common. The natural topography of the area is nearly flat, with the exception of unnatural features such as roadways, canals, berms, and trams.

(2) Sediment Type.
According to the National Resource Conservation Service soil survey (Luidahl et. al, 1998), this area consists of soils that are very poorly drained. The surface layer (top 5 inches) is typically black muck (organic mud). The subsurface layer (5 - 10 inches) is dark gray fine sand, and the substratum (10 - approx. 80 inches) is fine sand. Limestone outcrops were observed in the eastern portion of the project. Limestone can be encountered from the ground surface to a depth of 36 inches.

(3) Dredged/Fill Material Movement.
Once the material is in place, movement is not expected. Some minor erosion may occur in specific areas if high rain events induce flooding during or immediately after construction.

(4) Physical Effects on Benthos.
The benthos in the ponded areas adjacent to the construction areas have highly prolific organisms which are expected to quickly re-establish in the natural wetlands restored through improved hydrology.

(5) Actions Taken to Minimize Impacts.
Select fill will be used in inundated areas in order to minimize dispersal of fine materials into the substrate surrounding fill areas.

b. Water Circulation. Fluctuation and Salinity Determinations

(1) Water
(a) Salinity.
The tieback levee areas are freshwater; therefore there are no impacts to salinity. The manatee mitigation feature will establish a connection with saline groundwater in the POI Basin. There will likely be an overall increase in salinity in the POI Basin once flows are reduced through the Faka Union Canal.
(b) Water Chemistry.
No effect.
(c) Clarity.
Some decrease in clarity may occur in the immediate vicinity of construction activities. This effect will be temporary.
(d) Color.
No effect.
(e) Odor.

No effect.
(f) Taste.
No effect.
(g) Dissolved Gas Levels.
No effect.
(h) Nutrients.
No effect.
(i) Eutrophication.
No effect.

(2) Current Patterns and Circulation
(a) Current Patterns and Flow.
No effect.
(b) Velocity.
No effect.
(c) Stratification.
The temperature stratification in the POI Basin will likely change with the reduction of freshwater flows through the Faka Union Canal and the saline groundwater connection within the manatee mitigation feature.
(d) Hydrologic Regime.
No change with respect to the previously authorized project plan for the PSRP.

(3) Normal Water Level Fluctuations.
No change.

(4) Salinity Gradients.
No change.

(5) Actions That Will Be Taken to Minimize Impacts.
During construction activity, BMPs will be utilized in accordance with State regulations.

c. Suspended Particulate/Turbidity Determinations

(1) Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Disposal Site.
No significant impacts. Potential short term minor changes to turbidity and sediment transport during construction only.

(2) Effects (degree and duration) on Chemical and Physical Properties of the Water Column
(a) Light Penetration.
No effect.
(b) Dissolved Oxygen.
No effect.
(c) Toxic Metals and Organics.
None.

(d) Pathogens.
None.
(e)Aesthetics.
No effect.

(3) Effects on Biota
(a) Primary Production, Photosynthesis.
No effect
(b) Suspension/Filter Feeders.
No effect.
(c) Sight Feeders.
No effect.

d. Contaminant Determination.
Fill Material will not introduce or increase contaminants at the fill areas.

e. Aquatic Ecosystem and Organism Determinations.

(1) Effects on Plankton.
None.

(2) Effects on Benthos.
None.

(3) Effects on Nekton.
None.

(4) Effects on Aquatic Food Web.
None.

(5) Effects on Special Aquatic Sites.
(a) Sanctuaries and Refuges.
None.
(b) Wetlands.
Wetland vegetation in fill areas will be impacted. Small mangrove wetlands may also be affected near the manatee mitigation feature.
(c) Mud Flats.
None.
(d) Vegetated Shallows.
Wetland vegetation in vegetated shallows will be impacted during clearing and grubbing.
(e) Coral Reefs.
None.
(f) Riffle and Pool Complexes.
None.

(6) Threatened and Endangered Species.

There will be no significant impacts to any state or federally listed species or critical habitat. The Corps determines a "may affect, but not likely to adversely affect" the West Indian manatee.

(7) Other Wildlife.
No significant impacts to small foraging mammals, reptiles, wading birds, or wildlife in general are expected.

(8) Actions to Minimize Impacts.
Refer to Section 4.7 "Compliance with Environmental Requirements" for measures that will be implemented to protect listed species.

f. Proposed Disposal Site Determinations

(1) Mixing Zone Determination.
A 150 meter mixing zone will be requested through the CERPRA application process from the FDEP.

(2) Determination of Compliance with Applicable Water Quality Standards.
All standards will be complied with. A Comprehensive Everglades Restoration Plan Regulation Act permit will be sought from the state of Florida.

(3) Potential Effects on Human Use Characteristic
(a) Municipal and Private Water Supply.
None.
(b) Recreational and Commercial Fisheries.
No significant impacts.
(c) Water Related Recreation.
No impacts.
(d) Aesthetics.
No significant impacts. Potential for short-term negligible impact to aesthetics during construction activities.
(e) Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves.
No impacts.

g. Determination of Cumulative Effects on the Aquatic Ecosystem.
There will be no cumulative effects that result in a significant impairment of water quality as a result of the placement of fill at the project site.

h. Determination of Secondary Effects on the Aquatic Ecosystem. There will be no secondary impacts on the aquatic ecosystem as a result of the placement of fill at the project site.

III. Findings of Compliance or Non-Compliance With the Restrictions on Discharge.

a. No significant adaptations of the guidelines were made relative to this evaluation.

b. Evaluation of Availability of Practicable Alternatives to the Proposed Discharge Site Which Would Have Less Adverse Impact on the Aquatic Ecosystem. No practicable alternative exists that both meets the study objectives and does not involve discharge of fill in to waters of the United States. See Section 2.0 for an evaluation of project alternatives.

c. Compliance with Applicable State Water Quality Standards.
The discharge of fill materials will not cause or contribute to violation of any Florida water quality standards. The discharge operation will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

d. Compliance with Endangered Species Act of 1973.
The placement of fill material would not jeopardize the continued existence of any species listed as threatened or endangered under the Endangered Species Act of 1973, as amended.

e. Evaluation of Extent of Degradation of the Waters of the United States.
The placement of fill materials will not result in significant adverse effects on human health and welfare, municipal and private water supplies, recreational and commercial fishing, plankton, fish, shellfish, wetlands and special aquatic site, or wildlife. The life stages of aquatic species and other wildlife will not be adversely affected. Significant adverse effects to aquatic ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values will not occur.

f. Appropriate steps have been taken to minimize the adverse environmental impact of the proposed actions.

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Appendix B

Coastal Zone Management Act Consistency

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APPENDIX B
COASTAL ZONE MANAGEMENT ACT AND FLORIDA COASTAL MANAGEMENT PROGRAM FEDERAL CONSISTENCY DETERMINATION

Enforceable Policy. Florida State Statues considered "enforceable policy" under the Coastal Zone Management Act (www.dep.state.fl.us/cmp/federal/24_statutes.htm).
Applicability of the Coastal Zone Management Act.
The following summarizes the process and procedures under the Coastal Zone Management Act for Federal Actions and for non-Federal Applicants*.

Item	Non-Federal Applicant (15 CFR 930, subpart D)	Federal Action (15 CFR 930, subpart C)
Enforceable Policies	Reviewed and approved by NOAA (in FL www.dep.state.fl.us/cmp/federal/24_statutes.htm)	Same
Effects Test	Direct, Indirect (cumulative, secondary), adverse or beneficial	Same
Review Time	6 months from state receipt of Consistency Certification (30-days for completeness notice) Can be altered by written agreement between State and applicant	60 Days, extendable (or contractible) by mutual agreement
Consistency	Must be Fully Consistent	To Maximum Extent Practicable**
Procedure Initiation	Applicant provides Consistency Certification to State	Federal Agency provides "Consistency Statement" to State
Appealable	Yes, applicant can appeal to Secretary (NOAA)	No (NOAA can "mediate")
Activities	Listed activities with their geographic location (State can request additional listing within 30 days)	Listed or Unlisted Activities in State Program
Activities in Another State	Must have approval for interstate reviews from NOAA	Interstate review approval NOT required
Activities in Federal Waters	Yes, if activity affects state waters	Same

* There are separate requirements for activities on the Outer Continental Shelf (subpart E) and for "assistance to an applicant agency" (subpart F).
** Must be fully consistent except for items prohibited by applicable law (generally does not count lack of funding as prohibited by law, 15 CFR 930.32).

Chapter 161, Beach and Shore Preservation. The intent of the coastal construction permit program established by this chapter is to regulate construction projects located seaward of the line of mean high water and which might have an effect on natural shoreline processes.

Response: The proposed project is not located seaward of the mean high water line and would not affect shorelines or shoreline processes.

Chapters 186 and 187, State and Regional Planning. These chapters establish the State Comprehensive Plan which sets goals that articulate a strategic vision of the State's future. Its purpose is to define in a broad sense, goals and policies that provide decision-makers directions for the future and provide long-range guidance for orderly social, economic and physical growth.

Response: The project meets the primary goal of the State Comprehensive Plan through preservation and protection of the environment. The proposed work will be coordinated with the State through review of this document.

Chapter 252, Disaster Preparation, Response and Mitigation. This chapter creates a state emergency management agency, with the authority to provide for the common defense; to protect the public peace, health and safety; and to preserve the lives and property of the people of Florida.

Response: The proposed project purpose is to retain current flood protection measures and enhance the hydrologic regime in south Florida. Therefore, this work would be consistent with the efforts of Division of Emergency Management. The manatee mitigation feature will not affect public peace, health and safety, or the lives and property of the people of Florida.

Chapter 253, State Lands. This chapter governs the management of submerged state lands and resources within state lands. This includes archeological and historical resources; water resources; fish and wildlife resources; beaches and dunes; submerged grass beds and other benthic communities; swamps, marshes and other wetlands; mineral resources; unique natural features; submerged lands; spoil islands; and artificial reefs.

Response: The existing habitat within the tieback levee project area and within the manatee mitigation feature consists of uplands and some wetland areas. Impacts to wetlands will be minimized with the construction of the tieback levees and manatee mitigation feature. Any wetlands loss will be compensated by the hydrologic restoration of over 55,000 acres, as described in the 2004 Picayune Strand Restoration Project (PSRP) Final Project Implementation Report (PIR) and Environmental Impact Statement (EIS). Preconstruction surveys will be conducted to minimize any disturbance to threatened and endangered species in compliance with the U. S. Fish and Wildlife Service consultation. See the Environmental Assessment for further discussion of wetlands and cultural resources (Section 4.0, Environmental Effects).

Chapters 253, 259, 260, and 375, Land Acquisition. This chapter authorizes the state to acquire land to protect environmentally sensitive areas.

Response: The property proposed for this project is already in public ownership. The proposed project would comply with the intent of this chapter.

Chapter 258, State Parks and Aquatic Preserves. This chapter authorizes the state to manage state parks and preserves. Consistency with this statute would include consideration of projects that would directly or indirectly adversely impact park property, natural resources, park programs, management or operations.

Response: The proposed project would help improve environmental conditions at state parks or aquatic preserves in the region. The project is consistent with this chapter.

Chapter 267, Historic Preservation. This chapter establishes the procedures for implementing the Florida Historic Resources Act responsibilities.

Response: The historic properties identified in the PSRP area include features of a 1960's tram logging operation, a mid 20th century farm, and 63 prehistoric sites within or near the PSRP's area of potential effects. A determination of no adverse effect by the construction activities, including the tieback levee, has been made and coordinated with the Florida State Historic Preservation Officer and Federally Recognized Tribes. The effect of operations on the archeological sites is still being evaluated; a tentative determination of no adverse effect has been made based on the assumption that the PSRP will result in historic water levels. A monitoring plan is being developed to verify that archeological sites are not being inundated during operations. If sites are inundated by operations then the effect determination will be reevaluated. Consultation with the SHPO for the manatee mitigation feature is in progress.

Chapter 288, Economic Development and Tourism. This chapter directs the state to provide guidance and promotion of beneficial development through encouraging economic diversification and promoting tourism.

Response: Contribution of the project area to the State's tourism and economy would not be compromised but enhanced by project implementation. Therefore, the project would be consistent with the goals of this chapter.

Chapters 334 and 339, Transportation. This chapter authorizes the planning and development of a safe, balanced, and efficient transportation system.

Response: No public transportation systems would be impacted by this project.

Chapter 370, Saltwater Living Resources. This chapter directs the state to preserve, manage and protect the marine, crustacean, shell and anadromous fishery resources in state waters; to protect and enhance the marine and estuarine environment; to regulate fishermen and vessels of the state engaged in the taking of such resources within or

without state waters; to issue licenses for the taking and processing products of fisheries; to secure and maintain statistical records of the catch of each such species; and, to conduct scientific, economic, and other studies and research.

Response: This project will enhance saltwater resources by replacing man made point source discharges of freshwater to the Ten Thousand Islands Region with more natural sheet flow.

Chapter 373, Water Resources. This chapter provides the authority to regulate the withdrawal, diversion, storage, and consumption of water.

Response: The non-federal sponsor for this project is the South Florida Water Management District, which is the state agency responsible for implementing this statute. Coordinated planning has been done with this agency to ensure compatibility with established policies. The project is consistent with the goals of this chapter.

Chapter 376, Pollutant Spill Prevention and Control. This chapter regulates the transfer, storage, and transportation of pollutants and the cleanup of pollutant discharges.

Response: This work does not involve the transportation or discharging of pollutants. Conditions will be placed in all construction contracts to address any inadvertent spill of pollutants. Therefore, the project would comply with this chapter.

Chapter 377, Oil and Gas Exploration and Production. This chapter authorizes the regulation of all phases of exploration, drilling, and production of oil, gas, and other petroleum products.

Response: This work does not involve the exploration, drilling or production of gas, oil or petroleum product and therefore does not apply.

Chapter 380, Environmental Land and Water Management. This chapter establishes criteria and procedures to assure that local land development decisions consider the regional impact nature of proposed large-scale development. This chapter also deals with the Area of Critical State Concern program and the Coastal Infrastructure Policy.

Response: The work does not involve land development as described by this chapter; therefore, this chapter is not applicable.

Chapter 388 (Mosquito/Arthropod Control). Chapter 388 provides for a comprehensive approach for abatement or suppression of mosquitoes and other pest arthropods within the state.

Response: The work would not further the propagation of mosquitoes or other pest arthropods.

Chapter 403, Environmental Control. This chapter authorizes the regulation of pollution of the air and waters of the state by the Florida Department of Environmental Protection.

Response: An Environmental Assessment has been prepared and will be reviewed by the appropriate resource agencies including the Department of Environmental Protection.

Chapter 582, Soil and Water Conservation. This chapter establishes policy for the conservation of the state soil and water through the Department of Agriculture. Land use policies will be evaluated in terms of their tendency to cause or contribute to soil erosion or to conserve, develop, and utilize soil and water resources both onsite or in adjoining properties affected by the project. Particular attention will be given to projects on or near agricultural lands.

Response: Project implementation will include appropriate erosion control plans and measures to ensure compliance.

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APPENDIX C

PERTINENT CORRESPONDENCE

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

REPLY TO
ATTENTION OF

Planning and Policy Division
Environmental Branch

JAN 1 4 2014

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

Dear Mr. Williams,

This letter is in response to the U.S. Fish and Wildlife Service (USFWS) letter dated October 22, 2013 regarding the status of Endangered Species Act (Section 7) consultation for the Picayune Strand Restoration Project (PSRP). Your October 22, 2013 letter also included comments on the draft Limited Reevaluation Report (LRR) and Environmental Assessment (EA) that were released for a 30-day public and agency review on May 30, 2013. The purpose of the LRR is to address the total project cost increase over the cost authorized in the 2004 Final Project Implementation Report (PIR) and Environmental Impact Statement (EIS). The EA portion of the report was to provide compliance with the National Environmental Policy Act (NEPA) for the redesign of the spreader berms associated with each pump station. At the time of the May 30, 2013 report, the manatee mitigation feature was not fully designed and therefore, could not be fully analyzed in the LRR/EA.

Since the release of the May 30, 2013 LRR/EA, the EA portion of the document has been separated from the LRR. The revised EA will evaluate alternatives for the tieback levee and manatee mitigation feature. The LRR will be reviewed through the U.S. Army Corps of Engineers (the Corps) leadership and will not be released for subsequent public review. The revised EA will undergo an additional 30-day public and agency review period. It is anticipated that the public review will commence in February 2014 and the Corps encourages USFWS review.

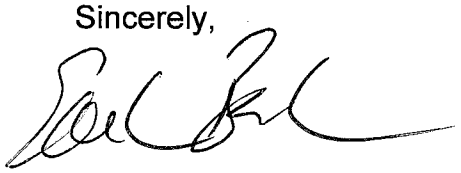
As stated in your letter, the Corps is aware of the USFWS' position regarding the need for a flood protection feature on the western side of the PSRP. At an interagency meeting, held February 28, 2013, Corps hydraulic engineers presented the final results of the detailed modeling analysis for the western protection features. This analysis found that a flood control feature would be needed to prevent water level increases in the 6L's farm area post project implementation. Following this meeting, additional model runs were completed to investigate the need for additional conveyance from U.S. 41 (Tamiami Trail) to the downstream estuaries. The results of this additional analysis were presented to the interagency team on March 8, 2013. Due to very gradual relief in this area, modeling showed that additional conveyance would not assist in moving water from U.S. 41 to the downstream estuaries.

The design of the western protection feature has not been completed and is contingent upon the authorization of additional project funds from Congress as noted in the May 30, 2013 LRR/EA. The Corps will continue to consult informally with USFWS regarding the design of the protection feature and, upon design completion, will analyze potential effects on threatened and endangered species within the project area in a Biological Assessment. Unless the final design of this feature is significantly different or larger than what was included in the 2004 Final PIR/EIS, additional NEPA is not anticipated.

The Corps is finalizing a draft BA to address potential effects of the PSRP on the West Indian manatee and potential effects associated with the proposed manatee mitigation feature on other threatened or endangered species that may occur within the action area. This draft BA will include an updated joint Corps and South Florida Water Management District manatee monitoring plan. As discussed at the November 5, 2013 PSRP manatee monitoring meeting held in Vero Beach, the Corps will provide the draft BA for USFWS' initial review and USFWS will provide manatee monitoring success criteria to incorporate into the manatee monitoring plan. The USFWS will be notified when the revised EA addressing the manatee mitigation feature and tieback levee are available for public and agency review.

Thank you for your continued coordination on the PSRP. Please contact the Project Manager, Ms. Emily Rivera at 904-232-1048 or the Project Biologist, Ms. Amy Thompson at 904-232-1545 if you have any questions.

Sincerely,



Enclosure

Eric L Bush
Chief, Planning and Policy Division

Copies Furnished (electronic):

Tom Teets, SFWMD
Janet Starnes, SFWMD
Paul Warner, SFWMD
Miles Meyer, USFWS
Kim Dryden, USFWS
Bob Pace, USFWS
Bob Progulske, USFWS
Kevin Godsea, Florida Panther National Wildlife Refuge
Ernie Marks, FDEP

United States Department of the Interior

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

October 31, 2014

Eric Bush
Chief, Planning Division
U.S. Army Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32232-0019

Project: Picayune Strand Restoration Project
September 2014 (Fourth) Supplemental
Biological Assessment
Dated: September11, 2014

Dear Mr. Bush:

This responds to your September 11, 2014, letter transmitting a fourth Supplemental Biological Assessment (BA) for the Picayune Strand Restoration Project (PSRP). The BA addresses the effects of construction and management of a proposed West Indian manatee (*Trichechus manatus*) mitigation feature on federally-listed species and designated West Indian manatee critical habitat consistent with the Endangered Species Act of 1973, as amended (Act) (87 Stat.884; 16 U.S.C. 1531 et seq.) and the Marine Mammal Protection Act of 1972, as amended (MMPA) (16 U.S.C. 1461 et seq.).

Critical habitat for the West Indian manatee (Code of Federal Regulations 50 Parts 1 to 199; revised on October 1, 2000) in the project area includes all United States territorial waters in southwest Florida "adjoining the coast and islands and all connected bays, estuaries, and rivers from Gordon's Pass, near Naples, Collier County, southward to and including Whitewater Bay, Monroe County." No primary constituent elements for manatee critical habitat have been designated. However, elements of the project area that are essential to the conservation of the species include access to fresh water, natural and man-made warmwater refugia, and forage; particularly submerged aquatic vegetation (U.S. Fish and Wildlife Service [Service] 2009; U.S. Army Corps of Engineers [Corps] 2014, 2008; Stith et al. 2004, 2006).

Specifically, you request concurrence with the Corps' effect determinations for the endangered West Indian manatee and West Indian manatee critical habitat, endangered American crocodile (*Crocodylus acutus*) and American crocodile critical habitat, the endangered Florida panther (*Puma concolor coryi*), endangered wood stork (*Mycteria americana*), endangered Florida bonneted bat (*Eumops floridanus*), endangered Everglade snail kite (*Rostrhamus sociabilis plumbeus*), threatened red-cockaded woodpecker (*Picoides borealis*), threatened eastern

indigo snake (*Drymarchon corais couperi*), and gopher tortoise (*Gopherus polyphemus*), a candidate species. Consultation on other species under the authority of the National Marine Fisheries Service (NOAA Fisheries) is occurring separately, although the Service has coordinated elements of this project with NOAA Fisheries (September 10, 2013, interagency conference call).

The proposed action is the construction and management of a new manatee refugium ("manatee mitigation feature") within and adjacent to a spoil berm resulting from the 1966 construction of the Faka Union Canal, located south of the existing passive manatee refugium in the Port of the Islands (POI) marina basin in Collier County (Section 16, Township 52S Range 28E). The action also includes a proposed PSRP Manatee Monitoring Plan (September 2014) and the Corps and South Florida Water Management District (District) requested Manatee Mitigation "Success Criteria." The BA indicates that measures agreed to minimize or avoid effects to manatees as part of the project consultation on manatees and their critical habitat to date (as described in the Project Implementation Report [PIR] and Environmental Impact Statement [EIS] and the 2009 PSRP Biological Opinion, including the Final PSRP Environmental Monitoring Plan etc.) are also incorporated therein as project commitments. The PSRP action area includes estuarine areas that are designated manatee critical habitat that should benefit by changes in hydrology resulting from PSRP; including the upper estuaries and receiving estuaries from Fakahatchee Bay southeast of PSRP to Blackwater Bay to the northwest of PSRP, as well as the POI Basin and Faka Union Canal. Although, the BA delineates the upstream extent of the action area as ending at the Faka Union-1 weir, the project action area includes those canals above the weir that are accessible to manatees during high tide events.

The existing manatee refugium in POI is anticipated to fail when point-source freshwater discharges to the Faka Union Canal that act to create a thermal manatee refugium at the POI marina are modified by elimination of canals for restoration in the upstream PSRP (Slone et al. In Press; Stith et al. 2011). The existing refugium, which is maintained by thermal inversion resulting from the input of fresh water into a deep saltwater marina basin, is proposed to be replaced by an excavated basin that is fed by warm, saline groundwater. The design is intended to create a groundwater connection documented to exist by nearby wells (SGT5W2 and 3) and other regional warmwater refugia used by manatees. The feature is designed to replace, not enhance, the existing manatee refugium.

The location and design of the manatee refugium mitigation feature is Alternative 27 (Option 2) of 27 project design alternatives that were developed by a subteam of the PSRP Project Development Team in 2012 and 2013. The final design of the manatee refugium described in the September 2014 BA has been slightly modified by a 90 percent final design developed by the District as received on October 7, 2014. The design includes the excavation of a 2-acre, 20-foot deep oxbow in the Faka Union Canal spoil berm. Based on a flushing assessment that was completed by the District, operable culverts were added to the northern "ingress" (now unnavigable to manatees) so that the oxbow can be closed off during cold season to minimize flushing and opened during warm season to allow the oxbow to flush. Additionally, the southern ingress/egress was meandered to further manage flushing potential in the cold season. The footprint of the feature is approximately 10 acres; including 8 acres of upland

habitat consisting of a revegetated spoil berm, and approximately 2 acres of wetlands, including 1.07 acres of mangroves. The upland portion of the site has partially revegetated with oaks (*Quercus spp.*) and cabbage palm (*Sabal palmetto*), as well as xeric groundcover. Approximately 16 gopher tortoise burrows will be affected by the site construction, and the gopher tortoise population, originally placed on the berm as mitigation, may be relocated.

The Corps has determined that the project will have "no effect" on the Everglade snail kite, wood stork, red-cockaded woodpecker an "may affect, but is not likely to adversely affect" the Florida panther, Florida bonneted bat, American crocodile and its critical habitat, the West Indian manatee and its critical habitat, and the eastern indigo snake and gopher tortoise. In our April 23, 2014, review of a March 13, 2014, version of this BA, the Service concurred with the Corps' determination that the construction of the manatee refugium will have "no effect" on the Everglade snail kite, wood stork, and red-cockaded woodpecker. Based on subsequent modifications to the BA, which include pre-construction wildlife surveys, gopher tortoise relocation, and construction observers, the Service now concurs with the "may affect, but is not likely to adversely affect" determination of the Corps for the bonneted bat, eastern indigo snake, Florida panther, and gopher tortoise, as well as "no effect" on the American crocodile.

West Indian Manatee

Our assessment of effects to the West Indian manatee and its critical habitat is based on a very extended consultation which included Corps and District funded studies by the U.S. Geological Survey (USGS), a subsequent commitment to replace the existing manatee refugium, a manatee monitoring plan that amends and modifies the existing PSRP Final Environmental Monitoring Plan that is attached to the 2009 PSRP Biological Opinion, development of manatee success criteria for manatees in the project action area, consideration of ongoing State and Federal research in the action area and State and Federal monitoring for this species and its habitat. The 2009 Biological Opinion provides for the continued review of the project by a subgroup of the PSRP Monitoring and Assessment Group (MAG) comprised of species and management experts, who will monitor the project and make recommendations for project adaptive management, if necessary, to managers and stakeholders.

The enclosure is an abridged 15-year (1999 to 2014) Act and MMPA consultation history for the West Indian manatee and its critical habitat for PSRP. This extended consultation period demonstrates the scope of the potential impacts and benefits of the PSRP to the southwest Florida manatee population; the need for science-based analysis of the large but passive thermal manatee refugium on the site, the complexity of a phased 50-year restoration project on project planning and implementation for endangered species, and the projected benefits of the project on more than 20,000 acres of downstream estuaries including critical habitat of the manatee. This task was accomplished because of the dedicated efforts of biologists, hydrologists, engineers, planners, and managers of the Corps, District, Service, Florida Fish and Wildlife Conservation Commission (FWC), USGS, Florida Department of Environmental Protection (DEP) and Collier County.

Summary of 2009 Biological Opinion for West Indian Manatee and Manatee Critical Habitat

As summarized in the 2009 Biological Opinion, direct effects (beneficial or adverse) of PSRP on manatees may include: (1) more seagrass growth in Faka Union Bay and adjacent affected bays; (2) an increase in freshwater sources due to estuarine watershed restoration; and (3) construction impacts related to placement of barriers to upstream movement and turbidity barriers during construction in Faka Union Canal above Faka Union-1 weir.

Indirect effects (beneficial or adverse) of the project on manatees include: (1) potential failure of the thermocline/halocline that supports the warm-water refugium in the POI basin resulting in cold stress and/or mortality, and injury or mortality associated with seeking an alternate refugium; (2) a reduction in the manatee reliance on the POI basin for fresh water during the spring dry season; and (3) an increase in exposure to boat traffic associated with access to new freshwater sources and forage opportunities.

The 2009 Biological Opinion indicated that available USGS modeling in the Picayune Strand area indicated that the rerouting of water in the restoration scenario could affect the temperature and salinity of the manatee refugium at POI and posed the following questions:

1. Is the observed halocline necessary to maintain the observed thermal inversion?
2. Is the halocline primarily tidal seawater or is there a ground-water salinity source?
3. How do changes in the flow system affect the halocline and thermocline?
4. How important are freshwater inflows to maintaining the halocline in the winter months?
5. Will saline water propagate upstream of the weir at POI and reduce the available freshwater that is important to manatees?

The 2009 Biological Opinion stated that the results of the following studies and actions would be monitored by the Service:

1. Development, Testing, and Application of a Coupled Hydrodynamic Surfacewater and Ground-water Model (FTLOADDS) with Heat and Salinity Transport in the Ten Thousand Islands (TTI) and Picayune Strand Restoration Area, Florida.
2. A measurement-derived heat-budget approach for simulating coastal wetland temperature with a hydrodynamic flow model.
3. Characteristics of winter passive thermal refugia and use by manatees in southwest Florida.
4. Assessing the impact of hydrological restoration on manatees with aerial surveys and hierarchical models by Catherine Langtimm, Robert Dorazio, Brad Stith, and Terry Doyle.
5. A three-dimensional model of the hydrology of POI.
6. Mapping and characterizing seagrass beds and manatee foraging areas in the TTI by incorporating manatee Global Positioning System (GPS) tracking data and habitat information by Daniel Slone, James Reid, and W. Judson Kenworthy.
7. Past and Future Impacts of Climate Change on Coastal Habitats and Species in the Everglades — An Integrated Modeling Approach by Catherine Langtimm, Eric Swain, Don DeAngelis, Thomas Smith, Dennis Krohn, and Brad Stith.

The 2009 Biological Opinion indicated that if through research, observation, or monitoring it is discovered that manatees are being adversely affected by PSRP, reinitiation of consultation would be necessary and the following potential measures may need to be taken to alleviate stress on manatees: (1) construction of a pipe to supply fresh water over the Faka Union -1 weir if the freshwater source fails as a result of the project; (2) maintenance of the Faka Union-1 weir in its existing condition; (3) installation of a precautionary groundwater well to substitute for the warmwater refugium represented by the thermocline/halocline in the POI basin; (4) monitoring of the location and type of manatee-related watercraft injury and mortality in the project action area; and (5) monitoring of the cold-stress/cold-related mortality in the POI marina basin or adjacent areas.

Reinitiation of Consultation on the West Indian Manatee and Manatee Critical Habitat

As a result of uncertainties posed by the available scientific information, subsequent to the 2009 Biological Opinion, a number of the referenced studies were conducted that resulted in additional analysis of the viability of the manatee thermal refugium on the site, as well other elements of the area affected by the project. Slone et al. (In Press), Stith et al. 2011, and Swain et al. 2009 documented that the primary attraction of the passive thermal refugia (PTR) at PSRP was the warm-water temperatures maintained in the bottom layers of the marina during the coldest periods. Bottom temperatures at nearby inland bays, nearshore Gulf, and surface layers at the PTRs regularly fell below temperatures suitable for manatees. These temperature patterns account for aerial survey results of manatee presence in southwest Florida which showed a majority of the individuals counted were aggregated at POI, while the next three largest aggregations occurred at similar inland sites, all artificial canals or basins. The telemetry data showed that manatees preferentially moved into these PTRs as the water temperatures fell below 20°C on their primary foraging areas in the shallow Gulf (Stith et al. 2011).

Stith et al. (2011) demonstrated that salinity stratification played an unexpectedly important role at the PTRs, explaining how warmer water persisted in the bottom layer, even when the surface water became much colder and turnover of the system might be expected. Thorough turnover and mixing did occur at POI, but only when salinity stratification was absent. The relationship between temperature inversion and salinity stratification was readily identified in comparisons of the densities of the surface and bottom under different conditions. During cold periods at POI, the warmer bottom layer was considerably denser than the cooler surface water, but only when there was a significant salinity gradient. Haloclines maintained a stable density gradient despite the temperature inversion, thus preventing vertical mixing. This finding was supported by the POI three-dimensional model (Swain et al. 2009), which showed that convective turnover rapidly cooled the bottom in the absence of salinity stratification. Within the typical range of salinity and temperature gradients observed at POI, salinity had a much greater impact on density than temperature, enabling haloclines to offset the potentially unstable density differences caused by temperature inversions.

The formation and maintenance of salinity stratification at POI during winter was strongly correlated with the amount of upstream freshwater discharged over the southern Faka Union weir. Under low or no-flow conditions, the stratification decreased fairly rapidly over time as

the surface salinity approached the higher values of the bottom layer. In such systems, an "estuarine circulation" pattern is established where the lighter freshwater layer flows seaward above a saltwater layer which is propagated upstream by tidal forcing (Kurup et al. 1998). Under such conditions, salinity stratification typically increases as freshwater discharge increases (Xu et al. 2008). At high levels of freshwater discharge tidal salinities can be eliminated (Hamilton et al. 2001). During the wet season, the entire Faka Union canal system has been observed to be oligohaline (Surge and Lohmann 2002). At POI, the strong correlation between winter discharge and salinity stratification indicates that haloclines break down without adequate levels of freshwater discharge.

Additional analysis by Slone et al. (In Press) documented that groundwater isotopes were not present in the POI marina basin, supporting a conclusion that for the POI marina, the thermal refugium was not correlated with groundwater input.

In June of 2011, the Manatee Mitigation Team (MMT) and project managers decided that a manatee refugium mitigation option would be the best solution for protection of the southwest Florida manatee population, to accommodate various project constraints and benefits, and avoid project delays that would benefit the ecosystem, including manatee critical habitat. From 2011 to 2013, the MMT developed some 27 alternatives to address manatee refugium issues and function within cost constraints.

Manatee Monitoring Plan

A Manatee Monitoring Plan (Corps 2014) was developed from 2013 to 2014 after the design of the new manatee refugium was finalized. The plan includes measures that are phased to accommodate the current construction plan for the PSRP. At present, this plan includes measures to first fill Merritt Canal, and although these effects will be monitored, no significant impacts to the thermal refugia are predicted because the east-west T canal will remain open, as will the freshwater input from Faka Union and Miller Canals. After a new thermal refugium is constructed, as indicated above, monitoring of the refugia (2 old and new) will occur to determine if initial success criteria have been met. If the new refugium is determined to have met the initial physical success criteria, the remainder of the project canals will be backfilled. Monitoring will continue until at least one moderate and two severe cold events have demonstrated that the replacement of the refugium is successful. The determination of success will made by project managers after the monitoring information is received and assessed by an expert subgroup of the PSRP MAG.

In addition to the Manatee Monitoring Plan included in the September 2014 BA, the 2009 PSRP Biological Opinion contains measures related to project description, project operations, and project construction that are included in the Biological Opinion or the Final Environmental Monitoring Plan which is a Term and Condition of the Biological Opinion. These include such measures as the Standard Manatee Construction Conditions, Comprehensive Everglades Restoration Plan (CERP) Manatee Guidelines, seagrass monitoring and some estuarine hydrological monitoring stations.

Manatee Mitigation Success Criteria

The Manatee Monitoring Plan includes "success criteria" negotiated by the project M and project managers. These success criteria include both physical and observational measures that demonstrate that the new refugium is functioning correctly to replace the features of the existing refugium. These criteria include project sponsor commitments for isotope and water temperature, observation of manatees in the new and old refugia, and agency commitments for manatee health assessments, boat traffic analysis, mortality/morbidity data and assessment of population demographics. The success criteria also identify and note the importance of specific hydrologic monitoring stations. As stated above, the determination of mitigation success will made by project managers after the monitoring information is received and assessed by a manatee expert subgroup of the PSRP MAG which includes the Service, FWC, and USGS.

Long-term management and maintenance

The new manatee refugium will be maintained by the District. As part of a long-term agreement between the District and Rookery Bay National Estuarine Reserve which manages the property for the State of Florida, access to the refugium will be restricted by water and by land except for research or recovery purposes.

Conservation Recommendations

The Service believes that a number of additional monitoring programs and research studies that were performed as part of the baseline information for this project, but are now unfunded or tied to other project success critera would benefit the post-project analysis of the manatees affected by this project. These include:

Langtimm, C.A. Doyle, T.J. Stith, B.M. and Kochman, H.I. 2009. A New Aerial Survey Method to Monitor the Response of Manatees to Restoration of the Florida Everglades. First National Conference on Ecosystem Restoration (NCER), Orlando, Florida. U.S. Geological Survey, Gainesville, Florida and U.S. Fish and Wildlife Service; Naples, Florida.

Locker, S.D. and A.K. Wright. 2003 Benthic Habitat Mapping for Habitat Suitability Modeling in Rookery Bay National Estuarine Research Reserve. College of Marine Science, University of South Florida, St. Petersburg, Florida 33701.

Patino, E. and L. Soderqvist. 2010. Western Tamiami Trail Flows-Baseline Information and Response to CERP. U.S. Geological Survey, Fort Myers, Florida.

Patino, E. and L. Soderqvist. 2010. Hydrodynamic and Salinity Characteristics of Rivers and Estuaries of the Ten Thousand Islands. U.S. Geological Survey, Fort Myers, Florida.

Slone, D.H., J.P. Reid, and W.J. Kenworthy. 2013. Mapping spatial resources with GPS animal telemetry: Foraging manatees locate seagrass beds in the Ten Thousand Islands, Florida. Marine Ecology Progress Series, Vol. 476:285-299, 2013. U.S. Geological Survey; Gainesville; Florida.

Summary

The proposed new manatee refugium is expected to functionally replace the potentially adverse effect of a failed thermocline/halocline within the project basin. No additional exposure to mortality associated with boat traffic will occur as a result of the new refugium because the location of the new refugium is within Faka Union canal which is posted "Idle Speed Only" downstream of the existing refugium. Isolation of the refugium from the boat access that occurs in the existing refugium may reduce human-caused stress to manatees that are seeking refuge from the cold.

Based on the September 14, 2014, BA, including the Manatee Monitoring Plan and manatee success criteria; the project site plan dated August 27, 2014; a commitment for long-term site management and maintenance by Rookery Bay National Estuarine Research Reserve and the District; the manatee protection measures as included in PSRP Final Environmental Monitoring Plan including estuarine condition monitoring and the ongoing monitoring of the manatee and its critical habitat in the project action area by state and federal governments, and implementation of the Adaptive Assessment and Management Plan strategy consistent with the PSRP Environmental Monitoring Plan (Corps 2008), the Service concurs with the Corps' determination that the project "may affect, but is not likely to adversely affect" the West Indian manatee and its critical habitat.

We sincerely appreciate the efforts that the Corps and District have employed to address protection of the endangered West Indian manatee as part of this restoration project completion. Thank you for your continued coordination on the PSRP effects on listed species, particularly the West Indian manatee. If you have any questions, please contact Bob Progulske, Everglades Program Supervisor at 772-469-4299.

Sincerely,

Donald (Bob) Progulske
Everglades Program Supervisor
South Florida Ecological Service Office

cc: electronic copy only w/enclosure
District, West Palm Beach, Florida (Thomas Teets)
District, Naples, Florida (Janet Starnes)
Corps, Jacksonville, Florida (Brad Tarr, Gina Ralph, Eric Summa, Eric Bush)
Service, Jacksonville, Florida (Jim Valade)
Florida Panther NWR, Naples, Florida, (Kevin Godsea)
FWC, Tallahassee, Florida (Carol Knox, Ron Mezich)
USGS, Gainesville, Florida (Dan Slone)
DEP, Fort Myers, Florida (Jordan Pugh)
Rookery Bay National Estuarine Research Reserve, Naples, Florida (Gary Lytton, Jeff Carter)

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Hamilton, D.P., T. Chan, M.S. Robb, C.B. Pattiaratchi, and M. Herzfeld. 2001. The hydrology of the upper Swan River estuary with focus on an artificial destratification trial. *Hydrological Processes* 15: 2465–2480.

Kurup, R.G., D.P. Hamilton, and J.C. Patterson. 1998. Modelling the effect of seasonal flow variations on the position of salt wedge in a microtidal estuary. *Estuarine, Coastal and Shelf Science* 47: 191–208.

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Enclosure

Consultation History (Abridged) for the West Indian Manatee and its Critical Habitat on the Picayune Strand Restoration Project

Since 1999, the U.S. Fish and Wildlife Service (Service) has initiated and participated in numerous meetings with the Corps, District, U.S. Geological Survey (USGS), Florida Fish and Wildlife Conservation Commission (FWC) manatee experts, and others, to identify expected effects on manatees from completion of the Picayune Strand Restoration Project (PSRP). The following is an abridged list of only what the Service considers to be major events in the Endangered Species Act section 7 consultation and other environmental restoration issues for the PSRP. These parties are described as the manatee mitigation team (MMT) during the development of the manatee refugium mitigation feature.

The Corps provided an initial Biological Assessment (BA), dated October 17, 2001, that included a determination of "may affect, but would not be likely to adversely affect" the West Indian manatee (*Trichechus manatus*). This preliminary BA was found to lack sufficient detail in project design, was subject to several changes in hydrologic modeling, and needed additional and updated information on manatee and other listed species issues.

The Service's July 8, 2004, Planning Aid Letter in response to the Draft Project Implementation Report/Environmental Impact Statement (PIR/EIS) led to an August 5, 2004, meeting with the U.S. Army Corps of Engineers (Corps), Corps, U.S. Geological Survey (USGS), and South Florida Water Management District (District) in Vero Beach, Florida to address comments on manatees and other listed species. The Service requested additional information on the manatee including project effects on its warmwater refugium and critical habitat. The Service and USGS also provided the Corps with updated information on the status of the southwest Florida regional population of the manatee and USGS manatee studies conducted near the PSRP.

On October 20, 2004, the Corps provided a second and more extensive BA.

On October 24, 2004, the Service concurred with the Corps' determinations that, based on project commitments and conservation measures described in their October 20, 2004, BA, the PSRP would have "no effect" on Everglade snail kite (*Rostrharnus sociabilis*) critical habitat and American crocodile (*Crocodylus acutus*) critical habitat, and "may affect, but is not likely to adversely affect" the Everglade snail kite, American crocodile, red-cockaded woodpecker (*Picoides borealis*), bald eagle (*Haliacetus leucocephalus*), eastern indigo snake (*Drymarchon corais*), and manatee critical habitat. The Corps concluded that it did not have sufficient information to reach an effect determination for the wood stork (*Mycteria americana*), Florida panther (*Puma concolor coryi*), and West Indian manatee. Those latter determinations were made in part because of the lack of detailed design or assessment for some features, particularly flood control features (red-cockaded woodpecker, wood stork, and Florida panther), impending studies on the panther and manatee, contaminant issues, concerns of adjacent public land managers (particularly estuarine interests), the lack of a draft project operating manual, and the lack of a monitoring and adaptive assessment plan.

In March 2007, the USGS submitted a Scope of Work (SOW) entitled "Monitoring and Assessing Effects of the PSRP Restoration Project on the Manatee." This SOW was negotiated by the Service, Corps, and District to address a number of uncertainties, including the effect of the PSRP on the existing thermal refugium, the potential for the PSRP to impact the volume and timing of freshwater inflow to the Faka Union canal, the effects of the redistribution of fresh water on receiving estuaries, and the potential effects of this redistribution on the regional distribution/behavior of manatees, including exposure to additional boat traffic leading to injury/mortality, and the effects of the redistribution of freshwater on manatee critical habitat.

On September 6, 2007, the Service, Corps, and District attended an interagency conference in Gainesville, Florida to discuss with State and Federal manatee experts the project's likely effects on southwest Florida manatees.

On March 20, 2008, the Service met with the Corps, District, and USGS to discuss the project SOW for manatees, USGS manatee modeling, and proposed changes in aerial survey techniques for manatees.

On April 18, 2008, the Service participated in a teleconference with USGS and Ten Thousand Islands (TTI) National Wildlife Refuge biologists regarding potential changes in the aerial survey methodology that might affect baseline information on manatees for the project. Hydrologic models for the TTI Islands estuary, post-construction monitoring for the manatee, and contingency plans for decline of the manatee warm water refugium at Port of the Islands (POI) were also discussed.

On May 20, 2008, the USGS provided an update on the status and expected due date for delivery of their Coupled Hydrodynamic Surface-water/Groundwater Model that included analysis of the warm water refugium and adjacent estuaries.

Between May and July of 2008, the Service met with the District and Corps nine times to discuss various elements of a Draft PSRP Environmental Monitoring Plan and pending BA.

On August 1, 2008, the Service attended an interagency meeting on manatees at the TTI National Wildlife Refuge. This meeting updated agency stakeholders; including the FWC, Rookery Bay National Estuarine Research Reserve (RBNERR), Florida Department of Environmental Protection (DEP), and Collier County, on the project status and manatee issues.

On August 6, 2008, the Service received a memo from USGS outlining their recommendation for improving the manatee aerial survey methodology with the new methodology to maintain a consistent baseline for the PSRP and TTI National Wildlife Refuge.

On August 7, 2008, the Service attended an interagency meeting (Corps, District, USGS) in Vero Beach, Florida to discuss the monitoring plan and listed species, with particular emphasis on manatees.

The Corps provided a third (supplemental) BA on November 6, 2008. The BA specifically described effects related to the elements of the authorized construction project only, and did not include any other features west of the 55,000-acre area that was described as the Federal project boundary. There was no description of effects related to the flood control features, particularly the 6Ls feature, or red-cockaded woodpecker, panther, or wood stork in the Belle Meade area to be affected by the project. Effects to estuaries or manatees west of Blackwater Bay, and features to mitigate and monitor for manatee effects within the thermal refugium or in the defined manatee action area (Fakahatchee to Blackwater Bay) were not included in the BA.

On November 25, 2008, the USGS sent the Service a memorandum commenting on the Corps' BA and disagreeing with the Corps' conclusion that freshwater flow from Faka Union canal was not a factor in sustaining the temperature and salinity characteristics at POI that created the manatee refugium.

On March 11, 2009, the Corps provided the Service with the PSRP Monitoring Plan and the Final Nuisance and Exotic Vegetation Control Plan.

The Service issued a Biological Opinion on March 12, 2009, that included a summary of the status of consultation on the manatee at that time. The Biological Opinion noted that data analysis and modeling completed to date was insufficient to address project uncertainties. Specifically, the Biological Opinion stated that results of the study entitled "Monitoring and Assessing Effects of the Picayune Strand Restoration Project on the Florida Manatee: Hydrological Monitoring and Analysis", as included in the PSRP Environmental Monitoring Plan, and other studies would be necessary to evaluate project level impacts on the manatee. The Biological Opinion further stated that estuarine conditions will be monitored throughout the life of the project using the hydrologic monitoring stations for the PSRP, including stations in the upper, middle, and lower estuaries (Final PSRP Environmental Monitoring Plan). Information on estuarine components, such as submerged aquatic vegetation, would also be monitored. In addition, the USGS would complete and continue studies on the dynamics of the manatee warm water refugium in the P01 marina basin (Corps 2008 BA; Final PSRP Environmental Monitoring Plan), manatee behavior in the project action area and southwest Florida, water quality, and the characteristics of the restored volume and quantity of water delivered to the estuaries. The Biological Opinion stated that baseline studies on manatees would be complete prior to the construction of project components that alter flows to the estuaries. The Biological Opinion concluded that if research, observation or monitoring indicated that manatees were being adversely affected by the PSRP, reinitiation of consultation would be necessary.

In February 2009, the USGS published a fact sheet entitled "Integrated Science: Florida Manatees and Everglades Hydrology (Langtimm et al. 2009).

On July 7, 2009, a juvenile manatee calf was photographed on the south side of a weir at Stewart Boulevard in the upper PSRP area, confirming that manatees could access the project area above the Faka Union-l weir, near U.S. Highway 41 (Tamiami Trail).

On September 15, 2009, USGS hosted a workshop via web meeting to update the MMT on Hydrological Monitoring of Modeling of POI and Use by Manatees.

On November 17, 2009, the MMT met to review the USGS' progress on baseline studies; preliminary data from an isotope analysis suggested that the warm water refugium was not a result of groundwater in the POI basin. The importance of specific hydrologic monitoring sites in the affected estuaries was described as necessary to assess effects to critical habitat and changes in manatee behavior (movements related to boat traffic and access to fresh water).

On April 21, 2010, the USGS published information documenting the POI passive manatee refugium (Temperature Inverted Haloclines Provide Winter Warm- Water Refugia for Manatees in Southwest Florida; Stith et al. 2010). The study found that the refugium was maintained by upstream freshwater inflow creating salinity stratification over a tidal wedge in the POI marina. In response to Service comments on the Draft Project Operating Manual for the Merritt Pump Station, the Corps stated on June 2, 2010, that pump operations for manatee management were not feasible or necessary, based on their opinion that there was no conclusive effect of the project on manatees.

On February 1, 2011, the Service convened an interagency meeting to discuss manatee issues, including the project schedule, USGS updates on manatee baseline studies, and the construction monitoring plan for the project. The Service submitted a draft Monitoring and Assessment Plan for review.

On May 24, 2011, the Service, FWC, USGS, Corps, and District met at the USGS office in Gainesville, Florida to discuss PSRP manatee effects and project mitigation alternatives. The FWC, Service, and Corps also convened a separate meeting on the same day to discuss the feasibility of alternatives, including potentially authorization of take under the Marine Mammal Protection Act of 1972, as amended (MMPA) (16 U.S.C. 1461 et seq.).

In June 2011, after discussions with the North Florida Ecological Services Office (the lead office for manatee policies in Florida), the Service's South Florida Ecological Services Office concluded that writing a rule for take under the MMPA was not supportable from biological, legal, or time feasibility standpoints. This took into consideration a 2005 lawsuit on manatees, the status of the southwest Florida manatee population, and status of recovery and de-listing efforts.

On June 29, 2011, the Service, Corps, and District met at RBNERR to screen and preliminarily rank 19 manatee mitigation measures for cost, manatee effects, and overall restoration project benefits.

On September 16, 2011, the MMT met in Gainesville, Florida to discuss six proposed manatee mitigation alternatives (3, 9, 10, 17, 18, and 19), triggers for hydrologic effects on manatees at the POI refugium, USGS modeling, and the history of manatee mortality at POI.

On September 19, 2011, the Corps provided a Draft Manatee Monitoring Plan to the Service and District.

On September 27, 2011, the Service received recommendations from the USGS on manatee monitoring, including requirements during construction and crucial hydrologic indicators of adverse effects to manatees at the thermal refugium.
On September 29, 2011, the Service, in coordination with USGS, sent an email to the Corps in response to the September 19, 2011, Corps' draft manatee monitoring conditions, including post-construction aerial surveys and hydrologic monitoring in the upper estuarine bays and rivers.

On October 26, 2011, the MMT met at the USGS office in Gainesville, Florida to discuss seven proposed manatee mitigation alternatives (3, 9, 10, l0a, l0b, 7, and 20).

On August 12, 18, and 30 and November 8 and 22, 2011; the MMT held bi-weekly meetings and teleconferences to discuss project schedule and several manatee mitigation alternatives, and baseline study updates.

On September 30, 2011, the Corps made a determination that the dewatering plans for the Faka Union pump site would not have any effect on the manatee. From May 2011 to January 2012, in coordination with USGS, the Service reviewed proposed dewatering plans for the Faka Union pump station for effects to manatees and recommended monitoring of canal flow and temperature during dewatering events.

The Corps prepared a Memorandum for the Record (MRR) dated March 21, 2012, discussing various manatee mitigation alternatives and recommending Alternative 20 (a manatee refugium to be constructed north of the Faka Union-1 weir).

On April 5, 2012, the MMT met in Vero Beach, Florida and received management approval for the team's recommended manatee mitigation, Alternative 20.

On May 8, 2012, the Service received a second Draft Manatee Monitoring Plan from the Corps. From May through July 2012, the Service coordinated with the DEP and Corps on several weeks of geotechnical surveys associated with manatee mitigation Alternative 20. The Service observed an adult manatee and calf passing north over the Faka Union-1 weir during high water tropical storm conditions on June 26, 2012. After observing attempts by these manatees to cross back downstream over the weir during the next week, the Service contacted the FWC about a possible rescue, but the manatees were not observed again.

On October 26, 2012, the District accepted the offer from the Corps to take the lead in design and construction of the manatee mitigation feature.

On January 11, 2013, the MMT met at the USGS office in Gainesville, reviewed previously developed alternatives from the June 2011 meeting, and discussed problems with the preferred Alternative 20 (dredging of Faka Union canal above the Faka Union-1 weir). The Corps' modeling results did not support likely success of this feature, and difficulties in dealing with concerns of the adjacent Orchid Cove homeowners were considered to be insurmountable. New information from USGS indicated that an artificial (canal basin) manatee thermal refugium at Big Cypress National Park was supported by groundwater-fed warm saline water. Based on this

information and groundwater well information from PSRP upper estuaries, the MMT decided to move away from the concept of a thermocline to sustain the refugium, especially given that the Corps' hydrologic modeling suggested the inability to provide sufficient freshwater volumes to sustain the thermocline. The MMT recommended moving forward on Alternatives 22 and 23A, and possibly a phased approach to look at combinations of several alternatives. On January 30, 2013, managers of the MMT were briefed, and they supported the MMT's recommendations to move forward with either Alternative 22 or 23A.

Off-site manatee mitigation features were discussed in early 2013, including areas within Big Cypress National Preserve, temporary refugium in the TTI National Wildlife Refuge and Everglades National Park, Warm Mineral Springs in Sarasota County, and Henderson Creek near RBNERR. On January 28, 2013, the FWC and the Service inspected the location of a small manatee refugium at Henderson Creek in Collier County and discussed manatee mitigation alternatives. Off-site mitigation options were determined to be inappropriate due to their location outside the action area of the consultation, their inadequate size, and anticipated additional direct and indirect effects to manatees in the POI basin and in other locations.

The agencies held an on-site inspection of PSRP that included senior management from the Corps, District, and Service on February 21 and 22, 2013. This visit included inspection of the existing manatee refugium at the Faka Union-1 weir and the leading two candidate areas for compensation, Alternative 22 and Alternative 23A. The field trip also included a site inspection and discussion of red-cockaded woodpecker, Florida panther, and estuarine habitat areas to be affected by a 6Ls levee feature. These areas are located in the State's portion of the Picayune Strand State Forest and Collier-Seminole State Park (CSSP). We also discussed effects on downstream estuaries in TTI National Wildlife Refuge, RBNERR, and CSSP.

On May 7, 2013, the MMT met and discussed the benefits and costs of potential mitigation features (Alternatives 22, 23A and a new Alternative 27). The District proposed Alternative 27, which would entail excavating a portion of the Faka Union Canal berm below the POI marina, creating an "oxbow" basin as the replacement manatee refugium. The berm in this location is owned by the state of Florida and managed by RBNERR. Monitoring during the testing of the Merritt Pump Station in July and August 2013 was also discussed. Previous discussions between the Service and FWC regarding the size of the mitigation basin, prohibition of boat traffic and other disturbances, and site management and enforcement were shared with the MMT. On July 10, 2013, the Corps transmitted a proposed manatee monitoring plan.

On June 27, 2013, the Service sent a letter to the Corps commenting on the modified Draft Project Operating Manual for PSRP, including provisions to avoid take of the manatee from pump discharges or operations.

On July 15, 2013, the MMT received the draft USGS publication entitled "Hydrological Monitoring and Analysis to Assess Effects of the Picayune Strand Restoration Project on the Florida Manatee" (Slone et al. in publication) which completed baseline studies funded by the Corps and District in 2008 on project effects on the manatee. These effects and contingencies had been outlined in the 2009 Biological Opinion.

On July 17, 2013, the MMT met to discuss the decision by the Corps' Real Estate Division that acquiring property or an easement in the POT marina basin (Alternative 23A) was not authorized by the PIR/EIS. The MMT decided to move forward with Alternative 27 (oxbow south of the POI marina). The monitoring plan was discussed and a decision was made to resolve remaining issues at the management level. Long-term population monitoring, the extent and length of monitoring at the mitigation feature, and water quality monitoring in the POT basin and in adjacent estuaries were among the unresolved issues remaining that needed to be considered at levels above the MMT.

On July 25, 2013, the District, Service, DEP, RBNERR, and TTI National Wildlife Refuge staff site inspected the Alternative 27 site to determine the feasibility of various design locations. The site inspection was followed by an interagency meeting to discuss the site design at RBNERR.

On July 26, 2013, the PSRP Monitoring and Assessment Group met at the District to discuss site construction status and monitoring with an interagency group.

On August 9, 2013, the Service and FWC had a teleconference to discuss manatee mitigation monitoring.

On August 14, 2013, the Service received the published USGS paper on the "modified aerial transect" manatee survey technique which was the baseline aerial survey methodology for manatees in the project action area (Langtimm et al. 2009).

On August 27, 2013, the Service received a preliminary manatee mitigation design from the District.

On September 10, 2013, the Service, Corps, and District had a teleconference with the National Marine Fisheries Service to discuss potential effects of the project on the endangered smalltooth sawfish (*Pristis pectinata*) and goliath grouper (*Epinephelus itajara*) as well as Essential Fish Habitat.

On November 5, 2013, the Service, Corps, USGS, and District met with managers to discuss the Manatee Mitigation Monitoring Plan.

On December 4, 2013, the Corps responded to the June 27, 2013, letter from the Service commenting on the Draft Project Operating Manual.

On December 5, 2013, the Service, FWC, and USGS met to discuss the Draft Manatee Monitoring Plan and Mitigation Feature Design as well as to develop Draft "Success Criteria" for the Manatee Mitigation Feature.

On January 9, 2014, the Corps transmitted a Draft Biological Assessment for the Manatee Mitigation to the Service for internal review.

On January 15, 2014, URS Corporation sent a proposal for geotechnical exploration on the POI Berm to the District.

On February 20, 2014, the Service sent the "Manatee Mitigation Success Criteria" drafted by the Service, FWC, and USGS to the Corps and District.

On February 28, 2014, the District sent a notice to the Service and Corps that the geotechnical exploration on the POI Berm was complete.

On March 13, 2014, the Corps sent a Final Draft of the Manatee Mitigation BA to the Service requesting written comments.

On April 23, 2014, the Service responded to the March 13, 2014, Manatee Mitigation BA citing the need for additional information and clarification.

On May 13, 2014, the District conducted a Manatee Mitigation Feature Design meeting to solicit comments on the design.

On May 22, 2014, the District and the Corps provided comments on the Draft Manatee Monitoring Plan and Success Criteria modified by the Service, FWC, and USGS.

On July 10, 2014, the Service and the District met with DEP at RBNERR to discuss the proposed state management and recreation of the Manatee Mitigation Feature at POI.

On July 27, 2014, the Service received a modified Manatee Mitigation Feature Design and comments on hydrological modeling of the design from the District.

On August 19, 2014, the Service and USGS exchanged updated information on water quality and hydrological monitoring stations that were located in the project action area estuaries.

On August 20, 2014, the Service, Corps, District, and DEP (Tallahassee real estate and CERPRA permitting sections) met with managers to finalize the Manatee Mitigation Feature Design, Manatee Monitoring Plan, and Manatee Success Criteria. Proposed design changes which included a meandered southern ingress/egress and culverting of the northern "ingress" were approved. Permitting deadlines, the Environmental Assessment, and compliance with Endangered Species Act of 1973, as amended (87 Stat.884; 16 U.S.C. 1531 et seq.) and MMPA were also discussed.

On September 8, 2014, the Corps transmitted a Final Draft BA to the Service for the Manatee Mitigation Feature, Monitoring Plan, and Success Criteria. On September 8, 2014, the Service transmitted the Final Draft BA to USGS and FWC for comment. On September 8, the Service transmitted recommended BA modifications to the Corps on other federally-listed species.

On September 11, 2014, the Corps transmitted the Final BA to the Service.

On September 30, the District, Corps, Service, and DEP participated in a pre-application conference for the Corps of Engineers 404 permit application for the project by the District.

On October 7, 2014, the District transmitted draft 90 percent plan details of the manatee mitigation feature to an interagency group for review.

On October 17, 2014, the Service sent recommendations to the Corps and District regarding the definition of moderate and severe cold events based on input from the Service, FWC, and USGS, to the Corps and District.

On October 31, 2014, the Service sent a letter to the Corps concurring on the effects of the project as described in the fourth BA.

Thompson, Amy D SAJ

From: Kim_Dryden@fws.gov
Sent: Tuesday, April 24, 2012 1:34 PM
To: Thompson, Amy D SAJ
Cc: Ralph, Gina P SAJ
Subject: Re: Listed Species for PSRP (UNCLASSIFIED)

Follow Up Flag: Follow up
Flag Status: Completed

Categories: Red Category

For this particular project, you can delete the red-cockaded woodpecker as I do not believe any habitat exists in that particular area. The bald eagle is no longer listed although it is covered under BGEPA and MBTA. There is a nest near POI, we need to check the distance. Add the hawksbill sea turtle. There are no nesting sea turtles in the immediate project area (there are downstream), however effects will depend on how equipment accesses or launches to the site.

Please copy me with your consultation with NMFS on listed species and Essential Fish Habitat.

Kim Dryden
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
South Florida Ecological Services Office
3860 Tollgate Blvd., Suite 300
Naples, FL 34114
Phone: (239) 353-2873
Fax: (239) 353-8640

"Thompson, Amy D SAJ" <Amy.D.Thompson@usace.army.mil>

04/10/2012 11:03 AM To
'Kim Dryden' <Kim_Dryden@fws.gov>
cc
"Ralph, Gina P SAJ" <Gina.P.Ralph@usace.army.mil>
Subject
Listed Species for PSRP (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Kim,

I am in the process of preparing a BA for the PSRP Manatee Mitigation Project and want to make sure the listed species table is up to date. I pulled the table below from a previous BA. Could you please look over and update if needed?

Federally listed threatened (T), endangered (E), or candidate (C) species that might occur within the PSRP area.

REPTILES
American crocodile Crocodylus acutus E
Eastern indigo snake Drymarchon corais couperi T
Loggerhead sea turtle Caretta caretta T
Kemp's ridley sea turtle Lepidochelys kempi E
Atlantic green sea turtle Chelonia mydas mydas E

BIRDS
Red-cockaded woodpecker Picoides borealis E
Wood stork Mycteria americana E
Everglade snail kite Rostrhamus sociabilis plumbeus E
Bald eagle Haliaeetus leucocephalus T

MAMMALS
Florida panther Puma concolor coryi E
West Indian manatee Trichechus manatus E

FISH
Consultation on listed fish will be coordinated with the National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries).
Smalltooth sawfish Pristis pectinata E
Goliath grouper Epinephelus itajara C
Mangrove rivulus Rivulus marmoratus C
Sand tiger shark Odontaspis taurus C

Thanks!

Amy

Amy Thompson
Biologist
US Army Corps of Engineers
Office: 904-232-1545
Cell: 904-607-7793
Fax: 904-232-3442

Classification: UNCLASSIFIED
Caveats: NONE

Thompson, Amy D SAJ

From: Dryden, Kim [kim_dryden@fws.gov]
Sent: Monday, May 20, 2013 11:49 AM
To: Thompson, Amy D SAJ
Cc: Pace, Robert FWS@SAD
Subject: Service Concurrence on Merritt, Faka Union and Miller phases

Follow Up Flag: Follow up
Flag Status: Completed

Categories: Red Category

The Service concurs with the Corps statement that listed species issues under the ESA were covered for the Merritt, Faka Union, and Miller tie-back levees under the 2009 Biological Opinion per the work (project description) specifically described in that opinion. Minor extensions of the Merritt and Faka Union levees which are beyond the descriptions in the BO are being compiled for concurrence under a minor Biological Opinion modification and are considered to be covered per agreements reached on those separate project descriptions.

Amy - we still have no phone Service here at my office if you need to reach me.

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

MARJORY STONEMAN DOUGLAS BUILDING
3900 COMMONWEALTH BOULEVARD
TALLAHASSEE, FLORIDA 32399-3000

RICK SCOTT
GOVERNOR

HERSCHEL T. VINYARD JR.
SECRETARY

July 31, 2013

Ms. Amy D. Thompson, Biologist
Jacksonville District, Planning & Policy Division
U.S. Army Corps of Engineers
P.O. Box 4970
Jacksonville, FL 32232-0019

RE: Department of the Army, Jacksonville District Corps of Engineers
Draft Limited Reevaluation Report and Environmental Assessment (LRR/EA),
Picayune Strand Restoration Project – Collier County, Florida.
SAI # FL201306036606C

Dear Ms. Thompson:

The Florida State Clearinghouse has coordinated a review of the U.S. Army Corps of Engineers' (USACE) Draft LRR/EA for the Picayune Strand Restoration Project under the following authorities: Presidential Executive Order 12372; § 403.061(42), *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 following agencies submitted comments, concerns and recommendations regarding the Draft LRR/EA, all of which (memorandum, letters or Clearinghouse database entries) are attached hereto, incorporated herein by this reference, and made an integral part of this letter:

- Florida Department of Environmental Protection
- Florida Department of Agriculture and Consumer Services, Florida Forest Service
- Florida Department of State, Division of Historical Resources
- Southwest Florida Regional Planning Council

Based on the information contained in the submittal and enclosed agency comments, the state has determined that the USACE's Draft LRR/EA for the Picayune Strand Restoration Project is 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 activities' compliance with FCMP authorities, including federal and state monitoring of the activities to ensure their continued conformance, and the adequate resolution of issues identified during this and any subsequent reviews. If further regulatory review is required, the state's final concurrence of the project's consistency with the FCMP will be determined upon

completion of the state's environmental permitting process, in accordance with Section 373.428, *Florida Statutes*.

Please refer to the attached memorandum, letters and Clearinghouse database entries for all agency comments, concerns and recommendations regarding the above-captioned project. Should you have any questions or require additional information, please contact Ms. Lauren Milligan, Clearinghouse Coordinator, at (850) 245-2170 or Lauren.Milligan@dep.state.fl.us.

Yours sincerely,

Sally B. Mann

Sally B. Mann, Director
Office of Intergovernmental Programs

SBM/lm
Enclosures

cc: Ernie Marks, DEP, OEP
Chad Kennedy, DEP, OEP WPB
Jennifer Nelson, DEP, South District
Tom Butler, DEP, DSL OES
Gregg Walker, DEP, DRP BNCR
Forrest Watson, FDACS, FFS
Timothy Parsons, DOS, DHR
Nichole Gwinnett, SWFRPC

Project Information	
Project:	FL201306036606C
Comments Due:	07/12/2013
Letter Due:	08/02/2013
Description:	DEPARTMENT OF THE ARMY, JACKSONVILLE DISTRICT CORPS OF ENGINEERS - DRAFT LIMITED REEVALUATION REPORT AND ENVIRONMENTAL ASSESSMENT, PICAYUNE STRAND RESTORATION PROJECT - COLLIER COUNTY, FLORIDA.
Keywords:	ACOE - DRAFT LLR/EA, PICAYUNE STRAND RESTORATION PROJECT - COLLIER CO.
CFDA #:	99.997

Agency Comments:

AGRICULTURE - FLORIDA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES

Thank you for the opportunity to comment. We recommend all references in the document to either the "Florida Department of Forestry" or the "Florida Division of Forestry" be changed to indicate "Florida Department of Agriculture and Consumer Services, Florida Forest Service." We also suggest references to the "Fakahatchee Strand State Forest" be changed to "Fakahatchee Strand Preserve State Park." Another suggestion is that references to the "Picayune Strand State Forest" include the following "Picayune Strand State Forest (under Lease Agreement number 3927 from the Board of Trustees of the Internal Improvement Trust Fund of the State of Florida (the land owner)." Please remember management goals in the Picayune Strand State Forest are based upon Management Plans created with input from many various interested organizations as well as the public. A final comment on this draft document relates to the Red-Cockaded Woodpecker (RCW) populations that this document indicates could be impacted by the project. If this project might impact RCW populations in the Picayune Strand State Forest and the Florida Forest Service is expected to undertake the monitoring of RCW populations for impact, additional funding should be provided to help cover these costs. We look forward to working with the U.S. Army Corps of Engineers and other partners on this and other projects. Thank you!

ENVIRONMENTAL PROTECTION - FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

The DEP has long supported the Picayune Strand Project. It was placed on the Conservation and Recreation Acquisition List in 1985. Unprecedented staff time and resources have been committed for the acquisition of over 55,000 acres of land over the period of a decade, and staff continues to actively participate on the project delivery team. The DEP submitted comments on the draft and final EIS demonstrating support of the project in 2004. In addition, the DEP formally approved what was then known as the CERP Southern Golden Gate Estates project pursuant to Section 373.026(8)(b), F.S., which directs the DEP to approve each CERP project component before it is submitted to Congress for federal authorization or receives an appropriation of state funds. The State of Florida has invested significant financial and staff resources towards this important hydrologic and ecologic restoration project and is committed to continuing restoration efforts. For further detailed comments, please refer to the enclosed DEP memorandum.

STATE - FLORIDA DEPARTMENT OF STATE

The DOS notes that the USACE is implementing a monitoring plan in which monitors will be present during all construction activities to ensure that archaeological sites are not affected by the project. Conditioned upon this monitoring, the DOS concurs with the finding of no significant impact on histoic properties.

SOUTH FLORIDA WMD - SOUTH FLORIDA WATER MANAGEMENT DISTRICT

COLLIER - COLLIER COUNTY
COMMUNITY PLANNING - FLORIDA DEPARTMENT OF ECONOMIC OPPORTUNITY
FISH and WILDLIFE COMMISSION - FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION
No Comment by Ron Mezich on 6/5/13. Waiting on further information for NEPA review.
TRANSPORTATION - FLORIDA DEPARTMENT OF TRANSPORTATION
The proposed project has been reviewed by Florida Department of Transportation, District One staff and no significant impact is anticipated on the state road system. FDOT District One offers no comments at this time.
SW FLORIDA RPC - SOUTHWEST FLORIDA REGIONAL PLANNING COUNCIL
The SWFRPC has determined that the Draft LRR/EA is Regionally Significant and Consistent with the Southwest Florida Regional Strategic Policy Plan. Please refer to the enclosed letter for further information.

For more information or to submit comments, please contact the Clearinghouse Office at:

3900 COMMONWEALTH BOULEVARD, M.S. 47
TALLAHASSEE, FLORIDA 32399-3000
TELEPHONE: (850) 245-2161
FAX: (850) 245-2190

Visit the Clearinghouse Home Page to query other projects.

Memorandum

TO: Lauren Milligan, Florida State Clearinghouse

THROUGH: Ernie Marks, Director
Office of Ecosystem Projects

FROM: Jordan Pugh and Stacey Feken
Office of Ecosystem Projects

Jennifer Nelson
South District Office

Chris Becker and Maulik Patel
Division of Recreation and Parks, Bureau of Parks District 4

DATE: July 31, 2013

SAI #: FL13-6606C

SUBJECT: Department of the Army, Jacksonville District Corps of Engineers – Draft Limited Reevaluation Report and Environmental Assessment, Picayune Strand Restoration Project – Collier County, Florida.

Summary:
The United States Army Corps of Engineers (USACE) prepared a Draft Limited Reevaluation Report and Environmental Assessment (LRR/EA) for the Comprehensive Everglades Restoration Plan (CERP) Picayune Strand Restoration Project in southwestern Collier County, Florida. Covering an area of 55,247 acres, the objective of the project is to restore natural water flow across 85 square miles of Collier County lands that were drained for the former Southern Golden Gate Estates extensive residential development. The South Florida Water Management District (SFWMD) is the non-Federal local sponsor.

The purpose of the LRR is to request a post authorization change for the project to increase the authorized project cost. The Picayune Strand Restoration Project was authorized in the Water Resources Development Act (WRDA) of 2007, with a total cost of $375.33 million. The current Section 902 limit in FY 2013 price levels is $505.5 million. The 2013 certified project current cost estimate is $601 million, requiring authorization of additional project funding of $96 million above the 2007 Section 902 limit authorization level.

The 2004 Final Project Implementation Report and Environmental Impact Statement (PIR/EIS) authorized the features of the Picayune Strand Restoration Project as Alternative 3D. However, since the original authorization there have been numerous design refinements which have resulted in this additional funding request. The EA included within the document evaluates one design refinement which led to an increase in the construction footprint of the Picayune Strand

Restoration Project and therefore must be analyzed under the National Environmental Policy Act. All other features discussed within the LRR were included in the 2004 Final PIR/EIS.

Background:
The State of Florida expedited efforts on the Picayune Strand project and the SFWMD completed initial construction efforts in the eastern portion of Picayune Strand under the Florida Department of Environmental Protection's (Department) Comprehensive Everglades Restoration Plan Regulation Act Permit (CERPRA) and associated modifications (File No. 0221670). This included installation of earthen plugs within the Prairie Canal, removal of roads east of the Merritt Canal (Prairie Canal Backfill and Road Removal Project). Additionally, work was completed on the Tamiami Trail Culverts West project, including the construction of culverts under Stewart Boulevard and Jane's Scenic Highway.

The WRDA of 2007 provided authorization for federal participation in the Picayune Strand Restoration Project, including construction of three pump stations, tie-back levees, and spreader systems in addition to the continuation of road removal and canal plugging activities. In 2008, the SFWMD transferred responsibility to complete construction of the project to the USACE. Significant revisions to the project design and construction planning were made to ensure conformity with the budget process and Federal Acquisition Regulations.

In 2009, the Department issued a permit and associated modification (Files Nos. 0288313-001-GL and 0288313-002-EM) to the USACE for construction and interim operation of the Merritt Canal Pump Station and associated components, removal of roads west of the Merritt Canal and east of the Faka Union Canal, and installation of earthen plugs within the Merritt Canal. Construction of the pump station and associated components for the Merritt Canal phase began in January 2010 and is scheduled for completion in 2013. In 2010, the Department issued a major modification (File No. 0288313-003) to the USACE for construction of the Faka Union Canal Pump Station, associated components, and removal of the roads between Faka Union and Miller Canals. Construction of the pump station and associated components for the Faka Union Canal phase began in May 2011, which is scheduled for completion in 2014. The Department recently (May 2, 2013) issued a permit modification for the final major phase of the project. Construction of the Miller Canal Pump station and road removal is scheduled for award in 2013/2014 with a final project completion target of 2017.

Comments:
The Department has long supported the Picayune Strand Project. It was placed on the Conservation and Recreation Acquisition List in 1985. Unprecedented staff time and resources have been committed for the acquisition of over 55,000 acres of land over the period of a decade, and staff continues to actively participate on the project delivery team.

The Department submitted comments on the draft and final EIS demonstrating support of the project in 2004. In addition, the Department formally approved what was then known as the CERP Southern Golden Gate Estates project pursuant to Section 373.026(8)(b), Florida Statutes (F.S.), which directs the Department to approve each CERP project component before it is

submitted to Congress for federal authorization or receives an appropriation of state funds. The Department also participated in the review of the water reservation for the project, which was adopted into rule by the SFWMD governing board in 2009.

The State of Florida has invested significant financial and staff resources towards this important hydrologic and ecologic restoration project and is committed to continuing restoration efforts. As stated in the draft LRR/EA, the Picayune Strand Restoration Project is an important component of CERP, essential for the recovery of the South Florida ecosystem. The project area is in the center of a block of surrounding state and Federal nature preserves and wildlife areas. The completed project will result in a much larger contiguous natural area, providing valuable wildlife habitat that was previously lost due to development. Since authorization, a substantial investment has been made constructing the sequential project components required to ultimately restore the project area to pre-drainage conditions. The additional funding requested is necessary to complete the project and realize the ecological benefits envisioned in the 2004 Final PIR/EIS, as well as connect the surrounding Federal and state parks, preserves, and refuges. When completed, the project will provide approximately 343,440 habitat units of hydrologic, biological, and estuarine restoration. The draft EA states that if the additional funding is not authorized, the protection features will not be constructed and full restoration will not be achieved resulting in the loss of approximately 70 percent of the hydrologic benefits, 62 percent of the biological benefits, and 100 percent of the estuarine benefits. The Department supports seeking additional federal funding to complete this critical project and ensure continued progress on ecosystem restoration in the area.

The Department recently (May 2, 2013) issued a permit modification for the final major phase of the project, construction of the Miller Canal Pump station and road removal. The draft LRR/EA states on Page 1-5, Section 1.8.1, that "To date, state water quality certification has been obtained for the tieback levees, spreader canals, canal plugs, and road removal features." Please note that while the features described in the EA are covered by the permit (which includes state water quality certification), it only includes ***conceptual*** authorization of canal plugging and demolition of weirs and bridges in the Faka Union and Miller canals. In order to plug the Faka Union and Miller Canals, the protection features (earthen levees to maintain existing levels of flood protection to adjacent private lands) must be completed, as acknowledged in the draft LRR/EA. There are additional hydrologic and hydraulic modeling efforts that are ongoing and associated with project assurances needed by the Department to issue authorization for features under state law. Consultation with the Department is required to determine whether or not a permit modification is necessary prior to implementation of these features. Please review CERPRA Permit (File No. 0288313-008) and revise the relevant text throughout the document accordingly.

The draft LRR/EA states that remaining project components to be constructed are the protection features and the manatee mitigation feature. Please note that, in addition to the conceptual authorizations described above, these features will also require additional review and permit authorizations from the Department. The draft LRR/EA states on Page 2-7, Section 2.5.2, that "In the 2004 Final PIR/EIS cost estimate, the cost for the construction of the 6Ls Farm, Port of

the Islands (POI), and protection features assumed that all earthen material would be obtained from the construction site. However, subsequent geotechnical investigations revealed that a majority of the onsite material is unsuitable for levee construction. Therefore, current LRR/EA estimates for each of the three protection features assume that the foundations for the levees will be excavated and replaced with suitable quarry material hauled in from offsite." This statement implies that a levee at 6Ls Farm, Port of the Islands and other private lands (presumably the northwest private lands) are needed. It is the Department's understanding that modeling has confirmed that there is no need for a levee at Port of the Islands nor at the northwestern private lands (a re-location of a canal is planned to maintain levels of flood protection here). The only levee protection feature currently under design is the 6Ls protection feature. Please revise the above text to eliminate confusion on these points. As acknowledged in the draft LRR/EA, the restoration benefits will be realized when all identified roads are degraded and the Merritt, Faka Union and Miller Canal plugs can be installed. In order to plug the Faka Union and Miller Canals, the needed protection features must be completed.

The draft LRR/EA states on Page 4-7, Section 4.11, that "Changes to the FDEP classification system have been made since the time the 2004 Final PIR/EIS was published. The new classification lists the PSRP project under the Faka Union Canal South Water Body Identification Number (WBID) which is listed as impaired for dissolved oxygen (DO)." The FDEP *classification* of these waterbodies has not changed, however the *assessment status* has changed. Please revise the text to make this distinction. Also, the Faka Union Canal South WBID number is 3278I (this was not identified in the text).

The draft LRR/EA states on Page 4-7, Section 4.12, that "Anticipated remediation activity still remains for the Belle Meade area, located within the project operational flowway, pending completion of ongoing Phase I/II Remediation Reports." The Department received a copy of the Corrective Actions Report for the Belle Meade project area based on the results of the Phase I/II Environmental Site Assessment (July 2012) on January 14, 2013. The Department's Waste Cleanup Section provided a letter on February 22, 2013, stating that the assessment is complete and no further assessment is warranted. Please coordinate with the Department's Division of Waste Management and revise your records and the text accordingly.

The draft LRR/EA states on Page 5-7, Section 5.1.5.5.1, that "Modeling is currently being conducted to confirm the need for the western portion of the Miller tieback levee to prevent impacting private lands." It is the Department's understanding that the modeling results clearly indicate that the original levee design can be shortened to approximately 6,000 feet west of the Miller Pump Station. Elimination of this unneeded portion of the tie-back levee will avoid impacts to wetlands that exist beyond the 6,000 feet. The USACE determined that the tieback levee "may affect" the Red Cockaded Woodpecker located in the mesic pine flatwoods west of the Miller Canal." It is important to note that the permit authorization only includes construction of the Miller tieback levee to approximately 6,000 feet west of the pump station, based on the plans on file with the Department. Please revise the text to make these points clear.

The Department has several comments regarding the Coastal Zone Management Consistency in Appendix D. While the section appropriately recognizes that the Department must review the draft EA under Chapter 403, F.S., it does not appear there has been a thorough review or adequate documentation to support the conclusions made regarding other chapters of Florida Statutes that the Department is responsible for administering:

- Chapter 253, State Lands. Please note that as staff to the Board of Trustees of the Internal Improvement Trust Fund (i.e., Governor and Cabinet), the Department is required to review activities for a determination of effects on state-owned lands. There may be activities which affect state-owned lands within the Picayune Strand State Forest subject to Board of Trustees Lease No. 3927 to the Florida Department of Agriculture and Consumer Services, Florida Forest Service. As such, additional coordination with the Florida Forest Service may be required, as noted in Specific Condition No. 34 of the CERPRA Permit (File No. 0288313-008) issued to the USACE for construction and interim operation of the project. The activities may also affect state-owned lands within Collier-Seminole State Park and, as such, additional coordination with the Department's Division of Recreation and Parks, who manages Collier-Seminole State Park, may be required. Right of Entry from the SFWMD may also be required. There is also a Cooperative Agreement between the SFWMD and Board of Trustees of the Internal Improvement Trust Fund for the CERP Central and Southern Florida, Picayune Strand Restoration Project. As such, activities outside of the scope of the Cooperative Agreement may require additional coordination and/or authorization.

- Chapter 258, State Parks and Aquatic Preserves. Some of the activities (i.e., 6Ls protection feature) described in the EA are adjacent to Collier-Seminole State Park, and it has been determined that other activities associated with the project may also affect state-owned lands within Collier-Seminole State Park. As such, additional coordination with the Department's Division of Recreation and Parks, who manages Collier-Seminole State Park, will be required. Although modeling performed thus far may be interpreted to suggest additional conveyance under US 41 may not be needed, it is recognized by project partners that additional conveyance may in fact be needed under US 41 in order to restore natural sheetflow and realize potential hydrologic benefits within and near Collier-Seminole State Park. The state lands within the Park are home to diverse biological communities as well as threatened and endangered species that may be affected by changes in water levels and hydroperiods. The Park also includes public facilities that may be impacted by changes in hydrologic conditions. Continued coordination with the Department's Division of Recreation and Parks is necessary to ensure that potential hydrologic benefits within the Park are realized and potential impacts to Park facilities are minimized. Right of Entry from the SFWMD may also be required.

- Chapter 373, Water Resources. Please note that the authorities provided by this chapter are much broader than what is summarized. The Department's determination of consistency with CZMA includes a review and determination of consistency with state law, including,

but not limited to, the permit authorization required by Section 373.1502, F.S., for CERP projects.

The Department has been closely monitoring the progress of this project since the SFWMD expedited efforts on the Prairie Canal phase of the project approximately ten years ago. We are pleased that restoration benefits are already being observed through the reemergence of foraging wading birds and native flora and fauna that have been absent from the area for decades.

The Department sincerely appreciates the opportunity to comment and looks forward to continuing the partnership with the SFWMD, the USACE and other state and federal agencies, such as the U.S. Fish and Wildlife Service and Florida Forest Service in completing this important restoration project. Should you have any questions regarding our comments, please contact Stacey Feken at 850-245-3176.

ec: Ernie Marks, Frank Powell, Jennifer Nelson, Stacey Feken, Kelli Edson, Deinna Nicholson, Chad Kennedy, Jordan Pugh, Renee Rau, Sheryl Boutin, Marianne Gengenbach, Paula Allen, Tom Butler, Judy Warrick, Chris Becker, Kirby Wilson, Valinda Subic, Gregory Walker

FLORIDA DEPARTMENT of STATE

RICK SCOTT
Governor

KEN DETZNER
Secretary of State

Re: SHPO/DHR Project File No.: 2013-2749 July 12, 2013
Agency: Florida State Clearinghouse
Agency Project Number: SAI#: FL201306036606C
Project Name: Draft Limited Reevaluation Report and Environmental Assessment, Picayune Strand Restoration Project

To Whom It May Concern:

This office reviewed the referenced draft limited reevaluation report and environmental assessment to identify issues for possible concerns regarding impact to historic properties listed, or eligible for listing, in the *National Register of Historic Places*, that should be addressed in the final statement. Our review was conducted in accordance with Section 106 of the *National Historic Preservation Act of 1966* as amended, the National Environmental Policy Act (NEPA), and their implementing regulations.

We reviewed the information provided, and note that the U.S. Army Corps of Engineers is implementing a monitoring plan in which monitors will be present during all construction activities to ensure that archaeological sites are not affected by the Picayune Strand Restoration Project. Conditioned upon this monitoring, this agency concurs with the finding of no significant impact on historic properties.

If you have any questions concerning our comments, please contact Deena Woodward at Deena.Woodward@dos.myflorida.com, or at 850-245-6333. Thank you for your interest in protecting Florida's archaeological and historical resources.

Sincerely

Robert F. Bendus, Director
Division of Historical Resources
and State Historic Preservation Officer

Southwest Florida Regional Planning Council
1926 Victoria Avenue, Fort Myers, Florida 33901-3414
(239)338-2550 FAX (239)338-2560 SUNCOM (239)748-2550

July 11, 2013

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

RE: IC&R 2013-27/SAI # 201306036606C, Department of the Army, Jacksonville District Corps of Engineers – Draft Limited Reevaluation Report (LRR) and Environmental Assessment (EA) and request for additional funding from Congress, Collier County, Florida.

Dear Ms. Milligan:

The staff of the Southwest Florida Regional Planning Council reviews various proposals, Notifications of Intent, Pre-applications, permit applications, and Environmental Impact Statements for compliance with regional goals, objectives, and policies, as determined by the Strategic Regional Policy Plan. The staff reviews such items in accordance with the Florida Intergovernmental Coordination and Review Process (Chapter 291-5, F.A.C.), and adopted regional clearinghouse procedures.

These designations determine Council staff procedure in regards to the reviewed project. The four designations are:

Less Than Regionally Significant and Consistent- No further review of the project can be expected from Council.

Less Than Regionally Significant and Inconsistent- Council does not find the project of regional importance, but will note certain concerns as part of its continued monitoring for cumulative impact within the noted goal area.

Regionally Significant and Consistent- Project is of regional importance, and appears to be consistent with Regional goals, objectives, and policies.

Regionally Significant and Inconsistent- Project is of regional importance and does not appear to be consistent with Regional goals, objectives, and policies. Council will oppose the project as submitted, but is willing to participate in any efforts to modify the project to mitigate the concerns.

The SWFRPC has determined that the Draft Limited Reevaluation Report (LRR) and Environmental Assessment (EA) and request for additional funding from Congress is Regionally Significant and Consistent with the Southwest Florida Regional Strategic Policy Plan.

The purpose of the EA portion of the report is to evaluate and compare alternatives for tieback levee features under NEP A. This evaluation was necessitated due to the larger feature footprint than indicated in the 2004 PIRJEIS.

The purpose of this LRR is to request a post authorization change for the project to increase the authorized project cost. The Picayune Strand Restoration Project (PSRP) was authorized in the Water Resources Development Act of 2007 and contained a total cost of $375.33 million. The current Section 902 limit in FY 2013 price levels is $505.5 million. The 2013 certified project current cost estimate is $601 million, requiring authorization of additional project funding of $96 million above the 2007 Section 902 limit authorization level. The 2004 Final Project Implementation Report and Environmental Impact Statement authorized the features of the Picayune Strand Restoration Project as Alternative 3D. However, since the original authorization there have been numerous design refinements which have resulted in this additional funding request. The Environmental Assessment included within this document, will evaluate one design refinement which led to an increase in the construction footprint of the Picayune Strand Restoration Project and therefore must be analyzed under the National Environmental Policy Act. All other features discussed within this Limited Reevaluation Report were included in the 2004 Final Project Implementation Report/Environmental Impact Statement.

The overarching objective of the authorized plan is the hydrologic restoration, preservation, and protection of the Southwest Florida ecosystem while providing flood protection to the adjacent lands. The project area is in the center of a landscape of surrounding state and Federal nature preserves and wildlife areas. The completed project will result in a much larger contiguous natural area, providing valuable wildlife habitat that was previously lost due to development. The plan consists of constructing three pump stations, spreader canals and levees, filling and plugging existing canals, and removing existing roadways to restore natural sheetflow to rehydrate the wetlands within Picayune Strand and reduce point source freshwater discharge to the estuary. When completed, it is expected that the project will successfully achieve all of the planning objectives authorized in the 2004 Final PSR Implementation Report and Environmental Impact Statement:

- Reestablish natural freshwater flows to estuary
- Restore historic hydropatterns, sheetflow and flowways
- Reestablish natural plant distribution and composition
- Increase surface aquifer recharge
- Restore habitat for listed species
- Increase fish and wildlife resources
- Restore ecological connectivity and provide contiguous habitat
- Provide resource based recreational opportunities
- Restore natural fire regime

The PSRP Implementation Report and Environmental Impact Statement was completed in 2004. Prior to the authorization in 2007, the Non-Federal sponsor initiated preconstruction, engineering and design efforts and started construction activity under the State of Florida's Acceler8 initiative. Roadway removal and the seven mile long Prairie Canal backfilling effort were completed in 2007. In 2008 the non-Federal sponsor transferred responsibility to complete the project to the U.S. Army Corps of Engineers. Significant revisions to the project design and construction planning were required to ensure conformity with the budget process and Federal Acquisition Regulations.

The Corps of Engineers awarded a contract for the construction of the first (Merritt) pump station and associated tieback levee, spreader canal, road removal and canal plugging activities in 2009. The Merritt project is scheduled for completion in 2013. The second pump station (Faka Union) and associated tie back levee, spreader canal, road removal and canal plugging construction contract was awarded in 2010 and is scheduled for completion in 2014. The final pump station (Miller) and related work is scheduled for award in 2013 with a final project completion target of 2017.

The remaining project components to be constructed are the protection features and the manatee mitigation feature. The restoration benefits will be realized when all identified roads are degraded and the Merritt, Faka Union and Miller Canal plugs can be installed. In order to plug the Faka Union and Miller Canals, the protection features (earthen levees to maintain existing levels of flood protection to adjacent private lands) must be completed. If the additional funding is not authorized, the protection features will not be constructed and full restoration will not be achieved resulting in the loss of approximately 70 percent of the hydrologic benefits, 62 percent of the biological benefits, and 100 percent of the estuarine benefits.

The 2004 Project Implementation Report and Environmental Impact Statement were prepared based on a limited engineering study and analysis, resulting in a project plan and cost estimate that were conceptual in nature and subject to refinement during preconstruction, engineering and design. Design refinements to the three pump stations and associated earthwork, detailed surveys of the project area revealing previously unknown topographic features and additional tram roads requiring removal as well as requiring a revised, full project width tieback levee to preclude recirculation of water from the pump stations, along with the increase in preconstruction, engineering and design and construction management costs have resulted in increasing the project's total cost above the authorized level.

The PSRP is an important component in the Comprehensive Everglades Restoration Plan and essential for the recovery of the South Florida ecosystem. Since authorization, a substantial investment has been made constructing the sequential project components required to ultimately restore the project area to pre-drainage conditions. The additional funding requested is necessary to complete the project and realize the ecological benefits envisioned in the 2004 Final Project Implementation Report and Environmental Impact Statement, as well as connect the surrounding Federal and state parks, preserves, and refuges. When completed in full, the project will provide approximately 343,440 habitat units of hydrologic, biological, and estuarine restoration.

Based on the information analyzed and presented in the EA, dated May 2013, reflecting pertinent information obtained from agencies having jurisdiction by law and/or special expertise, the USACOE has concluded that the proposed action will not significantly impact the quality of the human environment and does not require an Environmental Impact Statement (EIS). The USACOE states the proposed action is a minor activity that is not similar to any action normally requiring an EIS. There are no significant affects anticipated as a result of this design refinement to the PSRP as described in the 2004 Final Project Implementation Report (PIR) and EIS. Reasons for this conclusion are, in summary:

a. The primary purpose of the PSRP is to restore and enhance wetland habitat over approximately 55,000 acres in Southwest Florida. The PSRP is expected to provide the required flood protection for Northern Golden Gate Estates (NGGE),private lands, the 6L's agricultural area, and Port of the Islands community located near the PSRP area (33 C.F.R. § 385.37 Flood Protection).
b. The proposed action would facilitate movement of freshwater sheetflow to the estuaries thereby improving the water quality as it passes through the restored system. The PSRP would be in compliance with the conditions of a State Water Quality Certification.

c. The U.S. Army Corps of Engineers (Corps) is coordinating a consistency determination with the Florida Department of Environmental Protection (FDEP) under the guidelines of the Coastal Zone Management Act (CZMA) through the circulation of this EA. The Corps has determined that the proposed action is consistent with the State of Florida's CZMA program through compliance with all applicable chapters of the Coastal Zone Management Act (Appendix D).
d. Endangered Species Act (ESA) consultation has been completed for the proposed action and is described in the 2009 Biological Opinion (BO) for the PSRP. ESA and Marine Mammal Protection Act (MMPA) consultation for the West Indian Manatee are currently being revisited based on new scientific information and will be addressed in a future Biological Assessment and National Environmental Policy Act (NEPA) evaluation.
e. The proposed action would have no effect on any resources of cultural or historical significance. Monitors will be present during construction activities tonsure archeological sites are not affected by the PSRP. This project is incompliance with the National Historic Preservation Act.
f. Implementation of the proposed action will follow the guidelines outlined in the PSRP Nuisance and Exotic Vegetation Management Plan.
g. The proposed action would not substantially alter any other environmental or social impacts from those previously described in the 2004 Final PIR/EIS for the PSRP and in any other NEPA compliance documents related to the PSRP.
h. The proposed action is consistent with the authorized purpose of the PSRP and will not adversely affect anticipated restoration benefits.

Thank you for the opportunity to participate in the development and review of the LRR and EA. If you have specific questions about the content of this letter, please contact Mr. Jim Beever directly at (239) 338-2550 ext. 224, e-mail jbeever@swfrpc.org.

Sincerely,

Southwest Florida Regional Planning Council

Margaret Wuerstle, AICP
Executive Director

CC: Ms. Amy Thompson, Environmental Lead
U.S. Army Corps of Engineers

2014-4068
SFWMD

August 2, 2014

RECEIVED
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HISTORIC PRESERVATION
2014 SEP -4 A 10:41

Mr. Robert F. Bendus
Director, and State Historic Preservation Officer
Florida Division of Historical Resources
R.A. Gray Building
500 South Bronough Street
Tallahassee, Florida 32399

Attn: Timothy Parsons, Ph.D.

Re: Cultural Resource Reconnaissance Survey
Manatee Mitigation Picayune Strand Restoration Project
Collier County

Dear Mr. Bendus:

Please find enclosed the Cultural Resource Reconnaissance Survey (CRRS) memo report conducted by Janus Research for the Manatee Mitigation Picayune Strand Restoration Project (the Project). Enclosed you will find the following documents:

- One unbound copy of the CRRS memo report
- One CD containing a PDF of the CRRS memo report, an electronic version of the FMSF form for site 8CR191 and survey log sheet;
- One unbound FMSF forms for site 8CR191; and
- One unbound survey log sheet.

The purpose of this study was to attempt to relocate a previously recorded archaeological site (8CR191) within the project area, evaluate the project area for the potential for any new prehistoric or historic resources, and establish the research and field methods for the identification of cultural resources within the project area that may be eligible for listing in the *National Register of Historic Places* (National Register). Principal Investigators meet the *Secretary of the Interior's Professional Qualification Standards* (48 FR 44716) for archaeology. The archaeological reconnaissance survey was conducted under the direction of James Pepe, M.A., RPA.

The CRRS of the Manatee Mitigation Picayune Strand Restoration Project resulted in the relocation of 8CR191 and the confirmation of the low archaeological site potential for the remainder of the project area. No historic resources were identified within the project area.

Site 8CR191 appears to be cultural material redeposited from the excavation of the Faka Union Canal. No cultural material from an undisturbed context was found. Based on the results of the survey, no additional research is recommended. However, due to the presence of archaeological material in this area, archaeological monitoring is recommended for any future ground disturbing activities planned for the project in the vicinity of the site.

If you have questions regarding the Project or if I may be of assistance, please contact me at 813-636-8200 or jim_pepe@janus-research.com, or Armando Ramirez (SFWMD) at 561-682-6684 or aramire@sfwmd.gov.

Sincerely,

Jim Pepe, M.A., R.P.A.
Archaeologist
Janus Research

Enclosure

cc: Armando Ramirez, SFWMD

The Director of the Florida Division of Historical Resources, State Historic Preservation Officer finds the attached Cultural Resource Assessment Surveys complete and sufficient and concurs with the recommendations and findings provided in this cover letter for SHPO/DHR Project File Number 2014-4068.

Robert F. Bendus
Director, and State Historic Preservation Officer
Florida Division of Historical Resources

10/3/14
Date

Thompson, Amy D SAJ

From: Robbins, Rick - NRCS, Gainesville, FL [rick.a.robbins@fl.usda.gov]
Sent: Friday, November 09, 2012 7:15 AM
To: Thompson, Amy D SAJ
Subject: RE: Picayune Strand Restoration Project Environmental Assessment
Attachments: Collier_Imp_Farmlands.pdf

Follow Up Flag: Follow up
Flag Status: Completed

Categories: Red Category

Hello Amy,

Attached is a list of Locally and Unique Farmland soils for Collier County. None of the soils on the Web Soil Survey document you provided are listed as Local or Unique Farmland soils. Therefore, no Farmland impact.

Regards,

Rick

Rick Robbins
USDA-NRCS
Soil Scientist
2614 NW 43rd Street,
Gainesville, FL 32606
Phone: 352.338.9536
Email: rick.a.robbins@fl.usda.gov

"Helping people help the land"

Myakka Series: State Soil of Florida

-----Original Message-----
From: Thompson, Amy D SAJ [mailto:Amy.D.Thompson@usace.army.mil]
Sent: Thursday, November 08, 2012 11:13 AM
To: Robbins, Rick - NRCS, Gainesville, FL
Subject: Picayune Strand Restoration Project Environmental Assessment

Good Morning Rick,

I am a biologist with the Corps of Engineers and am preparing a Environmental Assessment for the Picayune Strand Restoration Project (PSRP) located in Collier County, Florida. An Environmental Impact Statement for the project was completed in 2004 but since then an additional feature has been added that has an additional project footprint. The feature is a weir located in the Faka Union Canal just north of US-41. In order to construct and maintain the weir, an access road must be constructed next to the canal. The impact area will be approximately 3 acres. I have attached a .kmz file of the project footprint as well are a map from the NRCS soil survey site. Please let me know if you need any additional information in order to reach a determination regarding the impact to farmlands.

Thanks,

Amy

Amy Thompson
Biologist
US Army Corps of Engineers
904-232-1545
Fax: 904-232-3442

Prime and other Important Farmlands

Collier County Area, Florida

Map symbol	Map unit name	Farmland classification
14	Pineda fine sand, limestone substratum	Farmland of local importance
18	Riviera fine sand, limestone substratum	Farmland of local importance
21	Boca fine sand	Farmland of local importance
2	Holopaw fine sand, limestone substratum	Farmland of unique importance
3	Malabar fine sand	Farmland of unique importance
7	Immokalee fine sand	Farmland of unique importance
8	Myakka fine sand	Farmland of unique importance
10	Oldsmar fine sand, limestone substratum	Farmland of unique importance
15	Pomello fine sand	Farmland of unique importance
16	Oldsmar fine sand	Farmland of unique importance
17	Basinger fine sand	Farmland of unique importance
20	Ft. Drum and Malabar, high, fine sands	Farmland of unique importance
22	Chobee, Winder, and Gator soils, depressional	Farmland of unique importance
27	Holopaw fine sand	Farmland of unique importance
28	Pineda and Riviera fine sands	Farmland of unique importance
29	Wabasso fine sand	Farmland of unique importance
37	Tuscawilla fine sand	Farmland of unique importance

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505
http://sero.nmfs.noaa.gov

F/SER31: SJA/KD

Mr. Eric Summa
Chief, Environmental Branch
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

DEC 17 2013

Re: Comprehensive Everglades Restoration Plan Programmatic Consultation

Dear Mr. Summa:

This responds to your July 2, 2013, Biological Assessment (BA) for the Comprehensive Everglades Restoration Plan (CERP) program received from the U.S. Army Corps of Engineers (USACE) requesting National Marine Fisheries Service (NMFS) concurrence with program and project-effect determinations submitted pursuant to Section 7 of the Endangered Species Act (ESA). You have determined that of the projects reasonably expected to be implemented as part of the CERP, only the following projects may directly affect, but are not likely to adversely affect through construction impacts, listed species and their critical habitats under NMFS's purview: Biscayne Bay Coastal Wetlands (BBCW); Indian River Lagoon South (IRL-S); Caloosahatchee River (C-43) West Basin Storage Reservoir; Picayune Strand Restoration Project; and the Central Everglades Planning Project (CEPP). Further, you determined that all the CERP program components that will change freshwater flow and storage across south Florida and thus affect salinity and aquatic resources in several coastal estuaries and bays inhabited by NMFS's listed species, may affect, but are not likely to adversely affect green, hawksbill, Kemp's ridley, leatherback, or loggerhead sea turtles and their respective critical habitat, smalltooth sawfish and its critical habitat, or Johnson's seagrass and its critical habitat. In addition, you determined that the proposed action would not affect Gulf sturgeon, elkhorn or staghorn corals and their critical habitat, or blue, finback, humpback, sei, or sperm whales. We have also determined that the proposed action may affect, but is not likely to adversely affect seven coral species, and would have no effect on the loggerhead critical habitat currently proposed to be listed as threatened or endangered in the action area of the program. Our findings on the program and each of the project's potential effects are based on the project descriptions in this response. Changes to the proposed actions for any of these projects may negate our findings and may require reinitiating consultation. An acronyms and abbreviation list is provided at the end of this document.

1.0 Consultation History

Between 2002 and 2011, NMFS and USACE consulted informally on several individual project components of the CERP program. In its November 3, 2011, letter concurring with USACE that the BBCW project is not likely to adversely affect any listed species, NMFS recommended that consultation should be conducted on the combined effects of the CERP program (SER-2010-2615). In the BBCW informal concurrence letter, NMFS indicated that 13 CERP projects were

in various stages of construction or planning. Of those 13 projects, seven were determined to potentially affect species and/or critical habitat under NMFS's purview through construction impacts, due to their presence in the action areas of the projects or due to change in water flows. These 13 projects were the BBCW, C-111 Spreader Canal, Site 1 Impoundment, IRL-S, C-43 West Basin Storage Reservoir, Picayune Strand Restoration Project, and Everglades National Park (ENP) Seepage Management. The other six projects have either been constructed or would have no construction effects on listed species or designated critical habitat including the L-31N Seepage Management Pilot Project, C-111 South Dade, Water Conservation Area 3A, Decompartmentalization (Decomp) and Sheet Flow Enhancement, Broward County Water Preserve Area, Lake Okeechobee Watershed, and Everglades Agricultural Area (EAA) Storage Restoration, though all these projects contribute to the overarching restoration objectives of the CERP program and these program-level effects are evaluated in this consultation.

USACE submitted a Programmatic BA on July 2, 2013, which included the seven projects as well as a more recently developed CERP project that may affect listed species and critical habitat, the CEPP, and provided specific evaluations of potential effects to threatened and endangered species and critical habitats within the purview of NMFS. This consultation on the CERP program evaluates the effects of all individual projects reasonably expected to be implemented over the course of the program, including the additive effects of the project components on Florida habitats and resources, and whether listed species or critical habitats under NMFS's purview may be adversely affected.

Because the program components and individual projects included in CERP that may affect NMFS's resources are sufficiently identified and described, including their likely locations, to determine and evaluate potential routes of effects, we are not recommending second tier consultation procedures in the future to validate effects predictions for these projects. Rather, any changes to individual projects covered by this consultation, or additional projects added to CERP, will be evaluated for potential needs to reinitiate consultation.

2.0 Interrelated or Interdependent Activities

As defined in ESA implementing regulations, effects of agency actions, including programs, include the effects of all activities that are either interrelated or interdependent with the action undergoing consultation (i.e. CERP). 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. NMFS recognizes that there are numerous activities being implemented across south Florida by state, local, and conservation entities that share similar goals with CERP, and may augment the benefits of Everglades restoration. Some non-CERP projects were assumed to be completed in the CEPP (system-wide) modeling, acknowledging that full restoration benefits of CEPP would not be achieved without the completion and operation of these projects [C-111 South Dade, Central and South Florida (C&SF) C-51, Kissimmee River Restoration, South Florida Water Management District Restoration Strategies]. These projects are all located inland and would not have direct construction impacts on NMFS species (project locations can be found http://www.evergladesplan.org/pm/projects/landing_projects.aspx). The goals of the non-CERP projects mentioned here have the same restoration goals as CERP, to improve the quality, quantity, timing, and distribution of freshwater flows to the estuaries and south Florida

ecosystem. These projects are not interrelated or interdependent since they each provide restoration benefits on their own.

The most closely associated project we evaluated is the Lake Okeechobee Regulation Schedule (LORS 2008), which regulates the freshwater flows that are released from Lake Okeechobee to the St. Lucie and Caloosahatchee estuaries. This is a legally separate project from CERP, with different National Environmental Policy Act (NEPA) documentation and consultation with NMFS and other agencies (SER-1999-1473; SER-1999-1111; SER-2005-4702; SER-2006-4089; SER-2012-2653; SER-2007-4580). NMFS received a supplemental BA from the USACE in January 2013, due to the need for consultation on sawfish critical habitat and Johnson's seagrass critical habitat (SER-2013-10229). LORS only restricts the water flows that would come from Lake Okeechobee if the water level is too low in the lake (ecological and public water supply purposes) or too high in the lake (flood control purposes). CERP would operate within the operational restrictions of LORS 2008, and if LORS changes there would be a new Environmental Impact Statement (EIS) and thus, new consultation. Therefore, LORS is not interrelated or interdependent since it operates separately from CERP and CERP is designed to add to the benefits of LORS by further improving releases of freshwater flows from Lake Okeechobee.

3.0 Description of CERP (Proposed Action and Action Area)

The purpose of CERP (originally called the Restudy) was to evaluate and determine the feasibility of modifying the C&SF project to provide ecosystem restoration and to provide for other water related needs of the region, such as agriculture. The C&SF project was authorized in 1948 and is a multi-purpose project that provides flood control; water supply for municipal, industrial, and agricultural uses; prevention of saltwater intrusion; water supply for Everglades National Park; and protection of fish and wildlife resources through an extensive system of canals, levees, pumps, and other structures. However, the C&SF project also had significant unintended adverse impacts on environments of south Florida, notably the Everglades. The Restudy investigated structural and operational changes to the C&SF project with the goal of improving the quality of the environment; improving protection of the aquifer; improving the integrity, capability, and conservation of urban and agricultural water supplies; and improving other water-related purposes.

A reconnaissance report for the Restudy was completed in 1994, with the feasibility study beginning in 1995. The Water Resources Development Act (WRDA) 1996 provided specific congressional direction stating that the feasibility report and programmatic EIS would need to be complete by 1999. CERP was authorized under WRDA in 2000. It is a joint South Florida Water Management District and USACE project with the goal of restoring the quality, quantity, timing, and distribution of water throughout the south Florida ecosystem. The CERP program's goal is to help restore the historic freshwater flows as shown in Figure 1.

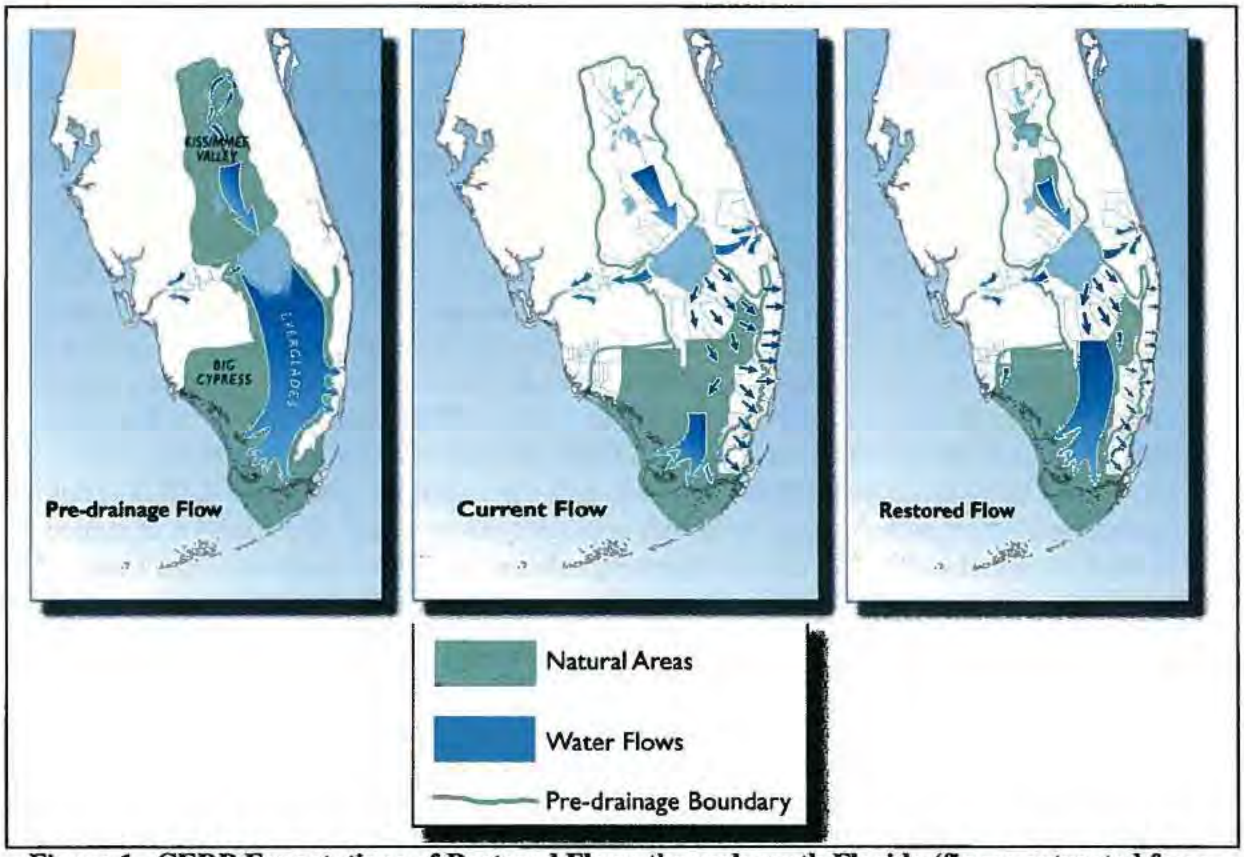

Figure 1. CERP Expectations of Restored Flows through south Florida (figure extracted from CEPP powerpoint presentations)

The CERP study area and thus the action area for this consultation encompasses approximately 18,000 square miles from Orlando to the Florida Reef Tract, within multiple counties including: Monroe, Miami-Dade, Broward, Collier, Palm Beach, Hendry, Martin, St. Lucie, Glades, Lee, Charlotte, Highlands, Okeechobee, Osceola, Orange, and Polk, depicted in Figure 2. The study regions of CERP are described in Table 1 and include Lake Okeechobee, EAA, the Water Conservation Areas (WCA), the majority of ENP, Florida Bay, the majority of Big Cypress National Preserve, coastal estuaries, and urban and agricultural areas along Florida's east coast, south of St. Lucie Canal. Descriptions of the action area and further descriptions in the rest of this section are taken from the CERP Programmatic BA.

Figure 2. CERP Study Area

Table 1. Description of CERP Study Regions

CERP Study Area Region	Description of the Study Area Region
Lake Okeechobee	Lake Okeechobee is a large, shallow lake (surface area approximately 73 square miles) 30 miles west of the Atlantic coast and 60 miles east of the Gulf of Mexico. It is the principal water supply reservoir for south Florida and is used for navigation, flood control, and recreation. It is impounded by a system of levees, with 6 outlets: St. Lucie Canal eastward to the Atlantic Ocean, Caloosahatchee Canal/River westward to the Gulf of Mexico, and four agricultural canals (West Palm Beach, Hillsboro, North New River and Miami).
Northern Estuaries	Lake Okeechobee discharges into the 2 Northern Estuaries. The St. Lucie Canal feeds into the St. Lucie Estuary, which is part of a larger system, the Indian River Lagoon (designated an Estuary of National Significance and is part of the U.S. Environmental Protection Agency - sponsored National Estuary program). The Caloosahatchee Canal/River feeds into the Caloosahatchee Estuary to the west.
EAA (Everglades agricultural area)	The EAA is approximately 700,000 acres in size and is immediately south of Lake Okeechobee. Much of this rich, fertile land is devoted to sugarcane production, and is crossed by a network of canals that are strictly maintained to manage water supply and flood protection.
WCAs (Water conservation areas)	The WCAs, WCA 1 (Loxahatchee National Wildlife Refuge), WCA 2, and, WCA 3 (the largest of the three) are situated southeast of the EAA and are approximately 1,350 square miles (approximately 40 miles wide and 100 miles long) from Lake Okeechobee to Florida Bay. Provides floodwater retention, public water supply, and are the headwaters of Everglades National Park.
ENP (Everglades National Park)	ENP was established in 1947, covering approximately 2,353 square miles (total elevation changes of only 6 feet from its northern boundary of Tamiami Trail south to Florida Bay). Landscape includes sawgrass sloughs, tropical hardwood hammocks, offshore coral reefs, mangrove forest, lakes, ponds, and bays.
Southern Estuaries	Florida Bay comprises a large portion of ENP, and is a shallow estuarine system (average depth less than 3 feet). Florida Bay is the main receiving water of the greater Everglades heavily influenced by changes in timing, distribution, and quantity of freshwater flows into the southern estuaries.
Lower East Coast	The Lower East Coast encompasses Palm Beach, Broward, and Miami-Dade counties, the most densely populated area in Florida. Water levels in this area are highly controlled by the C&SF water management system to prevent overdrainage and manage saltwater intrusion at the shoreline, provides flood control and water supply.

As discussed, the action area covers a large portion of south Florida. Nearly all aspects of south Florida's native vegetation have been affected by development, altered hydrology, nutrient inputs, and spread of non-native species that have resulted directly or indirectly from a century of water management. Habitat types that dominate the southern coastal regions within the project area include submerged aquatic vegetation (SAV) (primarily seagrasses and algae), mangrove

forests, saline emergent wetlands, freshwater wetlands, and non-native dominated wetlands (primarily wetlands dominated by Australian pine, (*Casuarina equisetifolia*), or Brazilian pepper, (*Schinus terebinthifolius*)).

The estuarine communities of south Florida have been affected by upstream changes in freshwater flows through the Everglades as a result of the C&SF project. A reduction in freshwater inflows into Florida Bay and alterations of the normal salinity balance have affected mangrove community composition and may have contributed to a large-scale die-off of seagrass beds (FWS 1999[1]).

Mangrove communities occur within a range of salinities from 0 to 40 practical salinity units (psu). Florida Bay experiences salinities in excess of 40 psu on a seasonal basis. Implementing CEPP will provide increased freshwater flows to Florida Bay and the southwest coast, thereby contributing to lower salinity levels within these areas to better encompass the mangrove salinity tolerance range. In addition, past changes in freshwater flow (from historic conditions) can lead to an invasion by exotic species such as Australian pine and Brazilian pepper.

All CERP projects are expected to improve freshwater flows throughout the south Florida ecosystem. Section 2 (Existing and Future Conditions) in the CEPP Project Implementation Report (PIR)/EIS explains in detail the current conditions of the south Florida ecosystem, including the vegetation, invasive species, threatened and endangered species, etc. Structural features currently in south Florida are depicted in Figure 3.

[1] U.S. Fish and Wildlife Service. 1999. South Florida Multi-Species Recovery Plan. Southeast Region, Atlanta, Georgia, USA.

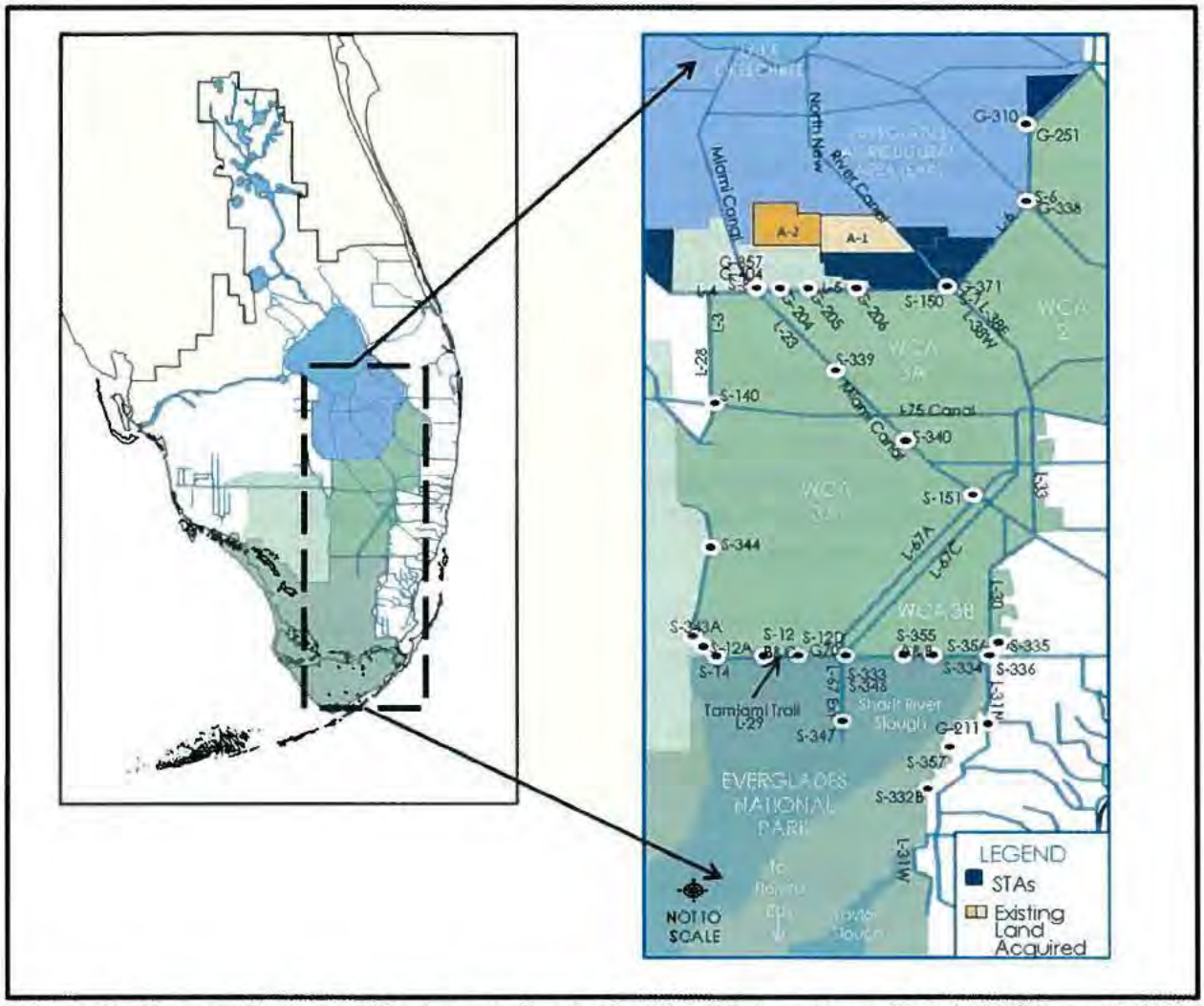

Figure 3. Current Structural Features in South Florida with Locations of EAA, WCAs, and ENP

Overall, freshwater flow improvements from the existing conditions is needed due to current freshwater flow conditions where approximately 1.7 billion gallons of water goes straight to tide through the extensive system of built canals and levees, rather than allowing sheetflow throughout the central part of the state (Figure 3 and Figure 4). More freshwater throughout south Florida will allow for rehydration of wetlands, marl prairies, and ultimately help regulate the salinity regimes in the estuaries by reducing the amount of harmful freshwater pulse releases from Lake Okeechobee and salt water intrusion. These freshwater improvements will then allow for more wading birds, fish, and many other species to thrive throughout south Florida.

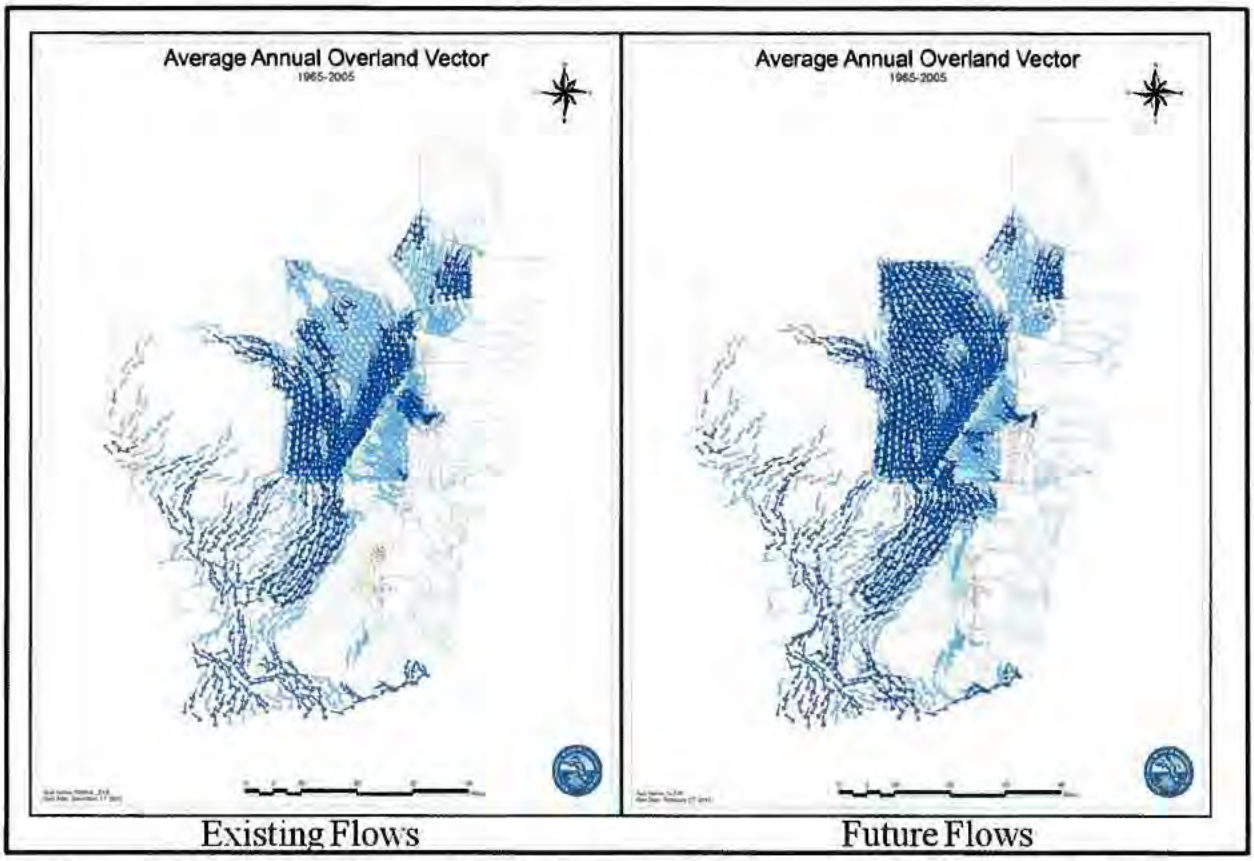

Figure 4. Existing and Future with Project Flows. Blue arrows indicate more water flowing throughout the areas. The box in Figure 2 depicts the same region shown in this figure. (Figure extracted from CEPP PIR/EIS Appendix G – Benefits Analysis)

Below is a detailed decription of all of the proposed actions covered under CERP, an explanation of the major components of CERP, and and an evaluation of the effects anticipated from the completion of CERP.

3.1 Major Components of CERP

CERP consists of structural and operational changes to the C&SF Project and defines components as conceptual project features (or options) intended to achieve a particular planning objective or set of planning objectives. They include both structural measures, such as reservoirs, pump stations, and canals, and nonstructural measures, such as reservoir operating schedules. One or more components are combined as features of specific projects to be implemented.

Components were developed by sub-regions and were optimized at the sub-regional level and then grouped with other components to form alternative Comprehensive Plans. The Restudy Team formulated and evaluated 10 alternative comprehensive plans. Alternative D-13R was selected as the Initial Draft Plan. Alternative D-13R, which is comprised of forty-nine operational and structural features or components, along with the series of Other Project Elements, Critical Projects, water quality treatment facilities, and other modifications that further improve performance of the plan, comprise the recommended Comprehensive Everglades

Restoration Plan. The following subsections (3.1.1 through 3.1.14) describe the structural and operational changes to the existing C&SF Project as part of the CERP.

3.1.1 Surface Water Storage Reservoirs

A number of water storage facilities are planned north of Lake Okeechobee, in the Caloosahatchee and St. Lucie basins, in the EAA, and in the Water Preserve Areas of Palm Beach, Broward, and Miami-Dade counties. These areas will encompass approximately 181,300 acres and will have the capacity to store 1.5 million acre-feet of water.

3.1.2 Water Preserve Areas

Multipurpose water management areas are planned in Palm Beach, Broward, and Miami-Dade counties between the urban areas and the eastern Everglades. The WCAs will have the ability to treat urban runoff, store water, reduce seepage, and improve existing wetland areas.

3.1.3 Manage Lake Okeechobee as an Ecological Resource

Lake Okeechobee is currently managed for many, often conflicting uses. The lake's regulation schedule will be modified and plan features constructed to reduce the extreme high and low levels that damage the lake and its shoreline. Management of intermediate water levels will be improved, while allowing the lake to continue to serve as an important source for water supply. Several plan components and Other Project Elements are included to improve water quality conditions in the lake. A study is recommended to evaluate in detail the dredging of nutrient-enriched lake sediments to help achieve water quality restoration targets, important not only for the lake, but also for downstream receiving bodies.

3.1.4 Improve Water Deliveries to Estuaries

Excess stormwater that is discharged to the ocean and the gulf through the Caloosahatchee and St. Lucie Rivers is very damaging to their respective estuaries. The CERP will greatly reduce these discharges by storing excess runoff in surface and underground water storage areas. During times of low rainfall, the stored water can be used to augment flow to the estuaries. Damaging high flows will also be reduced to the Lake Worth Lagoon.

3.1.5 Underground Water Storage

Wells and associated infrastructure will be built to store water in the upper Floridian aquifer. As much as 1.6 billion gallons a day may be pumped down the wells into underground storage zones. The injected fresh water, which does not mix with the saline aquifer water, is stored in a "bubble" and can be pumped out during dry periods. This approach, known as aquifer storage and recovery, has been used for years on a smaller scale to augment municipal water supplies. Since water does not evaporate when stored underground and less land is required for storage, aquifer storage and recovery has some advantages over surface storage. CERP includes aquifer storage and recovery wells around Lake Okeechobee, in the WCAs, and the Caloosahatchee Basin.

3.1.6 Treatment Wetlands

Approximately 35,600 acres of man-made wetlands, known as stormwater treatment areas, will be built to treat urban and agricultural runoff water before it is discharged to the natural areas throughout the system. Stormwater treatment areas are included in CERP for basins draining to Lake Okeechobee, the Caloosahatchee River Basin, the St. Lucie Estuary Basin, the Everglades, and the Lower East Coast. These are in addition to the over 44,000 acres of stormwater treatment areas already being constructed pursuant to the Everglades Forever Act to treat water discharged from the EAA.

3.1.7 Improve Water Deliveries to the Everglades

The volume, timing, and quality of water delivered to the south Florida ecosystem will be greatly improved. CERP will deliver an average of 26 percent more water into Northeast Shark River Slough over current conditions. This translates into nearly a half million acre-feet of additional water reaching the slough, and is especially critical in the dry season. More natural refinements will be made to the rainfall-driven operational plan to enhance the timing of water sent to the WCAs, ENP, Holey Land, and Rotenberger Wildlife Management Areas.

3.1.8 Remove Barriers to Sheetflow

More than 240 miles of project canals and internal levees within the Everglades will be removed to reestablish the natural sheetflow of water through the Everglades. Most of the Miami Canal in WCA 3 will be removed and 20 miles of the Tamiami Trail (U.S. Route 41) will be rebuilt with bridges and culverts, allowing water to flow more naturally into ENP, as it once did. In the Big Cypress National Preserve, a north-south levee will be removed to restore more natural overland water flow.

3.1.9 Store Water in Existing Quarries

Two limestone quarries in northern Miami-Dade county will be converted to water storage reservoirs to supply Florida Bay, the Everglades, Biscayne Bay, and Miami-Dade county residents with water. The 11,000-acre area will be ringed with seepage barriers to ensure that stored water does not leak or adjacent groundwater does not seep into the area. A similar facility will be constructed in northern Palm Beach county.

3.1.10 Reuse Wastewater

CERP includes two advanced wastewater treatment plants in Miami-Dade county capable of making more than 220 million gallons a day of the county's treated wastewater clean enough to discharge into wetlands along Biscayne Bay and for recharging the Biscayne Aquifer. This reuse of water will improve water supplies to south Miami-Dade county as well as reducing seepage from the Northeast Shark River Slough area of the Everglades. Given the high cost associated with using reuse to meet the ecological goals and objectives for Biscayne Bay, other potential sources of water to provide freshwater flows to the central and southern bay will be investigated before pursuing reuse.

3.1.11 Pilot Projects

A number of technologies proposed in CERP have uncertainties associated with them - either in the technology itself, its application, or in the scale of implementation. While none of the proposed technologies are untested, what is not known is whether actual performance will measure up to that anticipated in CERP. The pilot projects, which include wastewater reuse, seepage management, Lake Belt technology, and three aquifer storage and recovery projects are recommended to address uncertainties prior to full implementation of these components.

3.1.12 Improve Fresh Water Flows to Florida Bay

Improved water deliveries to Shark River Slough, Taylor Slough, and wetlands to the east of ENP will in turn provide improved deliveries of fresh water flows to Florida Bay. A feasibility study is also recommended to evaluate additional environmental restoration needs in Florida Bay and the Florida Keys.

3.1.13 Southwest Florida

There are additional water resource problems and opportunities in southwest Florida requiring studies beyond the scope of the CERP. In this regard, a feasibility study for Southwest Florida is being recommended to investigate the region's hydrologic and ecological restoration needs.

3.1.14 Comprehensive Integrated Water Quality Plan

The CERP includes a follow-on feasibility study to develop a comprehensive water quality plan to ensure that CERP leads to ecosystem restoration throughout south Florida. The water quality feasibility study would include evaluating water quality standards and criteria from an ecosystem restoration perspective and recommendations for integrating existing and future water quality restoration targets for south Florida water bodies into future planning, design, and construction activities to facilitate implementation of CERP. Further, water quality in the Keys is critical to ecosystem restoration. The Florida Keys Water Quality Protection Plan includes measures for improving wastewater and stormwater treatment within the Keys. Implementation of the Keys Water Quality Protection Plan is critical for restoration of the south Florida ecosystem.

The CERP program's projects will remove over 240 miles of internal levees in the Everglades to help the recovery of natural volumes of water to rehydrate preexisting wetlands. Water storage and water quality treatment are part of the overall project design to improve ecosystem and urban water supply needs within south Florida. Providing adequate flows throughout the system will help recharge the surficial aquifer, protecting it from saltwater intrusion and also providing for public water supply and other users in the lower east coast. All CERP projects have the same goal of improving the quality, quantity, timing, and distribution of freshwater flows throughout south Florida for the purpose of restoring the Everglades ecosystem. It will take more than 30 years to construct all of the elements and projects of CERP.

CERP plans to provide benefits to the estuaries by reducing harmful freshwater releases from Lake Okeechobee into the Caloosahatchee and St. Lucie River estuaries. The benefits would include improved seagrass beds as well as other SAV, thereby also improving species conditions that depend upon those resources (i.e. manatee, oysters, etc.). Increased freshwater flowing into the southern coastal systems (i.e. Florida and Biscayne Bays) would also improve habitat for listed species in the area.

4.0 CERP Evaluation and Reporting

Throughout the project implementation process, system-wide analyses will continue. A feedback loop will be established so that each PIR is evaluated for its contribution to the overall system and that the Comprehensive Plan is revised as necessary to reflect new information developed during the project development process. As part of this effort, the REstoration COordination VERification (RECOVER) team is responsible for linking science and the tools of science to a set of system-wide planning, evaluation, and assessment tasks. Their objectives are to evaluate and assess CERP's performance periodically, refine, and improve the plan during implementation, and ensure that a system-wide perspective is maintained throughout the restoration program.

The CERP program includes an adaptive management plan as well as an extensive monitoring and assessment plan (MAP). Monitoring results are reported to the RECOVER team of scientists who put together a system status report every four to five years. The MAP program provides documentation of the status and trends of the key indicator species of the south Florida

ecosystem, as well as addresses the key questions and uncertainties about achieving ecosystem restoration goals. A comprehensive understanding of the system enables the successful use of adaptive management principles to track and guide restoration activities to ultimately achieve restoration success (CERP reports are available on www.evergladesplan.org). These reports are distributed to all agencies and provide indicators such as salinity changes and changes in SAV as results that can be extrapolated to determine whether conditions for NMFS species have improved.

Performance measures were used in the CEPP modeling which includes other CERP projects within its modeling assumptions. These performance measures are described in detail in the CEPP PIR/EIS Appendix G – Benefits Model. The performance measures were split up by Northern Estuaries, Greater Everglades, and the Southern Coastal Systems. The RECOVER system-wide evaluation (CEPP PIR/EIS Annex E) analyzes the modeling results from CEPP in the same format, allowing for an evaluation of the estuaries, central Florida, and the southern estuaries. These effects are described in the Section 6.0 (Program Effects to Species) of this consultation.

5.0 CERP Projects Included in this Consultation

The projects included in the final recommended CERP are described in detail at http://evergladesplan.org/pm/projects/project_list.aspx. WRDA 2000 approved CERP as a framework for modifications to the C&SF project needed to restore the south Florida ecosystem and to provide for the other water-related needs of the region. WRDA 2000 also authorized construction of four pilot projects from CERP and implementation of ten initial projects needed to provide, in the short term, system-wide water quality and flow distribution benefits as well as an adaptive assessment and monitoring program subject to conditions. Authorization for the remaining components of the CERP occurs through subsequent WRDA legislation, after completion of PIRs.

In addition, Acceler8, a major initiative for Everglades restoration, was launched in 2005 to accelerate the pace of funding, design, and construction for eight environmental restoration projects. Seven of the ten congressionally authorized CERP projects are included in this initiative. These projects were recommended to Congress for initial authorization because the scientists and engineers engaged in the C&SF Restudy considered that they would provide immediate and significant restoration benefits.

The following CERP projects are either authorized by Congress and/or will be constructed entirely or in part by Acceler8 are the:

- C-44 Basin Storage Reservoir
- EAA Storage Reservoir – Phase 1
- Site 1 Impoundment (to be dedicated as the Fran Reich Preserve)
- WCA-3A/3B Levee Seepage Management
- C-9 Impoundment and Stormwater Treamtment Area (STA) – recently added to the Long-Term Plan
- C-11 Impoundment and STA – recently added to the Long-Term Plan
- C-111 N Spreader Canal
- Taylor Creek/Nubbin Slough STAs Project

- Raise and Bridge East Portion of Tamiami Trail and Fill Miami Canal
- North New River Improvement

In addition, the Acceler8 initiative will advance restoration benefits by constructing the following projects:

- Acme Basin B Discharge Project – programmatic authorization in WRDA 2000 and recently added to the Long-Term Plan
- Biscayne Bay Coastal Wetlands Project - Phase I
- Picayune Strand Restoration Project (formerly Southern Golden Gate Estates)
- C-43 West Reservoir Project
- Three STA expansions in the EAA as part of the Long-Term Plan

The CEPP project is a new project (2013) and is awaiting Congressional approval to begin detailed planning, construction, and implementation. Completed consultation is needed for CEPP approval, and this project is described in detail below. Because this project is more recent, modeling results encompass other CERP projects, presenting a programmatic view of CERP plus CEPP project effects.

5.1 Consultation Overview

Table 2 lists proposed and listed threatened (T) and endangered (E) species, along with designated or proposed critical habitat under the jurisdiction of NMFS that we believe may occur in or near the action area and may be affected by the project.

Table 2. Status of Species and Their Critical Habitat (CH) in the Project and Action Area

Species Name	Scientific Name	Status
Turtles		
Green sea turtle	*Chelonia mydas*[2]	T
Hawksbill sea turtle	*Eretmochelys imbricata*	E
Kemp's ridley sea turtle	*Lepidochelys kempii*	E
Leatherback sea turtle	*Dermochelys coriacea*	E
Loggerhead sea turtle	*Caretta caretta*[3]	T
Fish		
Smalltooth sawfish	*Pristis pectinata*[4]	E, CH
Gulf Sturgeon	*Acipenser oxyrinchus desotoi*	E, CH
Seagrass		
Johnson's seagrass	*Halophila johnsonii*	T, CH
Invertebrates		
Elkhorn coral	*Acropora palmata*[5]	T, CH
Staghorn coral	*Acropora cervicornis*[6]	T, CH
Elliptical star coral	*Dichocoenia stokesii*	Proposed T[7]

[2] Green turtles are listed as threatened except for the Florida and Pacific coast of Mexico breeding populations, which are listed as endangered

[3] Northwest Atlantic Ocean distinct population segment (DPS).

[4] U.S. DPS

[5] Proposed listing change from threatened to endangered on December 7, 2012

[6] Proposed listing change from threatened to endangered on December 7, 2012

[7] Corals proposed to be listed as threatened on December 7, 2012 (77 Fed. Reg. 73220)

Species Name	Scientific Name	Status
Lamarck's sheet coral	*Agaricia lamarcki*	Proposed T
Star coral	*Montastraea franksi*	Proposed E[8]
Mountainous star coral	*Montastraea faveolata*	Proposed E
Pillar coral	*Dendrogyra cylindrus*	Proposed E
Rough cactus coral	*Mycetophyllia ferox*	Proposed E
Boulder star coral	*Montastraea annularis*	Proposed E

Proposed critical habitat for the loggerhead sea turtle is within the action area, however, there are no routes of adverse effects to this habitat. No projects will be constructed in these habitats. The proposed units closest to the action area of the project are units 21-29, consisting of nearshore reproductive critical habitat defined as nearshore waters adjacent to nesting beaches that are used by hatchlings to egress to the open- water environment as well as by nesting females to transit between beach and open water during the nesting season (see http://www.nmfs.noaa.gov/pr/species/criticalhabitat_loggerhead.htm). The increased freshwater flows would likely not extend out into the ocean to effect this habitat, and even if it did, it would have no effect on the essential features of these units, which consist of lack of structures or conditions that would inhibit use of the habitat and ingress and egress to and from the beaches. Thus, loggerhead critical habitat will not be considered further in this consultation.

We reviewed all the projects included in the recommended CERP and authorized as a restoration framework by Congress in WRDA 2000 (Table 3). The level of specificity of project description, location, and objectives allowed us to make ESA effects determinations for all projects, including those not yet authorized. In many cases, we were able to conclude that projects would not have any direct effects on listed species or critical habitats, for example through construction interactions or noise, because the projects will be built outside of the ranges of NMFS's listed species and critical habitats. Those projects and reasoning are discussed below. We also evaluated the projects' potential effects individually and additively (programmatically) on habitats and aquatic resources used by NMFS species, primarily through the alteration of freshwater flow regimes across south Florida and into coastal habitats, which is one of the main goals of the CERP program.

CERP projects that may overlap with species or critical habitats under NMFS purview, and may affect these resources through construction activity include: IRL-S, Picayune Strand Restoration Project, BBCW Project, C-43 West Basin Storage Reservoir, C-111 Spreader Canal Western Project, and CEPP (the ENP Seepage Management Project has been incorporated into CEPP). The Florida Keys Tidal Restoration project is a project that may affect NMFS's listed species and would need separate NMFS consultation because no known plans exist for the project at this time or are expected in the foreseeable future.

Table 3 summarizes CERP projects in terms of their capacity to have potential direct effects through construction activities on NMFS species or critical habitats. Some projects were consulted on individually in the past and for most, construction is already complete. Potential impacts to sawfish critical habitat, which was designated after the project was already built or

[8] Corals proposed to be listed as endangered on December 7, 2012 (77 Fed. Reg. 73220)

consulted on, are evaluated here. Similarly, whether any of the past projects consulted on and/or completed may affect the seven species of corals proposed to be listed, was also evaluated. Below we describe the previous consultations, including any new information about the projects and anticipated effects. Program effects to species are evaluated in Section 6.0 (Program Effects to Species) and the project effects are equal to or less than determinations made on the program (meaning that each project has a may affect, not likely to adversely affect determination or less).

Table 3. CERP projects from Evergladesplan.org and determination of capacity for direct (construction) effects on NMFS species or their Critical Habitat (CH) http://evergladesplan.org/pm/projects/project_list.aspx

Project Name and PCTS # if Applicable	Potential to Affect NMFS species or CH
Acme Basin B Discharge	No Effect
Aquifer Storage and Recovery Regional Study	No Effect
Big Cypress – L-28 Interceptor Modifications	No Effect
Biscayne Bay Coastal Wetlands (SER-2010-2615)	Johnson's seagrass, elkhorn & staghorn coral, sea turtles, smalltooth sawfish
Broward Co. Secondary Canal System	No Effect
Broward County Water Preserve Areas	No Effect
C-111 Spreader Canal (SER-2009-3680)	No Effect
C-4 Control Structures	No Effect
C-43 Aquifer Storage and Recovery Pilot (SER-2004-1548)	No Effect
C-43 West Basin Storage Reservoir Project (SER-2007-2630)	Gulf sturgeon, sea turtles, smalltooth sawfish & CH
Caloosahatchee Back Pumping with Stormwater Treatment	No Effect
Caloosahatchee River West Basin Storage Reservoir Project	No Effect
Central Everglades Planning Project	Smalltooth sawfish & CH, sea turtles & CH, elkhorn & staghorn coral CH, Johnson's seagrass & CH, marine mammals
Central Lake Belt Storage Area	No Effect
Everglades Agricultural Area Storage Reservoirs	No Effect
Everglades National Park Seepage Management (now part of CEPP)	No Effect
Florida Keys Tidal Restoration	Smalltooth sawfish & CH, sea turtles & CH, elkhorn & staghorn coral CH, Johnson's seagrass & CH
Flows to Northwest and Central Water Conservation Area 3A	No Effect
Henderson Creek – Belle Meade Restoration	No Effect
Hillsboro Aquifer Storage and Recovery and Pilot	No Effect
Indian River Lagoon South	Sea turtles, Johnson's seagrass & CH
L-31N (L-30) Seepage Management Pilot	No Effect
Lake Belt In ground Reservoir Technology Pilot	No Effect
Lake Okeechobee Aquifer Storage and Recovery and Pilot	No Effect
Lake Okeechobee Watershed	No Effect
Lakes Park Restoration	No Effect
Loxahatchee National Wildlife Refuge Internal Canal Structures	No Effect

Project Name and PCTS # if Applicable	Potential to Affect NMFS species or CH
Loxahatchee River Watershed Restoration Project	No Effect
Loxahatchee River Watershed Restoration Aquifer Storage and Recovery	No Effect
Melaleuca Eradication and Other Exotic Plants	No Effect
Miccosukee Tribe Water Management Plan	No Effect
Modify Holey Land Wildlife Management Area Operation Plan	No Effect
Modify Rotenberger Wildlife Management Area Operation Plan	No Effect
North Lake Belt Storage Area	No Effect
Palm Beach County Agriculture Reserve Reservoir	No Effect
Picayune Strand Restoration Project	Smalltooth sawfish & CH, sea turtles
Restoration of Pineland and Hardwood Hammocks in C-111 Basin	No Effect
Site 1 Impoundment (SER-2005-7112)	No Effect
South Miami-Dade Reuse	No Effect
Strazzulla Wetlands	No Effect
Wastewater Reuse Technology Pilot	No Effect
Water Conservation Area 3 Decompartmentalization & Sheetflow Enhancement – Part 1 (Decomp)	No Effect
Water Conservation Area 2B Flows to ENP	No Effect
West Miami-Dade Reuse	No Effect
Winsberg Farm Wetlands Restoration	No Effect
Water Ppreserve Area Conveyance	No Effect

5.2 CERP Projects with No Potential to Directly Affect Listed Species or Critical Habitats

Projects listed as No Effect in Table 3 are not expected to have any effects on NMFS species due to construction activities. A review of the documentation for these projects on evergladesplan.org reveals that they are inland projects that do not consist of any construction or dredging in or near the estuaries or the coastline of Florida (all construction will be on or from the uplands), or in any designated critical habitat, and therefore would not directly impact NMFS species or their critical habitat. However, they all have and contribute additively to the overarching program objectives of CERP, to improve the quality, quantity, timing, and distribution of water flows throughout the south Florida ecosystem for restoration purposes.

5.3 CERP Projects that Have Prior Individual Consultations: Project Descriptions, Summary of Prior Consultation Conclusions, and Evaluation of New Information

As discussed above, between 2002 and 2011, NMFS and USACE consulted informally on several individual projects of the CERP program. In a November 3, 2011, letter of concurrence, NMFS summarized that at time 13 CERP projects were in various stages of construction or planning. Of those 13 projects, seven were determined to potentially affect species and/or critical habitat under NFMS's purview through construction impacts, due to their presence in the action areas of the projects. None of the projects were found likely to have adverse effects on NMFS listed species or critical habitats. These previous individual consultations and their effects conclusions are summarized below. Any new information or new species and critical habitat evaluations relevant to construction impacts of these projects is discussed below. Direct

construction would not take place in coral reef or hard bottom communities, thus elkhorn and staghorn corals, and the seven coral species proposed to be listed, will not be affected by construction activities. The program-level impacts of all CERP projects from changes in freshwater flow and hydrology, including the projects in this section that have had previous section 7 consultations, are evaluated in section 6.0. The previous section 7 concurrence letters for these projects are included as attachments to this programmatic consultation.

5.3.1 C-111 Spreader Canal

The C-111 Spreader Canal Western Project is an enhancement to the 1994 C-111 General Reevaluation Report. Its goal is to improve ENP conditions by establishing more natural water flows in Taylor Slough. This, in turn, will improve the timing, distribution, and quantity of water in Florida Bay. The western project also has features that will jumpstart environmental restoration in the Southern Glades and Model Lands. These areas form a contiguous habitat corridor with ENP, Biscayne National Park, Crocodile Lakes National Wildlife Refuge, the north Key Largo Conservation and Recreational Lands purchases, John Pennekamp State Park, and the National Marine Sanctuary. It is estimated that about 252,000 acres of wetlands and coastal habitat may be affected by the proposed project (Figure 5).

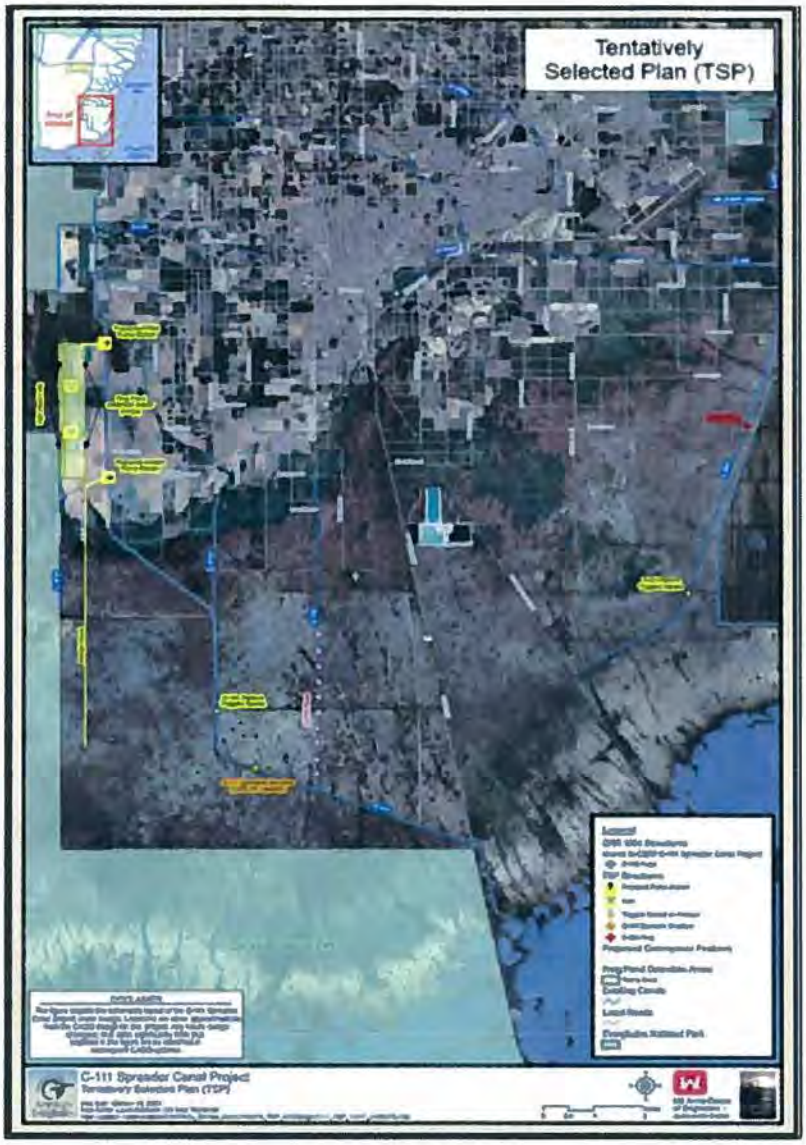

Figure 5. C-111 Spreader Canal Project Area

The C-111 Spreader Canal Western Project will create a nine-mile hydraulic ridge adjacent to ENP that will keep more of the natural rainfall and water flows within Taylor Slough. The hydraulic ridge will be created by constructing a 590-acre above-ground detention area in the Frog Pond area by installing two 225 cubic feet per second pump stations, and integrating other project features. The project will also begin restoration of the Southern Glades and Model Lands with an operable structure in the lower C-111 canal, incremental operational changes at the S-18C structure, a plug at S-20A, operational changes at the S-20 structure, and construction of earthen plugs at the C-110 canal (http://www.evergladesplan.org/docs/fs_c111_july_2013_508.pdf).

On May 7, 2009, the USACE requested concurrence with NMFS on its determination of may affect, but is not likely to adversely affect smalltooth sawfish and sea turtles. In addition, the USACE determined that the project would not modify critical habitat for elkhorn or staghorn

coral. Critical habitat for the smalltooth sawfish had not been designated until after publication of the final PIR/EIS. After further discussion with NMFS, and as described in their BA, the USACE changed their determinations to no effect for all species currently listed, including elkhorn and staghorn corals, and their designated critical habitat. Consultation on this individual project was concluded in 2009 with a no effect determination on all listed species under NMFS purview. Construction on this project is complete. We have no new information that requires revisiting the previous consultation conclusions.

5.3.2 Site 1 Impoundment

The Site 1 Impoundment (Figure 6) is designed to capture and store local runoff during wet periods and then use the water to supplement water deliveries to the Hillsborough Canal during dry periods, thus reducing demands for releases from Lake Okeechobee and the Arthur R. Marshall Loxahatchee National Wildlife Refuge (LNWR). Constructing and operating the impoundment will reduce the need for releases from LNWR during the dry season to meet local water demands and will facilitate the maintenance of more natural, desirable, and consistent water levels within the LNWR. The impoundment will also reduce groundwater seepage from LNWR. The ability to achieve and maintain more natural hydroperiods and hydropatterns within LNWR by retaining more rainfall and inflows from upstream will enhance habitat function and quality, also improving native plant and animal species abundance and diversity. In addition, there will be benefits to the downstream estuaries as a result of reducing peak freshwater flows from local stormwater runoff and large pulse releases from Lake Okeechobee.

Figure 6. Site 1 Impoundment Project Area and Features

Consultation on this individual project was completed in 2005 with a no effect determination on smalltooth sawfish. Construction is currently ongoing for this project. This project is not located within smalltooth sawfish critical habitat and will not have any effect on other listed species or critical habitats, given its location, other than its contribution to the program effects on freshwater flows and hydrology, discussed in Section 6.0 below.

5.3.3 Caloosahatchee River (C-43) West Basin Storage Reservoir

The C-43 project purpose is to improve the timing, quantity, and quality of freshwater flows to the Caloosahatchee River estuary. The project provides approximately 170,000 acre-feet of above-ground storage volume in a two-cell reservoir. Major features of the project include external and internal embankments, and environmentally responsible design features to provide fish and wildlife habitat such as littoral areas in the perimeter canal and deep water refugia within the reservoir. The project contributes toward the restoration of ecosystem function in the Caloosahatchee estuary by reducing the number and severity of events where harmful amounts of freshwater from basin runoff and Lake Okeechobee releases are discharged into the estuary system. The project also helps to maintain a desirable minimum flow of freshwater to the estuary during dry periods. These two primary functions help to moderate unnatural changes in salinity that are detrimental to estuarine communities (Figure 7).

Figure 7. C-43 Project Location and Features

Consultation on this project was completed in 2007 with the conclusion of may affect, not likely to adversely affect sea turtles and smalltooth sawfish. We have no new information requiring that the previous consultation conclusions be revisited. However, critical habitat for the smalltooth sawfish was designated in 2009. This project is located upstream from critical habitat and therefore needs to be considered in the evaluation of program level effects below.

5.3.4 Biscayne Bay Coastal Wetlands

The BBCW project is located in coastal wetlands adjacent to Biscayne Bay in Miami-Dade county (Figure 8).

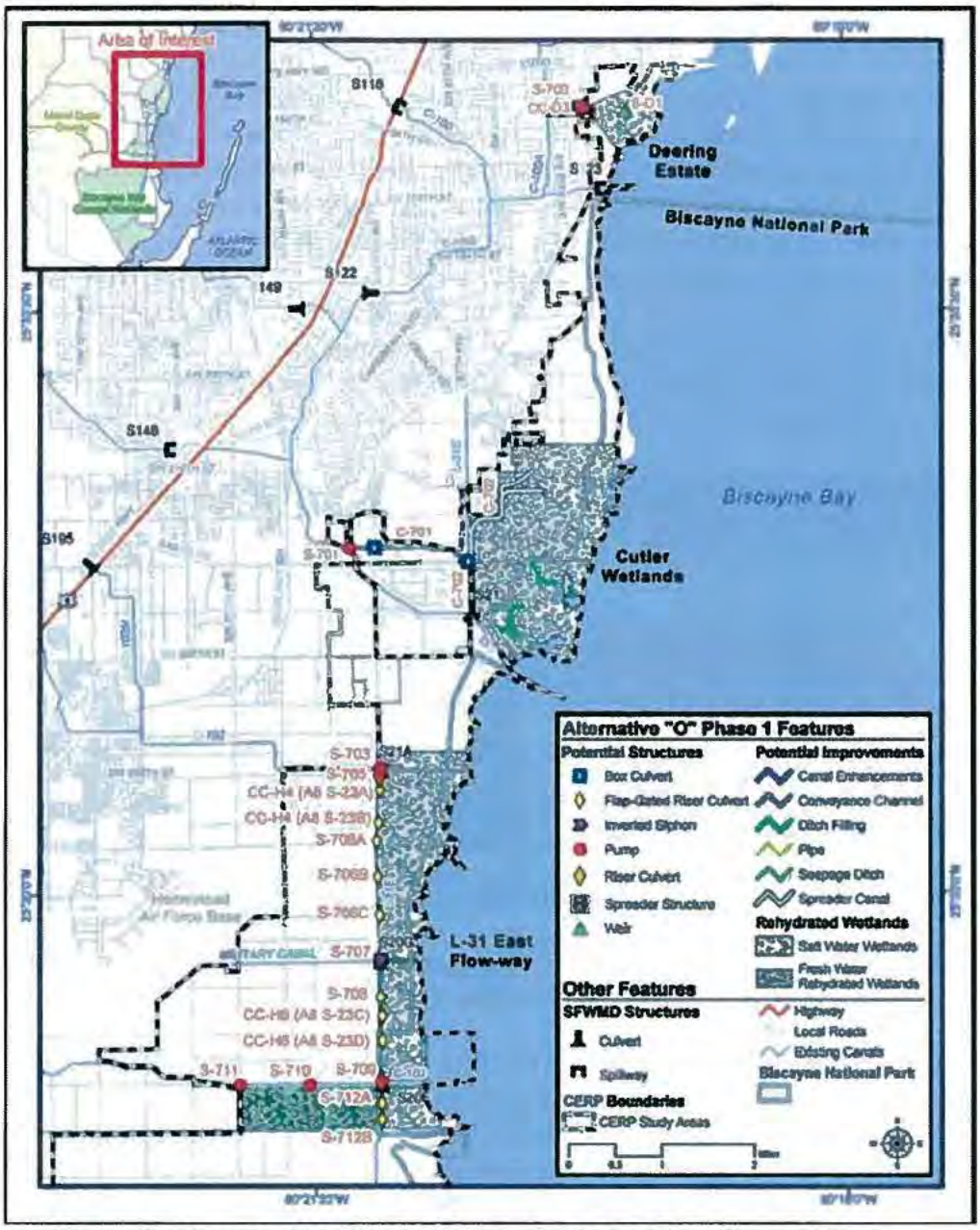

Figure 8. Biscayne Bay Coastal Wetlands Project Location and Features

The primary project purpose is to redistribute freshwater runoff from the watershed adjoining Biscayne Bay to provide a more natural and historic overland flow through existing coastal wetlands. CERP identified a need to replace lost overland flow, rehydrate coastal wetlands, and reduce point source freshwater discharges to Biscayne Bay using a system of pumps and interconnections between coastal canals and operational changes to coastal structures.

Consultation on this specific project was completed November 3, 2011, with a may affect, not likely to adversely affect determination for smalltooth sawfish and other listed species under NMFS purview. NMFS concurred with the USACE's determination that the BBCW project is not likely to adversely affect any listed species pending completion of a recommended

programmatic consultation for any remaining individual CERP projects. We have no new information that requires revisiting the prior effects determinations on listed species from construction activities.

5.3.5 Indian River Lagoon South

The IRL-S project is located in Martin and St. Lucie counties. The purpose is to improve surface-water management in the C-23/C-24, C-25, and C-44 basins for habitat improvement in the St. Lucie River Estuary and southern portions of the Indian River Lagoon. Project features include (1) the construction and operation of four above-ground reservoirs to capture water from the C-44, C-23, and C-25 canals for increased storage (130,000 acre-feet), (2) the construction and operation of four stormwater treatment areas to reduce the introduction of sediment, phosphorus, and nitrogen into the estuary and lagoon, (3) the restoration of upland and wetland habitat, (4) the redirection of water from the C-23/24 basin to the north fork of the St. Lucie River to attenuate freshwater flows to the estuary,(5) muck removal from the north and south forks of the St. Lucie River and middle estuary, and (6) the creation of oyster shell, reef balls, and artificial submerged habitat near muck removal sites for added habitat improvement. The project is expected to provide significant water quality improvement benefits to both the St. Lucie River and estuary and Indian River Lagoon by reducing the load of nutrients, pesticides, and suspended materials from basin runoff (Figure 9).

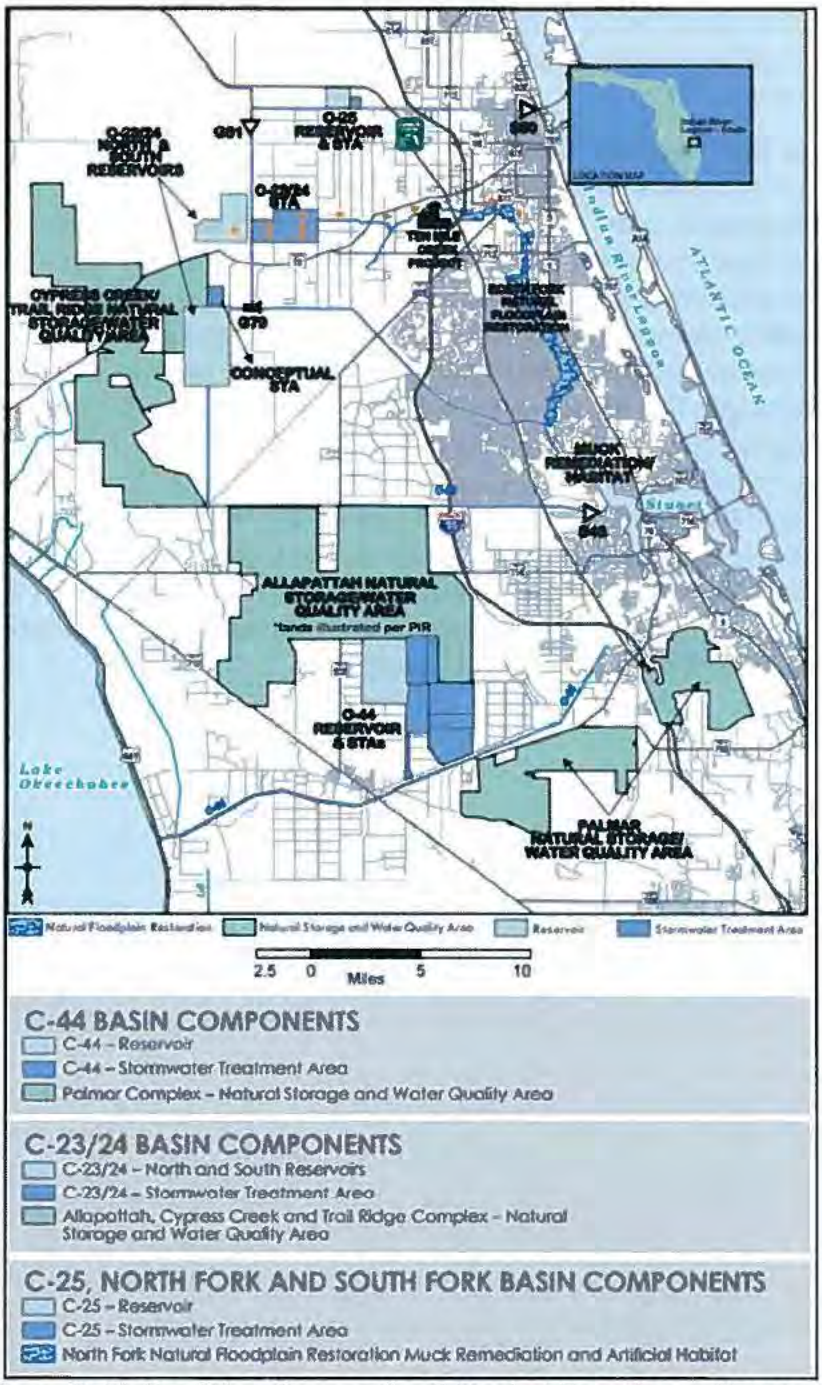

Figure 9. Indian River Lagoon South Project Location and Features

Consultation was complete in 2002, determining that the project may affect, but is not likely to adversely affect sea turtles, Johnson's seagrass, and Johnson's seagrass critical habitat. The smalltooth sawfish was listed after this project's consultation and needs to be considered in this consultation. The project is not located in sawfish critical habitat. Project features include building pumps, levees, canals, and other structures. These features are required in order to operate and interconnect project features, provide a mechanism for re-directing freshwater

discharges to the north fork of the St. Lucie River, and facilitate muck removal and habitat restoration actions inside the estuaries.

Smalltooth sawfish may be adversely affected by being temporarily unable to use the site for foraging and shelter due to avoidance of construction activities, related noise, and physical exclusion from areas blocked by turbidity curtains. Muck removal has not yet been completely designed for this project, therefore we are including measures to reduce any risk to NMFS's species. Construction will include minor dredging of muck by a mechanical dredge along with upland construction projects. All construction will be limited to daylight hours only to help construction workers spot sea turtles near the project areas and avoid interactions with these species. These effects will be insignificant, given the small area anticipated to be dredged and the short, daylight-only construction time limited likely needed to complete the task. The USACE will be required to follow NMFS's *Sea Turtle and Smalltooth Sawfish Construction Conditions*, which require work to stop if a protected species is seen within 50 feet of operating construction equipment. Additionally, turbidity controls will enclose the project site and be removed after construction which will not appreciably block use of the area by ESA-listed species, but will help prevent these species from getting close to the active construction site. The construction activies have not changed from previous consultation conclusions and will not impact foraging or refuge habitat for smalltooth sawfish. Thus we believe that effects to this species from construction activity are discountable. Once a muck removal plan is developed, USACE will provide this to NMFS in order to assure that the above measures are followed.

5.3.6 Picayune Strand Restoration

The Picayune Strand project involves restoration of natural water flow across 85 square miles in western Collier county that were drained in the early 1960s in anticipation of extensive residential development. The subsequent development dramatically altered the natural landscape, changing a healthy wetland ecosystem into a distressed environment. The goal is to restore wetlands in Picayune Strand and in adjacent public lands by reducing over-drainage while restoring a natural and beneficial sheetflow of water to the Ten Thousand Islands National Wildlife Refuge. Project features include 83 miles of canal plugs, 227 miles of road removal, and the addition of pump stations and spreader swales to aid in rehydration of the wetlands. Restoration benefits include wetland restoration and subsequent reemergence of foraging wading birds and native flora. In addition to restoring freshwater wetlands, the project will improve estuarine water quality by increasing groundwater recharge and reducing large and unnatural freshwater inflows.

On October 20, 2004, the USACE requested concurrence from NMFS on its no effect determination on smalltooth sawfish, green sea turtle, Kemp's ridley sea turtle, and loggerhead sea turtle. Re-initiation of consultation is needed since smalltooth sawfish critical habitat was designated after the original consultation was completed.

A recent potential project feature would remove up to two acres of mangrove habitat approximately one-half mile north of the smalltooth sawfish critical habitat along the Faka Union Canal (Figure 10). These effects will be discountable because the mangroves are likely located above the Mean High Water Line and inaccessible to sawfish because they are only hydrated during extreme storm events.

The mangroves are located west of the Faka Union Canal and all construction would take place from upland areas.

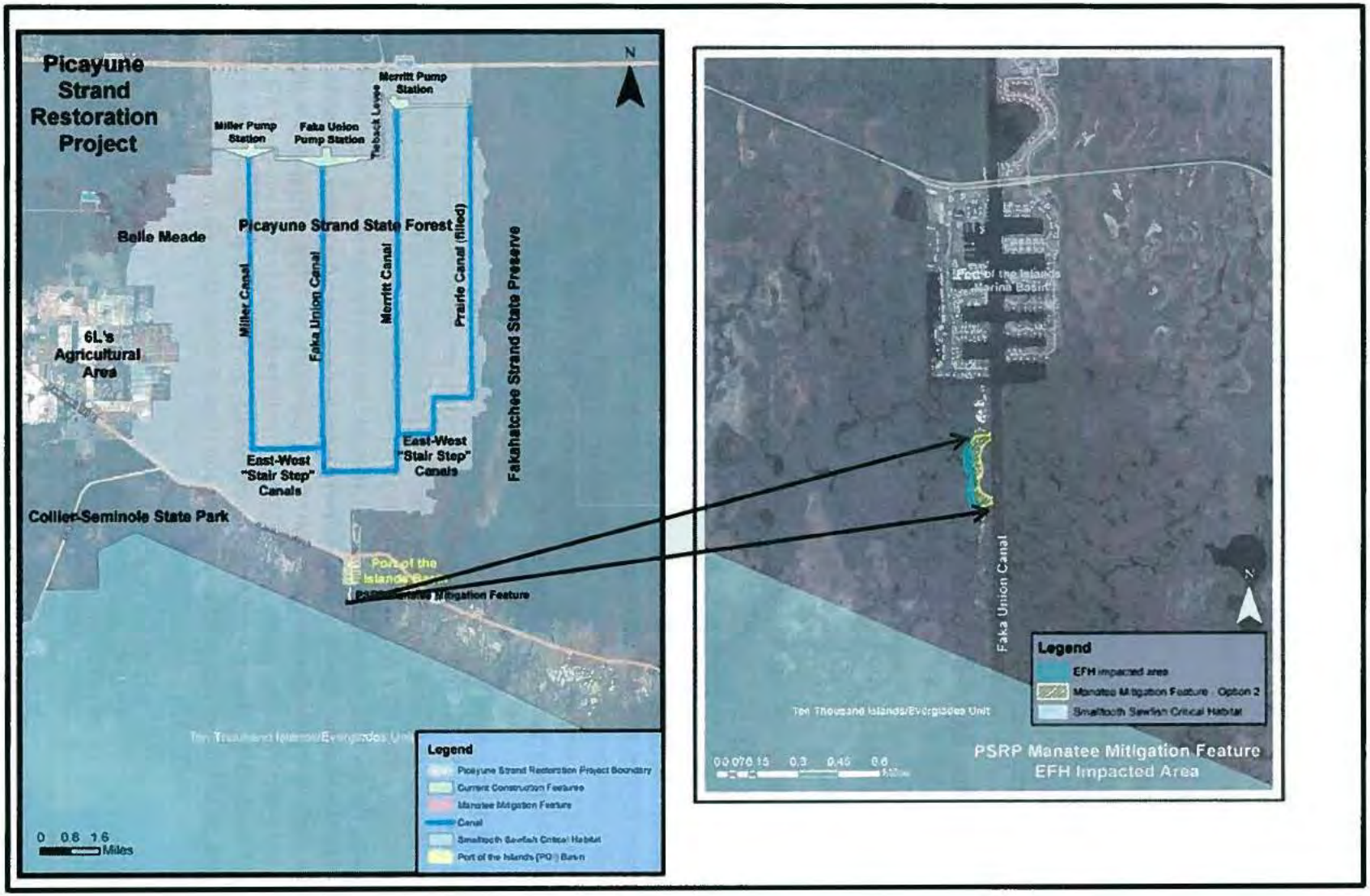

Figure 10. Picayune Strand Project Area and Potential Manatee Mitigation Feature with Smalltooth Sawfish Critical Habitat

5.4 Central Everglades Planning Project (CEPP)

CEPP is being described in detail in this document because the USACE is currently seeking authorization to construct new projects to achieve CEPP's goals, and authorization is contingent upon completion of consultation. As discussed below, CEPP assumes that some CERP projects are already completed, including some that have previous consultation histories, and some projects to be constructed in the future.

The purpose of CEPP is to propose implementation of a new set of components of CERP. Since the CERP framework and initial projects were approved through WRDA 2000, three projects were authorized in the 2007 WRDA and proceeded into construction (IRL-South, Picayune Strand, and Site 1 Impoundment) and a fourth project, Melaleuca and Other Exotic Plants Biological Controls, was implemented under the programmatic authority in WRDA 2000. Despite this progress, ecological conditions and functions within the central portion of the Everglades ridge and slough community continue to decline due to lack of sufficient quantities of freshwater flow into the central Everglades and timing and distribution problems. To respond to this concern, the USACE and the South Florida Water Management District initiated CEPP in November of 2011 to evaluate alternatives for restoring ecosystem conditions in the central portion of the Everglades and opportunities for providing for other water-related needs in the region.

This project incorporates restoration components primarily intended to benefit freshwater wetlands and estuarine resources by distributing freshwater flows through WCA 3A, 3B, and ENP. The CEPP project assumes that the following CERP projects are complete: (1) IRL-S, (2) Picayune Strand Restoration Project, (3) Site 1 Impoundment Project, (4) BBCW Project, (5) C-43 West Basin Storage Reservoir, and (6) C-111 Spreader Canal Western Project. CEPP encompasses ENP Seepage Management within its project, therefore combining the two. Because all CERP projects expected to potentially affect NMFS species or their critical habitat are assumed to be complete prior to implementation of CEPP, the modeling analysis for CEPP is inclusive of the programmatic effects of individual CERP projects effects.

CEPP would decrease the large freshwater pulse releases from Lake Okeechobee that currently are sent east to the St. Lucie and west to the Caloosahatchee estuaries, instead sending the water southward through the EAA canals to flowage equalization basins (similar to stormwater treatment areas). The reduction of existing high flows to the estuaries would help restore them by regulating the salinity regimes in a more favorable manner for listed and non-listed species. The flowage equalization basins would deliver water to existing stormwater treatment areas, which would reduce phosphorus concentrations in the water, and then the treated water would be released at the northwestern end of WCA 3A to flow through and restore much of WCA 3A, 3B, ENP, and Florida Bay. Several existing levees, canals, culverts, and pump stations would be constructed, modified, or removed to improve the flow of water through the system (Figure 11).

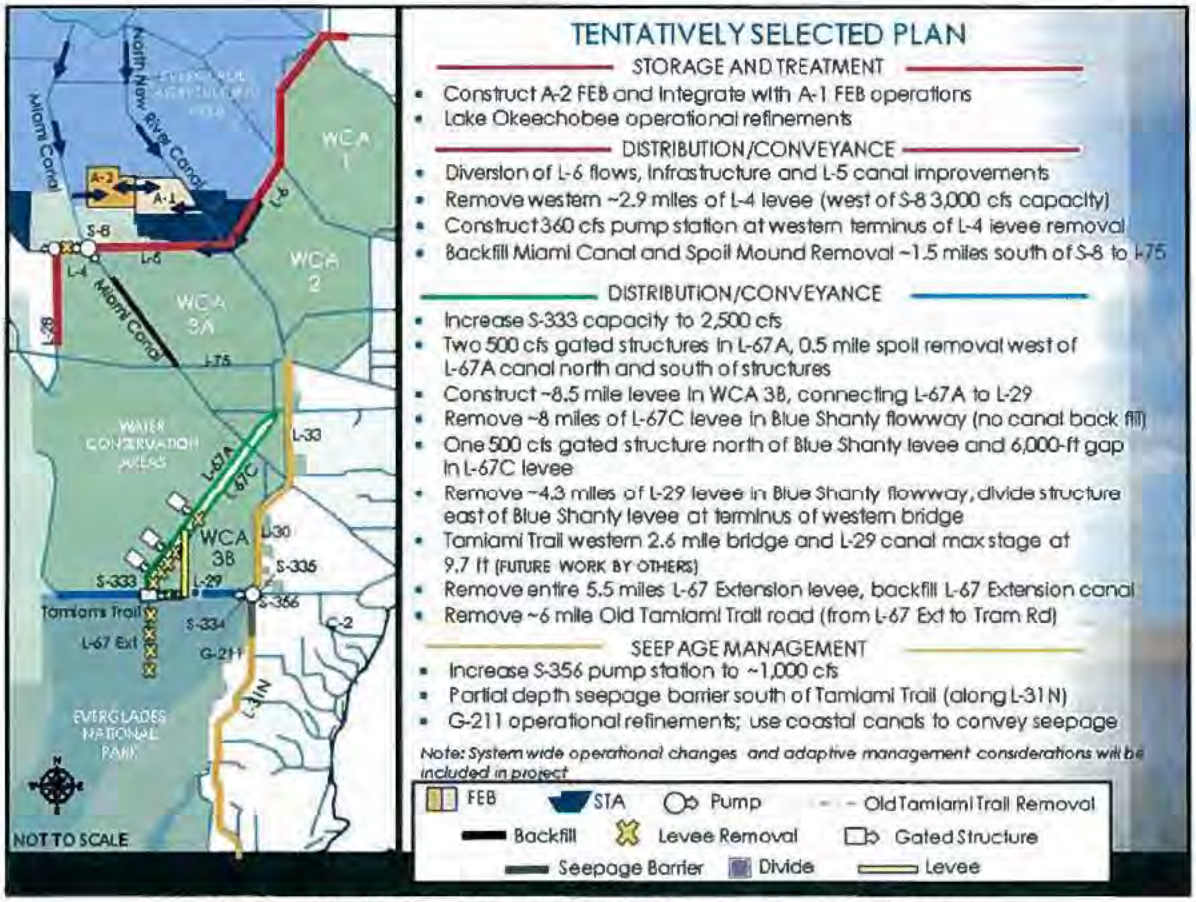

Figure 11. Central Everglades Planning Project Features

Consultation for six of these CERP projects were previously conducted. In its BA, the USACE determined CEPP would have no effect on corals or listed whales, due to these species' habitats outside of the expected extent of impacts of this project. The USACE determined, and NMFS concurs, that CEPP's construction activities may affect, but are not likely to adversely affect, green, hawksbill, leatherback, Kemp's ridley, and loggerhead sea turtles, and smalltooth sawfish. If they would be in the inland action areas of these projects, which is unlikely, these species would be expected to be foraging or migrating through project construction areas, but their mobility, and implementation of NMFS' sea turtle and sawfish construction conditions, will allow them to avoid any adverse effects from construction.

The program-level effects of CEPP through changes in freshwater flow and hydrology are discussed in Section 6.0.

6.0 CERP Program Effects on Listed Species or their Critical Habitat

NMFS has considered all routes of effects that CERP could have on listed species and critical habitat and determined that species and critical habitats may be affected through either impacts of construction activities or through changes to freshwater hydrologic flows. As described above, NMFS has previously consulted on all potential projects that may have construction impacts, with the exception of the Florida Keys Tidal Restoration Project which is not covered by this consultation and some components of CEPP, which are evaluated above. NMFS has determined that effects from construction, both individually and additively, would be

discountable or insignificant. All construction projects in the ranges of listed species or critical habitats will use floating turbidity curtains around all in-water construction areas and will follow NMFS's 2006 *Sea Turtle and Smalltooth Sawfish Construction Conditions*. The mobility of species that may be in the action area of construction activities allows them to avoid construction impacts.

As discussed below, CERP's program effects to freshwater hydrologic flows, individually and additively, would have solely beneficial effects to NMFS listed species and critical habitats. Potential effects would result from change in freshwater flows and alteration of salinity through the south Florida ecosystem. The Recovery Plans for some NMFS species indicate that restoring more natural freshwater flows would be a conservation measure for the species. CERP program effects are meant to be beneficial in nature to help restore the historic/more natural quality, quantity, timing, and distribution of freshwater flows throughout south Florida.

6.1 CEPP Modeling Evaluations and Key Findings

Modeling that was completed for CEPP includes the existing (current in 2010 when the project began) conditions, the Future Without Project (FWO), and CEPP. The FWO project assumptions contains all CERP projects listed in this consultation with the exception of the Florida Keys Tidal Restoration Project. CERP projects are also included in the CEPP Preferred Alternative modeling which provides an additive evaluation of program effects. Therefore, all discussion of CEPP modeling is an evaluation of the CERP program.

Evaluations of CEPP were performed using performance measures, independent analysis of the RECOVER system-wide evaluation (CEPP PIR/EIS Annex E), and a benefits model analysis (CEPP PIR/EIS Appendix G), as well as best professional judgment. This consultation is reiterating the key findings, however, a more detailed analysis of CEPP performance measures and modeling can be found in the CERP Programmatic BA or is located in the CEPP PIR/EIS located on www.evergladesplan.org. Modeling assumptions are explained in more detail in Section 2, Table 2-2 in the CEPP PIR/EIS.

The RECOVER system-wide evaluation was completed on Alternatives 1-4 of CEPP and not on the preferred Alternative (Alt 4R2). RECOVER recommendations were incorporated into Alternative 4R to improve performance in the St. Lucie Estuary, Water Conservation Area 2, and Biscayne Bay. Because most of the changes to CEPP Alternative 4R2 (preferred alternative) were limited to the southern end of the system, RECOVER scientist models were only rerun to determine Florida Bay benefits and to understand potential effects on Biscayne Bay. RECOVER scientists agree that Alternative 4R2 results to Biscayne Bay improved over Alternatives 1-4 for increased freshwater flows.

6.1.1 Northern Estuary Modeling

The northern estuary restoration goals include re-establishment of a salinity range favorable to juvenile marine fish, shellfish, oysters, and SAV, re-establishment of seasonally appropriate freshwater flows of favorable quality that maintain low salinities in the upper estuary and re-establishment of more stable salinities and ranges in the lower estuary.

In the Caloosahatchee, targets were based on freshwater discharges from C-43 canal at the S-79 structure where the mean monthly inflow should be maintained between 450 and 2,800 cubic feet per second (cfs). Targets were developed to reduce minimum discharge and mediate high flow events to the estuary to improve estuarine water quality and protect and enhance estuarine

habitat and biota. Ultimately, the low flow target is no months during October to July when the mean monthly inflow from the Caloosahatchee watershed, as measured at S-79, falls below a low-flow limit of 450 cfs (C-43 basin runoff and Lake Okeechobee regulatory releases). Ultimately, the high flow target is no months with mean monthly flows greater than 2,800 cfs, as measured at the S-79, from Lake Okeechobee regulatory releases in combination with flows from the Caloosahatchee River (C-43) basin.

The St. Lucie Estuary restoration requires addressing high volume, long duration discharge events from Lake Okeechobee, the C-44, C-23, and C-24 watersheds. The flow targets are designed to result in a favorable salinity envelop in the mid estuary of 8 to 25 psu salinity. Only discharges from Lake Okeechobee were included in the St. Lucie Estuary flow targets. This is due to the fact that the watershed flow targets are being addressed in the IRL-S Project which is included in the 2050 base conditions. Full restoration targets are estimated to be 31 months where mean flow is less than 350 cfs and 0 Lake Okeechobee regulatory discharge events (14 day moving averages > 2000 cfs).

Performance measures within the northern estuaries were used to measure the suitability for oyster and SAV habitat based on target flows from structures S-79 and S-80. CEPP will improve conditions for estuarine and marine resources throughout the northern estuaries by restoring more natural timing, volume, and duration of freshwater flows to the Caloosahatchee and St. Lucie estuaries with the potential to provide a more appropriate range of salinity conditions by reducing extreme salinity fluctuations. Performance measure scores within the northern estuaries were generated from the model at S-79 and S-80. Calculation of habitat benefits achieved by each of the project alternatives is restricted to portions of the estuary where changes in salinity in relation to freshwater flows at S-79 and S-80 can be reasonably predicted.

Modeling results indicate that CEPP would reduce the number of high flow events in both estuaries, thereby improving habitat for oyster and SAV. The low flow reductions were minimal, however, the RECOVER scientists state that the results provide indication that CEPP is moving restoration in the right direction.

6.1.2 Southern Coastal Systems Modeling

A desired result of restored hydroperiods through CEPP is to increase densities of small fishes and macroinvertebrates throughout the Everglades, especially in the southern Everglades. Because small fishes are the most abundant vertebrates in the Everglades and are consumed by large predators, the Trophic Hypothesis predicts that an increase in density of small fish will benefit higher trophic-level predators such as wading birds, reptiles, and larger fish that depend on them as a food source. This CEPP model (Cantano and Trexler, 2013[9]) compares freshwater fish densities in the WCA 3A and 3B, Shark River Slough, and Taylor Slough of existing conditions against FWO and CEPP.

Results of these model comparisons agree that abundance of both small fishes and largemouth bass would increase under the CEPP hydrologic model scenarios compared to the Existing

[9] Catano, C. and J. Trexler. 2013. CEPP Model Comparison of Predicted Freshwater Fish Densities, Draft 3.0. Comprehensive Everglades Restoration Plan, Restoration Coordination and Verification (RECOVER). U.S. Army Corps of Engineers, Jacksonville District, Jacksonville, Florida, USA and South Florida Water Management District, West Palm Beach, Florida, USA.

Conditions hydrology or the FWO. The increased fish productivity under CEPP is linked to longer hydroperiods and reduced severity of drying events in regions south of the L-5 canal (WCA 3A, WCA 3B, Shark River Slough, Southern Marl Prairies, Taylor Slough). CEPP Alternative 4 yielded the greatest benefits for fish production. There were relatively small differences between these two scenarios in the predicted benefits on small fish density and largemouth bass.

RECOVER evaluations determined that the model-predicted salinity improvements in Florida and Biscayne Bays translated to a noticeable increase in abundance of juvenile spotted trout, pink shrimp, juvenile crocodiles, and SAV. Salinity improvements from CEPP over the existing conditions and FWO include a more stable salinity regime for marine species in the estuaries due to a reduction in large freshwater pulse releases from Lake Okeechobee with CERP features such as more water storage, decreased acreage of levees acting as barriers to sheetflow, and increased overland freshwater flows throughout south Florida (CEPP PIR/EIS Annex E – RECOVER System-wide Evaluation).

6.2 Sea Turtles

There are five species of sea turtles (green, hawksbill, Kemp's ridley, leatherback, and loggerhead) that may be affected within the action area due to habitat alteration. Although these species may be present in the action area, adverse effects would not be expected to occur to them or their habitat due to the alteration of freshwater flows. On the contrary, increased freshwater flows to the estuaries would potentially benefit the species by better regulating the frequency of high volume freshwater discharges as well as regulating low flow events from Lake Okeechobee to the Caloosahatchee and St. Lucie River estuaries. Increased freshwater flows to the estuaries due to CERP are expected to regulate the salinity regime within the estuaries, thereby beneficially affecting seagrass foraging habitat. This beneficial regulation of salinity regimes is documented in the RECOVER system-wide evaluation, as well as the Habitat Modeling for CEPP (CEPP PIR/EIS Annex E and G). CERP expects to increase freshwater flows to Florida Bay; however, this would not alter the foraging base for the leatherback and is therefore unlikely to be impacted by activities in the proposed action. Based on the above discussion, we consider the potential for impacts to sea turtles to be discountable and they are not likely to be adversely affected by the program.

6.3 Smalltooth Sawfish and its Critical Habitat

Smalltooth sawfish and its critical habitat are within the action area that may be affected by the programmatic effects of CERP on freshwater flow and hydrology. The critical habitat consists of two units: the Charlotte Harbor Estuary Unit (CHEU) located in Charlotte and Lee Counties, which comprises approximately 221,459 acres (346 mi^2) of coastal habitat; and the Ten Thousand Islands/Everglades Unit, located in Collier, Monroe, and Miami-Dade Counties, which comprises approximately 619,013 acres (967 mi^2) of coastal habitat. The essential features of critical habitat are red mangroves and shallow, euryhaline waters less than 3 feet mean lower low water (MLLW). The only essential feature of critical habitat that would be affected by the proposed action is mangroves. NMFS has identified the following potential effects to smalltooth sawfish and its critical habitat, and concluded they will not likely be adversely affected by the program.

The goal and expectation of CERP is to decrease large freshwater pulse releases from Lake Okeechobee to the estuaries, and specific to the sawfish, the Caloosahatchee estuary which

contains critical habitat. The change in freshwater flows throughout central and south Florida would benefit the sawfish with more stable salinity regimes in the estuaries as well as providing more historic overland flows to Ten Thousand Islands and Florida Bay, thereby improving mangrove wetland habitat[10].

The ideal salinity range for sawfish is 18- 30 parts per thousand (ppt) (Poulakis et al 2011[11]). CEPP used salinity envelopes in their model by range of tolerability for tape grass (*Vallisneria Americana*) and oysters, which have a similar range to sawfish at 16-28 psu, with this range considered beneficial and less harmful to estuarine flora and fauna (USACE 2013 Appendix E[12]).

CEPP modeling results indicate that at Shell Point (Figure 12), which is within sawfish critical habitat, salinity is increased within the ideal range for oysters (16-28) from existing conditions at 8,569 psu to 9,870 psu with CEPP due to the reduction of freshwater pulse releases from Lake Okeechobee. Since the sawfish range is similar to the oyster, this increase in salinity at Shell Point (lower estuary) would benefit the smalltooth sawfish and its critical habitat as the salinity is better than current conditions.

The salinity regimes also improved at Cape Coral (middle estuary) from existing conditions to the FWO, and then improved more with CEPP (Table 4).

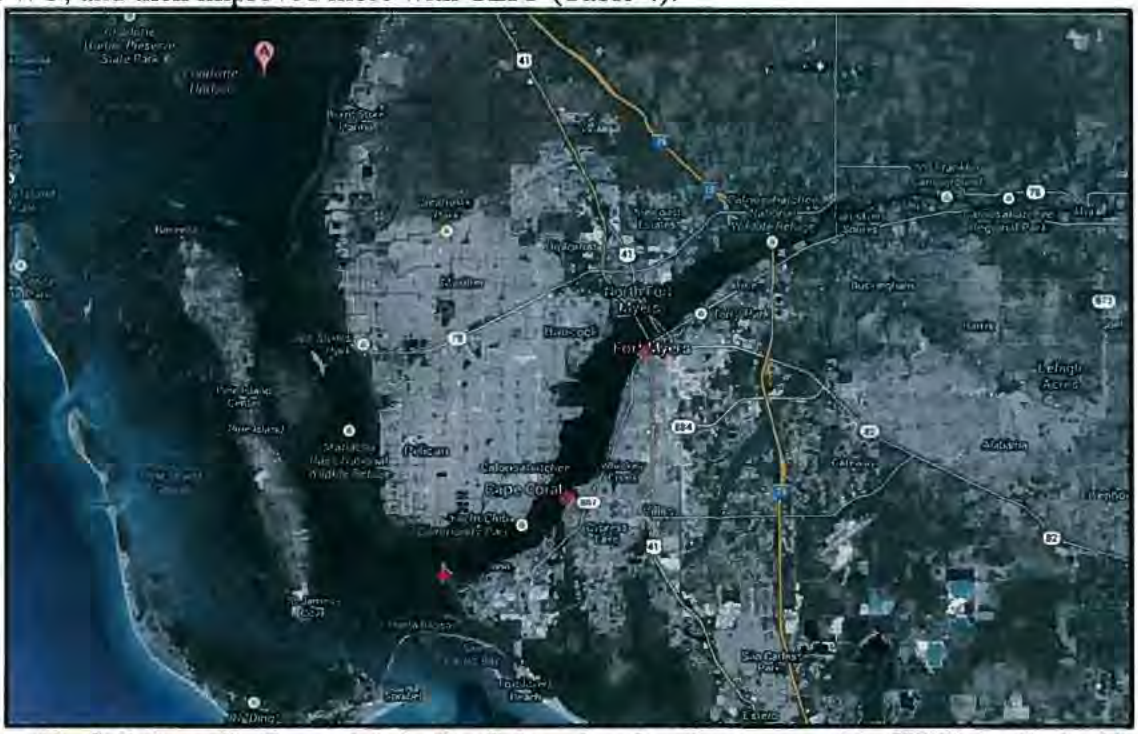

Figure 12. Salinity collection points in the Caloosahatchee Estuary used in CEPP Analysis. The red dots indicate where information was collected.

[10] http://www.evergladesplan.org/pm/recover/recover_docs/et/ne_pm_salinityenvelopes.pdf pg 9

[11] Poulakis, G.R., Stevens, P.W., Timmers, A.A., Wiley, T.R., and Simpfendorfer, C.A. (2011). Abiotic affinities and spatiotemporal distribution of the endangered smalltooth sawfish, *Pristis pectinata*, in a south-western Florida nursery. Marine and Freshwater Research. Available online (www.publish.csiro.au/journal/mfr)

[12] USACE 2013. Draft Project Implementation Report and Environmental Impact Statement for the Central Everglades Planning Project. Appendix E – RECOVER System-wide Evaluation. Jacksonville, FL.

Table 4. Distribution of daily average salinity modeled at Cape Coral Bridge. Table extracted from Annex E, RECOVER system-wide evaluation of CEPP.

Salinity ranges	Existing Conditions	FWO	CEPP
<16 psu	8596	8461	8025
16-28 psu	5640	6404	6772
>28	733	110	178

Implementation of CERP could benefit the smalltooth sawfish and its critical habitat with more stable salinity regimes in the estuaries as described above, and is consistent with the objectives of the Sawfish Recovery Plan[13], which states that one of the causes of sawfish decline was the diversion of freshwater runoff to the coast and throughout Ten Thousand Islands. CERP goals are in line with conservation aspects in the recovery plan to minimize or eliminate the disruption of natural and historic freshwater flow regimes (including timing, distribution, quality, and quantity) and maintain or restore water quality to ensure long term viability of sawfish. The potential restored hydrology provided by CERP would increase the periodic inundation of the downstream mangrove wetlands, which depend on this periodic inundation; the lack of freshwater from upstream sources contributes to their degradation. Based on the above discussion, we consider the potential programmatic effects to smalltooth sawfish and its critical habitat from freshwater flow to be beneficial and are therefore not likely to be adversely affected.

6.4 Johnson's Seagrass

Johnson's seagrass and its critical habitat have the potential to be affected within the action area in the St. Lucie estuary as well as the southern estuaries. The essential features of Johnson's seagrass critical habitat are: (1) adequate water quality; (2) adequate salinity levels; (3) adequate water transparency; and (4) stable, unconsolidated sediments that are free from physical disturbance. All four essential features must be present in an area for it to function as critical habitat for Johnson's seagrass.

Based on a study by Virnstein (1997[14]) in the Indian River Lagoon area (CERP project), the reduced high volume discharge to the northern estuaries due to implementation of CERP would benefit seagrass due to decreased siltation, increased water clarity, and more stable salinity envelopes, thus also beneficially affecting the features of Johnson's critical habitat. In the RECOVER annual report (2009[15]), the Interim Goals on Seagrass section suggest that Johnson's seagrass is expected to expand with improved salinity conditions. Analysis performed by the RECOVER team in 2013 for CEPP revealed that salinity envelopes for seagrasses improved with CEPP in the northern estuaries, Florida Bay, and Biscayne Bay. Based on the above discussion, we consider the potential for impacts to Johnson's seagrass and its critical habitat to be beneficial and this species is not likely to be adversely affected.

6.5 Corals

Elkhorn and staghorn coral and their critical habitat occur on the Atlantic side of Florida and have the potential to be affected by CERP. For elkhorn and staghorn coral, the physical feature

[13] NMFS. 2009. Recovery Plan for Smalltooth Sawfish (*Pristis pectinata*).

[14] Virnstein, R.W., L.J. Morris, J.D. Miller, and R. Miller-Myers. 1997. Distribution and abundance of Halophila johnsonii in the Indian River Lagoon. St. Johns River Water Management District Technical Memorandum #24. November 1997. 14 pp.

[15] USACE, 2009. RECOVER: 2009 System Status Report. http://www.evergladesplan.org/pm/ssr_2009/ssr_main.aspx

of critical habitat essential to the conservation of the species is substrate of suitable quality and availability, in water depths from the mean high water line to 30 meters, to support successful larval settlement, recruitment, and reattachment of fragments. Substrate of suitable quality and availability means consolidated hardbottom or dead coral skeletons free from fleshy macroalgae and sediment cover.

Proposed listed species of corals include the elliptical star coral, Lamarck's sheet coral, star coral, mountainous star coral, pillar coral, rough cactus coral, and boulder star coral that are located on the Atlantic and Caribbean side of Florida could also have the potential to be affected by CERP. Program effects include alteration of habitat due to changes in freshwater distribution throughout south Florida. Habitat suitability and quality are factors impacting recovery of the two listed species (http://sero.nmfs.noaa.gov/pr/esa/acropora.htm). Although the action area of CERP encompasses the shoreline, effects from freshwater flow alterations are not expected to reach the proximity of corals and their critical habitat. However, the southern estuaries are expected to receive more overland freshwater flows, thereby providing more stable salinity regimes within the southern coastal systems (see Section 6.1.2, Annex E of the CEPP PIR/EIS or Appendix G – Benefits Model of the CEPP PIR/EIS). Based on the above discussions, we consider the potential for impacts to corals and their critical habitat to be beneficial and are not likely to be adversely affected.

7.0 Conclusion and Next Steps

Based on our analysis, we concur with the USACE's determination that CERP is not likely to adversely affect any listed species or their designated critical habitat under our purview. CERP system-wide evaluation reports are provided to all agencies every four to five years and will be reviewed by NMFS. All reports are posted to the web: http://www.evergladesplan.org/pm/recover/assess_team.aspx. Because this is an ongoing action and involves assumptions about future individual projects, USACE has a continuing duty to ensure the program and its effects are not modified in a way that requires reinitiation of consultation, or that reinitiation is required due to new species listings or critical habitat designations in the future. As part of this responsibility, USACE will review all projects covered by this consultation as authorization to construct them is sought, to ensure that their locations and construction activities are not different than as evaluated in this consultation to the extent it requires additional consultation with NMFS.

This concludes the USACE's consultation responsibilities under the ESA for species under NMFS's purview. Consultation must be reinitiated if a take occurs or new information reveals effects of the action not previously considered, or the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat in a manner or to an extent not previously considered, or if a new species is listed or critical habitat designated that may be affected by the identified action.

Additional relevant information is enclosed for your review. We look forward to further cooperation with you on other projects to ensure the conservation of our threatened and endangered marine species and designated critical habitat.

If you have any questions on this consultation, please contact Kay Davy, consultation biologist, at (727) 415-9271, or by e-mail at kay.davy@noaa.gov.

Sincerely,

Miles M. Croom

for Roy E. Crabtree, Ph.D.
Regional Administrator

Enc.: 1. *Sea Turtle and Smalltooth Sawfish Construction Conditions* (Revised March 23, 2006)
2. *PCTS Access and Additional Considerations for ESA Section 7 Consultations* (Revised June 11, 2013)
3. Prior NMFS Concurrence Documentation for CERP Projects

cc: F/SER4 – Kay Davy

File: 1514-22.F.4

ACRONYMS AND ABBREVIATIONS

BA	Biological Assessment
C-43	Caloosahatchee River Project(C-43)
C&SF	Central and South Florida
CEPP	Central Everglades Planning Project
CERP	Comprehensive Everglades Restoration Plan
CH	Critical Habitat
cfs	Cubic Feet per Second
EAA	Everglades Agricultural Area
EIS	Environmental Impact Statement
ENP	Everglades National Park
ESA	Endangered Species Act
FWO	Future Without Project
IRL-S	Indian River Lagoon South Feasibility Study
LNWR	Loxahatchee National Wildlife Refuge
LORS	Lake Okeechobee Regulation Schedule
MAP	Monitoring and Assessment Plan
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
PIR	Project Implementation Reports
Psu	Pratical Salinity Units
RECOVER	REstoration COordination VErification
SAV	Submerged Aquatic Vegetation
STA	Stormwater Treatment Area
USACE	U.S. Army Corps of Engineers
WCA	Water Conservation Areas
WRDA	Water Resources Development Act

SEA TURTLE AND SMALLTOOTH SAWFISH CONSTRUCTION CONDITIONS
(REVISED MARCH 23, 2006)

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701

SEA TURTLE AND SMALLTOOTH SAWFISH CONSTRUCTION CONDITIONS

The permittee shall comply with the following protected species construction conditions:

a. The permittee shall instruct all personnel associated with the project of the potential presence of these species and the need to avoid collisions with sea turtles and smalltooth sawfish. All construction personnel are responsible for observing water-related activities for the presence of these species.

b. The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing sea turtles or smalltooth sawfish, which are protected under the Endangered Species Act of 1973.

c. Siltation barriers shall be made of material in which a sea turtle or smalltooth sawfish cannot become entangled, be properly secured, and be regularly monitored to avoid protected species entrapment. Barriers may not block sea turtle or smalltooth sawfish entry to or exit from designated critical habitat without prior agreement from the National Marine Fisheries Service's Protected Resources Division, St. Petersburg, Florida.

d. All vessels associated with the construction project shall operate at "no wake/idle" speeds at all times while in the construction area and while in water depths where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will preferentially follow deep-water routes (e.g., marked channels) whenever possible.

e. If a sea turtle or smalltooth sawfish is seen within 100 yards of the active daily construction/dredging operation or vessel movement, all appropriate precautions shall be implemented to ensure its protection. These precautions shall include cessation of operation of any moving equipment closer than 50 feet of a sea turtle or smalltooth sawfish. Operation of any mechanical construction equipment shall cease immediately if a sea turtle or smalltooth sawfish is seen within a 50-ft radius of the equipment. Activities may not resume until the protected species has departed the project area of its own volition.

f. Any collision with and/or injury to a sea turtle or smalltooth sawfish shall be reported immediately to the National Marine Fisheries Service's Protected Resources Division (727-824-5312) and the local authorized sea turtle stranding/rescue organization.

g. Any special construction conditions, required of your specific project, outside these general conditions, if applicable, will be addressed in the primary consultation.

Revised: March 23, 2006

PCTS ACCESS AND ADDITIONAL CONSIDERATIONS FOR ESA SECTION 7 CONSULTATIONS (REVISED JUNE 11, 2013)

PCTS Access and Additional Considerations for ESA Section 7 Consultations
(Revised 7-15-2009)

Public Consultation Tracking System (PCTS) Guidance: PCTS is an online query system at **https://pcts.nmfs.noaa.gov/** that allows federal agencies and U.S. Army Corps of Engineers' (COE) permit applicants and their consultants to ascertain the status of NMFS' Endangered Species Act (ESA) and Essential Fish Habitat (EFH) consultations, conducted pursuant to ESA section 7, and Magnuson-Stevens Fishery Conservation and Management Act's (MSA) sections 305(b)2 and 305(b)(4), respectively. Federal agencies are required to enter an agency-specific username and password to query the Federal Agency Site. The COE "Permit Site" (no password needed) allows COE permit applicants and consultants to check on the current status of Clean Water Act section 404 permit actions for which NMFS has conducted, or is in the process of conducting, an ESA or EFH consultation with the COE.

For COE-permitted projects, click on "Enter Corps Permit Site." From the "Choose Agency Subdivision (Required)" list, pick the appropriate COE district. At "Enter Agency Permit Number" type in the COE district identifier, hyphen, year, hyphen, number. The COE is in the processing of converting its permit application database to PCTS-compatible "ORM." An example permit number is: SAJ-2005-000001234-IPS-1. For the Jacksonville District, which has already converted to ORM, permit application numbers should be entered as SAJ (hyphen), followed by 4-digit year (hyphen), followed by permit application numeric identifier with no preceding zeros. For example: SAJ-2005-123; SAJ-2005-1234; SAJ-2005-12345.

For inquiries regarding applications processed by COE districts that have not yet made the conversion to ORM (e.g., Mobile District), enter the 9-digit numeric identifier, or convert the existing COE-assigned application number to 9 numeric digits by deleting all letters, hyphens, and commas; converting the year to 4-digit format (e.g., -04 to 2004); and adding additional zeros in front of the numeric identifier to make a total of 9 numeric digits. For example: AL05-982-F converts to 200500982; MS05-04401-A converts to 200504401. PCTS questions should be directed to Eric Hawk at Eric.Hawk@noaa.gov. Requests for username and password should be directed to PCTS.Usersupport@noaa.gov.

EFH Recommendations: In addition to its protected species/critical habitat consultation requirements with NMFS' Protected Resources Division pursuant to section 7 of the ESA, prior to proceeding with the proposed action the action agency must also consult with NMFS' Habitat Conservation Division (HCD) pursuant to the MSA requirements for EFH consultation (16 U.S.C. 1855 (b)(2) and 50 CFR 600.905-.930, subpart K). The action agency should also ensure that the applicant understands the ESA and EFH processes; that ESA and EFH consultations are separate, distinct, and guided by different statutes, goals, and time lines for responding to the action agency; and that the action agency will (and the applicant may) receive separate consultation correspondence on NMFS letterhead from HCD regarding their concerns and/or finalizing EFH consultation.

Marine Mammal Protection Act (MMPA) Recommendations: The ESA section 7 process does not authorize incidental takes of listed or non-listed marine mammals. If such takes may occur an incidental take authorization under MMPA section 101 (a)(5) is necessary. Please contact NMFS' Permits, Conservation, and Education Division at (301) 713-2322 for more information regarding MMPA permitting procedures.

NMFS's PRIOR CONCURRENCE

Biscayne Bay Coastal Wetlands

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701-5505
(727) 824-5312, FAX (727) 824-5309
http://sero.nmfs.noaa.gov

F/SER31:AL

NOV 0 3 2011

Ms. Rebecca S. Griffith
Environmental Branch
Planning Division
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, FL 32232-0019

Re: Biscayne Bay Coastal Wetlands (BBCW) Project and Recommendation for Programmatic Consultation on the Comprehensive Everglades Restoration Plan and Implementation

Dear Ms. Griffith:

This responds to your June 16, 2010, letter and October 2008 biological assessment (BA) regarding the subject Corps of Engineers' (COE) project located in coastal wetlands adjacent to Biscayne Bay in Miami-Dade County, Florida. The BBCW project is a component of the larger Comprehensive Everglades Restoration Plan (CERP). The primary purpose of the BBCW project is to redistribute freshwater runoff from the watershed away from the existing canal discharges and into the coastal wetlands adjoining Biscayne Bay to provide a more natural and historic overland flow of freshwater through existing coastal wetlands (BA, page A4-5). The proposed BBCW project will include pumps, a spreader canal, canal staging, and several culvert structures to manage freshwater flows for optimal restoration opportunities to adjacent freshwater and saltwater wetlands. You determined that the proposed activity may affect, but is not likely to adversely affect smalltooth sawfish and five species of sea turtles (loggerhead, leatherback, green, hawksbill, and Kemp's ridley), and requested the National Marine Fisheries Service's (NMFS) concurrence, pursuant to Section 7 of the Endangered Species Act (ESA). In addition, you determined that the proposed activity would not affect Johnson's seagrass, elkhorn coral, or staghorn coral.

Consultation History

By letter dated June 18, 2007, the COE submitted a BA and request for ESA Section 7 consultation with NMFS on the BBCW Acceler8 project. By letter dated August 30, 2007, NMFS concurred with the COE's determination that implementation of the BBCW Acceler8 project may affect, but is not likely to adversely affect, smalltooth sawfish. The Project Implementation Report (PIR), Environmental Impact Statement (EIS), and BA are written for this project only. However, the BBCW is part of the larger CERP program evaluated in a programmatic EIS, and as such, NMFS requested additional information from the COE (via phone and e-mail on 10/3/11, 10/17/11, and 10/20/11) which was received via e-mail on

10/17/11, 10/19/11, 10/20/11, and 10/26/11. The purpose of our request was to assess the need for a programmatic ESA Section 7 consultation that would evaluate the potential effects of the CERP program on listed species and designated critical habitat under NMFS' purview. A summary of the CERP projects is provided below under Conclusion and Next Steps. The Project Description and the Effects Analysis below pertain only to the BBCW project.

To evaluate potential effects of the CERP program on listed species and critical habitat under our purview, NMFS sought additional information on the CERP program and individual projects on the CERP website (http://www.evergladesplan.org/pm/projects/landing_projects.aspx). Based on our review, there are 13 CERP projects in various stages of planning and/or construction. Of these, NMFS determined that seven of the projects may affect listed species and/or designated critical habitat under our purview; one of those projects is the subject of this consultation. The other six projects have either been constructed or would have no effect on listed species or designated critical habitat under our purview. The status of these projects is summarized below:

- C-111 Spreader Canal: On 7 May 2009, the COE requested concurrence with NMFS on its determination of may affect, but is not likely to adversely affect smalltooth sawfish and sea turtles. In addition, the COE determined that the project would not modify critical habitat for elkhorn or staghorn coral. Critical habitat for the smalltooth sawfish had not been designated until after publication of the final PIR/EIS. After further discussion with NMFS, the COE changed their determinations to no effect for each species and their designated critical habitat, and NMFS concurred by email on 6 August 2009. Per COE, construction is complete for this project; therefore, reinitiation is not required.

- Site 1 Impoundment: On 16 February 2005, the COE requested concurrence with NMFS on its determination of no effect on the smalltooth sawfish and opossum pipefish downstream of the project area. By letter dated 18 February 2005, NMFS concurred with the COE's no effect determination. Per COE, construction is complete for this project.

- Indian River Lagoon South Feasibility Study: On 18 March 2002, NMFS concurred with the COE's determination of may affect, but is not likely to adversely affect sea turtles, Johnson's seagrass, and Johnson's seagrass designated critical habitat. The COE stated that construction is not complete and reinitiation of ESA Section 7 consultation with NMFS is needed to evaluate potential effects on smalltooth sawfish (e-mail from Bradley Tarr, COE, 10-20-11). The project is not located in designated critical habitat for smalltooth sawfish.

- Caloosahatchee River (C-43) West Basin Storage Reservoir: By letter dated 18 March 2002, NMFS stated that only the Gulf sturgeon could potentially be affected by the proposed action, but concluded that the project would not adversely affect the species. On 10 January 2007, the COE submitted a revised BA to the FWS and NMFS. NMFS concurred with the COE's determination of "may affect, but is not likely to adversely affect" sea turtles and smalltooth sawfish by letter dated 20 July 2007. NMFS designated critical habitat for smalltooth sawfish on September 2, 2009. Although the project site is not located within critical habitat, it is located upstream from smalltooth sawfish critical

habitat. If construction has not been completed for this project, NMFS recommends that the COE reinitiate Section 7 consultation and address its effects in a programmatic consultation as we believe the project may affect downstream designated critical habitat for smalltooth sawfish.

- Picayune Strand Restoration Project: On 20 October 2004, the COE requested concurrence with NMFS on its determination of may affect, but is not likely to adversely affect the smalltooth sawfish, the green sea turtle, Kemp's ridley sea turtle and the loggerhead sea turtle. As stated in the Biological Assessment published in the final PIR/EIS, NMFS concurred with the COE's effect determination for those species. This project intends to re-establish sheetflow to the Ten Thousand Islands, which has been designated as critical habitat for the smalltooth sawfish; therefore, re-initiation of consultation with NMFS is required and effects should be evaluated programmatically along with the other projects that have the potential to affect critical habitat.

- Everglades National Park (ENP) Seepage Management Project: As envisioned, this project is comprised of three components: L-31N Improvements for Seepage Management, S-356 Structures, and Bird Drive Recharge Area. These three components would work to improve freshwater deliveries to Northeast Shark River Slough and restore wetland hydroperiods and hydropatterns in ENP via seepage management. Planning efforts proceeded up to the formulation of an initial array of alternatives; however, the project is on hold until related projects can develop the best possible solutions for seepage management out of ENP. Therefore, ESA consultation on this project should be included in the proposed programmatic consultation no later than when the project planning resumes.

Based on the preceding, it is evident that some of the projects listed above (e.g., Indian River Lagoon South, C-43, Picayune Strand, and ENP) may affect one or more listed species or critical habitats under NMFS jurisdiction, and may have additive effects. Therefore, we recommend that the COE request a programmatic consultation with NMFS in order to assess potential effects of the CERP program on listed species and designated critical habitat under our purview. In the interim, we concur with the COE's determination that implementation of the BBCW project may affect, but is not likely to adversely affect smalltooth sawfish and sea turtles and that proceeding with this project pending completion of the programmatic consultation will not violate ESA sections 7(a)(2) or 7(d). Our project specific effects analysis on the BBCW project in support of that conclusion is included below.

BBCW Project Description and Effects Analysis

Based on discussions with the SFWMD, we understand that the Deering Estate and Cutler Flow Way components of the BBCW Acceler8 project are near completion (John Shaffer, SFWMD Project Manager, pers. comm. by telephone to Audra Livergood, NMFS, August 5, 2010). In addition, four culverts have been installed within the L-31E component of the Acceler8 project. No mangrove impacts are proposed for the Deering Estate component of Acceler8 or BBCW Phase 1. However, filling of mosquito ditches in the Cutler Flow Way will entail several acres of mangrove impacts. Mangrove impacts are also proposed under the L-31E component of the

BBCW Phase 1 project. Both of these components (including mangrove impacts) are discussed in greater detail below.

As described in the BA, the BBCW project objectives are to:

- Re-establish productive nursery habitat along the shoreline;
- Redistribute freshwater flow to minimize point source discharges to improve freshwater and estuarine habitat;
- Enhance and improve quantity, quality, timing, and distribution of freshwater to Biscayne Bay, including Biscayne National Park;
- Preserve and restore spatial extent of natural coastal glades habitat;
- Re-establish connectivity between the BBCW, C-111 Basin, Model Lands, and adjacent basins; and
- Restore nearshore and tidal wetland salinity regimes.

The goal of the project is to rehydrate coastal wetlands and reduce point source freshwater discharges into Biscayne Bay by replacing lost overland flow and partially compensating for the reduction in groundwater seepage by redistributing, through a spreader system, available surface water entering the area from regional canals. The proposed redistribution of freshwater across a broad front is expected to restore or enhance tidal wetlands and nearshore bay habitat. Diversion of canal discharges into coastal wetlands, as opposed to their direct discharge into Biscayne Bay, is expected to re-establish productive nursery habitat along the shoreline and reduce abrupt freshwater discharges that are physiologically stressful to fish and benthic invertebrates in Biscayne Bay near the canal discharge points (BA, page A4-8).

The project area is approximately 11,000 acres and is located in southeast Miami-Dade County, Florida (figures attached). It is comprised of three components: (1) the Deering Estate, (2) the Cutler Wetlands C-1 Flow Way, and (3) the L-31E Culverts. The Deering Estate includes the Power's Addition Parcel, also known as the Cutler Glade Rehydration Area. Features of this component include an extension of the C-100A Spur Canal, construction of a freshwater wetland on the Power's Addition Parcel, and delivery of freshwater under Old Cutler Road to the Cutler Drain and to the coastal wetlands along Biscayne Bay. The Spur Canal extension and freshwater wetland would run approximately 500 feet through the Power's Addition Parcel. The pump station required to move the water is located on the Power's Addition Parcel and has 100 cubic feet per second total capacity. The pump would discharge to a surcharge chamber and then to a 60-inch-diameter discharge pipe running under Old Cutler Road and to the outlet structure on the east side of Old Cutler Road. No other structures are proposed downstream of the outlet structure as the Cutler Drain is found immediately east of the roadway. Based on Table A4-2 in the BA, no mangrove impacts are anticipated from this component of the project.

The second component of the project is the Cutler Wetlands C-1 Flow Way. Features of this component include a pump station, a conveyance canal, culverts for roadway and canal crossings, and a spreader canal. This component also includes plugging and filling of mosquito ditches found in the saltwater wetlands east of the L-31E Levee and Canal. According to the BA, the intent is to discourage the channelization of freshwater delivered to the area by the spreader canals. Currently, the mangrove wetlands that have been impacted by mosquito ditches

are not receiving adequate amounts of freshwater, especially during times of drought. The plugging and filling of the ditches should help alleviate the channelization of freshwater and should restore a more natural flow of freshwater to rehydrate these wetlands. Based on Table A4-2 in the BA, the COE estimates 2.1 acres of mangroves would be impacted by filling/plugging approximately 2,500 linear feet of mosquito ditches. In addition to filling/plugging of mosquito ditches and rehydrating the wetlands, this component also includes removal of exotic vegetation.

The third component of the project is the L-31E Culverts. This component is divided into the L-31 North area (described in the BA as the portion of the project between the C-1 Canal to the north and the Military Canal to the south) and the L-31 South area (described in the BA as the portion of the project between the Military Canal to the north and the North Canal to the south). Features of this component include installing structures that would isolate the L-31E Canal from the major discharge canals (C-102 Canal and the Military Canal) as well as gated riser culverts (L-31E Culverts) that would deliver water from the L-31E Canal, through the L-31E Levee, and discharge freshwater into the saltwater wetlands to the east. In addition, a pump station would be constructed to mimic the intent of the L-31E Culverts by pumping water over the L-31E Levee and delivering it to the saltwater wetlands. The L-31E component involves the installation of ten culverts (five in the L-31 North area and five in the L-31 South area). The culverts would gravity discharge to the east at the edge of the wetlands. Flap gates would be installed on the culverts to prevent saltwater intrusion during periods of high tide when the tailwater elevation could exceed the headwater elevation. The purpose of the culverts is to rehydrate the adjacent saltwater wetlands and restore a more natural flow of freshwater into Biscayne Bay. Based on Table A4-2 in the BA, the COE proposes approximately 3 acres of mangrove impacts from the L-31E component (via installation of pumps, culverts, and the spreader canal). In addition to installing culverts to benefit saltwater wetlands (i.e., mangrove-dominated wetlands), L-31E includes a freshwater wetland component. The freshwater wetland component includes two pump stations, a spreader canal, a small berm, and a seepage collector ditch. Once filled, the spreader canal would deliver overland freshwater flows to the freshwater wetland. To help alleviate flooding concerns to the west of the spreader canal, a small berm and seepage collector ditch would be constructed immediately to the west of the spreader canal.

In summary, the proposed action may involve construction impacts to approximately 5.1 acres of mangrove habitat (2.1 acres in the Cutler C-1 Flow Way and 3 acres in the L-31E component). The BA states the project will adhere to the NMFS' March 23, 2006, Sea Turtle and Smalltooth Sawfish Construction Conditions (enclosed).

The project is located south of the known range of Johnson's seagrass; therefore, NMFS believes the project would have no effect on Johnson's seagrass. Two listed species of coral, elkhorn coral (*Acropora palmata)* and staghorn coral (*Acropora cervicornis),* are known to occur within the waters of Biscayne Bay and Biscayne National Park. However, NMFS believes there would be no effect on these species because they are not found within or near the project area. There is no designated critical habitat under NMFS' purview within the project area.

Five species of sea turtles (loggerhead, green, Kemp's ridley, hawksbill, and leatherback) and smalltooth sawfish, protected by the ESA and under NMFS' purview, are known to occur within

or near the project area (in Biscayne Bay). NMFS believes smalltooth sawfish and sea turtles may be affected by the proposed work. Potential direct effects from the proposed action include adverse effects resulting from construction activities in red mangroves and nearshore waters. Potential indirect effects include habitat loss and/or alteration.

NMFS believes that direct effects from the proposed action are extremely unlikely to occur and therefore discountable. Smalltooth sawfish and sea turtles are highly mobile and likely to move away from the work area during construction. In addition, the applicant has agreed to follow the enclosed construction conditions.

NMFS believes smalltooth sawfish may be indirectly affected by habitat loss and/or alteration. The Cutler Flow Way segment of the project proposes approximately 2.1 acres of mangrove impacts via backfilling and plugging of mosquito ditches. In addition, the L-31E component of the project proposes approximately 3 acres of construction-related mangrove impacts associated with the installation of pumps, culverts, and the spreader canal. Combined, these two components propose approximately 5.1 acres of construction-related mangrove impacts. NMFS believes the 2.1 acres of mangroves within the Cutler Flow Way segment are inaccessible to sawfish because these mangroves are impounded (i.e., they are not tidally connected to Biscayne Bay). Therefore, we believe the proposed action would only affect 3 acres of red mangrove habitat that is potentially utilized by sawfish. While NMFS acknowledges that approximately 3 acres of red mangroves may be adversely affected during construction, we believe that the overall project purpose (i.e., rehydrating coastal wetlands and restoring a more natural flow of freshwater into Biscayne Bay) may benefit smalltooth sawfish. The mangroves in this area exist within a hypersaline regime. Most juvenile smalltooth sawfish have an affinity for salinity between 18 and 30 psu.[1] The proposed action would not permanently alter the salinity regime such that it would fall outside of this range; however, during extremely wet periods, salinity in the nearshore environment may fall below 18 psu for a short duration until the freshwater from land mixes with the nearshore waters of the bay (personal communication, Bradley Tarr, COE, October 28, 2011). NMFS believes juvenile smalltooth sawfish that potentially utilize red mangroves in the project area would be able to physiologically tolerate salinities below 18 psu for a short duration. In a recent study, juvenile smalltooth sawfish were captured at the mouth of the Caloosahatchee River during a period of low salinity (between 3.1-9.0 psu) caused by increased freshwater flow. These individuals remained in the study area for as long as 473 days.[2] Based on these findings, Poulakis *et al.* 2011 conclude "the water conditions observed during the capture of these sawfish probably does not reflect an affinity for low salinity, but rather a tolerance, because they remained in the river rather than egressing to the open bay to find higher salinities." Based on the preceding, NMFS believes juvenile sawfish that may be found in the project area are likely to tolerate a temporary reduction in salinity (below 18 psu) for a short duration and are not likely to be adversely affected.

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[1] Poulakis, G.R., Stevens, P.W., Timmers, A.A., Wiley, T.R., and Simpendorfer, C.A. (2011). Abiotic affinities and spatiotemporal distribution of the endangered smalltooth sawfish, *Pristis pectinata*, in a south-western Florida nursery. Marine and Freshwater Research. Available online (www.publish.csiro.au/journal/mfr) [published online 12 August 2011].

[2] Simpendorfer, C.A., Yeiser, B.G., Wiley, T.R., Poulakis, G.R., Stevens, P.W., and Heupel, M.R. (2011). Environmental influences on the spatial ecology of juvenile smalltooth sawfish (*Pristis pectinata*): results from acoustic monitoring. *PLoS ONE* 6, e16918. Doi:10.1371/JOURNAL.PONE.0016918.

The proposed installation of culverts would rehydrate mangrove wetlands by restoring a more natural flow of freshwater to these wetlands and Biscayne Bay. NMFS believes the restoration of more natural freshwater flows to the mangroves and the bay may provide an ecological benefit to Biscayne Bay and smalltooth sawfish that potentially utilize red mangrove habitat in this area. In addition, the Cutler Flow Way component also proposes the removal of exotic vegetation, which may indirectly benefit coastal wetlands. NMFS believes the project may have a net benefit on smalltooth sawfish by rehydrating mangrove wetlands, enhancing coastal wetland function, and reducing harmful point source discharges from the major conveyance canals. We believe indirect effects due to habitat loss/alteration from the project are insignificant.

In addition to smalltooth sawfish, NMFS believes the project may affect sea turtles by habitat alteration. Foraging habitat for several sea turtle species (e.g., loggerhead, green, and Kemp's ridley) is present in the project area. NMFS believes there is the potential for changes in the species composition of seagrasses in the project area due to an increase in the amount of freshwater delivery to the coastal wetlands and nearshore waters of the project area. However, we concur with the FWS (November 18, 2009, concurrence letter from FWS to the COE for the BBCW project) that lowering salinities in the nearshore waters of the project area is not anticipated to reduce seagrass abundance in the project area; therefore, we believe the project is not likely to adversely affect sea turtles due to potential changes in their foraging habitat. Moreover, the proposed action may indirectly benefit sea turtles by minimizing harmful freshwater pulse releases and point-source discharges from the major conveyance canals, which may improve nearshore water quality and nearshore foraging habitat.

Conclusion and Next Steps

Based on our analysis, we concur with the COE's determination that the BBCW project is not likely to adversely affect any listed species under our purview and we concur with COE's determination that proceeding with the project will not violate sections 7(a)(2) and 7(d) pending completion of the recommended programmatic consultation. Be advised that the consultation on this particular project must be reinitiated if a take occurs or new information reveals effects of the action not previously considered, or the identified action is subsequently modified in a manner that causes an effect to listed species or critical habitat in a manner or to an extent not previously considered, or if a new species is listed or critical habitat designated that may be affected by the identified action.

We have enclosed additional information on other statutory requirements that may apply to this action, as well as information on NMFS' Public Consultation Tracking System (PCTS) that allows you to track the status of ESA consultations. We look forward to further cooperation with you on other projects to ensure the conservation of our threatened and endangered marine species and designated critical habitat. If you have any questions on this consultation or PCTS, please contact Audra Livergood at (954) 356-7100, or by e-mail at Audra.Livergood@noaa.gov.

Sincerely,

Miles M. Croom

for Roy E. Crabtree, Ph.D.
Regional Administrator

Enclosures (2)

File: 1514-22.F.4
Ref: I/SER/2010/02615

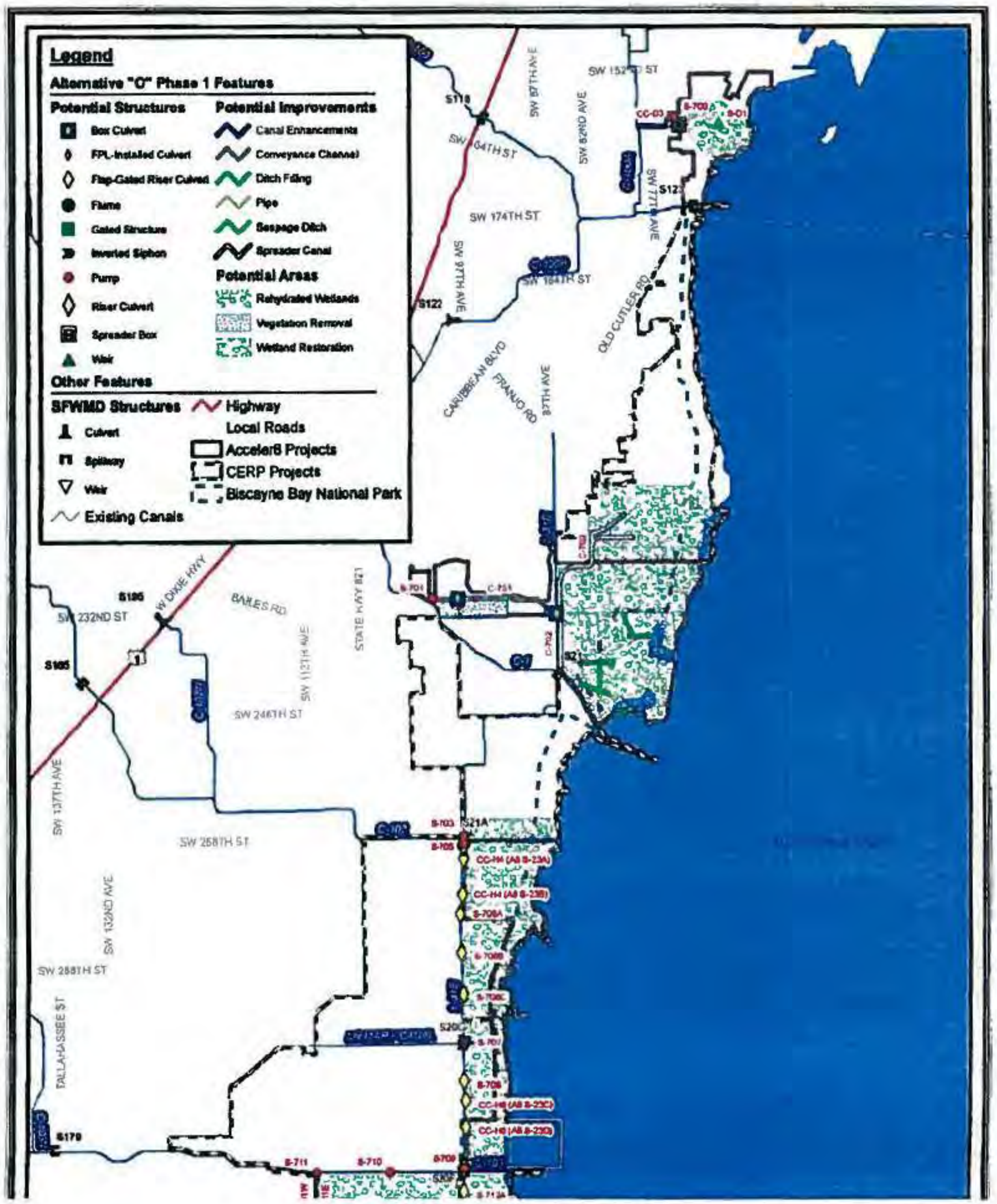
Legend
Alternative "O" Phase 1 Features
Potential Structures
Box Culvert
FPL-Installed Culvert
Flap-Gated Riser Culvert
Flume
Gated Structure
Inverted Siphon
Pump
Riser Culvert
Spreader Box
Weir
Potential Improvements
Canal Enhancements
Conveyance Channel
Ditch Filling
Pipe
Seepage Ditch
Spreader Canal
Potential Areas
Rehydrated Wetlands
Vegetation Removal
Wetland Restoration
Other Features
SFWMD Structures
Culvert
Spillway
Weir
Existing Canals
Highway
Local Roads
Acceler8 Projects
CERP Projects
Biscayne Bay National Park
SW 87TH AVE
SW 82ND AVE
SW 64TH ST
SW 174TH ST
SW 97TH AVE
SW 184TH ST
OLD CUTLER RD
CARIBBEAN BLVD
FRANJO RD
87TH AVE
W DIXIE HWY
BAILES RD
SW 232ND ST
SW 112TH AVE
STATE HWY 821
SW 248TH ST
SW 137TH AVE
SW 268TH ST
SW 132ND AVE
SW 288TH ST
TALLAHASSEE ST
S118
S123
S122
S196
S165
S179
S21A
S20G
CC-03
S-700
S-703
S-705
S-706A
S-706B
S-706C
S-708
S-709
S-710
S-711
CC-H4 (A8 S-23A)
CC-H4 (A8 S-23B)
CC-H4 (A8 S-23C)
CC-H4 (A8 S-23D)

FIGURE A4-2: BISCAYNE BAY COASTAL WETLANDS DEERING ESTATE

FIGURE A4-3: BISCAYNE BAY COASTAL WETLANDS C-1 FLOW WAY

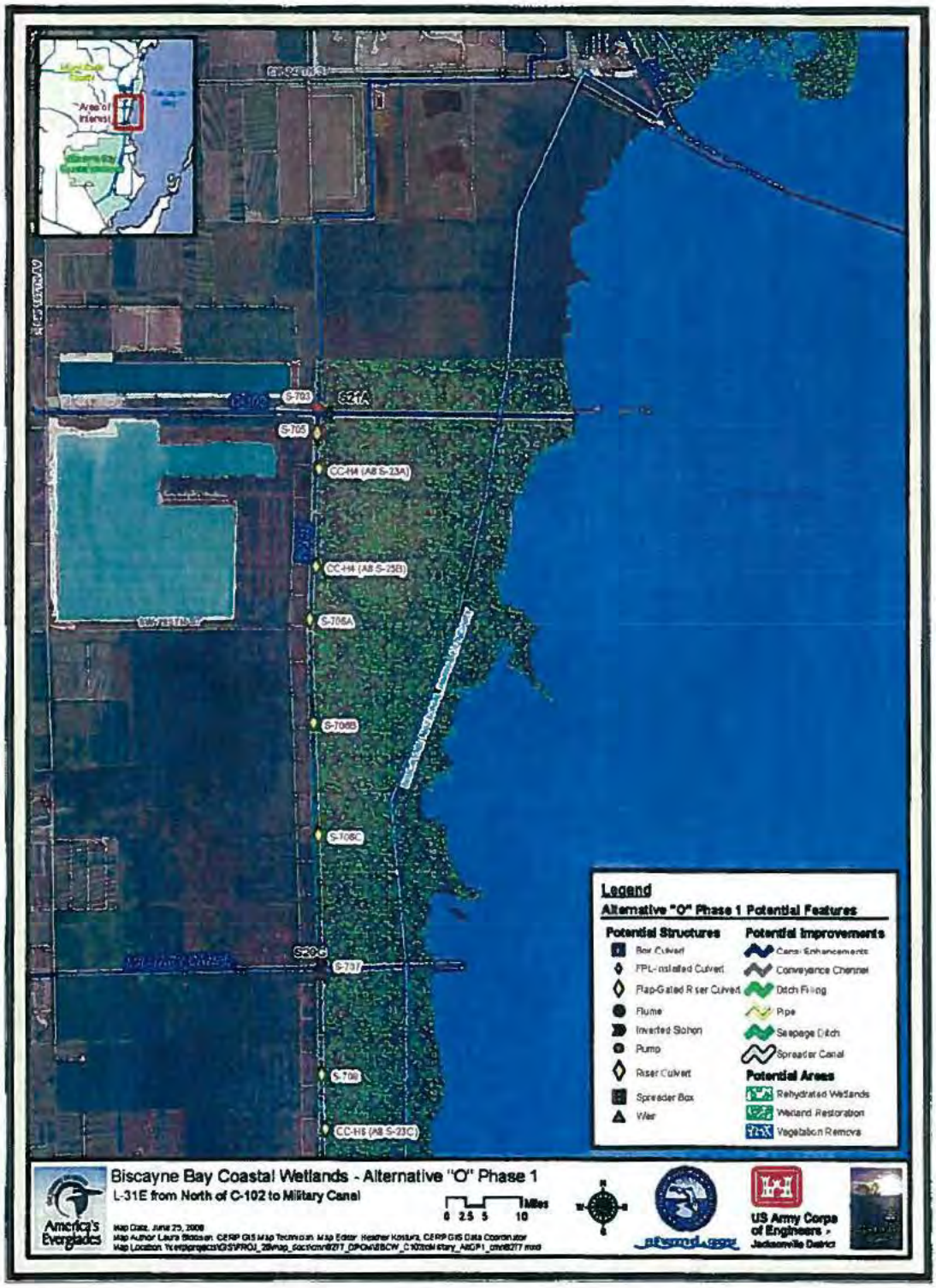

FIGURE A4-4: BISCAYNE BAY COASTAL WETLANDS L-31 FROM NORTH OF C-102 TO MILITARY CANAL

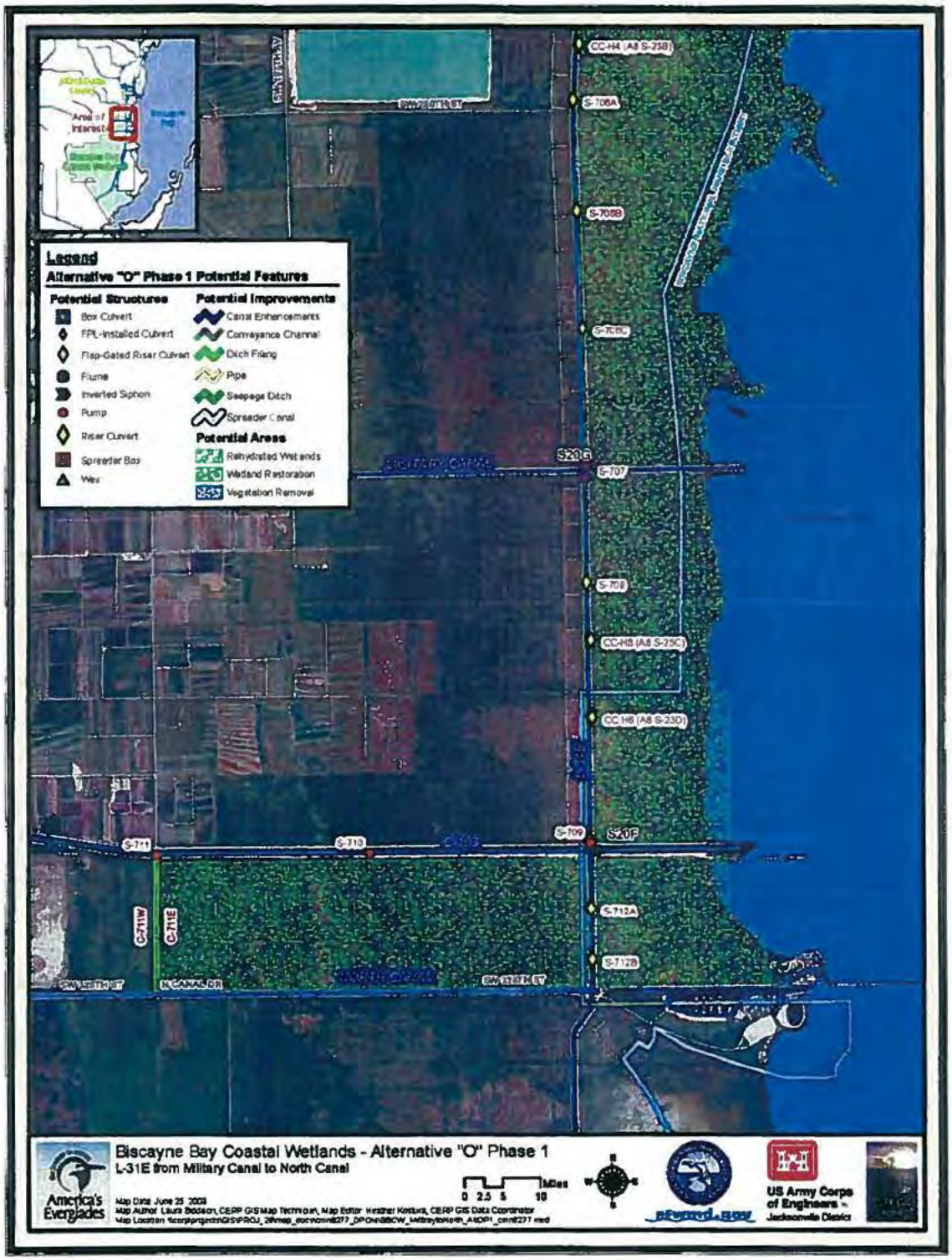

FIGURE A4-5: BISCAYNE BAY COASTAL WETLANDS L-31E FROM MILITARY CANAL TO NORTH CANAL

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701

SEA TURTLE AND SMALLTOOTH SAWFISH CONSTRUCTION CONDITIONS

The permittee shall comply with the following protected species construction conditions:

a. The permittee shall instruct all personnel associated with the project of the potential presence of these species and the need to avoid collisions with sea turtles and smalltooth sawfish. All construction personnel are responsible for observing water-related activities for the presence of these species.

b. The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing sea turtles or smalltooth sawfish, which are protected under the Endangered Species Act of 1973.

c. Siltation barriers shall be made of material in which a sea turtle or smalltooth sawfish cannot become entangled, be properly secured, and be regularly monitored to avoid protected species entrapment. Barriers may not block sea turtle or smalltooth sawfish entry to or exit from designated critical habitat without prior agreement from the National Marine Fisheries Service's Protected Resources Division, St. Petersburg, Florida.

d. All vessels associated with the construction project shall operate at "no wake/idle" speeds at all times while in the construction area and while in water depths where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will preferentially follow deep-water routes (e.g., marked channels) whenever possible.

e. If a sea turtle or smalltooth sawfish is seen within 100 yards of the active daily construction/dredging operation or vessel movement, all appropriate precautions shall be implemented to ensure its protection. These precautions shall include cessation of operation of any moving equipment closer than 50 feet of a sea turtle or smalltooth sawfish. Operation of any mechanical construction equipment shall cease immediately if a sea turtle or smalltooth sawfish is seen within a 50-ft radius of the equipment. Activities may not resume until the protected species has departed the project area of its own volition.

f. Any collision with and/or injury to a sea turtle or smalltooth sawfish shall be reported immediately to the National Marine Fisheries Service's Protected Resources Division (727-824-5312) and the local authorized sea turtle stranding/rescue organization.

g. Any special construction conditions, required of your specific project, outside these general conditions, if applicable, will be addressed in the primary consultation.

Revised: March 23, 2006

PCTS Access and Additional Considerations for ESA Section 7 Consultations (Revised 7-15-2009)

Public Consultation Tracking System (PCTS) Guidance: PCTS is an online query system at **https://pcts.nmfs.noaa.gov/** that allows federal agencies and U.S. Army Corps of Engineers' (COE) permit applicants and their consultants to ascertain the status of NMFS' Endangered Species Act (ESA) and Essential Fish Habitat (EFH) consultations, conducted pursuant to ESA section 7, and Magnuson-Stevens Fishery Conservation and Management Act's (MSA) sections 305(b)2 and 305(b)(4), respectively. Federal agencies are required to enter an agency-specific username and password to query the Federal Agency Site. The COE "Permit Site" (no password needed) allows COE permit applicants and consultants to check on the current status of Clean Water Act section 404 permit actions for which NMFS has conducted, or is in the process of conducting, an ESA or EFH consultation with the COE.

For COE-permitted projects, click on "Enter Corps Permit Site." From the "Choose Agency Subdivision (Required)" list, pick the appropriate COE district. At "Enter Agency Permit Number" type in the COE district identifier, hyphen, year, hyphen, number. The COE is in the processing of converting its permit application database to PCTS-compatible "ORM." An example permit number is: SAJ-2005-000001234-IPS-1. For the Jacksonville District, which has already converted to ORM, permit application numbers should be entered as SAJ (hyphen), followed by 4-digit year (hyphen), followed by permit application numeric identifier with no preceding zeros. For example: SAJ-2005-123; SAJ-2005-1234; SAJ-2005-12345.

For inquiries regarding applications processed by COE districts that have not yet made the conversion to ORM (e.g., Mobile District), enter the 9-digit numeric identifier, or convert the existing COE-assigned application number to 9 numeric digits by deleting all letters, hyphens, and commas; converting the year to 4-digit format (e.g., -04 to 2004); and adding additional zeros in front of the numeric identifier to make a total of 9 numeric digits. For example: AL05-982-F converts to 200500982; MS05-04401-A converts to 200504401. PCTS questions should be directed to Eric Hawk at Eric.Hawk@noaa.gov. Requests for username and password should be directed to PCTS.Usersupport@noaa.gov.

EFH Recommendations: In addition to its protected species/critical habitat consultation requirements with NMFS' Protected Resources Division pursuant to section 7 of the ESA, prior to proceeding with the proposed action the action agency must also consult with NMFS' Habitat Conservation Division (HCD) pursuant to the MSA requirements for EFH consultation (16 U.S.C. 1855 (b)(2) and 50 CFR 600.905-.930, subpart K). The action agency should also ensure that the applicant understands the ESA and EFH processes; that ESA and EFH consultations are separate, distinct, and guided by different statutes, goals, and time lines for responding to the action agency; and that the action agency will (and the applicant may) receive separate consultation correspondence on NMFS letterhead from HCD regarding their concerns and/or finalizing EFH consultation.

Marine Mammal Protection Act (MMPA) Recommendations: The ESA section 7 process does not authorize incidental takes of listed or non-listed marine mammals. If such takes may occur an incidental take authorization under MMPA section 101 (a)(5) is necessary. Please contact NMFS' Permits, Conservation, and Education Division at (301) 713-2322 for more information regarding MMPA permitting procedures.

Picayune Strand Restoration Project

Everglade snail kite, eastern indigo snake, American crocodile and West Indian manatee critical habitat. The proposed project would have "no effect" on everglade snail kite critical habitat and American crocodile critical habitat. Corps and Service biologists have agreed that there is insufficient information at this project phase to make a determination regarding effects on wood stork, West Indian manatee and Florida Panther. By letter dated October 20, 2004, the Service concurred with these determinations. A copy of the Biological Assessment for listed species found on proposed project lands is included in Appendix D. Coordination has concluded for the planning (feasibility-stage) of the project in 2004, but will continue, if the project is approved and funds are provided to continue through detailed design and construction, throughout the project life. No construction will begin until determinations of effects are coordinated with the Service for the three species of ongoing concern and concurrence is reached. It is the expectation of Corps and Service biologists that with detailed analysis, availability of pre-construction surveys, and final coordination of listed species conservation measures, concurrence may be reached early in the detailed design phase.

Initial informal consultation on marine species with the National Marine Fisheries Service (NMFS) began on May 25, 2001. Informal consultation was updated in an email exchange and a February 10, 2004 phone conversation. NOAA fisheries indicated its concurrence with a Corps information determination of no effect on listed marine species.

Section 9.6 of this report has additional information on both marine and upland listed species. With receipt of Service concurrence with current effect determinations, the Project is in compliance with the ESA for feasibility phase activities. Full compliance will be achieved when determinations on the manatee, Florida panther and wood stork are re-coordinated with the Service in a new BA, and Service concurrence is received.

11.3 FISH AND WILDLIFE COORDINATION ACT OF 1958, AS AMENDED

Consultation was initiated with FWS on February 26, 1999 in a Scope of Work (SOW) requesting a Planning Aid Letter (PAL) for the SGGE project. Several planning aid letters (PALs) have been received by the Corps (ref. Appendix D) Further coordination with the U.S. Fish and Wildlife Service resulted in the submission to the Corps of a draft Coordination Act Report (dCAR) dated February 2, 2004 and a Final report (FCAR) on September 22, 2004. The FCAR included 16 recommendations to assure that the objectives of the project would be achieved. The FWS stated that the proposed project, as described, should provide significant hydrologic improvements and enhancement of wetland

Kremer, John G SAJ

From: David Bernhart [David.Bernhart@noaa.gov]
Sent: Friday, August 10, 2001 9:04 AM
To: David Dale
Cc: Kremer John G SAJ; Eric Hawk; Jennifer Lee
Subject: Re: Southern Golden Gate Estates (SGGE) project

08-10-01 ESA phone consultation with David Bernhart of NMFS:
At approximately 1015 hrs on the above date I talked to David to explain the SGGE project. David stated that he was not aware of any listed marine species able to move up the Fahka Union Canal over the existing weir to the SGGE construction sites. Also since the project intent is to eliminate fresh water point source surges and restore the pre-alteraton overland flows which will emulate a natural hydrology he could see no negative indirect effects to listed species. He agreed that a no effects call in the EA would be justfied.

Good morning, John,

David's points on EFH consultation are directly applicable to ESA consultation as well. The adverse effect vs. net benefit is especially important. If there will be any adverse effect to a listed species, you need to consult, even if the outcome of that consultation is that the action will produce a net benefit. If the project will only produce beneficial results for ESA-listed species, then no consultation is required, but you should note in your NEPA documents that you've made these determinations.

I can send you a species list if you like. It sounds like there are none of our listed species present near the construction site. The 10,000 Islands (is this the affected downstream area?) are a very important habitat for endangered Kemp's ridley sea turtles, the proposed to be listed as endangered smalltooth sawfish, and several candidate species of fish. Please consider possible direct and indirect effects to these critters. If you need additional assistance, please call at 727-570-5312.

-DB

David Dale wrote:

> John, a couple points you may want to consider for this project and others in the future:
>
> 1. Even if an EFH or ESA Consultation is not required, you may want to note that finding in the NEPA document.
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> 2. NMFS has a division of labor regarding habitat issues and T&E issues. EFH Consultations and NEPA or FWCA coordination's are handled by the Habitat Conservation Division (which I am in). ESA Consultations are handled by the Protected Resources Division. I'm copying David Bernhart of that Division with this response, you will want to get a response from them regarding your need to Consult.
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EFH to implement them. For example, filling mud bottoms to an elevation to create saltmarsh results in a negative effect on mud bottoms but a positive effect on emergent wetlands and would generally be considered a net positive effect.

In this case I think all the implementing features of the project are well upstream of any designated EFH (depending where the canal is plugged) thus all the effects on EFH would be positive and consultation would not be required.

4. We've been asked to prepare EFH Assessments for FWCA Reports but it is our policy that we will not prepare EFH Assessments on behalf of another agency because it is our responsibility to review the Assessment and provide Conservation Recommendations. In essence, it would create a case where we are reviewing our own work and would create a conflict of interest. Also, EFH Assessments include the views of the Federal action agency which would not be appropriate for NMFS to provide. Bottom line is that the Magnuson-Stevens Act clearly puts that responsibility on the Federal action agency.

If this did nothing but confuse you give me a call!

David
727.570.5311

"Kremer, John G SAJ" wrote:

>
>
> David,
> Kim Dryden gave me your name as the NOAA biologist to contact about
> Essential Fish Habitat and any potential listed species for the SGGE
> project. Essentially what this project will do is reduce the Fahka
> Union Canal fresh water flows and storm surges to almost nothing.
> Instead broad slow moving sheetflow will be reestablished to the SGGE
> landscape. These waters will flow through culverts under US 41 and
> reach tide along a broad front which mimics the natural system that
> existed prior to this 1960 's real estate development debacle.
>
> At this time I have come across no information indicating that
> returning the SGGE landscape to a more natural system would have
> adverse effects on any EFH or listed aquatic species. If you have any
> information to the contrary please let me know.
>
> This project is on a very tight schedule to make the WRDA 2002
> congressional funding cycle. There is a lot of federal, state, and
> local political pressure to meet this deadline. I will be attending a
> meeting of the Interagency Team on 15 Aug 01 at the SFWMD Naples
> office. You are welcome to attend and present any information you
> have. If you are unable to attend please send your comments to me
> before 14 Aug 01 and I will present them.

> Should I not hear from you in the next week I will assume you have no
> input and the Corps will proceed with a "no effects" determination
> for this project.
>
> Thanks,
> John Kremer
> (904)232-3551
>
>

8/10/01

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>
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> (904)232-3551

Estuary selections by estuary:

Estuary	State	Common	Species	Lifestage	PDF
Ten Thousand Islands	Florida	Brown shrimp	Penaeus aztecus	Adult	Florida\TenThous\TenKbsa.PDF
Ten Thousand Islands	Florida	Brown shrimp	Penaeus aztecus	Juvenile	Florida\TenThous\TenKbsj.PDF
Ten Thousand Islands	Florida	Gray snapper	Lutjanus griseus	Adult	Florida\TenThous\TenKgsa.PDF
Ten Thousand Islands	Florida	Gray snapper	Lutjanus griseus	Juvenile	Florida\TenThous\TenKgsj.PDF
Ten Thousand Islands	Florida	Gulf stone crab	Menippe adina	Adult	Florida\TenThous\TenKgsca.PDF
Ten Thousand Islands	Florida	Gulf stone crab	Menippe adina	Juvenile	Florida\TenThous\TenKgscj.PDF
Ten Thousand Islands	Florida	Pink shrimp	Penaeus duorarum	Adult	Florida\TenThous\TenKpsa.PDF
Ten Thousand Islands	Florida	Pink shrimp	Penaeus duorarum	Juvenile	Florida\TenThous\TenKpsj.PDF
Ten Thousand Islands	Florida	Red drum	Sciaenops ocellatus	Adult	Florida\TenThous\TenKrda.PDF
Ten Thousand Islands	Florida	Red drum	Sciaenops ocellatus	Juvenile	Florida\TenThous\TenKrdj.PDF
Ten Thousand Islands	Florida	Spanish mackerel	Scomberomorus maculatus	Adult	Florida\TenThous\TenKsma.PDF
Ten Thousand Islands	Florida	Spanish mackerel	Scomberomorus maculatus	Juvenile	Florida\TenThous\TenKsmj.PDF
Ten Thousand Islands	Florida	Spiny lobster	Panulirus argus	Adult	Florida\TenThous\TenKsla.PDF
Ten Thousand Islands	Florida	Spiny lobster	Panulirus argus	Juvenile	Florida\TenThous\TenKslj.PDF
Ten Thousand Islands	Florida	Stone crab	Menippe mercenaria	Adult	Florida\TenThous\TenKsca.PDF
Ten Thousand Islands	Florida	Stone crab	Menippe mercenaria	Juvenile	Florida\TenThous\TenKscj.PDF
Ten Thousand Islands	Florida	White shrimp	Penaeus setiferus	Adult	Florida\TenThous\TenKwsa.PDF
Ten Thousand Islands	Florida	White shrimp	Penaeus setiferus	Juvenile	Florida\TenThous\TenKwsj.PDF

United States Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southeast Fisheries Science Center
Galveston Laboratory
4700 Avenue U
Galveston, TX 77551-5997
(409) 766-3500

1 = SUBMIT

Indian River Lagoon South

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
9721 Executive Center Drive North
St. Petersburg, FL 33702
(727) 570-5312; FAX 570-5517
http://caldera.sero.nmfs.gov

FILE #

JAN 3 2002

F/SER3:BH:mdh

Mr. John R. Hall
Stuart Regulatory Office
Jacksonville District Corps of Engineers
218 Atlanta Ave.
Stuart, Florida 34994

Dear Mr. Hall:

This is in reference to the Army Corps of Engineers' (COE) permit application number 200101177 (IP-TA). The proposed project consists of the restoration of aquatic habitat at Spoil Island, SL-15, in the Indian River Lagoon, St. Lucie County, Florida. This project includes the construction of a temporary work platform, the dredging of 0.61 acres of mangroves to create flushing channels, the removal of exotic vegetation, and the regrading of the island to create approximately 3.28 acres of submerged aquatic vegetation and 4.74 acres of mangroves. The National Marine Fisheries Service (NMFS) consultation number for this project is I/SER/2001/01161; please refer to this number in future correspondence on this project.

Five species of sea turtles (loggerhead, green, Kemp's ridley, hawksbill, and leatherback), Johnson's seagrass, and designated Johnson's seagrass critical habitat protected by the Endangered Species Act (ESA) can be found in or near the action area. Construction methods used for docks (*e.g.*, pile driving or jetting-in and construction barge anchoring) and small scale dredging have not been shown to adversely affect sea turtles, which are highly mobile and may be frightened away from the project area by construction activity and noise; therefore, the chances of the proposed action affecting sea turtles is discountable.

Seagrass surveys of the area indicate that Johnson's seagrass can be found in the action area. NMFS believes that the only parts of this project likely to affect Johnson's seagrass are the construction of the temporary work platform and the construction of the flushing channels. However, the applicant has stated that they will site the platform and flushing channels in areas devoid of Johnson's seagrass. Therefore, NMFS believes that any effects that the proposed action will have on Johnson's seagrass will be insignificant. In conclusion, NMFS believes that the proposed action is not likely to adversely affect species protected by the ESA under its purview.

This concludes the COE's consultation responsibilities under section 7 of the ESA for the proposed project. Be advised that 50 CFR 402.16 requires that consultation be

reinitiated if a take occurs or new information reveals effects of the action not previously considered, or the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat in a manner or to an extent not previously considered, or if a new species is listed or critical habitat designated that may be affected by the identified action.

We are copying our Habitat Conservation Division (HCD) with this letter, in case HCD has any habitat concerns pursuant to the section 305 essential fish habitat consultation requirements of the Magnuson-Stevens Fishery Conservation and Management Act (50 CFR 600.905-600.930, subpart k). HCD may be reached at (904) 232-2580, extension 121.

If you have any questions, please contact Mr. Robert Hoffman, fishery biologist, at the number listed above.

Sincerely yours,

for, Joseph E. Powers, Ph.D.
Acting Regional Administrator

cc: F/PR3
F/SER45 - George Getsinger

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1514.22f.1

FILE #

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
9721 Executive Center Drive North
St. Petersburg, FL 33702
(727) 570-5312; FAX (727) 570-5517
http://caldera.sero.nmfs.gov

MAR 18 2002 F/SER3:EGH

Mr. James C. Duck
Chief, Planning Division
Army Corps of Engineers, Jacksonville District
P.O. Box 4970
Jacksonville, FL 32232-0019

Dear Mr. Duck:

This responds to Mr. Stephen Traxler's February 12, 2002, telephone request to Mr. Eric Hawk of my staff for a written response from the National Marine Fisheries Service (NMFS) to your May 25, 2001, letter requesting informal consultation, pursuant to section 7 of the Endangered Species Act (ESA), on the potential effects of the Indian River Lagoon Restoration Integrated Feasibility Study. On June 12, 2001, Mr. Hawk advised Mr. Traxler of NMFS' concurrence with the Corps' determination that the study would not likely adversely affect listed species under NMFS' purview. We assigned consultation number I/SER/2001/00697 to this action. Additional details on the project were submitted by Mr. Traxler on February 17, 2002, and are incorporated herein by reference (Draft IRL-South Feasibility Report and Supplemental EIS, October 2001: Recommended Plan [Section 8: Construction Features]).

NMFS Protected Resources Division (PRD) has reviewed the proposed action, a restoration project whose primary goal is reestablishing a stable salinity regime in the St. Lucie Estuary. The recommended plan is a combination of components and operational rules that will help lead to a healthy, sustainable estuarine and watershed ecosystem. The components in the preferred plan include construction of reservoirs and stormwater treatment areas, and rehydration of impacted agricultural lands. These components will attenuate and treat the high freshwater flows to the St. Lucie Estuary. In addition, the preferred plan has proposed muck management, artificial habitats, and floodplain restoration in the north fork of the St. Lucie Estuary.

PRD has reviewed the construction features of the various components of the preferred plan, including: C-44 West Reservoir and Stormwater Treatment Areas, C-44 East Stormwater Treatment Area, Palmar Complex - Natural Storage and Treatment Area, C-23 North Reservoir, C-23 South Reservoir, C-23/C-24 Stormwater Treatment Area, Allapattah Complex - Natural Storage and Treatment Area, Cypress Creek Complex - Natural Storage and Treatment Area, C-23/C-44 Stormwater Treatment Area and Diversion Canal, C-25 Reservoir and Stormwater Treatment Area, Muck Remediation and Artificial Habitat (Creation), and North Fork Floodplain Restoration. The planned removal of approximately 5.5 million cubic yards of fine-grained

material ("muck") from the bottom of the St. Lucie River will create an additional 2,650 acres of substrate suitable for colonization by benthic organisms. In addition, six sites in the middle estuary, each approximately 15 acres in area, have been identified for creation of oyster habitat. Oysters are a desirable species because they are excellent at filtering fine sediments and nutrients in the water column. A total of 90 acres of artificial habitat will be created: 60 acres of oyster shell hash, 24 acres of prefabricated reef balls, and 6 acres of artificial submerged aquatic vegetation.

Sea turtles and Johnson's seagrass may occur within the Indian River Lagoon system. PRD concurs with the Corps' determination that implementation of the preferred plan will not adversely affect listed species nor designated critical habitat under NMFS' purview. PRD believes that implementation of the plan will lead to improvement of foraging and developmental habitat for federally listed species and candidate species under NMFS' purview by reducing the loads of nutrients, pesticides, phosphorous levels, and other pollutants entering the Indian River Lagoon system. Improved water quality will benefit existing submerged aquatic vegetation within the Indian River Lagoon system, including Johnson's seagrass. PRD believes that neither of the methods being considered for remediating or removing the muck - capping or dredging - will adversely impact listed species under NMFS' purview, since dredge equipment will necessarily be limited (because of the shallowness of the site) to a non-hopper type dredge. Reservoirs are located in inland areas where no endangered species under NMFS' purview are present.

This concludes consultation responsibilities under section 7 of the ESA. Consultation should be reinitiated if there is a take, new information reveals impacts of the identified activity that may affect listed species or their critical habitat, a new species is listed, the identified activity is subsequently modified or critical habitat designated that may be affected by the identified activity.

Pursuant to the essential fish habitat consultation requirements of the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1855(b)(2) and 50 CFR 600.905-.930, Subpart K), the NMFS Habitat Conservation Division (HCD) is being copied with this letter. The HCD biologist for this region is Mike Johnson. If you have any questions about consultation regarding essential fish habitat for this project, please contact Mr. Johnson at (305)595-8352.

Please contact Mr. Eric Hawk at 727/570-5312 if you have any questions or if we may be of assistance.

Sincerely,

for, Joseph E. Powers, Ph.D.
Acting Regional Administrator

cc: F/SER43 - Mike Johnson

O:\section7\informal\irl-rifs.jax
File: 1514-22 f.1. FL
Ref: I/SER/2001/00697

C-111 Spreader Canal

FW: C-111 Spreader Canal Western Project (UNCLASSIFIED)

Tarr, Bradley A SAJ <Bradley.A.Tarr@usace.army.mil> Mon, Dec 16, 2013 at 4:21 PM
To: Stacie Auvenshine - NOAA Federal <stacie.auvenshine@noaa.gov>
Cc: "Ralph, Gina P SAJ" <Gina.P.Ralph@usace.army.mil>

Classification: UNCLASSIFIED
Caveats: NONE

Stacie,

As stated in Section 7.2.2.4 of the CERP Programmatic BA, I originally (7 May 2009) stated that the C-111 SC project would have a may affect, not likely to adversely affect the smalltooth sawfish and the five sea turtles. My rationale was that we anticipated some potential benefits with improved estuarine conditions for the sawfish, and improved salinities in the nearshore that would benefit seagrasses, thus benefitting sea turtles. NMFS didn't feel that there would be any impact, therefore, suggesting a "no effect" determination which essentially, closed consultation. Below is the excerpt from the CERP BA; and below that is related correspondence with NMFS. Call me if you need more info.

Brad

"On 7 May 2009, the Corps requested concurrence with NMFS on its determination of may affect, but is not likely to adversely affect smalltooth sawfish and sea turtles. In addition, the Corps determined that the project would not modify critical habitat for elkhorn or staghorn coral. Critical habitat for the smalltooth sawfish had not been designated until after publication of the final PIR/EIS. After further discussion with NMFS, the Corps changed their determinations to no effect for each species and their designated critical habitat, and NMFS concurred by email on 6 August 2009.
Construction is complete for this project; therefore, re-initiation is not required."

-----Original Message-----
From: Shelley Norton [mailto:Shelley.Norton@noaa.gov]
Sent: Thursday, August 06, 2009 9:06 AM
To: Eric G. Hawk
Cc: Tarr, Bradley A SAJ
Subject: Re: C-111 Spreader Canal Western Project

Hi Bradley, I spoke with Alisa today. We discussed the potential routes of effects to our listed species and critical habitat. Alisa could not determine any and neither can I. Alisa changed the determinations to no effect. Let me know if you have any questions.

Shelley

Eric G. Hawk wrote:
> Hi Bradley,
> Shelley Norton was working with Alisa Zarbo on this, and sent out a
> technical assistance/request for additional information letter on it
> on August 4.

> Eric
>
> Tarr, Bradley A SAJ wrote:
>> Hello all,
>>
>> Can you guide me to the NMFS POC for the reference project? The Corps is
>> seeking a concurrence letter regarding the threatened and endangered
>> species
>> determinations outlined in the Biological Assessment which is
>> contained in
>> Annex A of the final EIS.
>>
>> Thank you very much,
>>
>> Brad Tarr
>> US Army Corps of Engineers
>> Environmental Branch, Planning Division
>> 701 San Marco Blvd.
>> Jacksonville, Florida 32232-0019
>> 904-232-3582
>>
>>

Classification: UNCLASSIFIED
Caveats: NONE

Shelley_Norton.vcf
1K

Caloosahatchee – 43 West Basin Storage Reservoir

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701
(727) 824-5317, FAX 824-5309
http://sero.nmfs.noaa.gov

MAR 28 2007

F/SER31:WW

Mr. David S. Hobbie
Jacksonville District Corps of Engineers
South Florida Restoration Program Office
1400 Centrepark, Suite 750
West Palm Beach, FL 33401

Re: SAJ-2005-5958 (IP-TKW)

Dear Mr. Hobbie:

This responds to your letter dated January 10, 2007, requesting section 7 consultation pursuant to the Endangered Species Act (ESA) for the subject Army Corps of Engineers (COE), permit application for the C-43 Basin Storage Reservoir Project (C-43 Project). You submitted a biological assessment and other supporting information prepared by Scheda Ecological Associates on behalf of the applicant, the South Florida Water Management District, along with your determinations that the project may affect but is not likely to adversely affect smalltooth sawfish and sea turtles, and requested our concurrence.

The C-43 Project is part of the Comprehensive Everglades Restoration Plan authorized by the Water Resources Development Act of 2000. The project is located in Hendry County, Florida, encompassing approximately 10,000 acres of low-lying uplands adjacent to the Caloosahatchee River. The purpose of the project is to capture excess storm water runoff and releases from Lake Okeechobee for later release into the Caloosahatchee River during times of need, preventing saltwater intrusion and providing water supplies during times of drought. The project would entail an above ground reservoir(s) with a total storage capacity of approximately 170,000 acre-feet within the Caloosahatchee Basin. Anticipated benefits of the C-43 Project include the attenuation of flood flows; improvement of water quality and timing of releases to the Caloosahatchee River and Estuary; protection of the Caloosahatchee Estuary from excessive fresh water deliveries; and improvement of water supply benefits for environmental, urban and agricultural users.

Five species of sea turtles (loggerhead, green, Kemp's ridley, hawksbill, and leatherback) and smalltooth sawfish, protected by the ESA under National Marine Fisheries Service (NMFS) purview can be found in or near the Caloosahatchee River and Estuary, may be affected by the project, and are included in this consultation.

Because of the project's inland location, NMFS believes there will be no direct effects to listed species. NMFS believes potential indirect effects of the action to sea turtles and sawfish are limited to saltwater regime changes that may alter the potential foraging and nursery habitat of smalltooth sawfish and foraging habitat for green sea turtles. Saltwater regime changes could alter survival and recruitment of seagrass beds and mangrove habitat. However, the project is intended to mediate current unnatural flows of freshwater and instead to replicate natural conditions in the Caloosahatchee Estuary resulting in preservation of aquatic flora and fawna in

its naturally occurring range. NMFS believes there will be no loss of habitat for these listed-species and the effects of the project will be beneficial to habitat utilized by protected species in the Caloosahatchee Estuary. Based on the above, NMFS concludes that the C-43 project may affect but is not likely to adversely affect sea turtles or smalltooth sawfish.

Changes to freshwater flows throughout the historic range of smalltooth sawfish, and in peninsular Florida in particular, may have affected how juvenile sawfish use nursery habitats. Little scientific research is available on the salinity preferences and tolerances of this species. This information needs to be collected and used to set appropriate freshwater flow regimes. NMFS is currently in the process of developing a Recovery Plan for smalltooth sawfish. Part of this plan will focus on the need to further research the role of salinity regimes in the lifecycle of smalltooth sawfish. While the C-43 Reservoir Project should be beneficial to smalltooth sawfish by simulating natural freshwater flows to the estuary, NMFS recommends the project should also allow for increased cooperation between the SFWMD, NMFS and smalltooth sawfish-associated research institutions in further defining the salinity requirements required by this species and allow the project, once implemented, to be operated in a manner consistent with its needs.

This concludes your consultation responsibilities under the ESA for species under NMFS' purview. Consultation must be reinitiated if a take occurs or new information reveals effects of the action not previously considered, or the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat in a manner or to an extent not previously considered, or if a new species is listed or critical habitat designated that may be affected by the identified action. We have enclosed additional information on other statutory requirements that may apply to this action, as well as NMFS' Public Consultation Tracking System to allow you to track the status of ESA consultations. The COE's user identification name and password for querying PCTS are: pctscoe and pcts22nmfs, respectively.

If you have any questions, please contact Walt Wilson at (727) 824-5312 or by e-mail at walt.wilson@noaa.gov.

Sincerely,

for Roy E. Crabtree, Ph.D.
Regional Administrator

Enclosure

File: 1514-22.f.1.FL
Ref: I/SER/2007/00096

Additional Considerations for ESA Section 7 Consultations (Revised 12-6-2005)

Marine Mammal Protection Act (MMPA) Recommendations: The Endangered Species Act (ESA) section 7 process does not authorize incidental takes of listed or non-listed marine mammals. If such takes may occur an incidental take authorization under MMPA section 101 (a)(5) is necessary. Contact Ken Hollingshead of our NMFS Headquarters' Protected Resources staff at (301) 713-2323 for more information on MMPA permitting procedures.

Essential Fish Habitat (EFH) Recommendations: In addition to its protected species/critical habitat consultation requirements with NMFS' Protected Resources Division (PRD) pursuant to section 7 of the ESA, prior to proceeding with the proposed action the action agency must also consult with NMFS' Habitat Conservation Division (HCD) pursuant to the Magnuson-Stevens Fishery Conservation and Management Act's (MSA) requirements for essential fish habitat (EFH) consultation (16 U.S.C. 1855 (b)(2) and 50 CFR 600.905-.930, subpart K). The action agency should also ensure that the applicant understands the ESA and EFH processes; that ESA and EFH consultations are separate, distinct, and guided by different statutes, goals, and time lines for responding to the action agency; and that the action agency will (and the applicant may) receive separate consultation correspondence on NMFS letterhead from HCD regarding their concerns and/or finalizing EFH consultation.

Public Consultation Tracking System (PCTS) Guidance: PCTS is an online query system allowing federal agencies and U.S. Army Corps of Engineers' (COE) permit applicants to track the status of NMFS consultations under ESA section 7 and under MSA sections 305(b)2 and 305(b)(4): Essential Fish Habitat. Access PCTS via: www.nmfs.noaa.gov/pcts. Federal agencies are required to enter an agency-specific username and password to query the Federal Agency Site. The Corps Permit Site allows COE permit applicants the ability to check on the current status of Clean Water Act section 404 permit actions for which NMFS has conducted an ESA section 7 consultation with the COE since the beginning of the 2001 fiscal year (no password needed).

For COE-permitted projects, click on "Enter Corps Permit Site." From the "Choose Agency Subdivision (Required)" list, pick the appropriate COE district. At "Enter Agency Permit Number" type in the COE district identifier, hyphen, year, hyphen, number. The COE is in the processing of converting its permit application database to PCTS-compatible "ORM." An example permit number is: SAJ-2005-000001234-IPS-1. For the Jacksonville District, which has already converted to ORM, permit application numbers should be entered as SAJ (hyphen), followed by 4-digit year (hyphen), followed by permit application numeric identifier with no preceding zeros. E.g., SAJ-2005-123, SAJ-2005-1234, SAJ-2005-12345.

For inquiries regarding applications processed by Corps districts that have not yet made the conversion to ORM (e.g., Mobile District), enter the 9-digit numeric identifier, or convert the existing COE-assigned application number to 9 numeric digits by deleting all letters, hyphens, and commas; converting the year to 4-digit format (e.g., -04 to 2004); and adding additional zeros in front of the numeric identifier to make a total of 9 numeric digits. E.g., AL05-982-F converts to 200500982; MS05-04401-A converts to 200504401. PCTS questions should be directed to Eric Hawk at Eric.Hawk@noaa.gov. Requests for username and password should be directed to April Wolstencroft (PCTSUsersupport@noaa.gov).

Thompson, Amy D SAJ

From: Mark Sramek - NOAA Federal [mark.sramek@noaa.gov]
Sent: Thursday, September 26, 2013 10:26 AM
To: Thompson, Amy D SAJ
Cc: David Dale - NOAA Federal; Shelley Norton - NOAA Federal; Auvenshine, Stacie SAJ
Subject: Re: [EXTERNAL] Re: FW: Picayune Strand Restoration Project Manatee Mitigation Feature Location
Attachments: Manatee_Option_2.jpg

Follow Up Flag: Follow up
Flag Status: Flagged

Categories: Red Category

Hi Amy,

Thank you for your email and the attached map you created overlaying the Picayune Strand Restoration Project (a component of the the Comprehensive Everglades Restoration Project) Manatee Mitigation Feature (MMF) onto the available online EFH mapper. Portions of the proposed project would be constructed in mangrove wetlands, identified by the Gulf of Mexico Fishery Management Council as essential fish habitat (EFH) for postlarval, juvenile and subadult shrimp; postlarval, juvenile and adult red drum; postlarval, juvenile and adult gray snapper; juvenile red and gag groupers; and juvenile and adult yellowtail and lane snappers. The area has also been designated as EFH by NMFS for highly migratory species including bull, lemon, and bonnethead sharks.

I agree the graphic designation using the EFH Mapper Tool seems inconsistent with the existing landscape adjacent to the Faka Union Canal as shown on the map provided. That said, in reviewing the project area on Google Earth, it appears a majority of the Feature's western limit would occur in mangrove wetlands; so, your estimate of one acre of EFH impacts may be inaccurate, depending on current onsite conditions.

Has a site meeting been conducted (or planned) for this restoration project, or a field assessment report available describing the wetland types and conditions of the site?

Thanks for your efforts, and please keep me apprised of project activities.
Mark S.
727-824-5311

---------- Forwarded message ----------
From: Thompson, Amy D SAJ <Amy.D.Thompson@usace.army.mil>
Date: Tue, Sep 17, 2013 at 3:07 PM
Subject: RE: [EXTERNAL] Re: FW: Picayune Strand Restoration Project Manatee Mitigation Feature Location
To: Mark Sramek - NOAA Federal <mark.sramek@noaa.gov>

Hi Mark,

I have put together a map with the proposed footprint of the manatee feature and the areas of EFH that would be affected. The entire footprint is 10 acres, and the EFH area impacted shown on this map is 1 acre. I was surprised to see that EFH extended through the Faka Union Spoil berm and to the Northeast. I did not count the berm in my calculation of EFH impacts. Let me know you thoughts on the assessment attached.

Thanks,

Amy

-----Original Message-----
From: Mark Sramek - NOAA Federal [mailto:mark.sramek@noaa.gov]
Sent: Monday, September 16, 2013 3:04 PM
To: Thompson, Amy D SAJ
Subject: Re: [EXTERNAL] Re: FW: Picayune Strand Restoration Project Manatee Mitigation Feature Location

Hi Amy,

Thanks for the update; please see:
http://www.habitat.noaa.gov/protection/efh/efhmapper/

Please feel free to contact me if you have any questions with regard to use of the mapper or categories at the project site. Feel free to contact me at the number below if you'd prefer to call.

I look forward to working with you on this project.

Mark
727-824-5311

On Mon, Sep 16, 2013 at 9:47 AM, Thompson, Amy D SAJ <Amy.D.Thompson@usace.army.mil> wrote:
> Hi Mark,
>
> The discussion went well. We will have a follow meeting when the design footprint is more refined. Do you have a shapefile that shows EFH in the southwest Florida? I looked on the NMFS website but didn't have any luck locating.
>
> Thanks,
>
> Amy
>
> -----Original Message-----
> From: Mark Sramek - NOAA Federal [mailto:mark.sramek@noaa.gov]
> Sent: Tuesday, September 10, 2013 4:42 PM
> To: Thompson, Amy D SAJ
> Cc: Kay Davy - NOAA Federal; Shelley Norton - NOAA Federal; Tarr, Bradley A SAJ
> Subject: Re: [EXTERNAL] Re: FW: Picayune Strand Restoration Project Manatee Mitigation Feature Location
>
> Hi Amy,
>
> I apologize for missing the call as I was in a meeting with USACE
> Tampa Section and Hillsborough County staffs which ran late; I then

> met with Tampa Section staff regarding a local project.
>
> If there are any notes, action items, or a timeline as the result of
> today's call, please let me know and I will continue to be engaged in
> this activity.
>
> Thank you for your efforts,
> Mark S.
> 727-824-5311
>
> On Tue, Sep 10, 2013 at 1:15 PM, Thompson, Amy D SAJ
> <Amy.D.Thompson@usace.army.mil> wrote:
>> Are you all planning to call in the meeting today at 1:15?
>>
>> -----Original Message-----
>> From: Kay Davy - NOAA Federal [mailto:kay.davy@noaa.gov]
>> Sent: Thursday, September 05, 2013 4:09 PM
>> To: Livergood, Audra
>> Cc: Thompson, Amy D SAJ; Shelley Norton - NOAA Federal; Tarr, Bradley A SAJ; Mark Sramek - NOAA Federal
>> Subject: Re: [EXTERNAL] Re: FW: Picayune Strand Restoration Project Manatee Mitigation Feature Location
>>
>> yes...she will have email access tomorrow and I will provide her address then
>>
>> Kay
>>
>>
>> On Thu, Sep 5, 2013 at 4:03 PM, Audra Livergood - NOAA Federal <audra.livergood@noaa.gov> wrote:
>>
>>
>>   Hi Amy et al.,
>>
>>
>>   Until recently, Kay Davy was the NMFS Protected Resources Division point of contact for CERP. However, our office recently hired a contractor, and Kay is in the process of transferring all of the CERP files to the contractor.
>>
>>
>>   Since we have a designated person to work on CERP, I do not plan to participate.
>>
>>
>>   Kay, when you have a chance, can you please provide Stacy's contact info to Amy Thompson?
>>
>>   Thank you,
>>   Audra
>>
>>
>>
>>   On Thu, Sep 5, 2013 at 8:34 AM, Thompson, Amy D SAJ <Amy.D.Thompson@usace.army.mil> wrote:
>>
>>
>>   Hi Shelley,
>>

>> The shapefiles are attached. Let me know if these work. Are you available to discuss early next week?
>>
>>
>> Thanks,
>>
>> Amy
>>
>> -----Original Message-----
>> From: Shelley Norton - NOAA Federal [mailto:shelley.norton@noaa.gov]
>>
>> Sent: Tuesday, September 03, 2013 4:00 PM
>> To: Thompson, Amy D SAJ
>>
>> Cc: Tarr, Bradley A SAJ; Livergood, Audra; Mark Sramek - NOAA Federal
>> Subject: Re: [EXTERNAL] Re: FW: Picayune Strand Restoration Project Manatee Mitigation Feature Location
>>
>> Hi Amy, do you have a shapefile of the project area? Since the project is located in smalltooth sawfish critical habitat we need to look at the effects of the project to the features (euryhaline waters less than 3 ft a MLLW and red mangroves). We also need to see if the project area is located near one of the nursery hotspots. You cannot mitigate for losses to critical habitat under the ESA. Mark Sramek is our Habitat Division contract for this area so I will include him on this email so he can address EFH issues. We can set up a conference call to discuss this further if that works for you.
>>
>> Thanks,
>> Shelley
>>
>>
>> On Tue, Sep 3, 2013 at 3:01 PM, Thompson, Amy D SAJ <Amy.D.Thompson@usace.army.mil> wrote:
>>
>>
>> Shelley,
>>
>> It is not included in the review submitted by Brad since it is a new feature that was not designed yet when Brad submitted the BA; however, this feature is part of CERP and would have been included if design was complete. We are looking for NMFS thoughts on whether the placement of the feature in the mangroves would be permitted and if so what conditions/mitigation would be needed so we can select the most efficient design.
>>
>> Thanks,
>>
>> Amy
>>
>> -----Original Message-----
>> From: Shelley Norton - NOAA Federal [mailto:shelley.norton@noaa.gov]
>> Sent: Tuesday, September 03, 2013 2:57 PM
>> To: Thompson, Amy D SAJ; Tarr, Bradley A SAJ; Livergood, Audra
>> Subject: [EXTERNAL] Re: FW: Picayune Strand Restoration Project Manatee Mitigation Feature Location
>>
>> Hi Amy, I know that Audra Livergood Davy is working with Brad Tarr on a comprehensive consultation on Everglades Restoration Projects. Do you know if this project is included in the review or not? I will include Brad on this email too.

>>
>> Thanks,
>> Shelley
>>
>>
>> On Tue, Sep 3, 2013 at 2:41 PM, Thompson, Amy D SAJ
<Amy.D.Thompson@usace.army.mil> wrote:
>>
>>
>> Good Afternoon,
>>
>> The Picayune Strand Restoration Project, part of the
Comprehensive Everglades Restoration Project, is investigating locations for implementation
of a manatee mitigation feature at Port of the Islands along US-41 south of Picayune Strand
in Collier County, Florida. The feature would consist of a deep oxbow connected to the Faka
Union Canal. We previously contacted you with regard to the possibility of placing this
feature in mangroves adjacent to the Faka Union Canal spoil berm. The current draft options
are attached. We would like to discuss this feature and potential effects to T&E species and
EFH before we determine the final footprint for the feature. We are available to discuss at
your convenience.
>>
>> Thanks,
>>
>> Amy Thompson
>>
>> -----Original Message-----
>> From: Audra Livergood - NOAA Federal
[mailto:audra.livergood@noaa.gov]
>> Sent: Tuesday, July 30, 2013 4:08 PM
>> To: Thompson, Amy D SAJ
>> Cc: Kim Dryden
>> Subject: Re: Picayune Strand Restoration Project Manatee
Mitigation Feature Location
>>
>> Good afternoon Amy and Kim,
>>
>> I will forward your request to Cathy Tortorici (my
supervisor) and Shelley Norton (our Smalltooth Sawfish Coordinator) who are both based in St.
Pete. Perhaps they can provide technical assistance.
>>
>> Thank you,
>> Audra
>>
>>
>> On Fri, Jul 26, 2013 at 9:39 AM, Thompson, Amy D SAJ
<Amy.D.Thompson@usace.army.mil> wrote:
>>
>>
>> Good Morning Audra,
>>
>> The Picayune Strand Restoration Project is
exploring options and locations to implement a manatee mitigation feature at the Port of the
Islands, near Naples, Florida. The team is exploring the option of creating a deep water
oxbow partially in mangrove habitat which is considered EFH and Smalltooth sawfish Critical
Habitat. This mangrove is in an area that was historically freshwater/brackish marsh.
Before we move forward with design and surveys we would like to meet with NMFS to discuss the

proposed footprint and your thoughts on the impacts/feasibility. This feature is not included in the original NMFS consultation or in the recent CERP programmatic BA.
>>
>> I am tentatively proposing to meet the week of August 5. Let me know your thoughts and if you may be available. I would like to do this in person if possible.
>>
>> Thank you,
>>
>> Amy Thompson
>> Biologist
>> US Army Corps of Engineers
>> 904-232-1545
>> Fax: 904-232-3442
>>
>>
>>
>>
>>
>>
>> --
>> Audra Livergood
>> Marine Resource Manager
>> NOAA National Marine Fisheries Service
>> SERO Protected Resources Division
>> Fort Lauderdale Field Office
>>
>>
>> For if one link in nature's chain might be lost, another might be lost, until the whole of things will vanish by piecemeal. Thomas Jefferson
>>
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>>
>> --
>>
>>
>> Shelley Norton
>> Sawfish and Johnson's Seagrass Coordinator
>> National Marine Fisheries Service
>> NOAA Southeast Regional Office
>> Protected Resources Division
>> 263 13th Avenue South
>> St. Petersburg, Florida 33701
>>
>> PH: (727) 551-5781 <tel:%28727%29%20551-5781>
<tel:%28727%29%20551-5781>
>> FX: (727) 824-5309 <tel:%28727%29%20824-5309>
<tel:%28727%29%20824-5309>
>>
>> Email: shelley.norton@noaa.gov
<mailto:%20shelley.norton@noaa.gov>
>> Web: http://sero.nmfs.noaa.gov/pr/pr.htm
<http://sero.nmfs.noaa.gov/pr/pr.htm%20>
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>>   Shelley Norton
>>   Sawfish and Johnson's Seagrass Coordinator
>>   National Marine Fisheries Service
>>   NOAA Southeast Regional Office
>>   Protected Resources Division
>>   263 13th Avenue South
>>   St. Petersburg, Florida 33701
>>   PH: (727) 551-5781 <tel:%28727%29%20551-5781>
>>   FX: (727) 824-5309 <tel:%28727%29%20824-5309>
>>   Email: shelley.norton@noaa.gov <mailto:%20shelley.norton@noaa.gov>
>>   Web: http://sero.nmfs.noaa.gov/pr/pr.htm
<http://sero.nmfs.noaa.gov/pr/pr.htm%20>
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>>   Audra Livergood
>>   Marine Resource Manager
>>   NOAA National Marine Fisheries Service
>>   SERO Protected Resources Division
>>   Fort Lauderdale Field Office
>>
>>
>>   With people it is impossible, but not with God; for all things are possible with
God.
>>
>>   Jesus Christ
>>
>>
>>
>>
>>
>> --
>>
>> Kay Davy
>> Protected Resources Division
>> National Marine Fisheries Service
>> National Oceanic and Atmospheric Administration (NOAA)
>> Office: 727-415-9271

APPENDIX D

MANATEE MONITORING PLAN

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Appendix D
Picayune Strand Restoration Project
Draft Manatee Monitoring Plan

Evaluation of Effects of Backfilling Merritt Canal on Flows to Port Of the Islands BASIN

When the north-south portion of Merritt Canal is plugged, the east-west portion of the canal at the southern end of the Picayune Strand Restoration Project (PSRP) will remain open and continue to capture flows moving to the south. Thus, the current level of flow into the Port of the Islands (POI) Basin should remain essentially the same after the north-south section of Merritt Canal down to 126th Avenue is plugged. However, monitoring will be conducted to ensure that plugging the Merritt Canal does not cause significant changes to the conditions in the POI Basin.

The South Florida Water Management District (SFWMD) currently monitors flows over Faka Union Weir #1 and three rainfall stations; SGGEWX (NW), Collier Seminole State Park (SW) and Dan House Prairie (SE), within or near the PSRP. The data are stored within SFWMD's DBHydro database. An equation developed by the United States Geological Survey (USGS) uses these four datasets to correlate canal flows from the lower Faka Union Canal into POI Basin with rainfall within the upstream watershed.

The USGS equation described above will be used to assess whether the monthly flow-rainfall relationship has been significantly altered by filling the north-south portion of Merritt Canal. This relationship will be evaluated for one winter season (December 1 to April 1) following the start of Merritt Canal plugging. If canal plugging begins between December 1 and April 1, monitoring will occur through April 1 of that dry season and be repeated the next winter season from December 1 through April 1. If canal plugging begins between April 1 and November 30, monitoring will occur during the next winter season from December 1 through April 1. The actual plugging of the canals will take approximately three to four months. If no significant changes to flows are observed, the evaluations will be discontinued after one full winter season (December 1 to April 1); however, if a significant change is observed using the equation developed by USGS, as a function of plugging Merritt Canal, the U.S. Army Corps of Engineers (Corps) and SFWMD will consult with U.S. Fish and Wildlife Service (USFWS) and Florida Fish and Wildlife Conservation Commission (FWC) to determine if any additional action(s) are needed or required. Information will be analyzed and reported on a monthly basis.

Additionally, the "Guidelines for Manatee Conservation During Comprehensive Everglades Restoration Plan Implementation" (CERP Interagency Manatee Task Force 2006) and the Standard Manatee Construction Guidelines will be implemented for all construction phases while working in canals accessible to manatees.

Post-construction Manatee Monitoring

Post-construction manatee monitoring for the PSRP will begin with the plugging of all canals within the project. The Faka Union Canal conveys the largest amount of water to POI Basin; therefore, plugging the Faka Union Canal will likely alter freshwater flows into POI Basin more

significantly than plugging of the Merritt or Miller canals. Therefore, if the Faka Union Canal is plugged prior to the Miller Canal, post-construction monitoring will begin following the construction of the first Faka Union Canal plug. As freshwater flows into POI Basin are reduced, the manatee refugium at POI Basin will likely be altered.

The Faka Union and Miller Canals will not be plugged until the Endangered Species Act (ESA) consultation on the West Indian Manatee is complete and a manatee mitigation feature has been implemented in the POI Basin to compensate for the reduction in freshwater flows into POI Basin. The project is phased so that each pump station will begin operations when complete, with the Miller pump station completed last. When all pump stations are completed, the manatee mitigation feature and western protection features are functional, and all canals are plugged, the project can begin to achieve estuarine benefits. One goal of PSRP was to redistribute freshwater flows to the estuaries and reduce the point discharge from the Faka Union Canal. It is this point source discharge from the Faka Union Canal that is responsible for the current manatee refugium within the POI Basin. As a result of restoration, this artificial refugium will be altered, thus the need for the manatee mitigation feature. As natural freshwater flows are reestablished in the estuaries south of Picayune Strand, it is anticipated that manatees will begin to utilize these natural areas once again. The PSRP acknowledges that manatees have become reliant upon the POI Basin refugium; therefore monitoring will be conducted in the POI Basin beginning the first winter season from December 1 through April 1 as identified in Table D-1. Manatee observations as described in Table D-1 will be conducted by a qualified marine species observer as outlined within the 2006 Guidelines for Manatee Conservation during Comprehensive Everglades Restoration Plan Implementation (CERP Interagency Task Force 2006). Post-construction seagrass surveys are included in the overall PSRP Monitoring Plan and will be included in results of manatee monitoring.

Table D-1: Proposed Picayune Strand Restoration Project Manatee Monitoring Plan

FEATURE	OBJECTIVE	TASK	DURATION	TARGET
Merritt Canal (begin monitoring with construction of first plug)				
Begin evaluating flows at Faka Union-1 (FU-1) and rainfall after the start of Merritt canal plugging.	Determine if significant changes occur to flows at FU-1 at times when rainfall would historically maintain the manatee refugium at POI.	Evaluate stage and rainfall at FU-1 using DBHydro and rainfall (SGGEWX [NW]; Collier Seminole State Park [SW] and Dan House Prairie [SE]) monthly using equation developed by USGS (Sloan et al., 2013) to determine if significant changes occur. Assumption: Headwater stages above 2.34 feet NAVD88 at FU-1 would result in halocline formation and resultant thermal refuge.	If the canal plugging begins between December 1 and April 1, monitoring will occur through April 1 of that winter season and be repeated the next winter season from December 1 through April 1. OR If canal plugging begins between April 1 and November 30, monitoring will be conducted for one full winter season from December 1 through April 1.	Maintain stage/rainfall correlation within 95% confidence limits of prediction based on 7 years of winter rainfall data for first full winter season following canal plugging. If stage/rainfall correlations met after one year (December 1-April 1 time period), determine no effect. If stage/rainfall correlations not met after one year, identify if rainfall patterns were outside of original model period of record (2003-2004 to 2009-2010). If yes, repeat analysis for one more year. If no, initiate consultation with FWS/FWC on manatee effects due to Merritt and potential additional effects from Miller and Faka Union canal plugging.
Post-Construction Monitoring (all canals plugged – Prairie, Merritt, Miller, Faka Union)				

FEATURE	OBJECTIVE	TASK	DURATION	TARGET
If construction of the manatee mitigation feature is completed between April 1 through November 30 monitoring will start the following December 1. OR If construction of the manatee mitigation feature is completed from December 1 through April 1 monitoring will start immediately through April 1 and restart the next winter season (December 1 to April 1).	Determine success of the manatee mitigation feature following the completion of the PSRP at times when rainfall would historically maintain the manatee refugium at POI.	1. Monitoring of vertical temperature strata using data loggers. Vertical temperature strata to include bottom, middle, and upper depths. These depths will be determined during mitigation feature design. At least one temperature logger would be telemetry-based for real time transmission of data to determine cold events. 2. Isotope analysis – collect water isotopes to determine 18O/16O and 2H/1H ratios. Monthly (December 1 to April 1) The bottom depth would be determined during mitigation feature design.	1. Collect and evaluate temperature data monthly during winter season (15 to 30 minute intervals with data loggers) collected and evaluated monthly from December 1 to April 1. Monitor for 3 years then re-evaluate in consultation with USFWS and FWC using decision matrix with options to continue or discontinue monitoring. Isotope data would be collected monthly (December 1 to April 1) and during moderate to severe cold weather events. 2. First test performed immediately following completion of construction of the manatee mitigation feature (construction	1. Maintain vertical temperature strata with bottom layer at least 20°C during moderate to severe cold weather events at times when rainfall would historically maintain the manatee refugium at POI. 2. Confirm presence of groundwater isotopes and trend in bottom layer. Moderate to severe weather events occurred: a) If groundwater isotopes are confirmed within mitigation refugium area and bottom temperatures remain at or above 20 degrees Celsius during moderate to severe cold weather events for 3 full winter seasons - monitoring will be discontinued. b) If isotopes are confirmed but temperature threshold is exceeded, monitor for additional 3 years and reevaluate. c) If isotopes are not confirmed, evaluate rainfall/stage equation to determine if halocline

FEATURE	OBJECTIVE	TASK	DURATION	TARGET
			contract). Duration: Monthly (December 1 to April 1) for 3 years at the beginning of winter season. Re-evaluate after 3 years in consultation with USFWS and FWC.	formation would have likely formed. If no, continue monitoring for additional 3 years. If yes, initiate consultation with USFWS and FWC on potential manatee effects. d) If no moderate to severe whether events occur, continue monitoring for 3 more years.
Manatee Observations	Determine if manatees are using the manatee mitigation feature.	Manatee use*: 1. Manatee mitigation feature and; 2. POI Basin * Manatee Observation protocol will be developed in conjunction with USFWS and FWC.	Winter season for up to 10 years following completion of the manatee mitigation feature within: 1. Manatee mitigation feature area beginning the next day following a cold event (water temperature below 20^{o}C) for 2 days. Based upon information provided from data loggers described in post-construction monitoring.	Determine presence and number of manatees within: 1. Manatee mitigation feature Confirm presence of manatees within the feature for 3 cold weather events (2 moderate and 1 severe during the period between December 1 to April 1). 2. POI Basin Confirm presence of manatees within the POI Basin for 3 cold weather events (2 moderate and 1 severe) during the period between December 1 to April 1. Discontinue task if target (letter a below) reached.

FEATURE	OBJECTIVE	TASK	DURATION	TARGET
			2. POI Basin area for 2 days beginning the next day following a cold event (water temperature below 20^{o}C) **and** when FU-1 stage is below 2.34 feet NAVD88. The PSRP Monitoring and Assessment Group (MAG) will meet annually to assess monitoring data. After three cold events (two moderate and one severe), the PSRP MAG will reassess need for further manatee observation monitoring requirements.	a. If manatees are present in manatee mitigation feature during 3 cold events (1 moderate and 2 severe) and the feature is working (hydrology/temperature criteria), then reevaluate monitoring. * b. If moderate to severe cold events occur and manatee mitigation feature is not working (hydrology/temperature criteria) and halocline would not have formed based on USGS equation analysis of rainfall and stage, then continue monitoring for additional 3 years. c. If manatees are not present in manatee mitigation feature during cold events and mitigation feature is working (hydrology/temperature criteria), then coordinate with FWC/USFWS to evaluate potential manatee effects. d. If manatees are not present in manatee mitigation feature during cold events and mitigation feature is not working (hydrology

FEATURE	OBJECTIVE	TASK	DURATION	TARGET
				and temperature criteria), and halocline would have formed based on USGS equation analysis of rainfall and stage; then coordinate with FWC/USFWS.

*A moderate cold event is described as ambient water temperatures fall below 20^{o}C for a period of 14 days. A severe cold event is defined as ambient water temperatures (as indicated by monitoring well located at mouth of Faka Union Canal) fall below 20^{o}C for 25 days or fall below 15^{o}C for a period of 14 days.

The determination of whether an event is considered to be moderate or severe should be part of the annual assessment of a subgroup of the PSRP Monitoring and Assessment Group which consists of manatee experts, including biologists with the Service, FWC, and USGS. All determinations of defined events and management recommendations that result will be subsequently coordinated with the Service, FWC, Corps, and SFWMD.

Additional Monitoring:

The following monitoring data is included in this monitoring plan solely per request of FWC and USFWS. All data are collected and funded by FWC/USFWS and will be considered in determining manatee use in area. Any data that are available and determined to be of use by FWC/USFWS will be coordinated with the Corps/SFWMD.

1. Boat Strike Data: FWC and USFWS boat strike data may be used to assess post-construction manatee distribution changes in POI Basin area. Data will be provided to Corps and SFWMD for review, if available and produced by FWC/FWS. Data will be assessed until manatee mitigation feature success criteria are met.
2. Mortality/Morbidity Data: FWC/FWS data regarding manatee mortality and morbidity related to regional cold stress data may be used to assess post-construction cold stress effects on manatees in the POI Basin area. Data will be provided to Corps and SFWMD for review, if available and produced by FWC/FWS. Data will be assessed until manatee mitigation feature success criteria are met.

In addition to the monitoring listed above, the following list of estuarine water quality and hydrological monitoring stations as well as the project-specific hydrological monitoring stations located in the upper estuary are considered important to evaluating project effects on manatees and their critical habitat. Funding sources for these stations have varied and have included RECOVER, USGS, PES, and the SFWMD. If funding of these stations is proposed to be discontinued, the MAG will be notified and the effect that the loss of the stations would have on manatees and their critical habitat will be evaluated.

1. **POI Boat Basin** – floating salinity/temperature sensor, near bottom salinity/temperature sensor, and 8 sensor thermistor string – monitoring salinity stratification and temperature inversions (re-starting in November 2013; only winter months) – **Funded by PES**
2. **East River** – salinity, temperature, water level – **funded by RECOVER**; discharge (*re-starting in November 2014*) – **funded by PES**
3. **Faka Union Canal near the mouth** – salinity, temperature, water level, and discharge – **funded by RECOVER**
4. **Pumpkin River** – salinity, temperature, water level, and discharge – **funded by RECOVER**
5. **Blackwater River** – salinity, temperature, water level, and discharge – **funded by RECOVER**
6. **Palm River** – salinity, temperature, and water level – **funded by RECOVER**

Vertical Temperature Strata

Three vertical temperature strata will be continuously monitored, as defined in Table D-1, during the winter season from December 1 through April 1 for three full winter seasons following the beginning of plugging the Faka Union and Miller Canals to determine the temperature in the water column within the manatee mitigation feature. Vertical temperature strata will include bottom, middle, and upper depths. These depths will be determined during mitigation feature design. Prolonged water temperatures below 20 degrees Celsius can lead to cold stress syndrome in manatees (Bossart et al. 2003). The current refugium in the POI Basin functions as a temperature inverted thermocline/halocline; it is expected that the manatee mitigation feature will serve as a manatee refugium by establishing a connection with warmer saline groundwater. It is important to monitor the vertical temperature strata to determine whether the manatee mitigation feature serves as a refugium in light of the post-construction reduction in point source discharge of freshwater inflows to POI Basin.

Isotope Analysis

Isotope analyses will be conducted on the bottom water layer of the manatee mitigation feature monthly (December 1 to April 1) for three years to verify the presence of groundwater within the manatee mitigation feature. USGS conducted studies from 2009 to 2011 of the isotope signatures in the POI Basin and determined that there is currently no groundwater connection in the relatively shallow POI basin; furthermore, they identified the unique isotope signatures of groundwater, water from the Gulf of Mexico, and freshwater from the Faka Union canal. These data can be used to determine the presence or absence of a groundwater connection once the manatee mitigation feature is completed.

Evaluation of Boat Strike and Mortality/morbidity Data

Boat strike and mortality/morbidity data collected by the USFWS and FWC will be evaluated to observe patterns of changes in distribution and occurrence of cold stress in manatees within the POI basin. Collection of these data will not be funded by SFWMD or USACE; however, SFWMD and USACE biologists can utilize these already available data to help evaluate possible post-construction changes in manatee boat strikes and mortality/morbidity patterns.

Manatee Observations

Manatee observations will be performed within the POI Basin and manatee mitigation feature to determine if manatees are using the new refugium. Observations will be conducted once a day within the manatee mitigation feature the next day following a cold event where the ambient water temperature reaches 20^{o}C or less for two days following the cold event. Observations will be conducted in the POI Basin under the same temperature condition and duration with the additional requirement that the stage at the FU-1 is less than 2.34 feet NAVD88 as determined critical by the USGS trigger analysis.

The definition of a moderate to severe cold event is based on a range of actual site conditions (Slone et. al in press) which may include: 1) a shorter time duration for moderate to severe cold events (7-25 days) based on intermittent but low temperatures, 2) a definition that is less than "consecutive" days, since temperatures may exceed the 20 degrees Centigrade for shorter periods of time but could be part of a severe prolonged condition that could lead to chronic cold stress (Mezich, pers. comm. September 24, 2014), and 3) multiple cold events in a single season that could be defined as resulting in a "severe" event.

Manatee observations as described in Table D-1 will be conducted by a qualified marine species observer as outlined within the 2006 Guidelines for Manatee Conservation during Comprehensive Everglades Restoration Plan Implementation (CERP Interagency Task Force 2006).

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APPENDIX E

SUPPLEMENTAL BIOLOGICAL ASSESSMENT

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ENDANGERED SPECIES ACT

SUPPLEMENTAL BIOLOGICAL ASSESSMENT

PICAYUNE STRAND RESTORATION PROJECT

U.S. Army Corps of Engineers
Jacksonville District

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ENDANGERED SPECIES ACT
SUPPLEMENTAL BIOLOGICAL ASSESSMENT

Picayune Strand Restoration Project

Prepared by
Department of the Army
U.S. Army Corps of Engineers, Jacksonville District

September 2014

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9.0 INTRODUCTION

The purpose of a Biological Assessment (BA) is to evaluate the potential effects of a federal action on both listed species and those proposed for listing, including designated and proposed critical habitat, and determine whether the continued existence of any such species or habitat are likely to be adversely affected by the federal action. The BA is also used in determining whether formal consultation or a conference is necessary [Federal Register 51 (USFWS, Biological Opinion for Picayune Strand Restoration Project 2009) (106): Section 402.1 (f), pg. 19960, 3 June 1986]. This is achieved by:

- **Reviewing the results of an on-site inspection of the area affected by the federal action to determine if listed or proposed species are present or occurs seasonally.**
- **Reviewing the views of recognized experts on the species at issue and relevant literature.**
- **Analyzing the effects of the federal action on species and habitat including consideration of cumulative effects, and the results of any related studies.**
- **Analyzing alternative actions considered by the federal agency for the proposed project.**

This document is the fourth supplement to the BA of the Central and Southern Florida Comprehensive Plan, Picayune Strand Restoration Project (PSRP), Final Project Implementation Report (PIR) and Environmental Impact Statement (EIS) dated September 2004. That BA, dated October 15, 2004, made determinations of effect for the following federally listed species: American crocodile (*Crocodylus acutus*) and its critical habitat, Kemp's ridley sea turtle (*Lepidochelys kempi*), Atlantic green sea turtle (*Chelonia mydas mydas*), red-cockaded woodpecker (*Picoides borealis*), Everglade snail kite (*Rostrhamus sociabilis plumbeus*) and its critical habitat, smalltooth sawfish (*Pristis pectinata*), eastern indigo snake (*Drymarchon corais couperi*), loggerhead sea turtle (*Caretta caretta*), and bald eagle (*Haliaeetus leucocephalus*). The 2004 BA also addressed candidate species, including the goliath grouper, (*Epinephelus itajara*), mangrove rivulus (*Rivulus marmoratus*), and sand tiger shark (*Odontaspis taurus*). The 2004 BA also identified and made a determination of effect for West Indian manatee critical habitat.

The 2004 BA determined that the project "may affect, but is not likely to adversely affect" red-cockaded woodpecker, bald eagle, Everglade snail kite, eastern indigo snake, and American crocodile. The 2004 BA further determined that the project "may affect, but is not likely to adversely affect" West Indian manatee critical habitat, and that the project will have "no effect" on Everglade snail kite critical habitat and American crocodile critical habitat. However, due to insufficient information on project design detail, project operations, and project hydrological models, the 2004 BA did not make a determination of effect for wood stork (*Mycteria americana*), Florida panther (*Puma concolor coryi*), and West Indian manatee (*Trichechus manatus*).

In 2004, the National Marine Fisheries Service (NMFS) concurred on determinations stated in 2004 PSRP Final PIR/EIS. Consultation with NMFS was reinitiated under a July 2, 2013 Comprehensive Everglades Restoration Program (CERP) Programmatic BA and addresses

potential impacts to smalltooth sawfish critical habitat. The addition of the manatee mitigation feature and potential loss of mangrove habitat is being coordinated with NMFS through an additional consultation process.

In November 2008, a third supplemental BA with additional information and analyses regarding the wood stork, Florida panther and West Indian manatee allowed determinations of effect to be made for these species. The 2008 supplemental BA determined that the project "may affect, but is not likely to adversely affect" wood stork and West Indian manatee. In the 2008 supplemental BA, the Corps determined that the project was "likely to temporarily adversely affect" Florida panther during the time that construction activities are occurring; however, no long term adverse effects are anticipated.

In a Biological Opinion (BO) dated March 2009, the USFWS concurred with the Corps' determination on the Florida panther and wood stork. Although the USFWS had previously concurred in 2004 that the PSRP "may affect, but was not likely to adversely affect" Eastern indigo snake, based on new information about this species and the risk that construction may pose, the USFWS and Corps agreed in 2008 to formally consult on this species. The USFWS determined that the PSRP, was "not likely to jeopardize" the continued existence of the Eastern indigo snake. The USFWS also concurred with the Corps "may affect, but not likely to adversely affect" determination for West Indian Manatee stating that if ongoing studies, project design or new information was presented that indicated a potential effect to manatee, consultation would be reinitiated. In 2009, the Corps contracted with the U.S. Geological Survey (USGS) to complete a baseline population study of manatees between 2009 and 2011 in order gather more information regarding manatee use of the Port of the Island (POI) Basin. In 2011, the USGS presented information indicating that the PSRP would have an adverse effect on the manatee population at the POI Basin when flows from the Faka Union canal are reduced through the restoration project (Stith, et al., 2011). As a result of the USGS study, the Corps, USFWS, Florida Fish and Wildlife Conservation Commission (FWC), USGS, South Florida Water Management District (SFWMD), Florida Department of Environmental Protection (FDEP), and the Florida Forest Service (FFS) formed a manatee mitigation sub-team with the purpose of formulating alternatives to explore solutions to prevent an adverse effect to manatees in the POI Basin. The manatee mitigation feature described in this BA best achieves the objectives of preventing adverse effects to manatees in the POI Basin and maintains the benefits of hydrologic restoration. This supplemental BA will address the effect of the construction of the manatee mitigation feature at the POI Basin. This BA will also address potential effects to the endangered Florida bonneted bat (*Eumops floridanus)* listed as of November 1, 2013 and the gopher tortoise (*Gopherus polyphemus*), a candidate species for listing.

10.0 CONSULTATION SUMMARY

10.1 PICAYUNE STRAND PROJECT IMPLEMENTATION REPORT

In October 2003, the USFWS completed consultation with the Corps on the Prairie Canal Early Start portion of the PSRP. The USFWS concurred with the Corps' determination that the backfill of the Prairie Canal on the eastern extent of the project "may affect, but would not likely adversely affect" the Florida Panther, wood stork, Everglades snail kite, manatee and manatee critical habitat, American crocodile, red-cockaded woodpecker, eastern indigo snake, and bald eagle. This project was permitted through a Corps Section 404 permit (SAJ 200308480 [IP-HWB]) and completed by the SFWMD.

During the initial planning phases of the 2004 PIR/EIS, the USFWS provided a Planning Aid Letter (PAL) dated October 27, 1999, that outlined project concerns including federally listed species. On October 17, 2001, the Corps provided an initial BA to the USFWS requesting formal consultation on the West Indian Manatee, red-cockaded woodpecker, Florida panther, wood stork, Everglade snail kite, and Eastern Indigo snake. The USFWS did not respond to this initial request for concurrence for the following reasons:

- several immediate changes in the project development schedule;
- lack of details provided with the identified selected plan;
- subsequent development of new alternatives;
- pending results of several iterations of the hydrological model; and
- a change in the hydrological model platform.

On August 5, 2004, the Corps met with the USFWS to address comments on listed species consistent with the July 13, 2004, PAL and the Department of the Interior (DOI) comments. On September 22, 2004, the USFWS provided a final Fish and Wildlife Coordination Act (FWCA) report recommending the 2004 PIR/EIS Alternative 3D as the preferred alternative. However, the Final Coordination Act Report (FCAR) stated that additional engineering, hydrologic, and biological information would be needed as refinement were made to the project and that an addendum to the FCAR would be provided as necessary. The Corps provided a BA, dated October 20, 2004, that requested initiation of consultation under the Endangered Species Act (ESA) on West Indian manatee, red-cockaded woodpecker, Florida panther, wood stork, Everglade snail kite, and Eastern indigo snake.

On October 24, 2004, a BO was issued for the PSRP in which a “no effect” concurrence was made for Everglades snail kite critical habitat and American crocodile critical habitat, and “may affect, not likely to adversely affect” the Everglades snail kite, American crocodile, red-cockaded woodpecker, bald eagle, eastern indigo snake, and West Indian manatee critical habitat. The Corps determined in this BA that it did not have sufficient information to reach an effect determination for the wood stork, Florida panther, and West Indian manatee.

On March 13, 2014, a revised draft BA was provided to the USFWS. Based on that assessment, previous project commitments, and conservation measures provided in the BA, the Corps determined that the project would have "no effect" on the Florida panther, Florida bonneted bat, Everglade snail kite, wood stork, red-cockaded woodpecker and American crocodile and its critical habitat; and "may affect, but is not likely to adversely affect" the West Indian manatee and its critical habitat, the eastern indigo snake and gopher tortoise. USFWS suggested that additional analysis would support a "may affect, but not likely to adversely affect" determination for the Florida panther, the American crocodile and its critical habitat and the bonneted bat. However, additional information would be required to complete analysis of the West Indian manatee and West Indian manatee critical habitat potentially affected by the project. The additional information and project commitments that were requested included:

1) Consensus on the "Manatee Refugium Success Criteria" with assistance from the Florida Fish and Wildlife Conservation Commission (FWC) and USGS;
2) A detailed design of the refugium based on recent geotech work by the SFWMD;
3) Consensus on a modified Manatee Monitoring Plan.

Subsequently, on August 20, 2014, a multi-agency meeting was held at the USFWS office in Vero Beach to establish consensus on the requested information; which has been incorporated in this document.

10.2 MANATEE MITIGATION CONSULTATION SUMMARY

In October 2001, the Corps provided the initial BA that requested initiation of consultation under the ESA on the West Indian manatee and its critical habitat. In the 2001 BA the Corps determined that the project "may affect, but would not likely adversely affect" manatee. However, as stated in Section 2.1 above, the USFWS did not complete consultation at the time.

In August 2004, the USFWS requested additional information concerning the manatee, including project effects on its warm water refugee and critical habitat. The USFWS and USGS provided the Corps with updated information on the status of the southwest Florida regional population of the manatee and USGS manatee studies conducted in the project vicinity.

On October 8, 2004, the USFWS commented on effects to listed species related to the removal and replacement of the Faka Union Weir Number 4 in the Faka Union Canal north of the PSRP. The purpose of the project was to increase groundwater recharge in Northern Golden Gate Estates (NGGE), including an analysis of improved flood protection in NGGE and the regulation of freshwater discharges to PSRP through Faka Union Canal. Based on a meeting on September 23, 2004, the USFWS concurred with a series of permit conditions including the intent to install additional monitoring wells in NGGE to monitor drainage of wetlands; provide additional information on water use allocations from Faka Union Canal and to modify the Big Cypress Basin (BCB) Operations Plan. The intent of the issued permit conditions was to raise wet and dry season water levels consistent with protection of surface water wetlands and groundwater in NGGE. The agreement also intended to maximize the restoration benefits to PSRP and its receiving estuaries by managing the volume flow and seasonal availability of water, and avoiding or minimizing effects to listed species associated with wetland hydroperiod and groundwater management.

On October 22, 2004, the USFWS provided a final Fish and Wildlife Coordination Act (FWCA) Report to the Corps, noting additional information needs including: (1) an accurate description of the anticipated hydrology and its effects on surrounding public lands and federally-threatened and endangered species; (2) a plan for protecting wetlands in the upper project watershed and explaining how project operations would affect flooding concerns, particularly in NGGE; (3) a completed Project Operations Manual; (4) a completed Water Quality and Ecological Monitoring Plan; (5) completion of consultation on threatened and endangered species; and (6) analysis of Off-Road Vehicle (ORV) use if proposed on the project site. The USFWS noted the concurrence of the Florida Fish and Wildlife Conservation Commission (FWC) with the USFWS position on project concerns and a lack of response or concurrence by the National Oceanic and Atmosphere Administration, National Marine Fisheries Service (NMFS).

On October 20, 2004, the Corps provided a second more extensive BA. In that BA, the Corps determined that the project "may affect, but is not likely to adversely affect" West Indian Manatee critical habitat. The Corps determined that they did not have sufficient information to reach an effect determination for the manatee. The USFWS concluded in the BO that monitoring project effects to manatee behavior was necessary to determine effects and potential incidental

take of the manatee population. The BO also stated that funding for pre-construction monitoring for the manatee would become available following project authorization.

Between 2004 and 2006 multiple meetings were held to discuss the design of the PSRP, the operating plan, and the effects of other projects that affect project water delivery to PSRP. Discussions concerning the potential effects of the PSRP on the West Indian manatee also occurred during this period.

In 2006, the USFWS provided comments on the PSRP road removal permit which included project commitments to reduce effects on the manatee and other listed species, including: 1) completion of the committed funding for the project baseline monitoring plan, 2) initiation of an Assessment and Adaptive Management (AAM, now Monitoring and Assessment Group [MAG]), 3) contaminant remediation, 4) compensation for wetland effects, 5) pre-construction wildlife surveys, 6) pre-construction contractor education, 7) site access restrictions, and 6), financial assurances for project completion.

In 2007, USFWS, Corps, and South Florida Water Management District (SFWMD) attended an interagency conference in Gainesville, Florida to discuss the project and southwest West Indian manatee issues with State and Federal manatee experts. At the time, there were a number of uncertainties related to the PSRP effects on manatees, including:

- The effect of PSRP on the thermocline/halocline in the existing thermal refugium at the POI Basin used by manatees.
- The potential for PSRP to affect the volume and timing of freshwater in the Faka Union Canal and at Faka Union Weir Number 1 upstream of the POI Basin used by manatees.
- The effects of the redistribution of freshwater to receiving estuaries and potential effects on the regional distribution/behavior of manatees in the Ten Thousand Islands, including exposure to additional boat traffic leading to injury/mortality.
- The effects of the redistribution of freshwater on manatee critical habitat.

Due to the number of uncertainties identified, the Corps, SFWMD, and USFWS determined that additional information was required to better understand and address potential adverse effects on manatees resulting from PSRP. In order to address the uncertainties identified, the Corps, USFWS and SFWMD negotiated a study with USGS to determine potential effects of changes in hydrology on the thermocline/halocline that supports the manatee warm water refugium in the POI Basin. In March 2007, the USGS submitted a Scope of Work (SOW) entitled "Monitoring and Assessing Effects of the PSRP Restoration Project on the Manatee". The SOW identified three tasks which focus on water in or near the POI Basin:

- Task A - Real-time and deep-water sensors to determine salinity and temperature in POI Basin, the juncture of the POI Basin and the Faka Union Canal; and isotope analysis to verify the presence/absence of a groundwater source in the POI Basin.
- Task B – Compile and analyze data from existing stage stations upstream and downstream of Faka Union Weir Number 1 and establish a salinity/temperature station downstream of Faka Union Weir Number 1 to monitor the freshwater lens at the weir to analyze availability of freshwater for drinking.

- Task C – Monitor temperatures and salinities in the upstream/downstream segments of tributaries surrounding POI Basin by establishing additional monitoring stations in the upper-river estuaries to complement real-time monitoring stations at the Tamiami Trail bridges and in the lower estuaries.
- An additional task, Task E – Interpret hydrology and other data to identify important and sensitive habitat areas associated with tasks A-C, was included in the SOW but was not funded by the Corps. Other manatee monitoring was included in the monitoring plan but was not funded by the project including aerial and telemetry baseline surveys, as well as water quality and quantity assessments funded by USGS and the USFWS.

On November 10, 2008, the USFWS received the PSRP Supplemental BA from the Corps dated November 6, 2008. In the 2004 BA, insufficient information was available for the USFWS to concur with a "may affect, not likely to adversely affect" determination for the West Indian manatee. Based on updated information provided in the November 2008 Supplemental BA, the USFWS concurred with that determination and provided rationale for that concurrence in a BO dated March 2009. In the 2009 BO, the USFWS stated that "if through research, observation, or monitoring it is discovered that manatees are being adversely affected by the PSRP, reinitiation of consultation would be necessary" and outlined a number of potential measures that could be used to alleviate stress on manatees. The USFWS concurred with the Corps' determination of "may affect, not likely to adversely affect" for West Indian manatee based on the project commitments, assumptions, and analyses provide in the 2009 BO (USFWS 2009).

On February 1, 2011, USGS, USFWS, SFWMD, and the Corps met to discuss the results of the Tasks performed under the USGS 2007 SOW entitled "Monitoring and Assessing Effects of the PSRP Restoration Project on the Manatee." Preliminary data indicated that a reduction of freshwater flow to the refugium resulting from the PSRP construction and operation may result in additional manatee morality during the cold, dry season. This was the first interagency meeting to discuss and formulate measures to mitigate for loss of flows in the POI Basin. On May 24, 2011, a second interagency meeting between the Corps, SFWMD, USFWS, USGS, and FWC was held to review alternatives and receive input from agency managers.

On June 29, 2011, the Corps, SFWMD, and USFWS, including managers from all agencies, met to evaluate an initial array of 19 alternatives. At this meeting, the alternatives were reduced to six alternatives. Alternatives were eliminated based on feasibility, negative effect to overall project benefits, enhancements to the refugium, and direct effects on manatees. The agencies also agreed that an initial reduction in freshwater flows over the Faka Union Weir Number 1 would occur after plugging of the Faka Union Canal downstream of the Faka Union pump station. It was also agreed that the solution should not enhance the POI Basin as a refuge for manatees.

Interagency meetings were held September 16, 2011 and October 26, 2011 to discuss alternatives and narrow down the list of feasible alternatives. An additional alternative, Alternative 20, was added to the list of alternatives at the October 26, 2011 interagency meeting. At this meeting, the pros, cons, possible permitting and consultation issues, unknowns, data collection needed, and rough order magnitude costs were discussed for each remaining alternative. Following this meeting, the team chose one alternative to perform a proof of concept model to evaluate the feasibility of a concept presented by USGS. The USGS concept was based on the idea that

reducing the size of the basin would reduce the amount of flow needed to sustain the thermocline/halocline under conditions it would have historically occurred.

On April 10, 2012, an updated species list for this second supplemental BA was requested from USFWS. The updated list was received on April 24, 2012.

On April 5, 2012, the initial results of the proof of concept modeling were presented to managers from the Corps, SFWMD, USFWS, USGS, and FWC. The team presented the recommended plan, Alternative 20, moving the Faka Union Weir Number 1 north, creating a smaller basin north of US-41, for approval. Management from all agencies concurred with the recommendation of Alternative 20 and requested a pre- and post-construction monitoring plan be created. However, further detailed modeling results completed by the U.S. Army Engineer Research and Development Center (ERDC) were inconclusive regarding the effectiveness and potential success of the concept of a smaller basin. In addition, there were significant local residents (Orchid Cove Homeowners' Association) concerns with relocating the Faka Union Weir Number 1. As a result, the team decided to re-evaluate alternatives that would effectively provide a refugium in the POI Basin. The new alternatives were based on the idea of creating a connection to warm saline groundwater in the POI Basin to mimic a natural warm-water refugium.

As stated in Section 2.0, a multi-agency meeting was held on August 20, 2014, where a consensus was reached on the Manatee Refugium Success Criteria and the Manatee Monitoring Plan. In addition, a detailed design of the refugium was completed by the SFWMD and provided to the represented agencies; all of which are contained in this document.

10.3 PROJECT AUTHORITY

The PSRP was initially authorized by Section 309(l) of the Water Resources Development Act of 1992 (Public Law 102-580) along with the balance of the Central and Southern Florida Restudy. Subsequent authorization occurred in October 1996 under Section 528 of the Water Resources Development Act of 1996 (Public Law 104-303); Section 208(d) of the Water Resources Development Act of 1999; and Section 601 of the Water Resources Act of 2000 (Public Law 106-541). Construction authorization for the project was provided by Section 1001 of the Water Resources Development Act of 2007 (Public Law 1495).

10.4 PROJECT LOCATION

The PSRP, formerly known as Southern Golden Gate Estates (SGGE), encompasses approximately 55,000 acres (241 km2 or 23,995 ha) in Collier County, southwest Florida, between Interstate Highway 75 (I-75) and U.S. Highway 41. The PSRP and the adjacent Belle Meade area to the west together constitute the Picayune Strand State Forest (PSSF) managed by the Florida Division of Forestry (DOF). The project is located northwest of Everglades National Park (ENP), west of Big Cypress National Preserve (BCNP), southwest of the Florida Panther National Wildlife Refuge (NWR), north of the Ten Thousand Islands NWR (TTINWR) and Rookery Bay National Estuarine Research Reserve (NERR), Cape Romano/Ten Thousand Islands (TTI) Aquatic Preserve, northeast of Collier Seminole State Park, west of the Fakahatchee Strand Preserve State Park, and east of the Belle Meade portion of PSSF. The completion of this restoration project in the midst of significant areas of State and Federal conservation lands will result in a total contiguous public land holding of about 2,602,144 acres

in southwest Florida (Figure 2-1). The project features include three pump stations, tieback levee, canal plugs, road removal, and western protection feature (Figure 2-2). Consultation with USFWS on the western (6L's) protection feature will be completed when detailed design for this feature is complete.

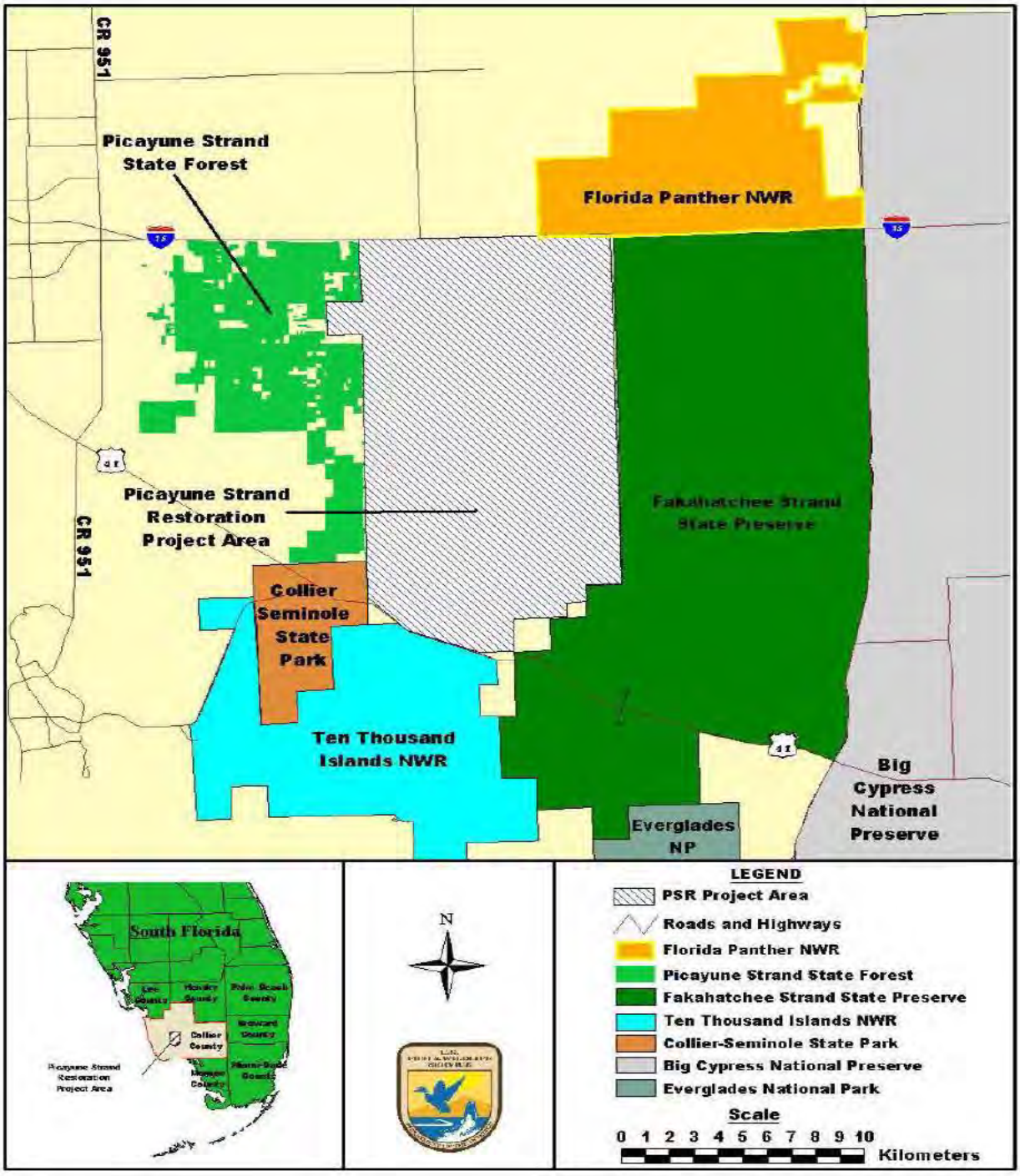

Figure 2-1. Location of the Picayune Strand Restoration Project and other adjacent public lands.

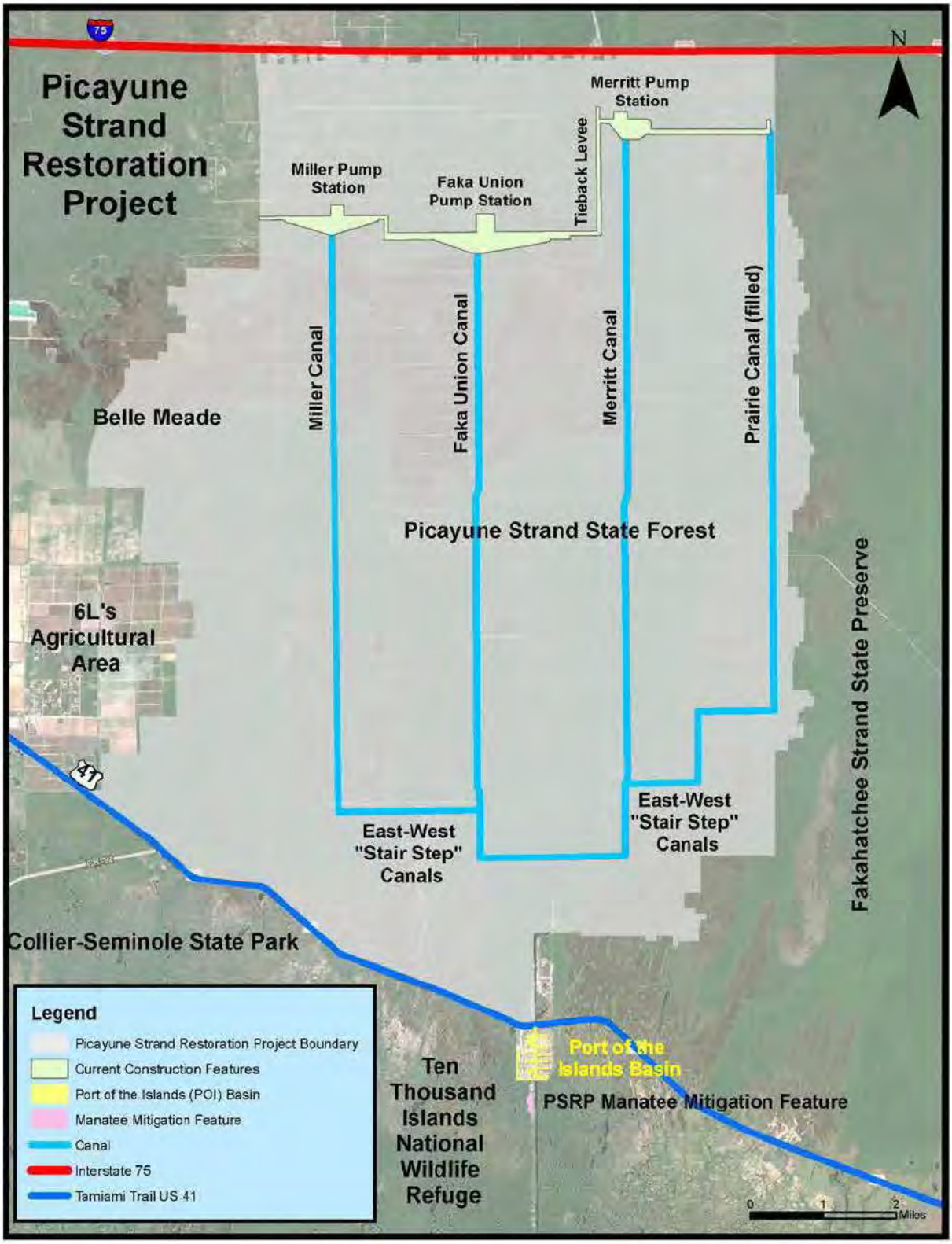

Figure 2-2. Picayune Strand Restoration Project Location

10.5 MANATEE MITIGATION FEATURE

As discussed in Section 2.2 above, it was determined during an interagency meeting discussing the results of the USGS study, that a solution would be needed to mitigate potential effects to manatee due to a reduction of freshwater flows in the POI Basin due to implementation of the full PSRP.

The manatee mitigation plan will consist of creating a connection to warm saline groundwater in the POI Basin. This will be done by creating a small oxbow in the western spoil berm of the Faka Union Canal just south of the POI Basin (FIGURE 2-3, 2-4). The deeper refugium within the oxbow will be approximately 1.67 acres and have a depth of 20 feet to create a groundwater connection. The entire footprint of the manatee mitigation feature is approximately ten (10) acres, with eight (8) acres being upland habitat on the spoil berm and 1.07 acres within wetland mangroves.

Additionally, the removal of the western spoil berm of the Faka Union Canal is a recommended component part of the Southwest Florida Comprehensive Watershed Plan (Functional Group 70 Coastal Fakahatchee, Component BC89). Placing a berm around the west side of the manatee mitigation feature may help reduce saltwater influences in areas that were originally brackish marsh but have since been converted to wetland mangroves as saltwater moved northward in the Faka Union Canal. Only a small portion of the berm (eight (8) acres) would be removed for the manatee mitigation feature.

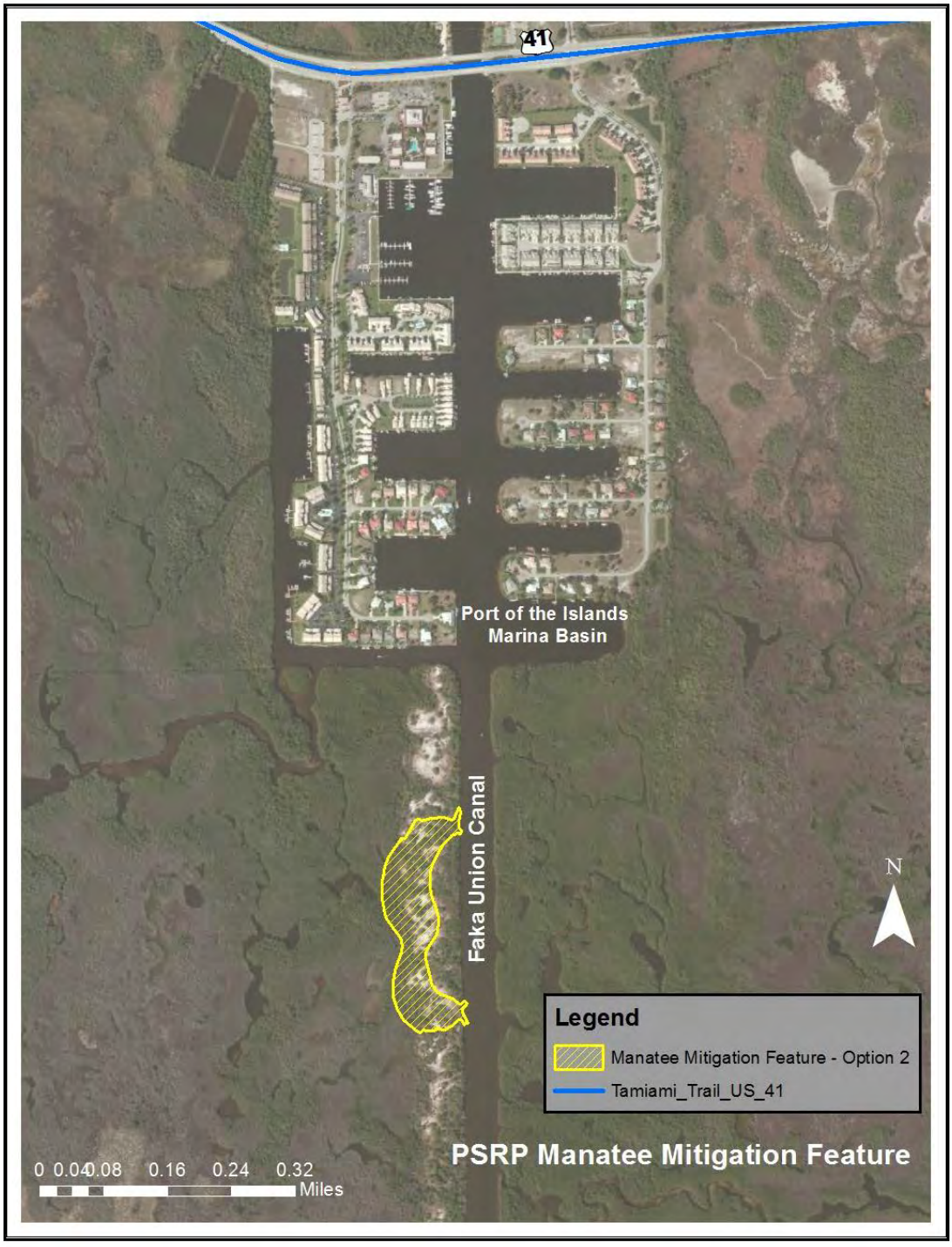

FIGURE 2-3. PSRP MANATEE MITIGATION FEATURE FOOTPRINT

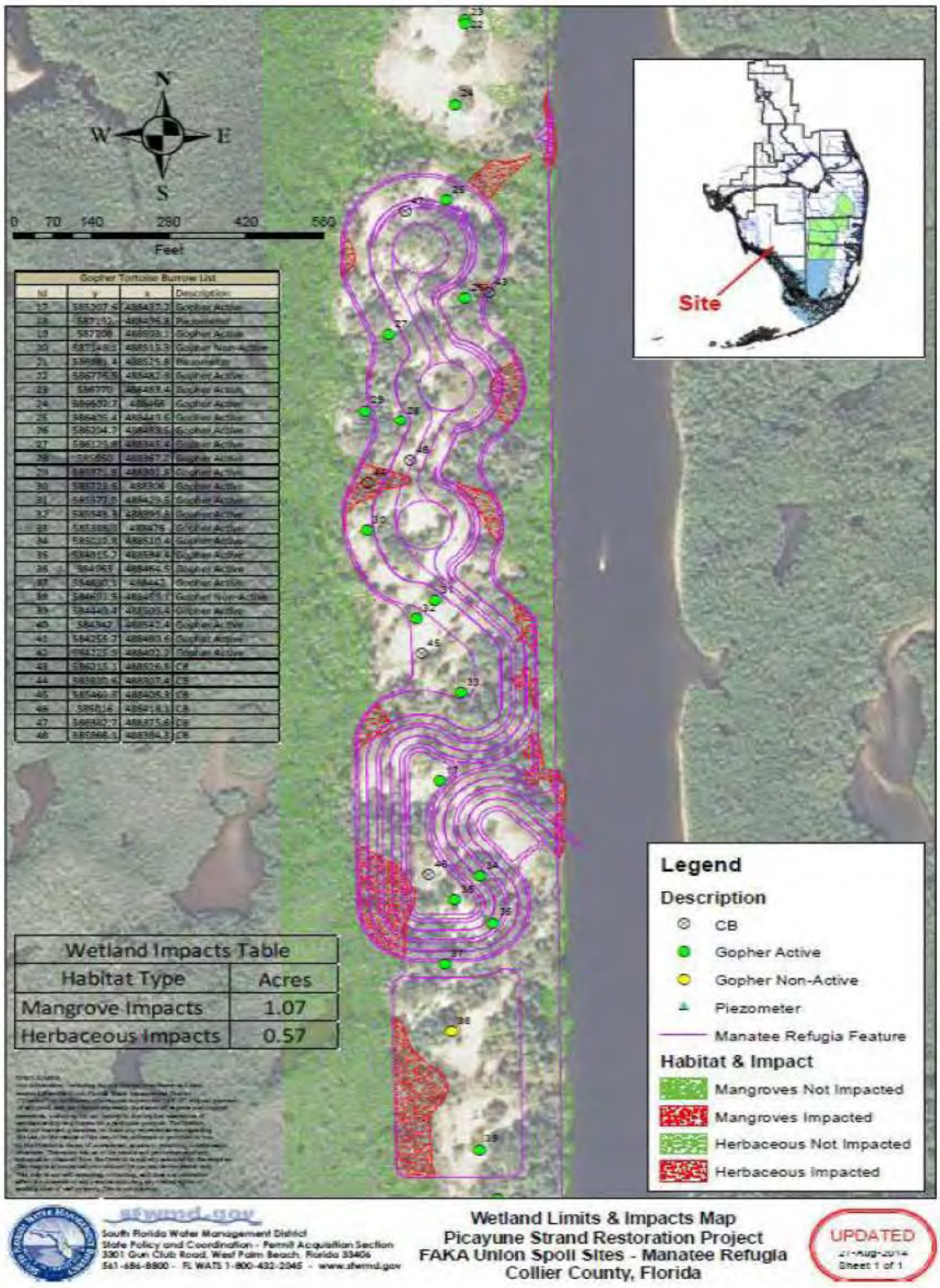

Figure 2-4. Alternative 27 Option 2 Draft Schematic of Oxbow Manatee Refugium

A groundwater well transect through the Ten Thousand Islands Region (Figure 2-5) (SGT5W1, SGT5W2, and SGT5W3) shows that the groundwater in this area fluctuates between approximately 24 to 28 degrees Celsius (Figure 2-6, Figure 2-7, and Figure 2-8). Since groundwater monitoring began at these wells in 2006, the groundwater temperature in the area has not dropped below 20 degree Celsius, the threshold for which manatees will seek refuge in thermal refugia (Stith et al. 2011).

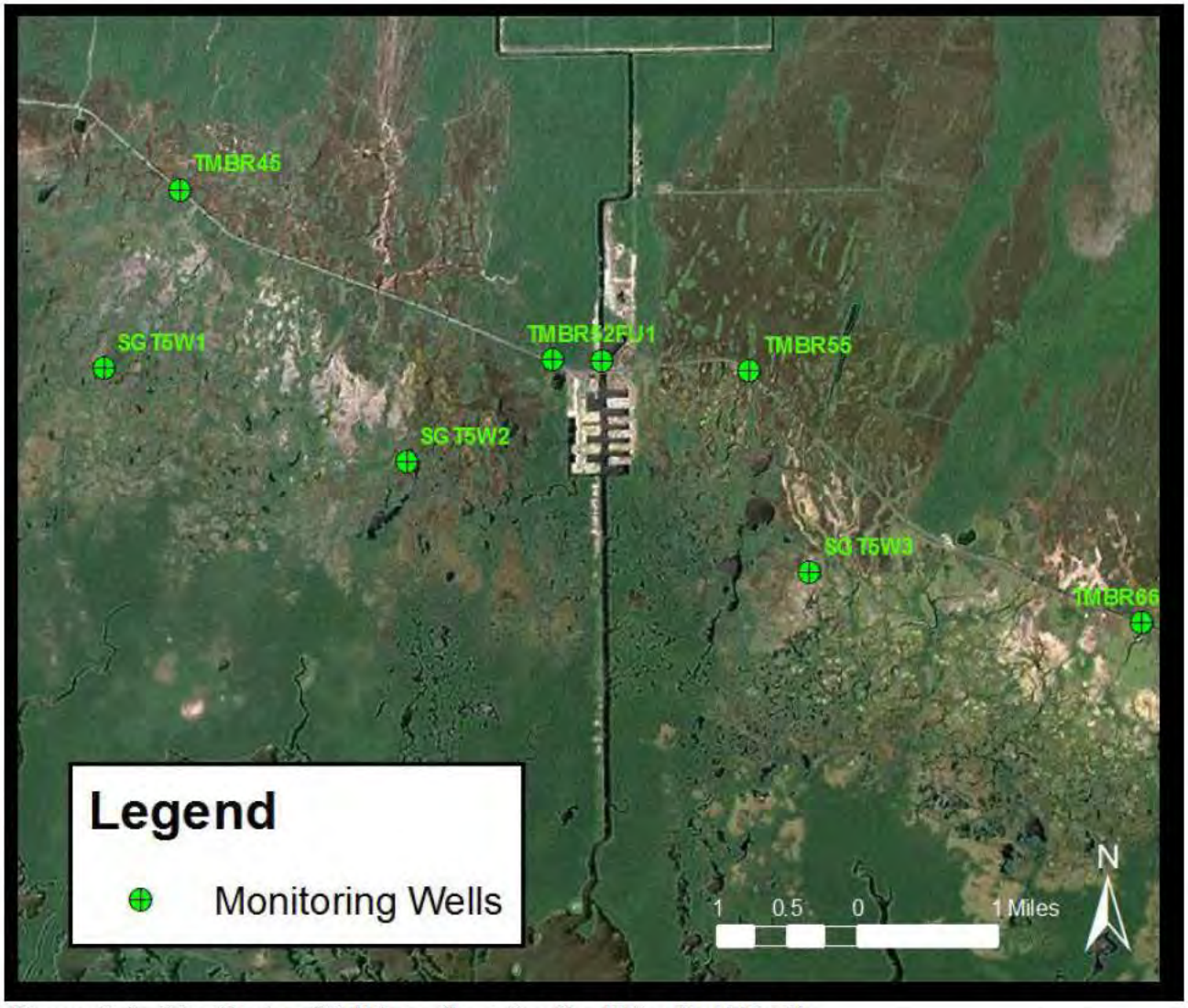

Figure 2-5. Monitoring Well Locations South of Tamiami Trail

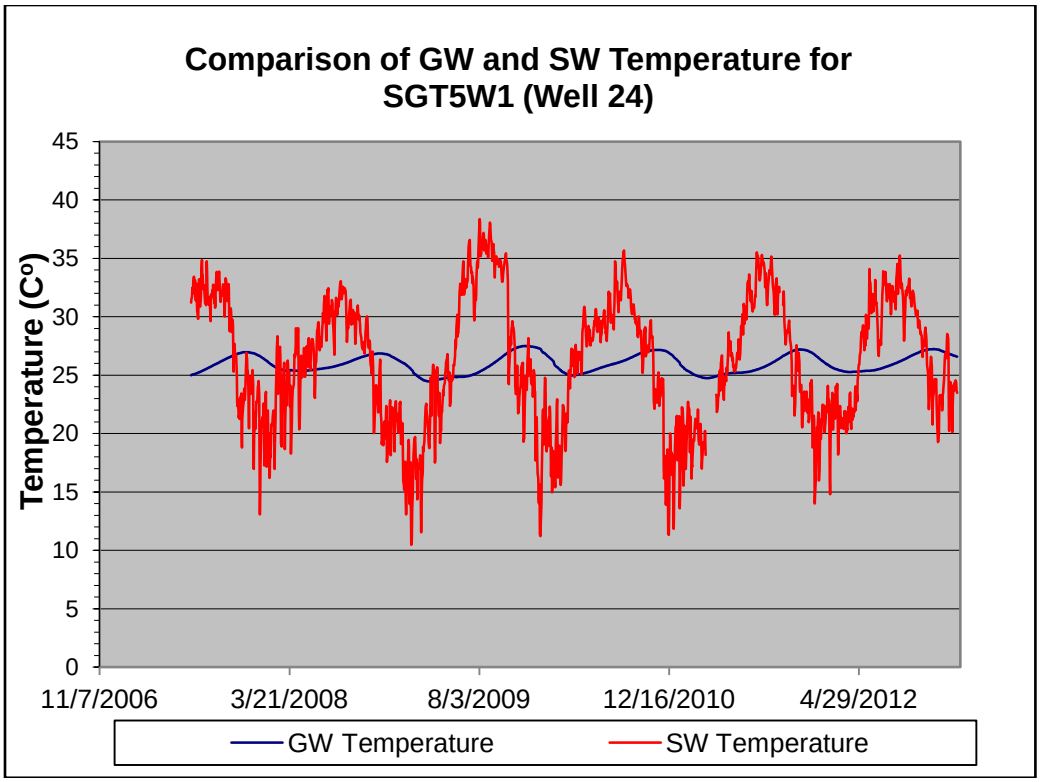

Figure 2-6. Comparison of groundwater and surface water temperatures at SGT5W1 (Well 24)

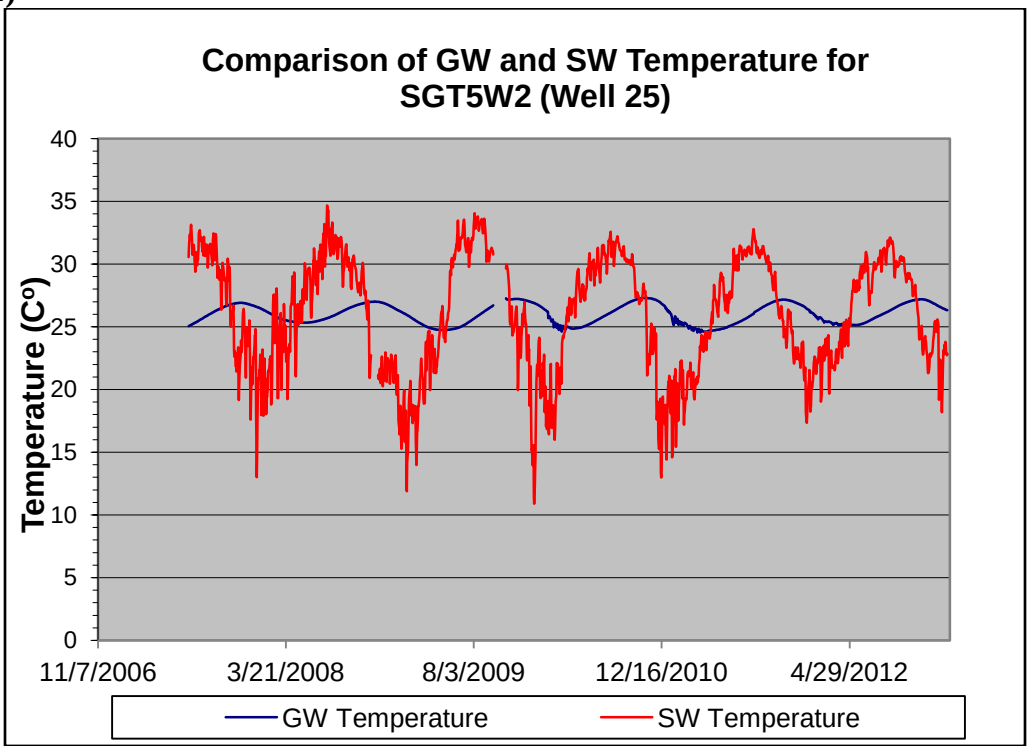

Figure 2-7. Comparison of groundwater and surface water temperatures at SGT5W2 (Well 25)

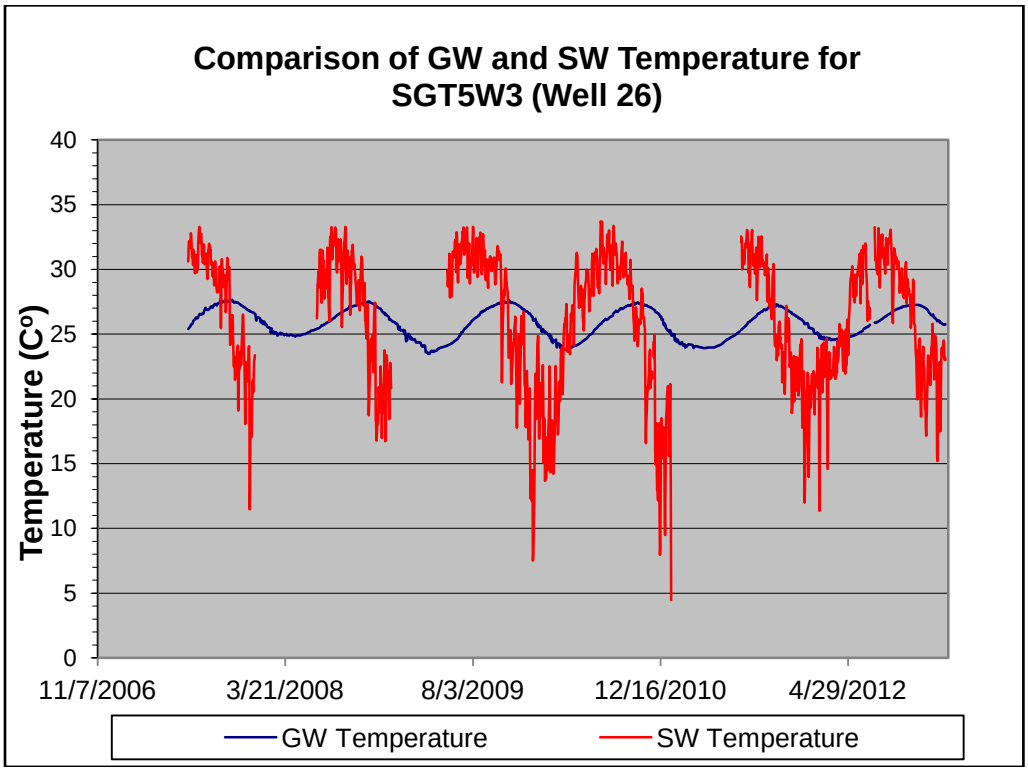

Figure 2-8. Comparison of groundwater and surface water temperatures at SGT5W3 (Well 26)

11.0 DESCRIPTION OF LISTED SPECIES AND DESIGNATED CRITICAL HABITAT

11.1 AFFECTED ENVIRONMENT

A detailed description of the overall PSRP affected environment can be found in the 2004 PSRP Final PIR/EIS though a short summary is included below. Information from the 2004 PSRP Final PIR/EIS is hereby incorporated by reference into this second supplemental BA.

In the late 1950s, Gulf American Corporation began purchasing an area of 173 square miles (110,620 acres) in Collier County, Florida for a vacation and retirement community. The Golden Gate Estates subdivision was approved in 1960, and included 183 miles of drainage canals with 25 water control structures and 813 miles of roads spaced at intervals of one-quarter mile. The area is characterized by nearly flat terrain with cypress wetlands, pine islands, wet and dry prairies, and several deeper wetland strands and sloughs including the adjacent Camp Keais and Fakahatchee Strands. Most of the land is inundated annually from at least July 1 to October 1 after the onset of the rainy season. Historically, water drained over the area to downstream estuaries of the Gulf of Mexico through surface water movement in the form of shallow sheet flow. Two major canal systems, Golden Gate and Faka Union, were constructed in the early 1960s and between 1968 and 1971, respectively, to drain this area into Naples and Faka Union Bays (U.S. Army Corps of Engineers 1980). These drainage systems channelized surface water

runoff and altered each sub-basins hydrologic response to rainfall. The canals also circumvented drainage to downstream estuaries of the Blackwater, Pumpkin, Wood, and Little Wood Rivers. On December 16, 1966, a Corps permit was issued to dredge an entrance channel connecting the Faka Union Canal with the mouth of the Faka Union River. The construction of this canal generated a major point source freshwater discharge in Faka Union Bay which has altered estuarine resources in portions of the Ten Thousand Islands (TTI).

The major effects of the drainage associated with the existing canal and water management infrastructure within the project are the loss of cypress forest and herbaceous wet prairies. Historically, small areas of pine flatwoods normally designated as uplands were located in narrow strands in elevated areas of the project and in the northwest project corner. Hydric flatwoods, which often have water at or above the ground surface for at least short periods during wetter portions of the year, were the majority of the remaining flatwoods. Due to the variable nature of shallow wetland hydroperiods and site topography over time, many on-site plant communities historically contained elements of both uplands and wetlands which were periodically affected by fire, freeze, drought, flood, and hurricane events. After drainage, upland pines, cabbage palms, and hardwoods invaded many of the cypress forests. Severe and frequent fires eliminated many of the pine and cypress trees, furthering the conversion of these lands to earlier successional shrubby states of upland or shallow wetland plant communities. Exotic plant species, particularly Brazilian pepper, have changed the character of many habitats, especially adjacent to the site's extensive canal and roadway network (Duever 2004).

A large portion of the Faka Union Canal watershed is part of the Golden Gate Estates development, zoned for single-family residential land use. The residential zoning in the Golden Gate Estates is low density with a minimum lot size of 1.25 acres. The remaining area is used for agriculture, predominantly vegetable farming, except in areas of persistent flooding. The most populated areas of Golden Gate Estates are north of Alligator Alley (Interstate 75 [I-75]) and west of Everglades Boulevard in Northern Golden Gate Estates. An exception is a small urban area, POI, located south of the PSRP adjacent to the northern portion of the main Faka Union Canal (USFWS 2009). The manatee mitigation feature will be constructed just south of the POI Basin in the spoil berm adjacent to the Faka Union Canal (FIGURE 2-3).

The POI marina, originally known as Remuda Ranch, was initially constructed by the Gulf American Corporation (GAC), who also developed Golden Gate Estates. The construction of the Faka Union Canal began in 1966, under a dredge and fill permit issued by the U.S. Army Corps of Engineers on December 14, 1966 under the jurisdiction of Section 10 of the Rivers and Harbors Act of 1899; however, at the time of issuance, no permitting systems were in place to issue permits for the discharge of refuse under Section 13 of the Rivers and Harbors Act of 1899. The original layout for Remuda Ranch closely resembles the western side of the POI marina today (Figure 3-1).

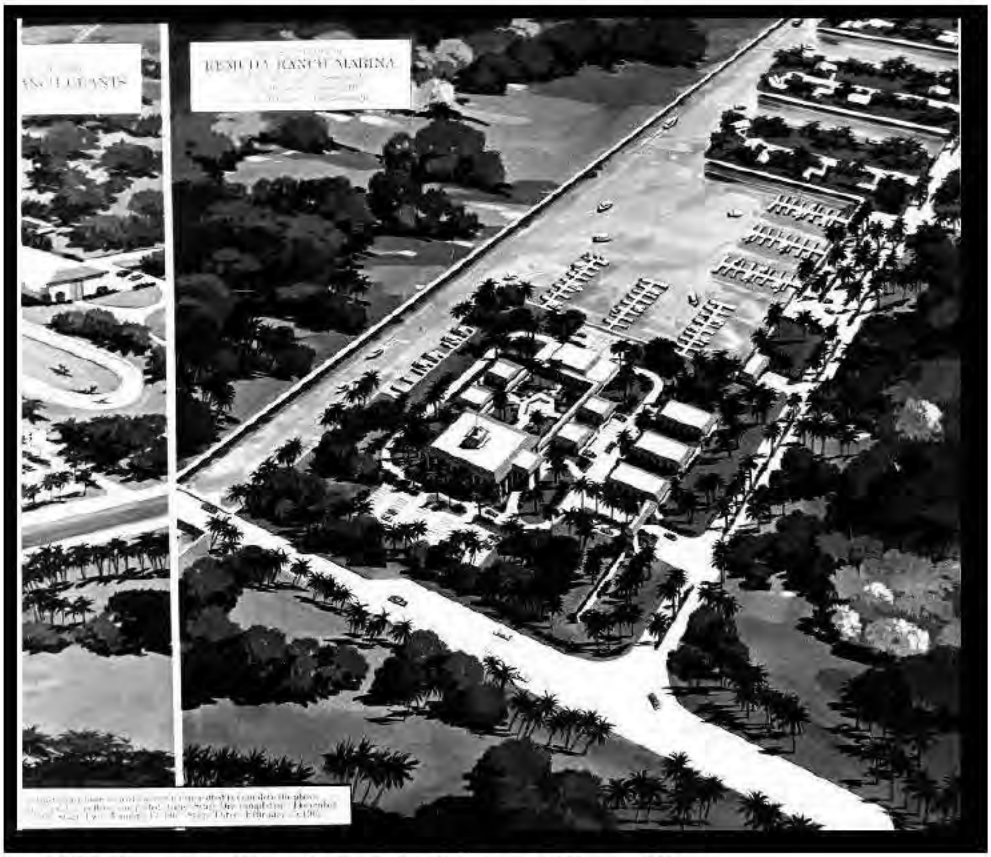

Figure 3-1. 1966 Remuda Ranch Original Layout Press Photo

11.2 FEDERALLY LISTED SPECIES

Threatened and endangered species that may occur in this area include American crocodile, Eastern indigo snake, gopher tortoise, loggerhead sea turtle, Kemp's ridley sea turtle, Atlantic green sea turtle, hawksbill sea turtle, wood stork, red-cockaded woodpecker, Everglade snail kite, Florida bonneted bat, Florida panther, West Indian manatee, smalltooth sawfish, goliath grouper, mangrove rivulus , and sand tiger shark.

The Corps coordinated potential effects to federally listed species with the USFWS and NMFS. Specifically, coordination with NMFS included listed fish, marine plants, and sea turtles. A list of species that may occur within the PSRP area is shown below in Table 3-1. There are no federally listed plant species in the project area. Many of these listed species have been previously affected by habitat changes resulting from wetland drainage, alteration of hydroperiod, wildfire, and water quality degradation. The PSRP has the potential to greatly benefit most, if not all, of these species. Those species not directly affected by the project include species that are rare in the project area or utilize estuarine habitat indirectly affected by the restoration project. Table 3-2 list threatened and endangered species that may occur within the PSRP, which fall under the purview of the USFWS, and are addressed in this BA.

Consultation on the red-cockaded woodpecker, bald eagle, Everglade snail kite, Eastern indigo snake, American crocodile, and West Indian manatee critical habitat occurred in 2004 and 2008. Consultation with NMFS regarding the smalltooth sawfish, goliath grouper, mangrove rivulus,

and sand tiger shark was completed in 2004. Smalltooth sawfish critical habitat has been addressed with NMFS in a CERP Programmatic BA. Since the manatee refugium is outside of designated critical habitat for the smalltooth sawfish, concurrence from the NMFS is anticipated. Consultation on wood stork, Florida panther, and West Indian manatee occurred through the 2008 supplemental BA and the 2009 BO. As a result of new information from USGS, consultation on the potential effects of the PSRP on West Indian manatee has been reinitiated and will be addressed in this supplemental BA. This supplemental BA will also address the addition of the manatee mitigation feature to the PSRP and its potential effects to other threatened and endangered species within the POI region.

Table 3-1. Federally listed threatened (T), endangered (E), candidate (C) species, or similarity of appearance (SA) that may occur within the overall PSRP area

Common Name	Scientific Name	Federal Status
Reptiles		
American **alligator**	Alligator **mississippiensis**	**SA**
American crocodile	**Crocodylus acutus**	**E**
Eastern indigo snake	**Drymarchon corais couperi**	**T**
Gopher tortoise	**Gopherus polyphemus**	**C**
Green sea turtle	**Chelonia mydas**	**E**
Fishes		
Gulf sturgeon	**Acipenser oxyrinchus desotoi**	**T**
Smalltooth sawfish	**Pristis pectinata**	**E**
Insects		
Bartram's Hairstreak butterfly	**Strymon acis bartrami**	**C**
Florida Leafwig butterfly	**Anaea troglodyte floridalis**	**C**
Miami Blue butterfly	**Cyclargus (=hemiargus) thomasi bethunebakeri**	**E**
Birds		
Audubon's Crested caracara	**Polyborus plancus audubonii**	**T**
Cape Sable Seaside sparrow	**Ammodramus maritimus mirabilis**	**E**
Everglade snail kite	**Rostrhamus sociabilis plumbeus**	**E**
Florida Grasshopper sparrow	**Ammodramus savannarum floridanus**	**E**
Florida scrub-jay	**Aphelocoma coerulescens**	**T**
Ivory-Billed woodpecker	**Campephilus principalis**	**E**
Kirtland's warbler	**Dendroica kirtlandii**	**E**
Piping plover	**Charadrius melodus**	**T**
Red knot	**Calidris canutus rufa**	**C**
Red-cockaded woodpecker	**Picoides borealis**	**T**
Wood stork	**Mycteria americana**	**E**

Mammals		
Florida panther	**Puma concolor coryi**	**E**
Puma	**Puma (=felis) concolor (all subspecies except coryi)**	**SA**
West Indian manatee	**Trichechus manatus**	**E**
Florida bonneted bat	**Eumops floridanus**	**E**

Table 3-2. Federally listed threatened (T), endangered (E), or candidate (C) species under the purview of USFWS that are included in this consultation.

Common Name	Scientific Name	Federal Status
Reptiles		
American crocodile	**Crocodylus acutus**	**E**
Eastern indigo snake	**Drymarchon corais couperi**	**T**
Gopher tortoise	**Gopherus polyphemus**	**C**
Birds		
Everglade snail kite	**Rostrhamus sociabilis plumbeus**	**E**
Red-cockaded woodpecker	**Picoides borealis**	**T**
Wood stork	**Mycteria americana**	**E**
Mammals		
Florida panther	**Puma concolor coryi**	**E**
West Indian manatee	**Trichechus manatus**	**E**
Florida bonneted bat	**Eumops floridanus**	**E**

12.0 EFFECT OF THE MANATEE MITIGTION FEATURE

The manatee mitigation feature will be constructed adjacent to the Faka Union Canal just south of the POI Basin as described in Section 2.5 above.

12.1 WEST INDIAN MANATEE AND WEST INDIAN MANATEE CRITICAL HABITAT

12.1.1 SPECIES DESCRIPTION

The West Indian manatee, was listed as endangered throughout its range for both the Florida and Antillean subspecies (*Trichechus manatus latirostris* and *Trichechus manatus manatus*) in 1967 (32 FR 4061) and received federal protection with the passage of the ESA in 1973. It should be noted that the manatee was designated as an endangered species prior to enactment of the ESA, therefore there was no formal listing package identifying threats to the species, as required by Section 4(a)(1) of the ESA. Critical habitat was designated in 1976 for the Florida subspecies, *Trichechus manatus latirostris* (50 CFR Part 17.95(a)) as show in Figure 4-1. Recovery Plans were published for the Antillean manatee in 1986 and for the West Indian manatee in 1989, 1996, and in 2001. Five-year listing-status reviews for West Indian Manatee were noticed in the Federal Register on July 22, 1985 (50 FR 29903), November 6, 1991 (56 FR 56884) and April 14, 2005 (70 FR 19780) with reopening and expansion of the review on March 24, 2006 (71 FR 14940) to include both the Florida and Antillean manatee subspecies. The five-year review was completed during April 2007. This BA will focus on the effects of the PSRP to the Florida subspecies of the West Indian manatee, commonly known as the Florida manatee.

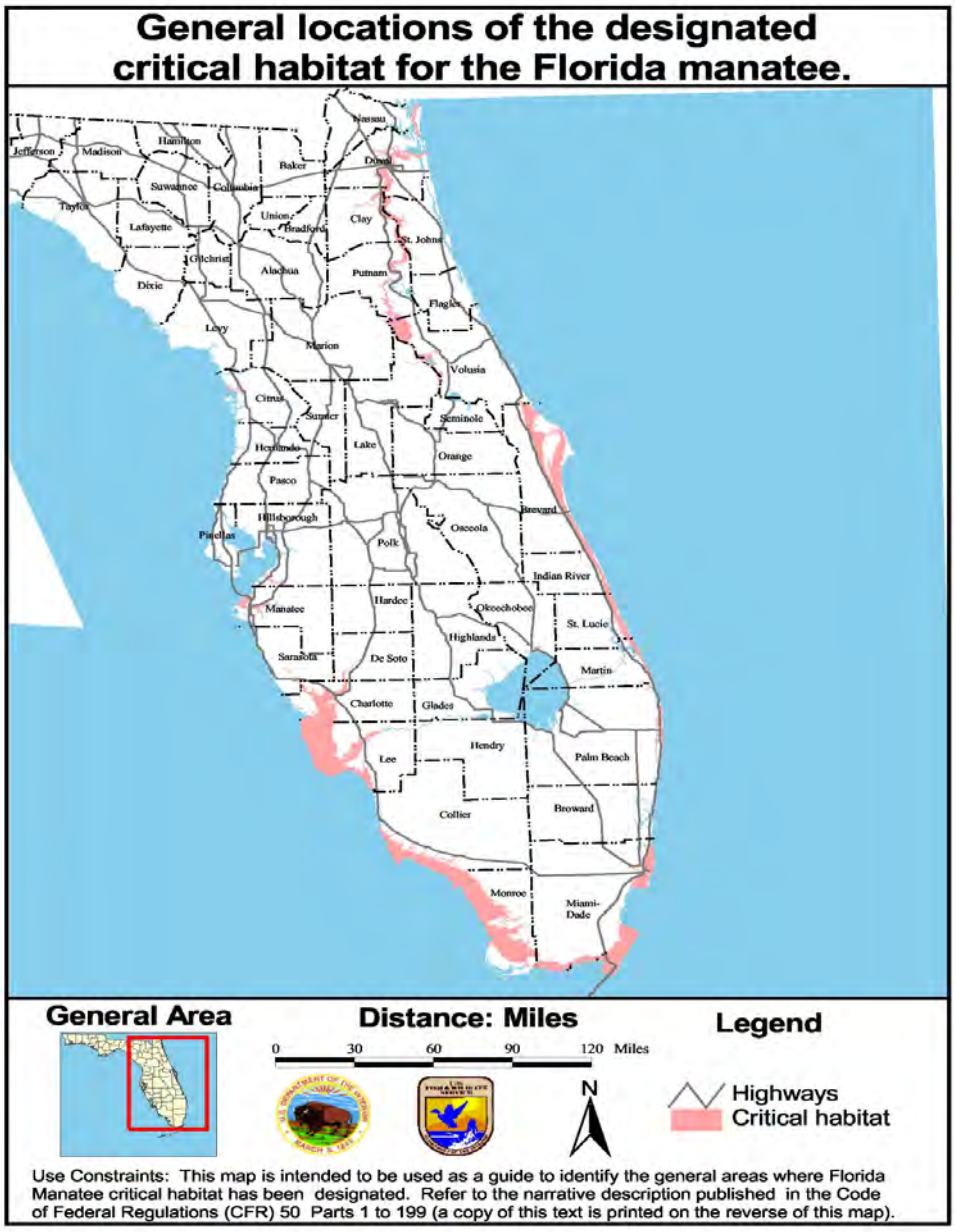

Figure 4-1. Critical habitat for the Florida manatee.

West Indian manatees also are protected under the Marine Mammal Protection Act (MMPA) of 1972, as amended (16 U.S.C. 1461 et seq.). The MMPA establishes, as national policy, the maintenance of the health and stability of marine ecosystems, and whenever consistent with this primary objective, obtaining and maintaining optimum sustainable populations of marine mammals. It also establishes a moratorium on the taking of marine mammals, which includes harassing, hunting, capturing, killing, or attempting to harass, hunt, capture, or kill any marine mammal.

In the southeastern United States, manatees occur primarily in Florida and southeastern Georgia, but individuals can range as far north as Rhode Island on the Atlantic coast, and as far west as Texas on the Gulf coast. The manatee population appears to be divided into at least two isolated

areas, one on the Atlantic coast and the other on the Gulf of Mexico coast of Florida. Each group is further divided into two regional groups for each coast: Northwest, Southwest, Atlantic, and Upper St. Johns River (USFWS 2001). A full description of life history, distribution, and other relevant information can be found in the 2004 PSRP Final PIR/EIS, 2008 BA, and 2009 BO and are incorporated by reference into this document.

12.1.2 ENVIRONMENTAL BASELINE

The following discussion of the environmental baseline will focus on the status of the Florida manatee and key factors affecting manatee population sustainability within the TTI National Wildlife Refuge (NWR). One of the main sources of information and research data is provided in the USGS's Review and Synthesis of Manatee Data in ENP, an administrative report authored by the USGS Florida Integrated Science Center and published in November 2006. This USGS manatee report also includes the TTI National Wildlife Refuge within its scope, and provides a timely and comprehensive discussion of manatee biology specific to the TTI and ENP. Unless otherwise cited, the Environmental Baseline relies upon manatee related data and discussion from the USGS manatee report (Stith et al. 2006) Additional baseline information was presented in a study of the warm-water refugia at the POI Basin (Stith, Reid, et al. 2011)(Stith et al. 2011)

12.1.3 ACTION AREA

The action area for effects on the West Indian manatee covers areas of potential hydrological effects in the upper estuaries of the TTI National Wildlife Refuge. This estuarine area extends along the coastline from Fakahatchee Bay in the southeast to Blackwater Bay in the northwest. Also included in the action area for the manatee is the POI Basin and Faka Union Canal from Faka Union Bay upstream to the weir above POI Basin.

12.1.4 STATUS OF THE SPECIES WITHIN THE ACTION AREA

12.1.4.1 Manatee Habitat Requirements in the Ten Thousand Islands

12.1.4.1.1 Manatee Forage (Submerged Aquatic Vegetation)

Submerged aquatic vegetation (SAV) in the TTI and ENP region includes marine seagrasses primarily turtle grass (*Thalassia testudinum),* manatee grass (*Syringodium filiforme*), and shoal grass (*Halodule wrightii*); macroalgae beds along the gulf coast, and freshwater tolerant vascular pants and algae periodically occurring among the inner bays and rivers (*Ruppia maritime*, *Potemogeton* sp., *Chara* sp., etc.). Although there appears to be preferential use among areas, all of these species are used by manatees as forage in the greater Everglades. Manatees are also known to occasionally feed on mangrove leaves, and mangroves have been mapped throughout the region (http://gapanalysis.nbii.gov). Manatees also have opportunities to access floating plants and bank grasses as forage.

There is a major gap in information about food resources available to manatees in the TTI/ENP region. Manatees likely are foraging on a wide variety of resources, and these resources differ among landscape zones. Resources in the offshore zone are associated with seagrass beds consisting of turtle grass, shoal grass and manatee grass, all of which are likely to be abundant throughout the region. Researchers following radio tracked manatees in the TTI have documented the occurrence of these species and their use as forage by manatees. Seagrasses are almost certainly more extensive than is indicated by the mapping data available for this region.

Little is known about long term changes in these seagrass beds, and whether they change significantly in composition or extent seasonally.

Even less is known about the potential food resources within bays, river systems, or freshwater marshes used by manatees. The home range analysis and telemetry maps show that the offshore zone is a major focus of activity for most individuals, but some individuals spend a substantial proportion of their time within inshore bays, rivers, and a few accessible marshes. The food resources available in these less saline ecozones may vary significantly both seasonally and annually, and the plant communities are likely to be much more dynamic compared to the offshore seagrass beds. For example, during the wet season, species that favor less saline conditions, such as *Ruppia* and *Chara*, may establish and grow rapidly in river mouths and nearby bays, only to die back during the dry season when conditions favor species such as shoal grass that prefer higher salinities. Human modifications to freshwater inflow into these bays may have greatly altered the composition and abundance of SAV in many of these bays, probably favoring more salt tolerant species. Restoration activities may favor the re-establishment and growth of new SAV communities in these bay and river systems through increased and prolonged freshwater discharge.

Throughout the year, and especially during the summer and fall, high relative densities of manatees were found in offshore seagrass beds. The aerial survey and telemetry data show that the relative use of these offshore areas was non-uniform, with some areas showing much higher use than others. In general, aerial survey data showed that during the winter and dry season, relative densities in offshore areas of ENP were highest near Lostmans and Broad Rivers, which are the seagrass beds closest to inshore hotspots for these two seasons. During the summer and fall, offshore use was more widely distributed and extensive, shifting into the more northerly portions of ENP and TTI. Telemetry data suggest that some manatees forage preferentially within inshore bays, especially during the winter, although the majority of manatee foraging occurred in offshore seagrass beds.

12.1.4.1.2 Water Temperature and Manatee Avoidance of Cold Stress

Typically during December through February, water temperatures in the Gulf fall below 20° Celsius for several weeks at a time. These cold-water conditions can be fatal or debilitating to manatees, and induce them to seek out small scale thermal refuges that are found throughout inshore areas of the TTI. Manatees in the TTI and ENP may be more vulnerable to cold stress, especially during severe winters, due to the absence of significant springs or warm water effluent. Anecdotal evidence for cold stress includes observations of dead manatees in the region following strong cold fronts. In some years, physical examination of manatees captured at POI during winter showed signs of acute cold stress. The carcass data analysis for cold stress shows that POI, which is the largest winter aggregation site in this region, had very high relative mortality during the winter. The undetermined mortalities are very high in the Whitewater Bay and these numbers peak strongly during the winter. While these data are suggestive of cold stress, boater density also peaks in the winter, so that cold stress or watercraft/manatee collision or both factors may contribute to increased winter mortality.

Analysis of the 1991 through 2004 winter synoptic survey data indicated that Whitewater Bay, including adjacent areas such as Mud Bay, Joe River, Rogers River, and North River, are important winter aggregation sites for manatees in ENP. Several other inland sites north of

Whitewater Bay also are important, including Broad River Bay, Wood River Bay, Rogers River Bay, and Lostmans Creek. The 1990 through 1993 aerial survey showed a similar spatial pattern for winter season densities. Counts in these sites tend to vary considerably from year to year, presumably depending in part on the severity of the winter and timing of surveys with cold fronts. Large numbers of manatees overwinter in ENP, but they are scattered across the landscape in smaller aggregations as compared to the larger winter aggregations at POI in the TTI. The winter synoptic surveys likely underestimate the use at identified sites, due to the turbid conditions where manatees aggregate, and because they do not include some winter use sites that may exist outside of the surveyed area.

Analysis of tracking data has revealed insights to manatee overwintering strategies in the TTI and ENP region. Winter aggregation sites north of ENP in the TTI area are mostly associated with deep, dredged canals. As cold fronts pass, temperatures in these deeper waters drop more slowly than in the adjacent shallow bays and gulf. These canals often have a pronounced thermocline/halocline with warmer, salty water on the bottom. In ENP, few accessible canals exist; the Buttonwood canal has rather small winter aggregations compared to the deeper canal systems in the TTI region. Instead, manatees in ENP seem to be using small dead end bays (e.g. Mud Bay) or deeper, bay like sections of rivers (e.g. Broad River Bay, Tarpon Bay, and Wood River).

Physical mechanisms that produce warm water used by manatees during the winter are poorly understood in this region. There are no artificially warmed water sources in the entire study region. The largest winter aggregation site, the POI Basin, is an artificial but passively warmed refuge. One mechanism by which the POI Basin retains its warm water is by a thermal inversion layer, where warm salt water is trapped under a layer of fresh water (Stith, Reid, et al. 2011). Analyses of the isotope signatures in the POI Basin shows that the warm bottom layer of water is from the Gulf of Mexico and not a result of upwelling of ground water (USGS 2011). It is unclear if the mechanisms operating in natural sites in ENP are similar to those of deeper canal sites, where warm water attraction seems to be associated with haloclines.

The mechanisms that create the warmer water may vary among these sites. During strong cold fronts, shallow water cools rapidly, while deeper pockets of water may show a lag in cooling that allow manatees to bottom rest. The temperature of groundwater in this region is much warmer than the ambient water temperature during much of the winter, so areas with significant groundwater seepage may accumulate layers of warm water. If the groundwater beneath tidally influenced rivers is saline, groundwater seepage may establish haloclines with heavier saline water on the bottom, which maintain temperature inversions such as those observed at the POI Basin.

Haloclines have been recorded in association with manatee sightings during the winter at Rogers River. Following the passage of cold fronts, shallow areas heat up rapidly due to solar radiation and become the focus of manatee use. Also, soft sediments likely provide additional insulation and reduce heat loss for bottom resting manatees. There is speculation that bacterial decomposition of organic matter in the muddy substrate may provide additional warmth. Submerged and emergent aquatic vegetation also may have an effect on winter water temperature.

At the POI Basin, freshwater input from the Faka Union canal, entering the basin over the Faka Union Weir Number 1, provides a freshwater lens that forms a blanket over the warmer salt water on the bottom, thus creating a temperature inverted halocline during the cold dry winter months (Stith, Reid, et al. 2011). The PSRP is expected to greatly reduce the freshwater flows in the POI Basin. Research has shown that approximately 100 cubic feet per second (cfs) are needed to maintain the halocline when ambient temperatures fall below 20° Celsius (Slone 2011). As a result, the PSRP is proposing the construction of the manatee mitigation feature to compensate for the loss of freshwater flows into the POI Basin.

12.1.4.1.3 Salinity and Manatee Need for Fresh Drinking Water

Some evidence indicates that manatees need regular access to freshwater, presumably for drinking and osmoregulation. Manatees in the TTI need to travel inland to find water sources of less than five parts per thousand (ppt) salinity for a significant proportion of each year, especially during the winter dry season. Manatees seeking freshwater may travel far upstream into tidal creeks and rivers. The availability of freshwater changes dramatically with season; low salinities in the TTI estuaries typically begin in July or August, showing much less variability than ENP estuaries and reflecting the high discharge rates associated with Faka Union Canal. Aerial survey data shows that during the dry season, more manatees are seen in inland canals, rivers and creeks. Seasonal patterns developed from telemetry data are very similar to the aerial survey patterns. Analysis of tagged individuals shows that manatees make frequent trips between the offshore to reach narrow and shallow rivers and creeks, especially during the cold and dry season.

12.1.5 MANATEE MOVEMENTS (AERIAL SURVEY AND TELEMETRY DATA)

The USGS Florida Integrated Science Center examined data from aerial surveys flown from 1979 – 2004 and looked for patterns in spatial and temporal manatee distributions. In the northern part of ENP and TTI area, sightings are common in or near Chokoloskee Bay, Broad River, Turner River, East River, Fakahatchee River, House Hammock Bay, Rabbit Key, Demijohn Key, POI Basin, Faka Union Canal, Barron River, Wootens and Big Cypress basins, White Horse Key, Round Key, and Cape Romano. Marco Island also has high relative densities (Figure 4-2).

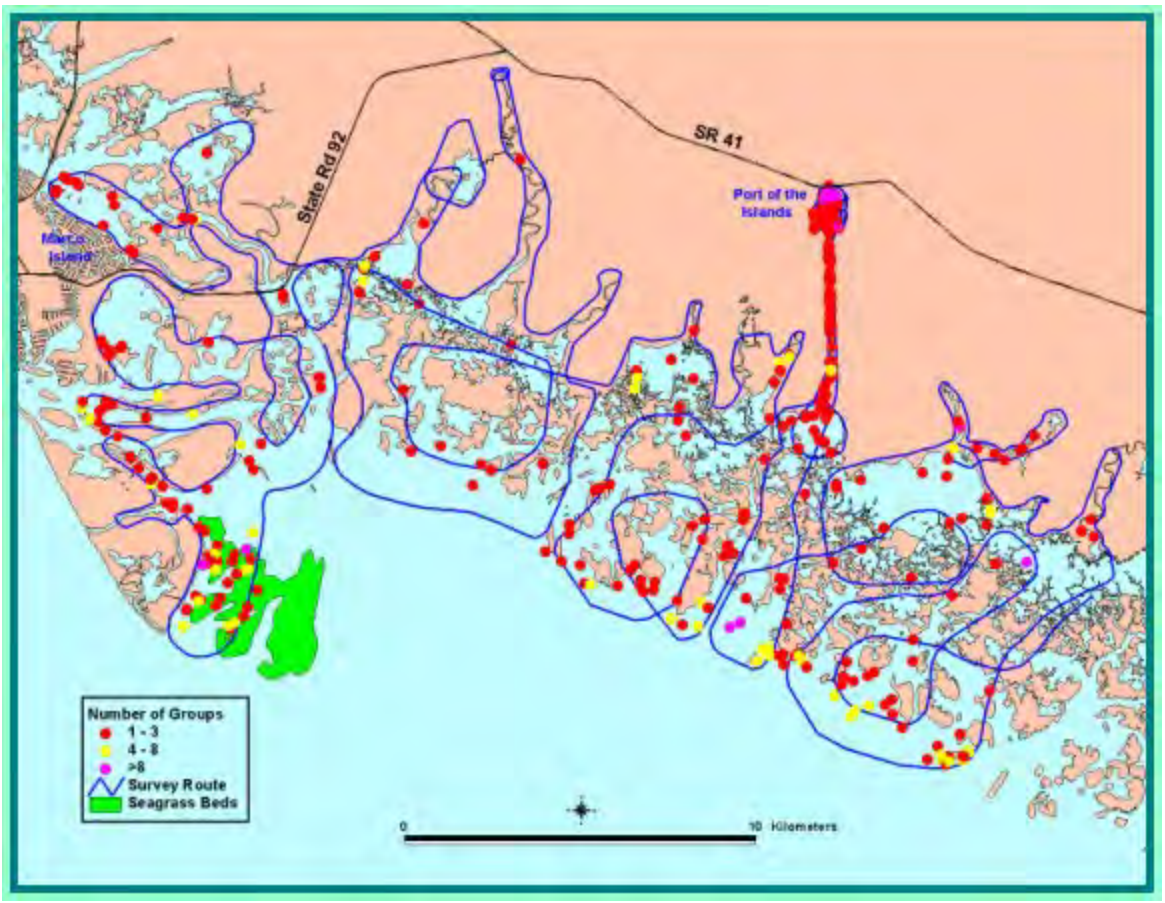

Figure 4-2. Aerial survey data; manatee sightings in TTI from 1999 and 2001.

Summer and fall sightings are prevalent in offshore seagrass beds and Chokoloskee Bay, while relative densities in winter and spring are greater in riverine systems and basins, where warm or fresh water are available. The winter synoptic surveys flown from 1991 – 2004 show heavy use of the inland areas, similar to those in the cold season distributional aerial surveys, such as Mud Bay, Wootens and Big Cypress basins, and POI. Other winter use areas include Tarpon Bay, Broad River Bay, Fakahatchee River, Marco Island canals, and the Glades canal system (just north of Manatee Bay).

The global positioning system (GPS)-based corridor analysis show high use of areas that connect offshore feeding areas with inshore access points for fresh water. The aerial survey and telemetry data show concordant patterns of how manatees use the landscape within ENP and TTI. Throughout the year, manatees are present within most coastal-accessible waters in ENP and TTI. Although offshore seagrass foraging areas are used throughout the year, manatee distribution shifts inland during the winter and spring. During summer and fall, the distribution shifts toward offshore areas. The inland focus during winter is likely associated with manatees seeking thermal refuges, whereas during the spring this inland focus may be associated with access to fresh water. In summer and fall, fresh water is more readily available, allowing the manatees to shift to offshore areas (Figure 4-3).

12.1.5.1 Home Ranges

Broad patterns in the movements of individuals indicate that manatees change their high use areas seasonally. The Cape Romano Shoals is a high use area. Other areas of high or moderate use include within TTI, Caxambas Pass, and shoals near Turtle Key and Round Key. Within ENP, Demijohn Key and Pavilion Key are high use areas. These sites also have high numbers of manatees in the aerial survey data, except that telemetry-based home ranges for wild-caught manatees do not generally extend into southern ENP (excluding winter). This northerly habitat usage in the telemetry home ranges is probably because nearly all wild-caught, tagged animals in this study were caught at POI, a northern site.

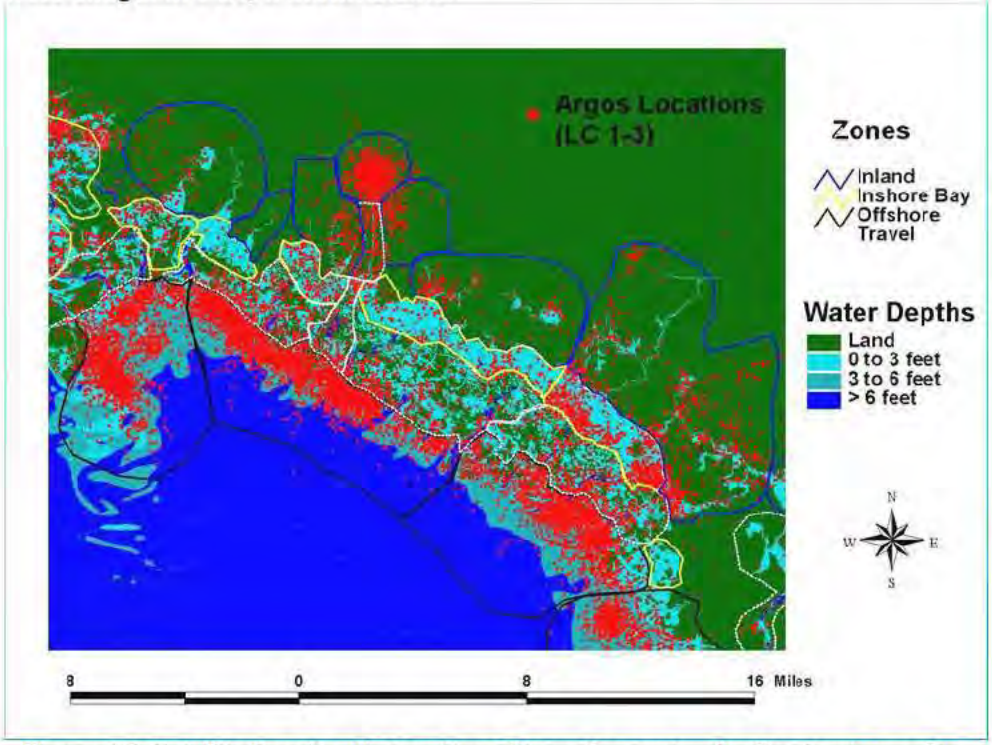

Figure 4-3. Satellite based radio tracking of tagged manatees by Service Argos, Inc.

The telemetry data show individual patterns and heterogeneous behavior of manatees that could not be discovered with aerial surveys or carcass data. For example, tagged, wild-caught animals show substantial individual variation in winter behavior, with five individuals moving south to Whitewater Bay from TTI, six individuals moving north out of the study area, and the remainder wintering in the TTI area. Such behavioral heterogeneity is encouraging from a conservation standpoint, since it means that animals employ different strategies when seeking out thermal refugia, making the population less vulnerable to a particular type of environmental change (e.g., plant shutdowns) than a population with a single migratory strategy. This heterogeneity is consistent with the well documented migratory behavior on the east coast of Florida.

Composite home ranges for the wild caught animals were mostly within the TTI area and northwest portion of ENP. The winter range of 16 of 21 manatees tagged at POI was within 10 – 20 km of POI, but the other five animals made a winter movement to Whitewater Bay. For other seasons, all tagged manatees had home ranges that were within 30 to 40 kilometers of the POI Basin. Areas of high use during winter included the POI capture site (a major winter refuge), the mouth of the Fakahatchee River, and shoals near Cape Romano and Round Key. The other

seasonal home ranges are all in or near the TTI area and northwest portion of ENP. The POI Basin is an important refugium for manatees especially during winter and spring. During spring, areas of high use included the POI capture site, shoals off Cape Romano, and areas near Turtle Key and Round Key. Summer and fall home ranges are more dispersed, centering on offshore areas. The Cape Romano shoals are frequented in all seasons, highlighting their importance to manatees as a feeding area. The Pavilion Key shoals are frequented by manatees mainly in summer and fall.

The telemetry tracking of one manatee, Santina, provides a typical example of seasonal movement with a home range. During the dry season, Santina's home range included the POI Basin as a regular inland site. During the wet season, she shifted away from this inland site and her home range was focused more on the offshore areas or inland bays. Manatee in the TTI use inland sites more often during the dry season, especially those sites with more reliable sources of fresh water such as POI. During the wet season, manatees spend more time offshore, foraging on seagrass beds.

Irrespective of season, most manatees showed a similar pattern of frequent, regular movement between offshore and inland zones (Figure 4-4). Tagged manatees typically spent less than a day at inland sites, but often remained on offshore seagrass beds for several days or more. Nearly all manatees showed a similar pattern of alternating between the offshore and inshore zones at regular intervals ranging from 2 to 8 days throughout the year.

Figure 4-4. Telemetry tracking of two individual manatees during March 2001

12.1.5.2 Seasonal Migration Patterns

Resources used by manatees in the TTI and ENP can be viewed as occurring on a seasonally changing network, where the network consists of warm water sites, sources of fresh water, and foraging areas. On a broad scale, some manatees migrate into the ENP from the north during the

winter, and others migrate north out of the region, while a very few migrate to or from the Atlantic population. The limited telemetry data for wild caught individuals suggest that the majority of manatees in the region are year round residents. The winter network for these year round residents may be smaller than during other seasons, consisting of warm water nodes in inland canals, rivers, creeks and bays, all connected to nearby foraging areas by corridors formed by rivers or tidal channels.

As water temperatures climb with the approach of spring, warm water nodes may become less important, and nodes providing increasingly scarce freshwater may become more important. However, there is considerable overlap in the winter and dry season inland sites. These nodes commonly are located up narrow creeks and shallow marshes. During the spring, the high use nodes increasingly extend into offshore areas where good forage is available.

As summer approaches, freshwater nodes become less important, and high use areas increasingly shift towards offshore areas or inshore bays with good forage. The advent of low salinities is generally delayed in the southern part of the ENP relative to the TTI area, so the shift to offshore areas may be delayed in those areas as well.

12.1.6 MANATEE MORTALITY (WATERCRAFT COLLISIONS)

Wherever manatee and watercraft share waterways or open water, manatees are vulnerable to potentially fatal manatee/boat collisions. Manatees feeding in offshore seagrass beds are in very shallow water and are especially vulnerable to boat strikes. Manatee carcass data indicate that Chokoloskee Bay has disproportionately high manatee/watercraft collision mortality. The boat density data also show this area is heavily used by boats. Several major manatee travel corridors cross this region from the offshore grass beds, through the inshore bays and passes, and up into river systems. These include Chokoloskee Pass and Rabbit Key Pass, Chokoloskee Bay, Baron River, Turner River, Cross Bays, and Lopez River. Speed zones in the inland bay portion of ENP from Gate Bay to Chokoloskee Bay are generally less restrictive (or non-existent) compared to adjacent portions of Collier County, where speed limits are typically 30 mph in channels and 20 mph outside of channels.

12.1.6.1 Boating and Manatee Use Patterns

The winter peak in boating activity corresponds with the greatest number of manatee deaths in the Ten Thousand Islands. Manatees periodically travel between freshwater rivers, including the Port of the Islands, and offshore feeding areas. Boats seem to follow the same pattern using similar travel routes. Boating destinations overlap with the offshore manatee feeding grounds, while the primary point of origin (POI) is also an important manatee thermal refugium and freshwater drinking source.

12.1.7 MANATEE MORTALITY (ALL KNOWN CAUSES)

Salvage records documented 520 manatee carcasses from 1977 through 2004 in the TTI and ENP. The cause of mortality could not be determined for 45% of the carcasses recovered in the Everglades area. In cases where the mortality cause was known, over 40% were from watercraft collisions. Nearly all human related mortality resulted from watercraft collisions: only 2% were caused by other human-related means, and no manatees were killed by flood gates or canal locks. Red tide and other natural causes accounted for 27%, and perinatal mortality was the cause in 20% of the known cases. Inland sites were overrepresented in the carcass database, possibly

because the carcass of a manatee that dies offshore might drift inland and be found, or float out to sea and be lost, depending on currents and tides. The Everglades City through Chokoloskee area showed very high numbers of manatees killed by watercraft relative to the entire Everglades region. Marco Island and Whitewater Bay had high numbers of perinatal deaths, and Marco Island also had high numbers of manatees killed by red tide. The relatively few cases of mortality due to cold stress were found in disproportionately high numbers in the POI and Whitewater Bay areas. Overall, the regions with the highest density of carcasses were POI, Marco Island, Chokoloskee Bay, and the east side of Whitewater Bay. There is large annual variation in carcass counts for various mortality categories (USGS data).

12.1.8 SPATIAL PATTERNS IN CARCASS RECOVERY (USGS DATA)

The spatial distribution of carcasses in the TTI and the ENP was non-uniform, with a large majority occurring in the northwest area, especially near Chokoloskee Bay, Faka Union Canal, and Marco Island – all areas with a large human population. Watercraft deaths and natural deaths due mostly to red tide also were concentrated in this northwest area. The cause of death could not be determined for a large proportion of the carcasses in the middle and southern portion of the study area, and a large majority of these undetermined or decomposed deaths occurred during the winter.

Undetermined Cause: Approximately 45% (234 of the 520 carcasses) recorded in the study area were caused by an unknown mortality agent. Whitewater Bay showed a significantly higher proportion of undetermined mortality carcasses, possibly due to the remoteness of the area and the low probability of finding a carcass before it decomposes. Conversely, the heavily-populated areas of Marco Island and the POI, along with the Florida Keys showed significantly lower proportions of undetermined cause.

Known Causes:

Watercraft mortality: Approximately 40% (115 of the 286 carcasses) that were recorded with known mortality agents were killed by watercraft collisions. Chokoloskee Bay showed very high numbers of manatees killed by watercraft relative to the entire Everglades region, while the POI and especially Marco Island had disproportionately low numbers. The Florida Keys area showed high numbers of carcasses killed by watercraft.

Perinatal mortality: Approximately 20% (56 of 286 manatee carcasses) were perinatal. Marco Island and Whitewater Bay showed high numbers of perinatal carcasses, and the southern portion of the TTI plus Big Cypress showed low relative numbers of perinatal carcasses.

Cold stress mortality: Approximately 11% (31 of 286 manatee carcasses) died of cold stress. Almost 66% of the manatees killed by cold stress were found at the POI. Whitewater Bay also showed high numbers in comparison with other areas where cold stress mortality occurred.

Other human mortality: Only 2% (2 of 286) manatee carcasses showed mortality due to human causes other than watercraft.

Other natural mortality: Approximately 27% (78 of 286 manatees) died of natural causes other than cold stress. Marco Island showed very high relative numbers, and many of these deaths may

have been due to red tide. Of the relatively few known-cause deaths in the Lostmans River/Shark River area, more than half were from "other natural mortality". The POI and the southern part of the TTI showed low numbers of "other natural" causes.

12.1.9 SEASONAL PATTERNS IN CARCASS RECOVERY

Most carcasses (300 of 520; 58%) were recovered during the cold months of December, January, and February, and consisted mainly of cold stress and undetermined deaths. The undetermined deaths peaked during and just after the winter months, and natural mortality, mostly red tide, was disproportionately high during March and April. During the winter, high numbers of carcasses were recovered in the Whitewater Bay region and the POI. During the spring quarter, west of Chokoloskee to Marco Island, high numbers of carcasses were recovered, showing high losses due to red tide in those areas. During the summer and fall quarters, in the southern part of the TTI to Lostmans River, high numbers of carcasses were recovered, all of which were either from watercraft collisions or undetermined causes.

12.1.10 FACTORS AFFECTING SPECIES ENVIRONMENT WITHIN THE ACTION AREA

Manatee Habitat Requirements in the Ten Thousand Islands

12.1.10.1.1 Access to Foraging Areas

Large numbers of manatees were seen during aerial surveys in several of the larger inshore bays. Chokoloskee Bay had high counts in all seasons, while eastern Whitewater Bay, was occupied year-round, but had high counts only during winter. Smaller bays were also seasonally important, especially in the cold and dry season. Analysis of telemetry data suggest that some manatees remained within inshore bays, although the majority of use by tagged animals occurs in offshore seagrass beds. As an example of a tagged animal that spent a large proportion of time in inshore bays, Santina spent most of the time feeding in Chokoloskee Bay during the wet seasons of 2001 and 2002.

12.1.10.1.2 Access to Freshwater

Several lines of evidence indicate that manatees need regular access to freshwater, presumably for drinking and osmoregulation. Aerial survey data show that manatees were present in rivers and inland areas year-round, but especially during the dry season. The availability of freshwater changes dramatically with season, and during the dry season more manatees were seen inland as compared with the wet season. Seasonal patterns developed from the telemetry data are very similar to the aerial survey patterns, and analysis of tagged individuals show that all tagged manatees make frequent trips up rivers and creeks, apparently to access freshwater, especially during the cold and dry season.

12.1.10.1.3 Avoidance of Cold Stress

Manatees in southwest Florida may be vulnerable to cold stress, especially during severe winters, due to the absence of freshwater springs or industrial warm water effluents. Several passively warmed winter aggregation sites have been documented in this region outside of the ENP, but little is known about the characteristics of aggregation sites within the ENP. Analysis of the 1991 through 2004 winter synoptic surveys indicated that Whitewater Bay, including adjacent areas such as Mud Bay, Joe River, Rogers River, and North River, had the highest counts of manatees in winter in the ENP. Several other inland sites north of Whitewater Bay also were

important, including Upper Broad River, Broad River Bay, Wood River Bay, Rogers River Bay, and Lostmans Creek. Usage of these sites tended to vary considerably from year to year and among surveys, presumably depending in part on the severity of cold winter weather. During cold weather, large numbers of manatees use the canals and basins at the POI Basin, Wooten's Basin, and Big Cypress headquarters as thermal refuges (Figure 4-5).

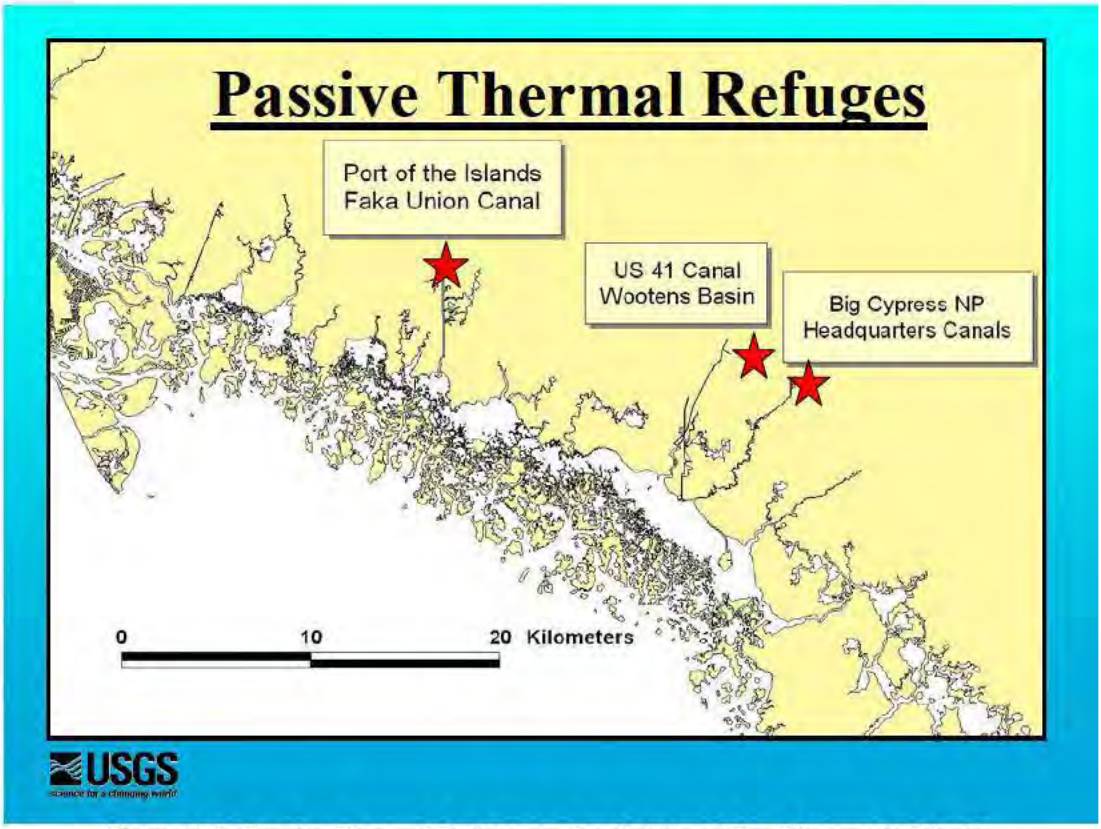

Figure 4-5. Passive Thermal Refuges in the vicinity of Ten Thousands Islands

12.1.10.1.4 Manatee Seasonal Distribution and Movement Patterns

All tagged individuals show regular movement between access points for freshwater and areas with preferred forage. When these two resources are close together, manatee movements may be relatively small, but all of the wild manatees tracked for significant periods show regular, multi-kilometer movements between different habitat zones. Manatees with home ranges are likely traveling regularly between offshore and inland zones.

Resources used by manatees in the ENP can be viewed as occurring on a seasonally changing network, where the network consists of warm water sites, sources of fresh water, and foraging areas. On a broad scale, some manatees migrate into the ENP from the north during the winter, while others migrate north out of the region. The limited telemetry data suggest that the majority of manatees in the region are year round residents. The network for these year round residents appears to be smaller in winter than during other seasons, consisting of warm water nodes in inland canals, rivers, creeks and bays, all connected to nearby foraging areas by corridors formed by rivers or tidal channels.

As water temperatures climb with the approach of spring, these warm water nodes may become less important, and nodes providing increasingly scarce freshwater may become more important. However, there is considerable overlap in the winter and dry season inland sites. These nodes commonly are located up narrow creeks and shallow marshes where manatees have difficulty evading fast-moving powerboats. During the spring, the high use nodes increasingly extend into offshore areas where good forage is available.

With the advent of the summer wet season, freshwater nodes become less important, and manatees make more use of offshore areas or inshore bays that provide good forage. During summer and fall, manatee and boat densities showed the highest overlap, generally in the offshore seagrass beds or inshore bays, especially in the Chokoloskee region.

12.1.10.2 POI Basin Isotope Analysis

The USGS baseline study examined the isotope signatures of water in and around the POI Basin to determine the source of warm saline water in the bottom layer of the halocline. Isotopes were collected from a variety of locations designed to present a range of potential water sources, including surface water from rainfall runoff, groundwater from the surficial aquifer, Gulf of Mexico water, several points within the Faka Union Canal, and two deep holes within the POI Basin where manatees are known to congregate. Analysis of the water samples identified the source of the warm saline water in the bottom layer of the halocline as tidal water from the Gulf of Mexico. There is no evidence of a groundwater connection in the POI Basin (Slone, et al. 2013)

12.1.11 POTENTIAL EFFECTS OF THE ACTION

12.1.11.1 Direct Effects of the PSRP

12.1.11.1.1 Access to Freshwater

Implementation of the PSRP would reduce point source discharge via the Faka Union Canal; however, as a whole, the restoration will increase overland flow of freshwater into estuarine waters. Some manatee may alter their behavior and movement patterns to take advantage of these freshwater sources, especially those sources that have a significant freshwater discharge during the dry season. If combined with foraging on SAV in estuarine rivers and bays, this alteration of movement pattern may have a beneficial effect for individual manatees. The reduction of the point discharge via the Faka Union Canal should improve SAV in the estuaries downstream of the PSRP. Access to a stable water source and nearby inshore foraging is beneficial to manatee because they spend less time traveling to offshore seagrass beds resulting in lower energy expenditures and reduced risk of watercraft collisions.

Manatees rely on the Faka Union Weir Number 1 as a source of freshwater during the winter dry season. The PSRP will lead to a reduction of surface flows over the Faka Union Weir Number 1 in the dry season. The weir appears to provide freshwater even under minimal flow conditions. After restoration, surface flows in the Faka Union Canal will be reduced from current dry season conditions; however, during the drier parts of the year after surface flows cease, increased groundwater storage in the undrained PSRP will continue to provide groundwater flows into the remaining unfilled portion of the Faka Union Canal above the POI Basin at higher rates for longer into the dry season than those prior to restoration (Feng, et al. 2010) . However, after

several studies on the potential effect of the PSRP on the thermal refugium at POI Basin, the interagency team has agreed to mitigate for the loss of freshwater flows in the Faka Union Canal.

The proposed action that will mitigate for the loss of freshwater flows in the Faka Union Canal involves creating an oxbow with a warm saline groundwater connection adjacent to the Faka Union Canal just south of the POI Basin. This feature will provide a thermal refugium to manatees during cold, dry periods. The footprint of the feature will be approximately 10 acres, with two (2) acres at a depth of 20 feet to ensure a connection to the groundwater is made (Figure 2-4). Monitoring of groundwater isotopes within the new manatee feature will be used to confirm the presence of groundwater.

12.1.11.1.2 Avoidance of Cold Stress

There are three major thermal refuges for manatees in or relatively close to TTI: POI Basin on Faka Union Canal, Wooten's Basin on U.S. Highway 41 Canal, and the Big Cypress National Preserve Headquarters Canals. These canals were created by dredging, and are deeper than surrounding waters or natural channels. The increased canal or basin depth seems to be a factor in the formation of thermoclines during the winter dry season.

POI Basin provides a thermal refuge to the largest winter aggregation of manatees in TTI. During the dry season months of December through February and into mid-March, both a thermocline and a halocline form in the bottom layer of water at the POI Basin. This layer of relatively warm, salty water appears to form where the basin has been dredged to a depth of 3 to 4 meters (Figure 4-6).

There are multiple factors in the formation and stability of the thermocline. One mechanism by which the POI Basin retains its warm water appears to be a thermal inversion layer, where warm salt water is trapped under a layer of freshwater. The origin of this salt water layer has been shown, through isotope analysis, to be warm salt water from the Gulf of Mexico.

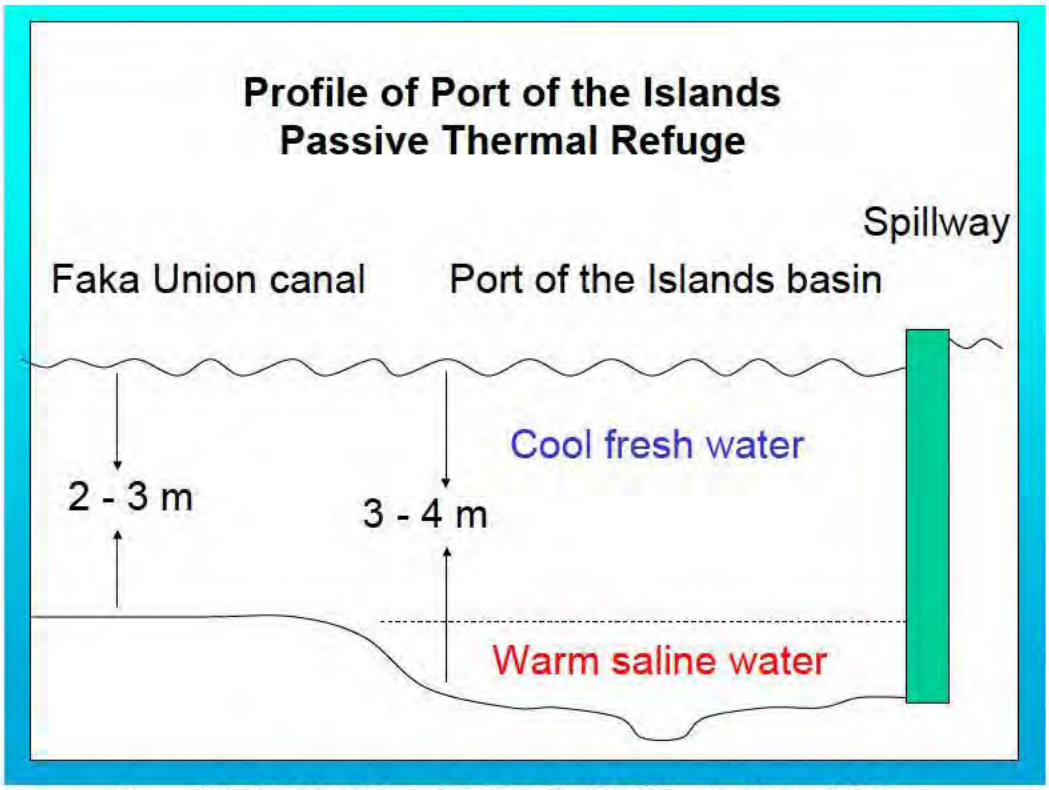

Figure 4-6. Profile of Port of the Islands (POI) Passive Thermal Refuge

USGS scientists measured surface and bottom water temperatures in POI Basin from December 1, 2004, through March 30, 2005 (Figure 4-7). The data showed the influence of a strong cold front between December 11 and 15, with surface water temperatures dropping rapidly from 25 degrees Celsius to a low around 18 degrees Celsius. There was a lag of about two days, then bottom temperatures also dropped suddenly and reached a low around 18 degrees Celsius. On seven subsequent occasions from December 22, 2004 through March 12, 2005 (see circles surrounding bottom temperature spikes on graph), bottom temperatures were significantly warmer than surface temperatures, indicating the formation of a thermocline. The thermocline formed between January 15 and January 19, 2005 apparently resulted from thermal lag; however, the other spikes in bottom temperature appeared to result from another mechanism, possibly saline groundwater seepage. Overall, the thermocline appeared unstable, and formed, then dissipated after a few days as surface and bottom temperatures equalized. This cycle repeated several times throughout the period from mid-December 2004 through mid-March 2005.

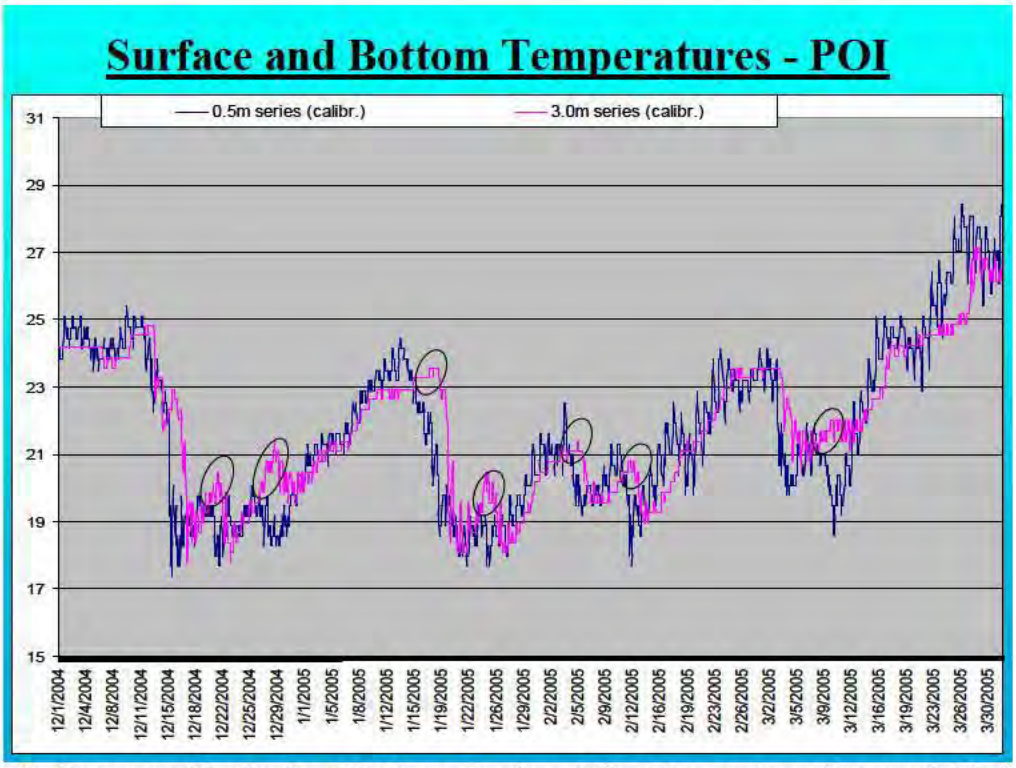

Figure 4-7. Surface water (blue line) and bottom water (purple line) temperatures (degrees Celsius) at Port of the Islands Marina, from December 2004 through March 2005

Based on research results provided by USGS (Stith et al. 2011), the original PSRP as outlined in the 2004 PSRP Final PIR/EIS may affect the stability of the thermocline/halocline during the winter at the POI Basin which could potentially lead to an increased risk of cold stress to manatees wintering in the POI Basin. An interagency team formulated the manatee mitigation feature to reduce the risk associated with the loss of the thermocline/halocline in the POI Basin thereby reducing the risk of cold stress to manatees in the area. As a result of the addition of the manatee mitigation feature to the PSRP, the Corps determines that the PSRP will not have a direct effect the warm water refugium in the POI Basin and therefore, will not increase the likelihood of cold stress mortality on manatee within the POI Basin due to implementation of PSRP.

12.1.11.1.3 USGS Predictive Carcass Count Model for Cold Stress

The USGS baseline study shows that the POI Basin does not connect currently connect to warm groundwater, which could provide a constant source of warm water for the manatee refugium. When the freshwater stage Faka Union Weir Number 1 is less than 2.34 feet (NAVD88), no halocline is formed, and there is generally no warm water found during cold periods. This scenario increases manatees risk to cold-stress syndrome which can lead to morbidity and mortality (Slone, et al. 2013). Data on the daily water temperature and manatee mortality from the POI Basin from 2000 to 2011 were used to create a predictive model. Results indicated that the number of days where the ambient water temperature was less than 20 degrees Celsius during the winter was a significant predictor; however, separating the number of days when the stage at the Faka Union Weir Number 1 was above or below 2.34 feet led to a significant increase in predictive power. The model indicated that there was a 49% higher cold-stress mortality rate per days when the stage was low versus when the stage was higher when the ambient temperature is

below 20 degrees Celsius (Slone, et al. 2013). When the PSRP reduces flow over the Faka Union Weir Number 1, it is likely that the number of manatees experiencing cold-stress in the POI Basin will increase.

12.1.11.2 Indirect Effects

12.1.11.2.1 Access to Foraging Areas

Within the action area for manatees, the primary effect of PSRP will be hydrological changes in seasonal discharges to the estuaries in TTI. These hydrological changes would affect freshwater discharges through Faka Union Canal and into the southern estuaries ranging from Fakahatchee River and Bay in the southeast corner of TTI to Blackwater River and Bay in the northwest. During a typical wet year and during the wet season, the amount of rainfall and subsequent runoff within the project area is significant. Currently, Faka Union Canal collects most of the water draining from the project area and channels the flow as an unnaturally large point source discharge into Faka Union Bay. Since most of the runoff that would otherwise go to the estuaries is captured by Faka Union Canal, wet season discharges to the estuaries are significantly decreased compared to predevelopment conditions.

Currently, by the peak of the dry season, runoff from the project area is diminished and flows through Faka Union Canal and the estuaries are minimal. A reduction in runoff would have occurred naturally during the dry season, but the seasonal reduction in surface runoff and ground water flow is amplified by increased drainage from the existing canal system and associated lowering of the water table. The effects of this changed hydrology are not fully known, but salinity envelopes and inshore SAV communities in the TTI estuaries have likely been altered.

Despite an aquatic environment that is altered from pre-development conditions, manatees have adapted to the hydraulic changes and exhibit movement patterns that allow then to successfully access both fresh water for drinking and SAV for forage. Although the offshore zone is a major focus of activity for manatees, some individuals spend a substantial proportion of their time within inshore rivers and bays. The food resources available in these less saline ecozones may vary significantly both seasonally and annually, and the plant communities are likely to be more dynamic compared to the offshore seagrass beds. Human modifications to freshwater inflow into these bays may have greatly altered the composition and abundance of SAV in many of these bays, probably favoring more salt-tolerant species.

Irrespective of season, most manatees show a pattern of frequent, regular movement between offshore and inland zones. Tagged manatees typically spent less than a day at inland sites, but often remained on offshore seagrass beds for several days or more. Nearly all manatees show a similar pattern of alternating between the offshore and inshore zones at regular intervals ranging from 2 to 8 days throughout the year.

With implementation of PSRP and the filling of canals in the project area, the water table will raise and likely remain higher throughout the year. During the wet season, most of the runoff will no longer be collected by Faka Union Canal. Instead, increased volumes of run-off will flow out to TTI bays through various estuarine rivers and creeks. Salinity envelopes in the estuaries will shift, and the types of SAV communities that existed prior to development may become reestablished or shift in response to salinity changes.

With the raised water table resulting from restoration, dry season discharges to the estuaries, while diminished as compared to the wet season, will likely be significantly greater than under current conditions. After restoration, surface flows in the Faka Union Canal will be reduced from current dry season conditions; however, during the drier parts of the year after surface flows cease, increased groundwater storage in the undrained PSRP will continue to provide groundwater flows into the remaining unfilled portion of the Faka Union Canal above the POI Basin at higher rates for longer into the dry season than those prior to restoration (Feng, et al. 2010) .

Offshore seagrass beds will not change as a result of restoration; because these foraging areas are located too far offshore to be affected by changes in salinity conditions resulting from restoration. In estuarine river systems and bays, restoration activities will likely favor the reestablishment and growth of new SAV communities through exposure to increased and prolonged freshwater discharge. The likely reestablishment of new SAV communities in estuarine and inshore aquatic areas would have the beneficial effect of providing more foraging habitat for manatees in the TTI.

Manatees are opportunistic in their search for forage. Some individuals may alter their movement patterns and spend more time during the wet season, and perhaps the dry season, foraging on new SAV communities in estuarine rives and bays. This change in foraging behavior and movement pattern may have a significant beneficial effect on these individuals. Access to a stable water source and nearby inshore foraging is beneficial to manatee because they spend less time traveling to offshore seagrass beds resulting in lower energy expenditures and reduced risk of watercraft collisions.

12.1.11.2.2 Manatee Mortality from Boat Collisions

According to manatee mortality data for the TTI region, 115 of the 286 manatee carcasses (40%) that were recorded with known mortality agents were killed by watercraft collisions. However, POI had disproportionately low numbers, probably resulting from regulatory and educational influences on human behavior. Faka Union Canal has manatee speed limits, with apparently some successful enforcement by authorities. Also, educational efforts to teach manatee conservation may have persuaded many boaters at POI to voluntarily comply with speed restrictions, resulting in a relative reduction in manatee/watercraft collisions.

Manatees in TTI use a network of resources, and have daily, weekly, and seasonal movement patterns to access forage, most frequently at offshore seagrass beds, to access freshwater available in the upper estuaries or at the POI weir, and to seek warm water refuge during the winter. Irrespective of season, most manatees exhibit a pattern of frequent, regular movement between offshore and inland zones. Manatees typically spend less than a day at inland sites, but often remain on offshore seagrass beds for several days or more. Nearly all manatees show a similar pattern of alternating between the offshore and inshore zones at regular intervals ranging from 2 to 8 days throughout the year.

In addition, the channels used by manatees to access resources are also frequently used by boaters, resulting in the risk of manatee/watercraft collisions which may be harmful or fatal to manatees. However, the restoration project will have no effect on recreational boating in TTI.

There remains the possibility that manatees may alter their movement patterns as a result of restoration, perhaps indirectly increasing the risk of manatee/watercraft collisions.

For those individual manatees traveling between inshore resources and offshore seagrass beds, the risk of manatee/boat collisions would not be changed by restoration. Manatee use of POI would remain unchanged, or would be reduced as manatees seek freshwater and potentially new forage in restored upper estuaries. For individual manatees foraging on new SAV communities inshore, or seeking freshwater in upper estuarine creeks and rivers instead of POI, restoration would result in less manatee travel through corridors heavily used by boats, with the beneficial result of reduced risk of manatee boat collisions.

12.1.12 PROPOSED MANATEE MONITORING

12.1.12.1 Evaluation of Effects of Backfilling Merritt Canal on Flows to Port of the Islands Basin

When the north-south portion of Merritt Canal is plugged, the east-west portion of the canal at the southern end of the Picayune Strand Restoration Project (PSRP) will remain open and continue to capture flows moving to the south. Thus, the current level of flow into the Port of the Islands (POI) Basin should remain essentially the same after the north-south section of Merritt Canal down to 126th Avenue is plugged. However, monitoring will be conducted to ensure that plugging the Merritt Canal does not cause significant changes to the conditions in the POI Basin.

The South Florida Water Management District (SFWMD) currently monitors flows over Faka Union Weir #1 and three rainfall stations; SGGEWX (NW), Collier Seminole State Park (SW) and Dan House Prairie (SE), within or near the PSRP. The data are stored within SFWMD's DBHydro database. An equation developed by the United States Geological Survey (USGS) uses these four datasets to correlate canal flows from the lower Faka Union Canal into POI Basin with rainfall within the upstream watershed.

The USGS equation described above will be used to assess whether the monthly flow-rainfall relationship has been significantly altered by filling the north-south portion of Merritt Canal. This relationship will be evaluated for one winter season (December 1 to April 1) following the start of Merritt Canal plugging. If canal plugging begins between December 1 and April 1, monitoring will occur through April 1 of that dry season and be repeated the next winter season from December 1 through April 1. If canal plugging begins between April 1 and November 30, monitoring will occur during the next winter season from December 1 through April 1. The actual plugging of the canals will take approximately three to four months. If no significant changes to flows are observed, the evaluations will be discontinued after one full winter season (December 1 to April 1); however, if a significant change is observed using the equation developed by USGS, as a function of plugging Merritt Canal, the U.S. Army Corps of Engineers (Corps) and SFWMD will consult with U.S. Fish and Wildlife Service (USFWS) and Florida Fish and Wildlife Conservation Commission (FWC) to determine if any additional action(s) are needed or required. Information will be analyzed and reported on a monthly basis.

Additionally, the "Guidelines for Manatee Conservation During Comprehensive Everglades Restoration Plan Implementation" (CERP Interagency Manatee Task Force 2006) and the

Standard Manatee Construction Guidelines will be implemented for all construction phases while working in canals accessible to manatees.

12.1.12.2 Post-construction Manatee Monitoring

Post-construction manatee monitoring for the PSRP will begin with the plugging of all canals within the project. The Faka Union Canal conveys the largest amount of water to POI Basin; therefore, plugging the Faka Union Canal will likely alter freshwater flows into POI Basin more significantly than plugging of the Merritt or Miller canals. Therefore, if the Faka Union Canal is plugged prior to the Miller Canal, post-construction monitoring will begin following the construction of the first Faka Union Canal plug. As freshwater flows into POI Basin are reduced, the manatee refugium at POI Basin will likely be altered.

The Faka Union and Miller Canals will not be plugged until the Endangered Species Act (ESA) consultation on the West Indian Manatee is complete and a manatee mitigation feature has been implemented in the POI Basin to compensate for the reduction in freshwater flows into POI Basin. The project is phased so that each pump station will begin operations when complete, with the Miller pump station completed last. When all pump stations are completed, the manatee mitigation feature and western protection features are functional, and all canals are plugged, the project can begin to achieve estuarine benefits. One goal of PSRP was to redistribute freshwater flows to the estuaries and reduce the point discharge from the Faka Union Canal. It is this point source discharge from the Faka Union Canal that is responsible for the current manatee refugium within the POI Basin. As a result of restoration, this artificial refugium will be altered, thus the need for the manatee mitigation feature. As natural freshwater flows are reestablished in the estuaries south of Picayune Strand, it is anticipated that manatees will begin to utilize these natural areas once again. The PSRP acknowledges that manatees have become reliant upon the POI Basin refugium; therefore monitoring will be conducted in the POI Basin beginning the first winter season from December 1 through April 1 as identified in Table 4-1. Manatee observations as described in Table 4-1 will be conducted by a qualified marine species observer as outlined within the 2006 Guidelines for Manatee Conservation during Comprehensive Everglades Restoration Plan Implementation (CERP Interagency Task Force 2006). Post-construction seagrass surveys are included in the overall PSRP Monitoring Plan and will be included in results of manatee monitoring.

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Table 4-1. Proposed Picayune Strand Restoration Project Manatee Monitoring Plan

FEATURE	OBJECTIVE	TASK	DURATION	TARGET
Merritt Canal (begin monitoring with construction of first plug)				
Begin evaluating flows at Faka Union-1 (FU-1) and rainfall after the start of Merritt canal plugging	Determine if significant changes occur to flows at FU-1 at times when rainfall would historically maintain the manatee refugium at POI	Evaluate stage and rainfall at FU-1 using DBHydro and rainfall (SGGEWX [NW]; Collier Seminole State Park [SW] and Dan House Prairie [SE]) monthly using equation developed by USGS (Sloan et al., 2013) to determine if significant changes occur. Assumption: Headwater stages above 2.34 feet NAVD88 at FU-1 would result in halocline formation and resultant thermal refuge.	Maintain stage/rainfall correlation within 95% confidence limits of prediction based on 7 years of winter rainfall data for first full winter season following canal plugging. If stage/rainfall correlations met after one year (December 1-April 1 time period), determine no effect. If stage/rainfall correlations not met after one year, identify if rainfall patterns were outside of original model period of record (2003-2004 to 2009-2010). If yes, repeat analysis for one more year. If no, initiate consultation with FWS/FWC on manatee effects due to Merritt and potential additional effects from Miller and Faka Union canal plugging.	If the canal plugging begins between December 1 and April 1, monitoring will occur through April 1 of that winter season and be repeated the next winter season from December 1 through April 1. OR If canal plugging begins between April 1 and November 30, monitoring will be conducted for one full winter season from December 1 through April 1.
Post-Construction Monitoring (all canals plugged – Prairie, Merritt, Miller, Faka Union)				

If construction of the manatee mitigation feature is completed between April 1 through November 30 monitoring will start the following December 1. OR If construction of the manatee mitigation feature is completed from December 1 through April 1 monitoring will start immediately through April 1 and restart the next winter season (December 1 to April 1).	Determine success of the manatee mitigation feature following the completion of the PSRP at times when rainfall would historically maintain the manatee refugium at POI.	1. Monitoring of vertical temperature strata using data loggers. Vertical temperature strata to include bottom, middle, and upper depths. These depths will be determined during mitigation feature design. At least one temperature logger would be telemetry-based for real time transmission of data to determine cold events. 2. Isotope analysis – collect water isotopes to determine 18O/16O and 2H/1H ratios. Monthly (December 1 to April 1) The bottom depth would be determined during mitigation feature design.	1. Maintain vertical temperature strata with bottom layer at least 20°C during moderate to severe cold weather events at times when rainfall would historically maintain the manatee refugium at POI. 2. Confirm presence of groundwater isotopes and trend in bottom layer. Moderate to severe weather events occurred: a) If groundwater isotopes are confirmed within mitigation refugium area and bottom temperatures remain at or above 20 degrees Celsius during moderate to severe cold weather events for 3 full winter seasons - monitoring will be discontinued. b) If isotopes are confirmed but temperature threshold is exceeded, monitor for additional 3 years and reevaluate. c) If isotopes are not confirmed, evaluate rainfall/stage equation to determine if halocline formation would have likely formed. If no, continue monitoring for additional 3 years. If yes, initiate consultation with USFWS and FWC on potential manatee effects. d) If no moderate to severe whether events occur, continue monitoring for 3 more years.	1. Collect and evaluate temperature data monthly during winter season (15 to 30 minute intervals with data loggers) collected and evaluated monthly from December 1 to April 1. Monitor for 3 years then re-evaluate in consultation with USFWS and FWC using decision matrix with options to continue or discontinue monitoring. Isotope data would be collected monthly (December 1 to April 1) and during moderate to severe cold weather events. 2. First test performed immediately following completion of construction of the manatee mitigation feature (construction contract). Duration: Monthly (December 1 to April 1) for 3 years at the beginning of winter season. Re-evaluate after 3 years in consultation with USFWS and FWC.

Manatee Observations	Determine if manatees are using the manatee mitigation feature	Manatee use*: 1. Manatee mitigation feature and; 2. POI Basin * Manatee Observation protocol will be developed in conjunction with USFWS and FWC.	Determine presence and number of manatees within: 1. Manatee mitigation feature Confirm presence of manatees within the feature for 3 cold weather events (2 moderate and 1 severe during the period between December 1 to April 1. 2. POI Basin Confirm presence of manatees within the POI Basin for 3 cold weather events (2 moderate and 1 severe) during the period between December 1 to April 1. Discontinue task if target (letter a below) reached. a. If manatees are present in manatee mitigation feature during 3 cold events (2 moderate and 1 severe) and the feature is working (hydrology/temperature criteria), then reevaluate monitoring. b. If moderate to severe cold events occur and manatee mitigation feature is not working (hydrology/temperature criteria) and halocline would not have formed based on USGS equation analysis of rainfall and stage, then continue monitoring for additional 3 years. c. If manatees are not present in manatee mitigation feature during cold events and mitigation feature is working (hydrology/temperature criteria), then coordinate with FWC/USFWS to evaluate potential manatee effects. d. If manatees are not present in manatee mitigation feature during cold events and mitigation feature is not working (hydrology and temperature criteria), and halocline would have formed based on USGS equation analysis of rainfall and stage; then coordinate with FWC/USFWS.	Winter season for up to 10 years following completion of the manatee mitigation feature within: 1. Manatee mitigation feature area beginning the next day following a cold event (water temperature below 20^{o}C) for 2 days. Based upon information provided from data loggers described in post-construction monitoring. 2. POI Basin area for 2 days beginning the next day following a cold event (water temperature below 20^{o}C) **and** when FU-1 stage is below 2.34 feet NAVD88. The PSRP Monitoring and Assessment Group (MAG) will meet annually to assess monitoring data. After three cold events (two moderate and one severe), the PSRP MAG will reassess need for further manatee observation monitoring requirements.

*A moderate cold event is described as ambient water temperatures fall below 20^{o}C for a period of 14 days. A severe cold event is defined as ambient water temperatures (as indicated by monitoring well located at mouth of Faka Union Canal) fall below 20^{o}C for 25 days or fall below 15^{o}C for a period of 14 days.

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12.1.12.3 Vertical Temperature Strata

Three vertical temperature strata will be continuously monitored, as defined in Table 4-1, during the winter season from December 1 through April 1 for three full winter seasons following the beginning of plugging the Faka Union and Miller Canals to determine the temperature in the water column within the manatee mitigation feature. Vertical temperature strata will include bottom, middle, and upper depths. These depths will be determined during mitigation feature design. Prolonged water temperatures below 20 degrees Celsius can lead to cold stress syndrome in manatees (Bossart et al. 2003). The current refugium in the POI Basin functions as a temperature inverted thermocline/halocline; it is expected that the manatee mitigation feature will serve as a manatee refugium by establishing a connection with warmer saline groundwater. It is important to monitor the vertical temperature strata to determine whether the manatee mitigation feature serves as a refugium in light of the post-construction reduction in point source discharge of freshwater inflows to POI Basin.

12.1.12.4 Isotope Analysis

Isotope analyses will be conducted on the bottom water layer of the manatee mitigation feature monthly (December 1 to April 1) for three years to verify the presence of groundwater within the manatee mitigation feature. USGS conducted studies from 2009 to 2011 of the isotope signatures in the POI Basin and determined that there is currently no groundwater connection in the relatively shallow POI basin; furthermore, they identified the unique isotope signatures of groundwater, water from the Gulf of Mexico, and freshwater from the Faka Union canal. These data can be used to determine the presence or absence of a groundwater connection once the manatee mitigation feature is completed.

12.1.12.5 Evaluation of Boat Strike and Mortality/morbidity Data

Boat strike and mortality/morbidity data collected by the USFWS and FWC will be evaluated to observe patterns of changes in distribution and occurrence of cold stress in manatees within the POI basin. Collection of these data will not be funded by SFWMD or USACE; however, SFWMD and USACE biologists can utilize these already available data to help evaluate possible post-construction changes in manatee boat strikes and mortality/morbidity patterns.

12.1.12.6 Manatee Observations

Manatee observations will be performed within the POI Basin and manatee mitigation feature to determine if manatees are using the new refugium. Observations will be conducted once a day within the manatee mitigation feature the next day following a cold event where the ambient water temperature reaches 20^{o}C or less for two days following the cold event. Observations will be conducted in the POI Basin under the same temperature condition and duration with the additional requirement that the stage at the FU-1 is less than 2.34 feet NAVD88 as determined critical by the USGS trigger analysis. Manatee observations as described in Table 4-1 will be conducted by a qualified marine species observer as outlined within the 2006 Guidelines for Manatee Conservation during Comprehensive Everglades Restoration Plan Implementation (CERP Interagency Task Force 2006).

12.1.12.7 Manatee Mitigation Success Criteria

In conjunction with the proposed manatee monitoring plan, an inter-agency meeting including the SFWMD, the FWC, the USFWS, and the Corps was held on 20 August 2014 to discuss factors in determining the success of the manatee refugium.

The Success Criteria Objectives are as follows:

1. The new manatee refugium (POI berm refugium) will maintain the thermo-regulating functions of the existing manatee refugium (POI marina refugium) with sufficient warm water supply, temperature and longevity to attract and protect manatees from cold stress during a moderate to severe cold weather event. Warm water supply, temperature and longevity are sufficient to attract and protect manatees from cold stress and mortality during moderate to severe cold weather event.
    a. A groundwater connection (as demonstrated by isotope analysis) to warm saline water will be established and maintained at the new refugium site.
    b. Water temperature within the refugium will remain at or above 20 degrees Celsius; supporting a manatee refugium during a moderate to severe cold weather event lasting up to 3 weeks.

    Groundwater isotopes and water temperature monitoring is included as monitoring success criteria for the manatee refugium mitigation feature. The goal is to create a refugium with groundwater signatures at or above temperature thresholds of 20 degrees Celsius during moderate to severe cold weather events. In addition, analysis of the FU-1 stage, flow and area rainfall is included to assess whether these variables would have created a halocline in POI Basin under pre-restoration conditions.

2. Manatees use the new refugium without definitive changes (as defined by the USFWS, FWC, and USGS) in manatee demographics and health:

    a. Manatee cold stress-related deaths in the POI area do not exceed the Predictive Carcass Count Table for POI and Faka Union Canal (USGS citation).

    The goal of the monitoring plan is to determine if the Manatee Mitigation feature warm-water refugium was created based on groundwater signatures and whether the constructed feature meets the temperature threshold as described in response to #1 above. The monitoring plan to be funded by USACE/SFWMD as part of the PSRP Manatee Mitigation Feature does not include any monitoring to identify whether manatee cold stress-related deaths in POI Basin exceed the Predictive Carcass Count Table for POI Basin and Faka Union Canal. There is concern regarding the complexity and accuracy

of monitoring cold-stress specific mortality to determine whether the feature may or may not be creating unintended consequences. USACE and SFWMD recognize that FWC/USFWS may fund and provide this information per their species conservation monitoring efforts to understand manatee species conditions in the area. Language was incorporated into the monitoring plan at the request of USFWS and FWC to address mortality/morbidity data, however, it was always acknowledged that this monitoring data would be funded and evaluated by USFWS/FWC and the valuation and associated results provided to USACE and SFWMD for review. If the evaluation and results are provided, data and analysis should explain how predictive carcass count table was used to confirm whether or not results indicate potential manatee refugium mitigation performance issues. FWC will continue to uphold the responsibility of carcass recovery and determination of cause of death. FWC will coordinate with USFWS on evaluation of the data. USACE and SFWMD are not responsible for obtaining or analyzing data related to manatee cold stress deaths.

b. Comparable numbers of manatees that used the POI marina refugium site are using the POI berm refugium site under a moderate to severe cold weather event.

Identifying whether manatees are using the manatee mitigation feature (through observation of manatee presence) is another important criterion to confirm whether the refugium is working. The monitoring plan includes manatee observations at the manatee mitigation feature, POI Basin and FU-1 to determine presence of manatees under a moderate to severe cold weather event. Due to natural population variability, it is not feasible to make accurate comparisons of manatee usage. The success of the refugium will be based upon whether a groundwater interaction has been created and presence of manatees within the manatee mitigation feature. The USFWS and FWC will continue to conduct surveys to confirm that comparable numbers are present. USACE and SFWMD will monitor manatees are described in Table 4-1: Picayune Strand Restoration Project Manatee Monitoring Plan.

c. Manatee population health assessments at the POI berm refugium (cold stress symptoms, morbidity/mortality due to cold stress) are comparable to the existing refugium, unless those symptoms are attributed to area habitat or climatic changes.

The monitoring plan to be funded by USACE/SFWMD as part of the PSRP Manatee Mitigation Feature does not include monitoring to assess manatee population health at the manatee mitigation feature. Manatee health assessment monitoring is both complicated and challenging to pinpoint to the

manatee mitigation feature to determine whether the project was successful and did not result in unintended consequences. Climate variability, food source availability throughout the year prior to entering the manatee mitigation feature and stressors unrelated to the manatee mitigation feature could confound the animal's stress level and compromise the ability to detect any changes due to the manatee mitigation feature or changes in POI Basin due to PSRP. USACE and SFWMD recognize that FWC/USFWS may fund and provide information per their species conservation monitoring efforts to understand manatee species conditions in the area. If provided, data and analysis should explain how the predictive carcass count table was used to confirm whether or not results indicate potential manatee mitigation feature performance issues. FWC will continue to conduct health assessments. Health assessments are not an appropriate activity for the project to fund. USACE and SFWMD are not responsible for conducting manatee population health assessments.

The POI berm manatee refugium shall be determined to be a success when monitoring indicates that the two objectives listed above are achieved over a time period that includes one moderate and two severe cold weather events. A moderate cold weather event is defined as: Ambient water temperatures fall below 20 degrees Celsius for a period of 14 days. A severe cold weather event is defined as: Ambient water temperatures fall below 20 degrees Celsius for a period of 25 days or fall below 15 degrees Celsius for a period of 14 days. Ambient temperature will be as measured by Faka Union Canal monitoring well (near mouth of canal- station number to be identified).

Monitoring of the refugium and manatee sub-population shall occur consistent with the monitoring plan presented in Table 4-1. After at least one moderate and one severe cold weather events and at least three years of data, a panel of manatee experts that includes the U.S. Fish and Wildlife Service, Florida Fish and Wildlife Conservation Commission, and U.S. Geological Survey shall meet to determine if additional monitoring is necessary.

The original recommendation to discuss discontinuance of monitoring after one moderate and two severe cold weather events occurrence and after 10 years have experienced was confusing and too long a period before the discussion of discontinuing the monitoring should occur. Discussion and determination of whether monitoring should continue needs to occur at a minimum of three year intervals. The actual determination should be based on whether moderate and/or severe cold events have occurred and the new manatee mitigation feature success criteria have been met. These decision statements have been added to the monitoring plan to help aid determinations of whether or not to continue monitoring. Once the success criteria have been met during a moderate and/or extreme cold weather event, then the decision to discontinue monitoring will be made by USACE/SFWMD in coordination with USFWS and FWC. USACE and SFWMD will monitor manatees are described in Table 4-1: Picayune Strand Restoration Project Manatee Monitoring Plan.

12.1.12.8 Additional Monitoring**:**

The following monitoring data is included in this monitoring plan solely per request of FWC and USFWS. All data are collected and funded by FWC/USFWS and will be considered in determining manatee use in area. Any data that are available and determined to be of use by FWC/USFWS will be coordinated with the Corps/SFWMD.

3. Boat Strike Data: FWC and USFWS boat strike data may be used to assess post-construction manatee distribution changes in POI Basin area. Data will be provided to Corps and SFWMD for review, if available and produced by FWC/FWS. Data will be assessed until manatee mitigation feature success criteria are met.
4. Mortality/Morbidity Data: FWC/FWS data regarding manatee mortality and morbidity related to regional cold stress data may be used to assess post-construction cold stress effects on manatees in the POI Basin area. Data will be provided to Corps and SFWMD for review, if available and produced by FWC/FWS. Data will be assessed until manatee mitigation feature success criteria are met.

In addition to the monitoring listed above, the following list of estuarine water quality and hydrological monitoring stations as well as the project-specific hydrological monitoring stations located in the upper estuary are considered important to evaluating project effects on manatees and their critical habitat. Funding sources for these stations have varied and have included RECOVER, USGS, PES, and the SFWMD. If funding of these stations is proposed to be discontinued, the MAG will be notified and the effect that the loss of the stations would have on manatees and their critical habitat will be evaluated.

7. **POI Boat Basin** – floating salinity/temperature sensor, near bottom salinity/temperature sensor, and 8 sensor thermistor string – monitoring salinity stratification and temperature inversions (re-starting in November 2013; only winter months) – **Funded by PES**
8. **East River** – salinity, temperature, water level – **funded by RECOVER**; discharge (*re-starting in November 2014*) – **funded by PES**
9. **Faka Union Canal near the mouth** – salinity, temperature, water level, and discharge – **funded by RECOVER**
10. **Pumpkin River** – salinity, temperature, water level, and discharge – **funded by RECOVER**
11. **Blackwater River** – salinity, temperature, water level, and discharge – **funded by RECOVER**
12. **Palm River** – salinity, temperature, and water level – **funded by RECOVER**

12.1.13 DETERMINATION OF EFFECT

With implementation of the PSRP and the filling of canals in the project area, the water table will raise and likely remain higher throughout the year. During the wet season, most of the runoff will no longer be collected by Faka Union Canal. Instead, increased

volumes of run-off will flow out to TTI bays through ground water and various estuarine rivers and creeks. Salinity envelopes in the estuaries will shift, and the types of SAV communities that existed prior to development may become reestablished or shift in response to salinity changes.

With the implementation of the PSRP, dry season discharges to the POI Basin that maintain the thermal refugium will likely be reduced from current conditions; therefore, PSRP will implement a manatee mitigation feature as described in Section 2.5, to compensate for the loss of dry season flows. The presence of a manatee refugium at the POI Basin will not be affected by the PSRP during the wet season with implementation of the feature described in Section 2.5.

There may be a direct effect to manatees as a result of the PSRP implementation; however, the manatee mitigation feature was designed to mitigate for the loss of dry season freshwater flows that maintain a thermal refugium at the POI Basin. The West Indian manatee's critical habitat includes all waters of TTI estuaries and the POI Basin. Based on the USGS studies and the implementation of the manatee mitigation feature, the Corps determines that the PSRP "may affect, but is not likely to adversely affect" manatee or its critical habitat at the POI Basin or in the TTI region. A manatee monitoring plan has been developed to confirm the existence of a groundwater connection following the implementation of the manatee mitigation feature. If monitoring indicates that the manatee mitigation feature is not able to provide a thermal manatee refugium, further monitoring or measures may have to be implemented to ensure the maintenance of the refugium at the POI Basin.

12.2 FLORIDA PANTHER

12.2.1 SPECIES DESCRIPTION

The Florida panther was listed as endangered throughout its range in 1967 (32 FR 4001), and received Federal protection under the passage of the ESA of 1973, as amended (16 U.S.C. 1531 *et seq.*). Since the panther was designated as an endangered species prior to enactment of the ESA, there was no formal listing package identifying threats to the species as required by section 4(a)(1) of the ESA. No critical habitat has been designated for the panther. An extensive description of life history traits of the Florida panther is included in the 2009 BO (USFWS 2009) and is hereby incorporated into this fourth supplemental BA by reference.

12.2.2 DETERMINATION OF EFFECT

The project area is known to support the Florida panther, panther prey, and to include panther habitat as discussed in the 2004 PSRP Final PIR/EIS, 2008 BA, and 2009 BO. However, the manatee mitigation feature is constructed outside of the Florida Panther Focus Area or ESA consultation area as described in the 2009 BO. The inclusion and implementation of the manatee mitigation feature at the POI Basin will not significantly affect panther habitat and most of the effect will be temporary. Therefore, the Corps determines the manatee mitigation feature "may affect, likely to adversely affect" the Florida panther.

12.3 FLORIDA BONNETED BAT

12.3.1 SPECIES DESCRIPTION

The Florida bonneted bat is Florida's largest bat, weighing approximately 1.1 to 2.0 ounces, with a 19 to 21 inch wingspan, and a body length of 5.1 to 6.5 inches. The species has dark brown fur and large broad ears that join together and slant forward over the eyes. Relatively little is known regarding the ecology and habitat requirements of this species (USFWS 2013). In general, bats will forage over ponds, streams and wetlands and require roosting habitat for daytime roosting, protection from predators and rearing of young (Marks and Marks 2008). Florida bonneted bats roost in tree cavities, rocky outcrops and dead palm fronds. In residential communities, the bats roost in Spanish tile roofs, but have also been found in attics, rock or brick chimneys and fireplaces of old buildings (NatureServe 2013). Colonies are small, with the largest reported as just a few dozen individuals. The bat is a nocturnal insectivore and relies upon echolocation to navigate and detect prey. Females give birth to a single pup from June through September (Marks and Marks 2008, Florida Bat Conservency 2005); however limited data suggests that a female may undergo a second birthing season possibly in January or February (USFWS 2013).

The Florida bonneted bat is Florida's only endemic bat and is listed by FWC as a state listed endangered species and is listed as endangered under the Endangered Species Act as of November 1, 2013. The range of this species is limited to southern Florida, although this species was encountered in 2008 in two locations within the Kissimmee River Wildlife Management Area north of Lake Okeechobee. Records indicate that it was once common in the 1950s and early 1960s near Coral Gables and Miami (Belwood 1992). The Florida bonneted bat has only been documented in 12 locations within Florida, including areas within Coral Gables, Homestead, Naples, Everglades City and North Fort Myers. Seven of the locations are under public ownership with the Florida bonneted bat found in discrete and specific areas within Big Cypress National Preserve, Fakahatchee Strand Preserve State Park, Kissimmee River Wildlife Management Area, Babcock Ranch and Fred C. Babcock and Cecil M. Webb Wildlife Management Area (USFWS 2013). The capture of a juvenile male at Picayune Strand State Forest on December 17, 2009 indicated that breeding was occurring in the area (Smith 2010). FWC biologists and volunteers caught a free-flying juvenile male Florida bonneted bat using a mist net in the PSSF (PSRP). Habitat composition of PSSF includes wet prairie, cypress stands, and pine flatwoods in the lowlands and subtropical hardwood hammocks in the uplands, and the individual was captured in the net above the fresh water portion of Faka Union Canal (Smith 2010, p. 1). The species has been detected at nine locations within PSSF (i.e. captured at one location, heard while mist netting at eight other locations), and each site was located near freshwater canals (K. Smith, pers. comm. 2013). In 2000, the species was recorded within mangroves at Dismal Key within the Ten Thousand Islands (Timm and Genoways 2004, p. 861; Marks and Marks 2008a, pp. 6, A9, B53; 2012, p.14. Habitat loss and alteration in forested and urban areas are major threats to the Florida bonneted bat (Belwood 1992, p.220; Timm and Arroyo-Cabrales 2008, p.1). In natural areas, this species may be impacted when forests are converted to other uses or when old trees with cavities are removed (Belwood 1992, p. 220; Timm and Arroyo-Cabrales 2008, p.1). In urban settings, this species may be impacted when

buildings with suitable roosts are demolished (Robson 1989, p.15; Timm and Arroyo-Cabrales 2008, p.1) or when structures are modified to exclude bats. Although the species' habitat preferences and extent of range are not well understood, significant land use changes have occurred in south Florida and additional habitat losses are expected in the future, placing the species at risk. Uncertainty regarding the species' specific habitat needs and requirements arguably contributes to the degree of this threat. Loss of suitable habitat is believed to be the primary cause of population decline. Other perceived threats include pesticide and herbicide use, which decrease populations of insects, the bats primary prey. Since the Florida bonneted bat is suspected to have high roost site fidelity, the loss of a roost site may cause greater hardship to the species than the loss of a roost site for other, more labile species (H. Ober, *in litt.* 2012). Current roosting sites include only manmade, artificial structures, although bats have been documented to roost in pine tree cavities and in palm fronds (FWS 2013).

DETERMINATION OF EFFECT

Evidence of direct impacts to the Florida bonneted bat as a result of the construction of the manatee mitigation feature is lacking, and negative impacts to the species is unlikely. The restoration of natural hydrology in Picayune Strand and the surrounding protected public lands would likely increase available nesting and foraging habitat for the Florida bonneted bat. Only limited removal of open areas of scattered live oak, cabbage palm, some mangroves and sandy, xeric habitat will occur at the project site. No artificial structures suitable for roosting are located on the site. As a condition for construction, pre-construction wildlife surveys for all listed species and migratory birds will be conducted and any cavities that are identified will be surveyed for roosting bats. Therefore, the manatee mitigation feature, "may affect, but is not likely to adversely affect" the Florida bonneted bat.

12.4 AMERICAN CROCODILE

12.4.1 SPECIES DESCRIPTION

The current distribution of the American crocodile is limited to extreme south Florida, including coastal areas of Collier and Lee Counties along Florida's southwest coast. The majority of crocodiles are present in the vicinity of core nesting areas, located near Biscayne and Florida Bays (Kushlan and Mazzotti 1989). Several small groups and individual crocodiles have been documented from Sanibel and Pine Islands, Lee County, south to Fakahatchee River, Collier County (USFWS 1999), including the Port of the Island marina basin and surrounding estuaries. The 35,000-acre TTI National Wildlife Refuge is located directly south and southwest of the PSRP in Collier County and ½ mile west of the manatee mitigation feature, and was created to protect important mangrove and marsh habitats, native wildlife, and the endangered species of the area including the American crocodile. The PSRP area does not include designated critical habitat for the American crocodile, therefore, none will be affected.

The American crocodile is found primarily in mangrove swamps and along low-energy mangrove-lined bays, creeks, and inland swamps (Kushlan and Mazzotti 1989). In

Florida, patterns of crocodile habitat use shift seasonally. During the breeding and nesting seasons, adults outside of Key Largo and Turkey Point use the exposed shoreline of Florida Bay. Males tend to stay more inland than the females at this time (Mazzotti 1998, Moler1998). During the non-nesting season, they are found primarily in the fresh and brackish-water inland swamps, creeks and bays, retreating farther into the back country in fall and winter (Kushlan and Mazzotti 1989). Natural nesting habitat includes sites with sandy shorelines or raised marl creek banks adjacent to deep water. Crocodiles also nest on elevated man-made structures such as canal berms and other places where fill has been introduced. The American crocodile is typically active from shortly before sunset to shortly after sunrise (Lang 1975, Mazzotti 1983). During these times crocodiles forage opportunistically, eating whatever animals they can catch. Juveniles typically eat fish, crabs, snakes, and other small invertebrates, whereas adults are known to eat fish, crabs, snakes, turtles, birds, and small mammals (Ogden 1978b, Ross and Magnusson 1989). A crocodile was killed on U.S. 41 near the Faka Union Canal (south of Faka Union weir No. 1) in 1997 (Jones 1998). Crocodiles have been reported to feed at the POI marina basin downstream of the PSRP project (Dryden 1998) and adjacent to the manatee mitigation feature site. Crocodiles do nest in southwest Florida, but successful crocodile reproduction has not been documented in this area. Crocodiles have also been identified at Blue Crab Key (Pine Island) and Bonita Bay developments in Lee County (Repenning 1998, Dryden 1998), at the Eagle Creek Country Club just southwest of State Road (SR) 951 and U.S. 41 (Mazzotti 1998, Bertone 2009), in the Fakahatchee River southeast of theproject site by National Park Service (NPS) and DEP staff in 2002 and 2003 and at CSSP (Doyle 1993). As many as 11 adult crocodiles have frequented manmade borrow pits at the Marco Airport site, approximately 9 miles southwest of the PSRP and manatee mitigation feature. The timing and frequency of the freshwater inputs to estuaries influences the health of the estuarine environment in south Florida and may be one of the most important large-scale factors influencing crocodile populations. Drainage canals and impervious surface runoff have changed the seasonal timing and discharge of sheetflow to Pumpkin, Blackwater, Faka Union, and to a lesser extent, Fakahatchee Bay downstream of the PSRP project. Point-source discharges into Faka Union Bay and disruption of fresh water flows to Pumpkin and Blackwater Bays have potentially reduced the production of fish and other aquatic species that provide forage for the American crocodile. Temperature changes related to freshwater input may also be a factor in influencing forage activities. Because juvenile crocodiles require access to low salinity water for maintenance of osmotic balance, changes in freshwater flows may also affect juvenile crocodiles. Restoration of natural flows from the PSRP should improve the existing estuarine condition and habitat conditions for the American crocodile by enhancing the forage base in adjacent estuaries and would likely provide sufficient fresh water to meet crocodilian needs.

12.4.2 DETERMINATION OF EFFECT

The addition of the manatee mitigation feature to the PSRP will result in excavation and/or stockpiling of fill on the existing artificially constructed Faka Union canal berm. Small numbers of American crocodiles occasionally forage in the Faka Union canal and estuaries adjacent to the project. However, no known crocodile nesting or resting areas have been documented on the Faka Union spoil berm where the manatee mitigation feature will be constructed. Pre-construction wildlife surveys will be conducted as part of

the project commitments. Turbidity barriers will be constructed in order to avoid impacts to estuarine waters at the project location. Vessel speed restrictions and observers that will be required as part of the Standard Manatee Construction Conditions that will be employed for the project construction to avoid manatee impacts, will also provide for avoiding construction-related injuries or death of any foraging American crocodiles. Therefore, the Corps maintains the determination reached in the 2004 BA and 2009 BO that the PSRP would have "no effect" to American crocodile or its designated critical habitat.

12.5 EASTERN INDIGO SNAKE

12.5.1 SPECIES DESCRIPTION

An extensive description of life history of the Eastern indigo snake is included in the 2004 PSRP Final PIR/EIS, 2008 BA, and the 2009 BO. The descriptions contained within these documents are incorporated by reference into this fourth supplemental BA.

12.5.2 DETERMINATION OF EFFECT

The manatee mitigation feature will permanently affect approximately 2 acres of Eastern indigo snake habitat associated with the wetlands portion of the manatee mitigation features and temporarily affect 10 acres of habitat associated with stockpiled fill areas and re-constructed berms surrounding the manatee mitigation feature. Gopher tortoise burrows are located in the proposed construction area and could function as refugia for the indigo snake although burrows are not required as refugia in the southern portion of the indigo snake's range. Consistent with the analysis in the 2009 BO, it is not easy to estimate the density of indigo snakes at the project site due to a general lack of existing data for the action area. We anticipate that the actual density of indigo snakes and their prey within the project footprint may be low due to the disturbed habitat condition and geographic location (narrow spoil berm adjacent to canal and bordered by a mangrove swamp). In the 2009 BO, the FWS anticipated up to 2 indigo snakes may be harmed (injury or mortality) incidental to project construction and initial re-hydration of the manatee mitigation feature. As a result, the Standard Eastern Indigo Snake Construction Guidelines will be implemented during the construction of the manatee mitigation feature and other project commitments and Terms and Conditions as contained in the 2009 BO will be in effect. Therefore, the Corps has determined that the construction of the manatee mitigation feature "may affect, but is not likely to adversely affect" the Eastern indigo snake during and following the construction of the manatee mitigation feature.

12.6 GOPHER TORTOISE

12.6.1 SPECIES DESCRIPTION

The gopher tortoise, an upland dwelling reptile, is currently listed as a candidate species in the Eastern U.S. by the USFWS (USFWS 2013). The gopher tortoise shell can be from 5.9 to 14.6 inches long, is dark-brown to grayish-black terrestrial turtle, has large hind feet, and shovel-like forefeet (Ernest and Barbour 1972). In Florida, individuals from coastal areas are generally darker than more central populations. Gopher tortoises excavate deep burrows that provide shelter from weather extremes and refuge from

predation (Diemer 1989). The gopher tortoise commonly occupies habitats with a well-drained sandy substrate, ample herbaceous vegetation for food, and sunlit areas for nesting (Landers 1980, Landers, Garner and McRae 1980, Diemer 1989). Diemer (1992) found that gopher tortoise activity increased in April, peaked in July, and remained high through October. Many vertebrate and invertebrates species are known to seek refuge in gopher tortoise burrows, including protected species like the Eastern Indigo snake (Franz 1986, Jackson and Milstrey 1989, Lips 1991, Witz, Wilson and Palmer 1991).

One small population (less than 30 individuals) of relocated gopher tortoises currently reside on the Faka Union Canal spoil berm, which acts as an island. Comparisons of tortoise populations on true islands with populations on the mainland suggested that tortoises do respond to relatively small, isolated habitats (Mushinsky and McCoy 1994). This study found that the density of burrows decreased as area increased on the mainland, but density of burrows was not related to area on the islands. Findings suggest that tortoises have a greater selection of habitats on the mainland than on islands. Tortoises on islands are confined and may be forced to live in less than ideal conditions. The implications of these findings are profound for tortoises living in small, fragmented "habitat islands" on the mainland. As the quality of their habitat island is degraded; mature adults may be forced to abandon a site in search of better habitat quality. From a practical perspective, prior to this study (Mushinsky and McCoy 1994),observations of large numbers of active and inactive gopher tortoise burrows in a confined area likely would have been viewed as indicators of a "healthy" population; however, these findings suggest just the opposite. Rather than a signal of a healthy population, large numbers of active and inactive gopher tortoise burrows, relative to the actual number of tortoises, may signal a stressed population (Stewart, Austin and Bourne 1993).

12.6.2 DETERMINATION OF EFFECT

A small population of gopher tortoises has been relocated to the Faka Union Canal spoil berm just south of the POI Basin. These tortoises would be relocated prior to construction of the manatee mitigation feature and would be moved to suitable habitat in a nearby location. The tortoises may be returned to the site following the completion of the feature. The Corps determines that the manatee mitigation feature “may affect, but is not likely to adversely affect” the gopher tortoise during and following the construction of the manatee mitigation feature.

12.7 WOOD STORK

12.7.1 SPECIES DESCRIPTION

An extensive description of life history traits of the wood stork is included in the 2004 PSRP Final PIR/EIS, 2008 BA, and the 2009 BO. In addition, these documents contain a full discussion of the wood stork colonies located near the PSRP. The descriptions contained within these documents are incorporated by reference into this second supplemental BA.

12.7.2 DETERMINATION OF EFFECT

The addition of the manatee mitigation feature to the PSRP will not change the original effects to the wood stork as stated in the 2004 PSRP Final PIR/EIS and the 2009 BO;

therefore, the Corps determines that the addition of the manatee mitigation feature will have "no effect" on the wood stork.

12.8 EVERGLADE SNAIL KITE

12.8.1 SPECIES DESCRIPTION

An extensive description of life history traits of the Everglade snail kite is included in the 2004 PSRP Final PIR/EIS, 2008 BA, and the 2009 BO. The descriptions contained within these documents are incorporated by reference into this second supplemental BA.

12.8.2 DETERMINATION OF EFFECT

The addition of the manatee mitigation feature will not have an effect on the Everglade snail kite; therefore, the Corps maintains the original determination of "no effect" received in the 2009 BO.

12.9 RED-COCKADED WOODPECKER

12.9.1 SPECIES DESCRIPTION

South Florida supports populations necessary for the recovery of red-cockaded woodpeckers. Statewide protection and restoration efforts focus on acquiring, managing, and restoring habitat surrounding these populations. Lands acquired in southwest Florida for red-cockaded woodpecker conservation should be contiguous with publicly-owned conservation lands that contain red-cockaded woodpecker clusters (Beever and Dryden 1992).

Pine stands, or pine-dominated pine/hardwood stands, with a low or sparse understory and ample old-growth pines, constitute primary red-cockaded woodpecker nesting and roosting habitat. In southwest Florida (Charlotte, Collier, and Lee Counties), hydric slash pine (*P. elliotii* var. *densa*) flatwoods provide the preferred nesting and foraging habitat for the red-cockaded woodpecker (Beever and Dryden 1992). This community has been maintained by fire and hydroperiod, and therefore does not have the dense midstory more typical of xeric and mesic flatwoods in southwest Florida. Also, hydric pine flatwoods were not as accessible to historic forestry, agriculture, and land clearing practices as the xeric and mesic communities due to their wetland status.

Currently, the PSSF has 13 active red-cockaded woodpecker clusters with 10 potential breeding groups, and the remaining three with solitary birds; however, only one of these clusters occur within the SGGE tract (PSRP area) (Sowell 2012). The majority of the clusters are located in Belle Meade, west of the PSRP area. Figure 4-8 shows the locations of the red-cockaded woodpecker clusters in the Belle Meade tract.

An extensive description of life history traits of the red-cockaded woodpecker is included in the 2004 PSRP Final PIR/EIS, 2008 BA, and the 2009 BO. The descriptions contained within these documents are incorporated by reference into this second supplemental BA.

12.9.2 DETERMINATION OF EFFECT

The addition of the manatee mitigation feature will not have an effect on the red-cockaded woodpecker. Therefore, the Corps determines that the addition of the manatee mitigation feature will have "no effect" on the red-cockaded woodpecker.

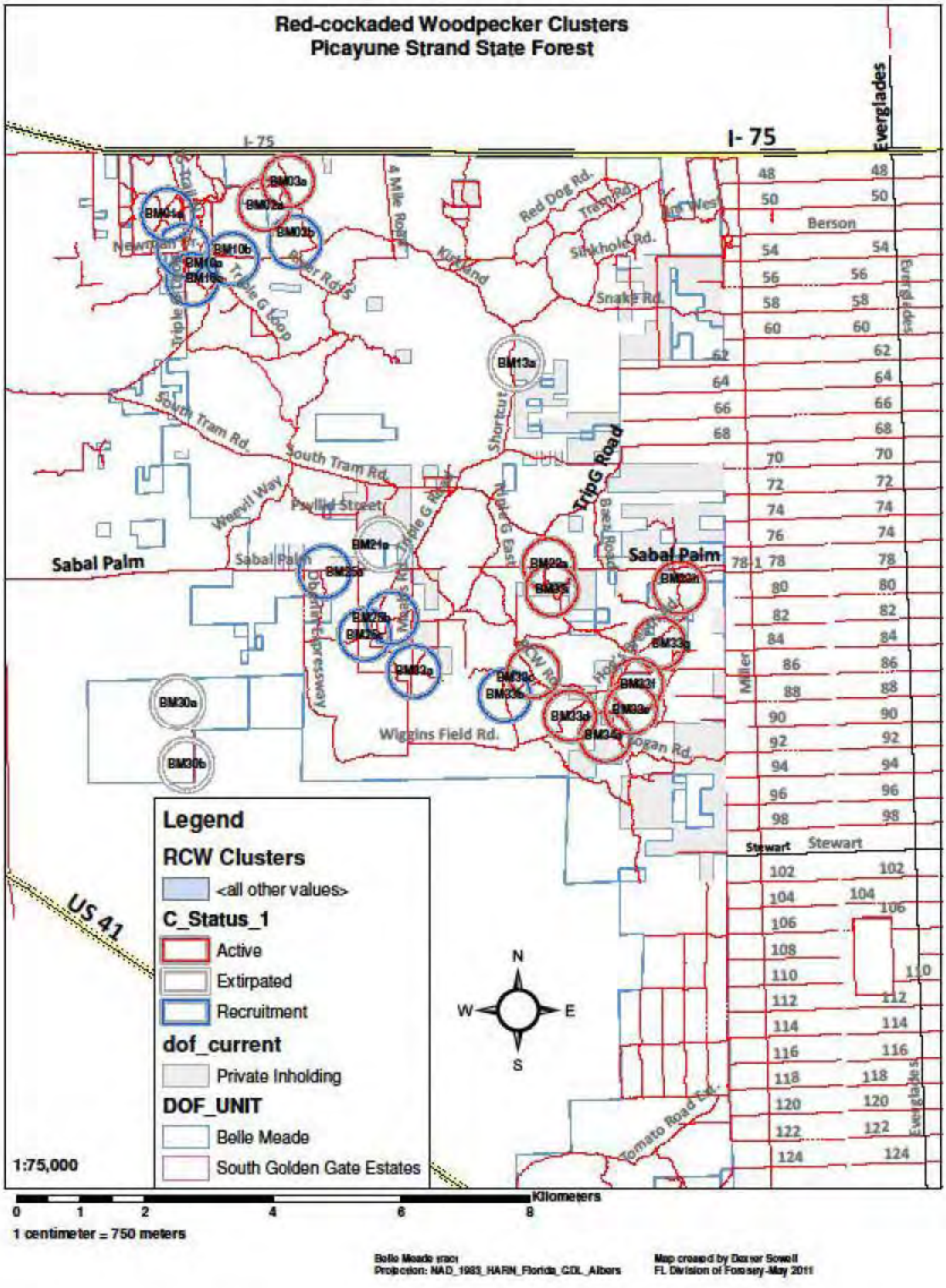

Figure 4-8. Red-cockaded Woodpecker Clusters at Picayune Strand State Forest

12.10 NMFS CONSULTATION

The species designated under the purview of the NMFS was included in a 2 July 2013 CERP Programmatic BA. The species found at or near the PSRP include: loggerhead sea turtle, Kemp's ridley sea turtle, Atlantic green sea turtle, smalltooth sawfish and its critical habitat, goliath grouper, mangrove rivulus, and sand tiger shark. NMFS provided a CERP Programmatic BO on 17 December 2013 which included concurrences to the PSRP effect determinations.

The manatee mitigation feature will have "no effect" on the above listed species or critical habitat under NMFS jurisdiction. A more detailed design of the manatee refugium was provided to the NMFS on 3 September 2014. A small area (two acres) of Essential Fish Habitat may be affected by the placement of the manatee mitigation feature (Figure 4-9) and this effect has been coordinated with NMFS. A discussion of the essential fish habitat (EFH) near the PSRP is included in Section 3.6.11 of the 2004 PSRP Final PIR/EIS. These areas consist of mangroves in the Faka Union Bay and Ten Thousand Islands Region. The manatee mitigation feature, located adjacent to the Faka Union Canal south of the POI Basin, will be adjacent to mangrove wetlands, identified by the Gulf of Mexico Fishery Management Council as EFH for post-larval, juvenile and sub adult shrimp; post-larval, juvenile and adult red drum; post-larval, juvenile and adult gray snapper; juvenile red and gag groupers; and juvenile and adult yellowtail and lane snappers. The area has also been designated as Essential Fish Habitat by NMFS for highly migratory species including bull, lemon, and bonnethead sharks (Sramek 2013).

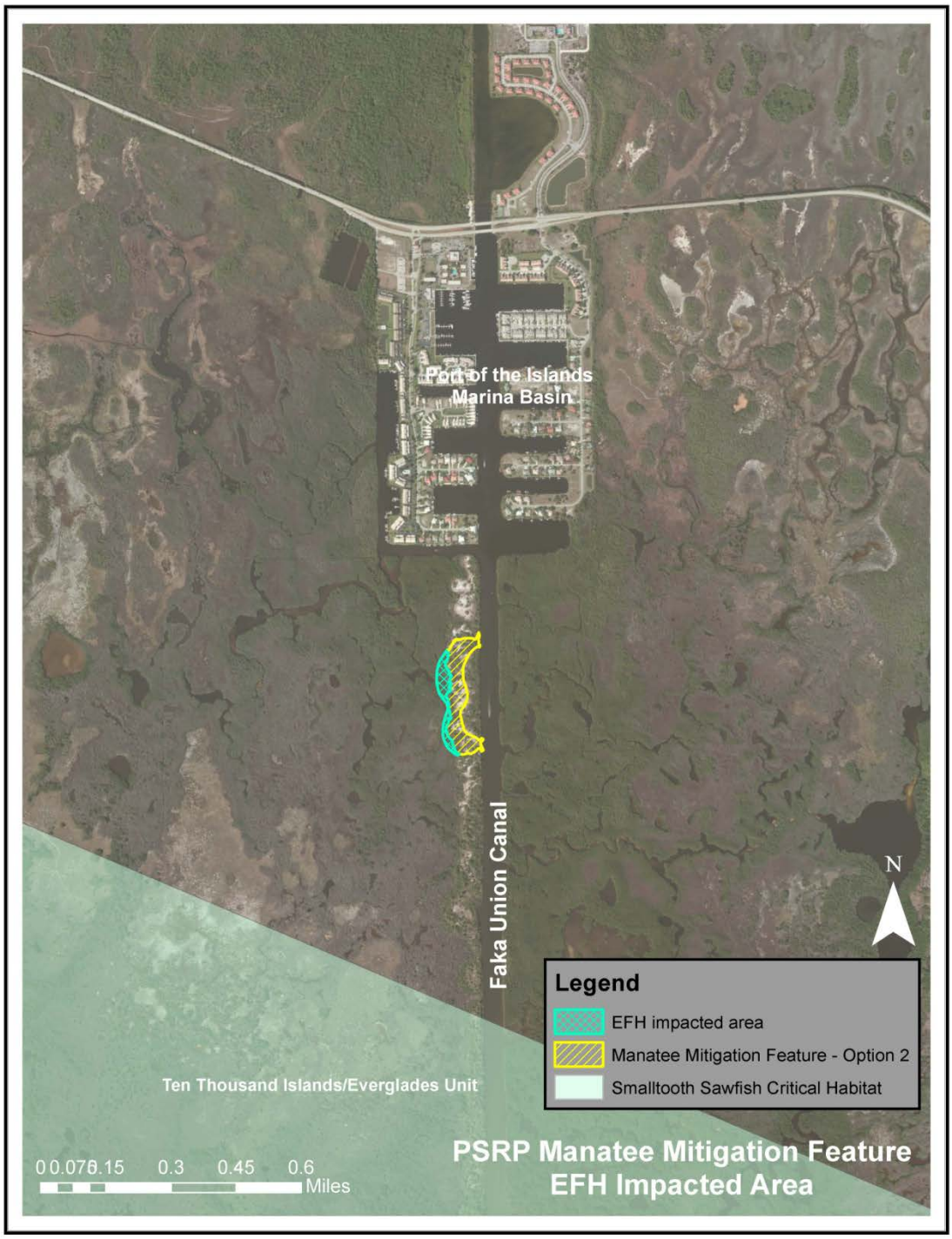

Figure 4-9: Essential Fish Habitat Potentially Affected by the Manatee Mitigation Feature

13.0 CONSERVATION MEASURES

This project will follow the Standard Operating Procedures (SOPs) outlined in the October 2006 Guidelines for Manatee Conservation during Comprehensive Everglades Restoration Implementation. The project commitments and conservation measures outlined in the 2004 BA as well as the terms and conditions of the 2009 BO are included

in this BA by reference and will be followed with the implementation of the manatee mitigation feature.

14.0 DETERMINATION OF EFFECT SUMMARY

Table 6-1 below summarizes the Corps' effects determinations specifically for the addition and implementation of the manatee mitigation feature. The Corps' has determined the manatee mitigation feature will have "no effect" on, the Florida panther, American crocodile, Everglade snail kite, red–cockaded woodpecker, and wood stork; and "may affect, but not likely to adversely affect" the gopher tortoise, Florida bonneted bat, Eastern indigo snake, and West Indian manatee . The Corps and SFWMD will implement the Terms and Conditions of the 2009 PSRP BO for the panther and indigo snake while constructing the manatee mitigation feature.

Table 6-1. Federally listed threatened (T), endangered (E), or candidate (C) species that are included in this BA and are under the purview of the USFWS.

Common Name	Scientific Name	Federal Status	Effect Determination
Reptiles			
American crocodile	**Crocodylus acutus**	**E**	**No effect**
Eastern indigo snake	**Drymarchon corais couperi**	**T**	**May affect, but not likely to adversely affect**
Gopher tortoise	**Gopherus polyphemus**	**C**	**May affect, but not likely to adversely affect**
Birds			
Everglade snail kite	**Rostrhamus sociabilis plumbeus**	**E**	**No effect**
Red-cockaded woodpecker	**Picoides borealis**	**T**	**No effect**
Wood stork	**Mycteria americana**	**E**	**No effect**
Mammals			
Florida panther	**Puma concolor coryi**	**E**	**May affect, but not likely to adversely affect**
West Indian manatee	**Trichechus manatus**	**E**	**May affect, but not likely to adversely affect**
Florida bonneted bat	**Eumops floridanus**	**E**	**May affect, but not likely to adversely affect**

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APPENDIX F

MANATEE MITIGATION MEETING SUMMARIES

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Picayune Strand Restoration Project
Manatee Mitigation Consultation Issue Resolution Meeting
20 August 2014
South Florida Ecological Services Office, USFWS, Vero Beach, Florida
Meeting Notes

20 August 2014 12:00-4:00pm

Attendees:
USFWS: Kim Dryden, Larry Williams, Bob Progalski, Miles Myer
FDEP: Frank Powell, Jordan Pugh
FWC: Ron Mezich; Carol Knox
USGS: Dan Sloane (on phone)
SFWMD: Tom Teets, Rod Braun, Janet Starnes, Mike Duever, Cesar Pena, Karyn Allman, John Leslie, Nimmy Jeyakumar (on phone)
USACE: Eric Bush, Gina Ralph, Brad Tarr, Lacy Shaw

NOTES:
The history of consultation was presented, focusing on the submissions of the monitoring plan and the Biological Assessment (BA) for the Manatee Mitigation Feature. The latest submission of the BA left the following remaining un-resolved items: manatee success criteria, design of manatee refugium and the manatee monitoring plan. USFSW (Kim Dryden) confirmed that there are no outstanding issues other than the three items identified as unresolved (success criteria, monitoring plan and design). All concerns related to the meeting of March 2014 were communicated by USFWS in a letter dated April 2014.

SFWMD presented the Manatee Mitigation Feature. USFWS concurred with the design and agreed that the presentation gave the appropriate level of detail needed for the USFWS to make a determination.

USFWS stated that there will be many sources of information that will be used to analyze the performance of the mitigated manatee refugium and other project-related manatee effects. USFWS would like to include this information in the concurrence letter but recognize that the other information will not be the responsibility of USACE or SFWMD. USFWS requested that this information be included in the BA to support the USFWS determination. The information the USFWS will use is captured in the Manatee Refugium Success Criteria (Appendix E, Supplemental Biological Assessment, Section 12.1.12.7).

USFWS agreed with all aspects of the Manatee Monitoring plan except for the observation portion of the table. Their changes are included in the Manatee Monitoring Plan (Appendix D). FWC committed to providing a draft manatee observation protocol for review and approval by USCAE/SFWMD/FWS. USFWS, Corps, and SFWMD agreed to acknowledge the importance (to manatees and their critical habitat) of estuarine water quality and hydrological monitoring stations that are currently funded as part of the project or by RECOVER, PES, or USGS. If these stations are defunded, the monitoring plan lists the evaluation process.

Long-term maintenance of the refugium was discussed. At this time, the SFWMD will likely be responsible for long-term maintenance.

Long-term maintenance of the refugium was discussed. At this time, the SFWMD will likely be responsible for long-term maintenance.

USACE committed to completing the BA by 3 September 2014 but will share a draft with USFWS next week (28 August 2014). USFWS committed to completing the concurrence letter by 11 September 2014 with the signed copy delivered to USACE by the end of September 2014.

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