SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT AND PROPOSED FINDING OF NO SIGNIFICANT IMPACT

PICAYUNE STRAND RESTORATION PROJECT SOUTHWEST PROTECTION FEATURE, ADDITIONAL CONVEYANCE FEATURES, AND PARTIAL PLUGGING OF THE FAKA UNION CANAL

COLLIER COUNTY, FLORIDA

PREPARED BY
DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
JACKSONVILLE DISTRICT
MAY 2020

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FINDING OF NO SIGNIFICANT IMPACT

PICAYUNE STRAND RESTORATION PROJECT SOUTHWEST PROTECTION FEATURE, ADDITIONAL CONVEYANCE FEATURES, AND PARTIAL PLUGGING OF THE FAKA UNION CANAL
Collier County, Florida

The U.S. Army Corps of Engineers, Jacksonville District (USACE) has conducted an environmental analysis in accordance with the National Environmental Policy Act of 1969, as amended. The draft Environmental Assessment (EA) for the Picayune Strand Restoration Project Southwest Protection Feature, additional conveyance features, and partial plugging of the Faka Union Canal addresses the effects of features needed to address flood risk management in order to complete restoration and enhancement of wetlands opportunities and feasibility in Collier County, FL.

The draft EA, incorporated herein by reference, evaluated various alternatives, design refinements, for the Southwest Protection Feature (SWPF) that would reduce flood risk and provide additional freshwater conveyance to downstream estuaries in the study area (Section 2.1). Secondly, the draft EA evaluated various alternatives for plugging of the Faka Union Canal prior to the completion of the SWPF without increasing flood risk to adjacent properties (Section 2.2). The recommended plan for the SWPF is the design refinement of a National Ecosystem Restoration (NER) Plan from the 2004 Picayune Strand Restoration Project (PSRP) Final Integrated Project Implementation Report and Environmental Impact Statement (PIR/EIS) authorized in 2007 Water Resources Development Act and updated in the 2013 PSRP Limited Reevaluation Report and EA and includes:

- Construction of a levee approximately 7.5 miles in length. The SWPF protection levee footprint is approximately 7.5 miles in length and 145 feet (including the conveyance canal). There is a 950 foot gap between the southern terminus of the levee and US-41 to allow more distance and time for freshwater sheetflow from the conveyance canal to sheetflow prior to encountering US-41. The elevation of the levee was set to be 2.5 feet above the 100 year maximum computed water surface profile for the area. The levee steps down (in elevation) from 11.5 feet North American Vertical Datum of 1988 (NAVD88) in the north to 7.5 feet NAVD88 in the south, 6 inches at a time, generally maintaining a minimum of 2.5 feet of superiority.
- Construction of additional conveyance features as part of the 7.5 mile long levee. The additional conveyance features tied to the SWPF levee include: (1) a 7.5 mile conveyance canal that is 20 feet wide and 4 feet deep, along the west side of the SWPF levee designed to capture overflow of farm discharge, rainfall, and seepage from increased water levels from the Picayune Strand State Forest; (2) a SWPF levee conveyance culvert consisting of two 5-foot diameter culverts located approximately one mile north of US-41; and (3) three 5-foot diameter culverts under the SWPF levee access road.
- Construction of additional conveyance features associated with US-41 and CR-92. The additional conveyance features associated with US-41 and CR-92 include: (1) a series of three 12-foot by 4-foot concrete box culverts spaced 120 feet apart just east of the intersection of Tomato Rd and US-41; (2) the addition of one 3-foot diameter culvert to the existing three 3-foot culverts under the Indian Village entrance road on the northside of US-41 east of the intersection of US-41 and

CR-92; and (3) modification of the existing CR-92 culvert to reconnect a historic drainage channel cut off with the construction of CR-92.

In addition to a "no action" plan, eight alternatives were evaluated. The alternatives included the No Action Alternative, Alternative 1A, Alternative 1Aw, Alternative 1B, Alternative 1Bw, Alternative 2w, Alternative 3, Alternative 3w, and Alternative PC2. Information on alternative descriptions, basis for choice, and selection can be found in Section 2.1.

For all alternatives associated with the construction of the SWPF and conveyance features, the potential effects to the following resources were evaluated:

Resource	In-depth evaluation conducted	Brief evaluation due to minor effects	Resource unaffected by action
Aesthetics	☐	☒	☐
Air quality	☐	☐	☒
Aquatic resources/wetlands	☒	☐	☐
Invasive species	☐	☒	☐
Fish and wildlife habitat	☒	☐	☐
Threatened/Endangered species	☒	☐	☐
Historic properties	☐	☒	☐
Other cultural resources	☐	☒	☐
Flood Risk	☒	☐	☐
Hazardous, toxic & radioactive waste	☐	☒	☐
Hydrology	☒	☐	☐
Land use	☐	☐	☒
Navigation	☐	☐	☒
Noise levels	☐	☒	☐
Socio-economics	☐	☒	☐

Resource	In-depth evaluation conducted	Brief evaluation due to minor effects	Resource unaffected by action
Environmental justice	☐	☐	☒
Soils	☐	☒	☐
Water quality	☒	☐	☐
Climate change	☐	☒	☐
Recreation	☐	☒	☐
Regional Water Management (Operations)	☐	☒	☐

All practical means to avoid or minimize adverse environmental effects were analyzed and incorporated into the recommended plan. Best management practices (BMPs) as detailed in the EA will be implemented to minimize impacts. Modeling and analysis during this action revealed a potential impact to the red-cockaded woodpecker that could occur due to future Miller Canal plugging and Miller Pump Station operations. To avoid and minimize the potential impact to the red-cockaded woodpecker, prior to Miller Canal plugging, USACE commits to: (1) conducting further analysis including additional design, modeling, and evaluation; (2) continuing work with partner agencies, including USFWS, FWC, and FFS for both development and evaluation of strategies to reduce or avoid impacts to the red-cockaded woodpecker; (3) develop a strategy that will avoid and minimize impacts to red-cockaded woodpecker nesting and roosting habitat; and (4) develop a strategy that will avoid and minimize impacts to red-cockaded foraging habitat. Water quality concerns were expressed by a number of stakeholders and agencies because the SWPF alters current farm runoff patterns. Reductions in total phosphorus (TP) and total nitrogen (TN) concentrations are expected once the PSRP is completed and restored flows are not expected to adversely impact nutrient concentrations in the tidal creeks or the estuarine OFWs. However, USACE understands the concern with introducing flows and nutrient loads to new locations, and concerns with downstream water quality impacts in the estuaries. As the project lead, USACE is committed to working with the State of Florida in continued coordination with project stakeholders to develop and implement a monitoring and adaptive management framework to characterize and address impacts related to the PSRP, should they occur. Environmental commitments to avoid and minimize adverse environmental effects can be found in Section 4.7.

The recommended plan for plugging of the Faka Union Canal is a design refinement of the National Ecosystem Restoration (NER) Plan from the 2004 PSRP Final Integrated PIR/EIS and includes:

- A change in sequence of plugging of the Faka Union Canal. As stated in the 2013 PSRP Final Limited Reevaluation Report and Environmental Assessment, plugging of the Faka Union Canal and Miller Canal will take place after the completion of the Southwest Protection Feature to avoid an increase in flood risk to the agricultural lands southwest of the Picayune Strand Restoration Project.

- Construction of plugs in the Faka Union Canal. Plugs will be constructed at the end of each east-west road intersecting the Faka Union Canal. Each plug will be a minimum of 100 feet. Material available to create the plugs will be composed from soil from road grading to natural grade, spoil along the western side of the Faka Union Canal south of the Faka Union Pump Station, and spoil along both sides of Faka Union Canal north of the Faka Union Pump Station.

In addition to a "no action" plan, six alternatives were evaluated. The alternatives included the No Action Alternative, Alternative 1, Alternative 2, Alternative 3, Alternative 4, Alternative 5, and Alternative 6. Information on alternative descriptions, basis for choice, and selection can be found in Section 2.2.

For all alternatives associated with the plugging of the Faka Union Canal, the potential effects to the following resources were evaluated:

Resource	In-depth evaluation conducted	Brief evaluation due to minor effects	Resource unaffected by action
Aesthetics	☐	☒	☐
Air quality	☐	☐	☒
Aquatic resources/wetlands	☒	☐	☐
Invasive species	☐	☒	☐
Fish and wildlife habitat	☒	☐	☐
Threatened/Endangered species	☐	☒	☐
Historic properties	☐	☒	☐
Other cultural resources	☐	☒	☐
Flood Risk	☒	☐	☐
Hazardous, toxic & radioactive waste	☐	☐	☒
Hydrology	☒	☐	☐
Land use	☐	☐	☒
Navigation	☐	☐	☒
Noise levels	☐	☐	☒

Resource	In-depth evaluation conducted	Brief evaluation due to minor effects	Resource unaffected by action
Socio-economics	☐	☐	☒
Environmental justice	☐	☐	☒
Soils	☐	☒	☐
Water quality	☐	☒	☐
Climate change	☐	☒	☐
Recreation	☐	☒	☐

All practical means to avoid or minimize adverse environmental effects were analyzed and incorporated into the recommended plan. Best management practices (BMPs) as detailed in the EA will be implemented to minimize impacts.

No compensatory mitigation is required. The full implementation of the PSRP will restore pre-development hydrological conditions over 66,500+ acres within Picayune Strand State Forest, Collier Seminole State Park, and Fakahatchee Strand Preserve State Park. The PSRP will also improve downstream fresh water deliveries by reducing point source discharge through the Faka Union Canal and providing more natural sheetflow throughout the southern portion of the PSRP footprint into downstream estuaries. Due to the project size and anticipated acreage of wetlands to be restored, the project benefits are expeted to be greater than the limited direct impacts to wetlands as has been the case for the Merritt, Faka Union, Miller, Tieback Levee, Manatee Mitigation Feature, and Eastern Stair Steps project phases. The Proposed Actions, included in the authorized plan, will not require mitigation.

Pursuant to section 7 of the Endangered Species Act of 1973, as amended, the National Marine Fisheries Service (NMFS) issued a programmatic biological opinion, dated 17 December 2013, that determined that the recommended plan will not jeopardize the continued existence of the following federally listed species or adversely modify designated critical habitat: (1) sea turtle species and their designated critical habitat (green, hawksbill, Kemp's ridley, leatherback, and loggerhead); (2) smalltooth sawfish and its critical habitat; (3) Johnson's seagrass and its critical habitat; (4) smalltooth sawfish and its critical habitat; (5) Gulf sturgeon and its critical habitat; (6) coral species and their critical habitat (elkhorn, staghorn, elliptical star, Lamarck's sheet, star, mountainous star, pillar, rough cactus, and boulder star). All terms and conditions, conservation measures, and reasonable and prudent alternatives and measures resulting from these consultations shall be implemented in order to minimize take of endangered species and avoid jeopardizing the species. Consultation between the USACE and NMFS regarding the CERP program evaluates the effects of all individual CERP projects, including PSRP, reasonably expected to be implemented over the course of the CERP program, including the additive effects of the project components on Florida habitats and resources, and whteher listed species or critical habitats under NMFS's purview may be adversely affected. In the BO dated 17 December 2013, NMFS stated, "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 (NMFS) are not recommending second tier consultation procedures in the future to validate effects predictions for these projects." The USACE has determined the design refinements analyzed in this Supplemental EA will not affect the species effect determinations.

Pursuant to Section 7 of the Endangered Species Act of 1973, as amended, the U.S. Fish and Wildlife Service (FWS) provided two biological opinions for the PSRP, dated 12 March 2009 and 25 April 2016. Initiation of formal consultation for the Proposed Actions included in this EA began with the provision of a biological assessment by USACE on 6 April 2020 that determined that the recommended plans will not jeopardize the continued existence of the following federally listed species or adversely modify designated critical habitat for: American alligator, American crocodile, loggerhead sea turtle and critical habitat, green sea turtle, leatherback sea turtle, hawksbill sea turtle, Kemp's ridley sea turtle, Cape Sable seaside sparrow, Florida scrub jay, ivory-billed woodpecker, piping plover and critical habitat, red knot, Audubon's crested caracara, Everglade snail kite, Kirtland's warbler (no longer listed), roseate tern, wood stork, Florida leafwing butterfly, Bartram's hairstreak butterfly, cassius blue butterfly, ceraunus blue butterfly, Miami blue butterfly, nickerbean blue butterfly, Stock Island tree snail, Florida prairie clover, red-cockaded woodpecker, Florida bonneted bat, Florida panther, eastern indigo snake, West Indian manatee and critical habitat, and gopher tortoise. All terms and conditions, conservation measures, and reasonable and prudent alternatives and measures resulting from these consultations shall be implemented in order to minimize take of endangered species and avoid jeopardizing the species. Formal consultation between the USACE and USFWS is ongoing.

Pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended, the USACE has initiated consultation for the Proposed Actions with the Florida State Historic Preservation Officer (SHPO) and the appropriate Federally-recognized Tribes. Consultation letters were sent on 6 May 2020 asking for concurrence on our determination of no adverse effect for the construction of the additional conveyance features and hydration southward into Collier Seminole State Park, while maintaining all previous PSRP determinations of no adverse effect to historic properties for the PSRP. The USACE will continue to consult with these agencies as part of the PSRP construction.

Pursuant to the Clean Water Act of 1972, as amended, the discharge of dredged or fill material associated with the recommended plan has been found to be compliant with section 404(b)(1) Guidelines (40 CFR 230). The Clean Water Act Section 404(b)(1) Guidelines evaluation is found in Appendix C of the IFR/EA.

A water quality certification pursuant to section 401 of the Clean Water Act will obtained from the Florida Department of Environmental Protection prior to construction. Full compliance with this Act will be evaluated upon the issuance of water quality certification by the State of Florida. All conditions in the water quality certification will be implemented in order to avoid or minimize adverse impacts to water quality

A determination of consistency with the State of Florida Coastal Zone Management program pursuant to the Coastal Zone Management Act of 1972 is found in Appendix B of this EA. The USACE has coordinated a consistency determination pursuant to the Coastal Zone Management Act of 1972 through the circulation of this EA. The USACE has determined that the Proposed Action is consistent to the maximum extent practicable with the enforceable policies of Florida's approved Coastal Zone Management Program.

Public review of the draft EA was initiated on 8 May 2020 for 30 days. All comments submitted during the public comment period will be responded to in the Draft EA.

Technical and environmental criteria were used in the development of alternative designs were consistent with those specified in the Water Resources Council's 1983 Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies. All applicable laws, executive orders, regulations, and local government plans were considered in evaluation of alternatives. Based on these report, the reviews by other Federal, State and local agencies, Tribes, input of the public, and the review by my staff, it is my determination that the recommended plan would not significantly affect the human environment; therefore, preparation of an Environmental Impact Statement is not required.

_____
Date

_____
Andrew D. Kelly, Jr.
Colonel, Corps of Engineers
District Commander

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SUPPLEMENTAL DRAFT ENVIRONMENTAL ASSESSMENT
ON
PICAYUNE STRAND RESTORATION PROJECT SOUTHWEST PROTECTION FEATURE, ADDITIONAL CONVEYANCE FEATURES, AND PARTIAL PLUGGING OF THE FAKA UNION CANAL
COLLIER COUNTY, FL

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1 INTRODUCTION

The purpose of this Supplemental Environmental Assessment (EA) is to update National Environmental Policy Act (NEPA) documentation of construction associated with the Picayune Strand Restoration Project (PSRP) in Collier County, Florida for: (1) the Southwest Protection Feature (SWPF) (levee), (2) additional conveyance features to assist in moving water south of Tamiami Trail (US-41), and (3) partial plugging of the Faka Union Canal. Phased implementation and an adaptive management approach of the PSRP has resulted in a series of updates to NEPA documentation associated with this project. The primary objective of the PSRP is to restore hydrological and ecological function to the Picayune Strand State Forest (former Southern Golden Gate Estates (SGGE)) and to adjacent public conservation lands while increasing ecological and hydrological connectivity. This Supplemental EA will address design modifications of these flood risk management features, the SWPF and additional conveyance features, which are components of the PSRP and are considered refinements of the original design described in the 2004 PSRP Final Integrated Project Implementation Report and Environmental Impact Statement (PIR/EIS); as updated by the 2013 Final PSRP Integrated Limited Reevaluation Report (LRR) and EA. Additionally, this Supplemental EA will address a change in sequence for the plugging of the Faka Union Canal described in the 2004 PIR/EIS and 2013 LRR. As stated in the 2013 LRR, the updated plan included the plugging of the Faka Union Canal after the completion of the SWPF. In order to increase project benefits, the U.S. Army Corps of Engineers (USACE) plans to partially plug the Faka Union Canal prior to the completion of the SWPF. The following subsections detail the purpose and need of the Proposed Action for the SWPF, additional conveyance features, and partial plugging of the Faka Union Canal.

1.1 Project Authority

The 2004 Final Picayune Strand Restoration Project Final Project Implementation Report and Environmental Impact Statement 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 Water Resources Development Act (WRDA) of 2007, Public Law 110-114 and was later modified to add the manatee mitigation feature (also referred to as the manatee refugium feature) by Section 1401 (9)5 of the WRDA of 2016, Public Law 114-322 based on evaluation included in the 2013 LRR. The 2004 PIR/EIS presented the results and recommendations of investigations into restoration of natural water flow across 94 square miles of western Collier County that were drained for an extensive residential development.

The need to provide flood risk management to private lands adjacent to the project footprint was identified in the 2004 PIR/EIS. At that time, the SWPF was included as a conceptualized levee surrounding the agricultural lands (6L Farms at the time). The natural topography of the PSRP footprint slopes from the northeast corner to the southwest corner across the Picayune Strand State Forest. Using a new Gridded Surface/Subsurface Hydrological Analysis (GSSHA) model and updated LIDAR data, the 2013 LRR provided more detail of the impacts of potential flooding as result of implementation of the PSRP and validated the need to include the SWPF. However, the extent of the levee for flood risk management was nearly reduced in half, from 17.25 miles (2004 PIR/EIS) to 8.75 miles (2013 LRR). This conceptual change was incorporated in the WRDA of 2016 which amended the authorization of PSRP under WRDA 2007. The authorized project also includes the plugging of the Faka Union Canal.

1.2 PROJECT PURPOSE AND NEED

As stated in the 2000 Comprehensive Everglades Restoration Plan (CERP), the purpose of the Southern Golden Gate Estates (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.

Without the implementation of the SWPF and conveyance features, completion of the PSRP will not be possible. Miller Canal, the majority of the Faka Union Canal, and Western Stair Step Canal will not be plugged if the SWPF and conveyance features are not completed. Currently, the USACE estimates that only 20% to 30% of the project benefits are being realized given that approximately 80% of the budget has been expended. The budget expended to date were to complete the plugging of Prairie and Merritt Canals, removal of road and logging trams east of Miller Canal, construction of three pump stations each with a spreader berm, construction of the tieback levee and manatee mitigation feature, removal of roads north of the tieback levee, and plugging of 75% of the Eastern Stair Step Canal. Removal of road and logging trams west of the Miller Canal is currently being completed. In order to improve upon the project benefits realized, THE USACE is proposing to plug part of the Faka Union Canal.

The project components portrayed in the 2004 PIR/EIS were conceptual and required significant refinement during the detailed project design phase. Detailed modeling information obtained through design phase investigations in the 2013 LRR provided more accurate details and highlighted the reduction in length of the SWPF Levee and the need for additional conveyance features to reduce ponding of water north of US-41. The 2004 PIR/EIS provided sequencing for implementation of construction features. The 2004 PIR/EIS states that the plugging of Miller Canal and Faka Union Canal cannot occur prior to the implementation of the SWPF. These components represent a design refinement to ensure continued flood risk reduction and were authorized under the PSRP authority cited in Section 1.1 above. This Supplemental EA describes the need for, and evaluates potential environmental effects of the SWPF, additional conveyance features, and change in sequence for the partial plugging of the Faka Union Canal.

1.3 Project Location

Development of the PSRP area, previously known as SGGE, began in the early 1960's within Collier County in Southwest Florida (Figure 1). Private interests planned to develop a 173 square mile (111,000 acres) residential subdivision. Today this development is split into two entities by Interstate 75 (I-75). Northern Golden Gate Estates (NGGE) remains a residential subdivision. PSRP had very limited development and was acquired by the State of Florida (Florida Department of Environmental Protection [FDEP]) for restoration from private owners. The PSRP area is known as the Picayune Strand State Forest.

The PSRP consists of approximately 94 square miles located between I-75 and U.S. Highway 41 (US-41), also known as Tamiami Trail (Figure 1). It is situated southwest of the Florida Panther National Wildlife Refuge, north of Ten Thousand Islands National Wildlife Refuge and Rookery Bay National Estuarine Research Reserve, north-northeast of Collier-Seminole State Park, east of the Belle Meade CARL Project area, and west of the Fakahatchee Strand State Park.

The SWPF levee and conveyance features are on lands managed by Picayune Strand State Forest, Collier-Seminole State Park, and the Florida Department of Transportation (FDOT). The SWPF is located in the southwest corner of the PSRP area, east of Tomato Road, Lipman Farms, and Deseret Farms. Similarly, the additional conveyance features discussed in this Supplemental EA are on lands managed by the same entities, and are located along U.S.-41 and County Road 92 (CR-92) in the southwest corner of the PSRP area.

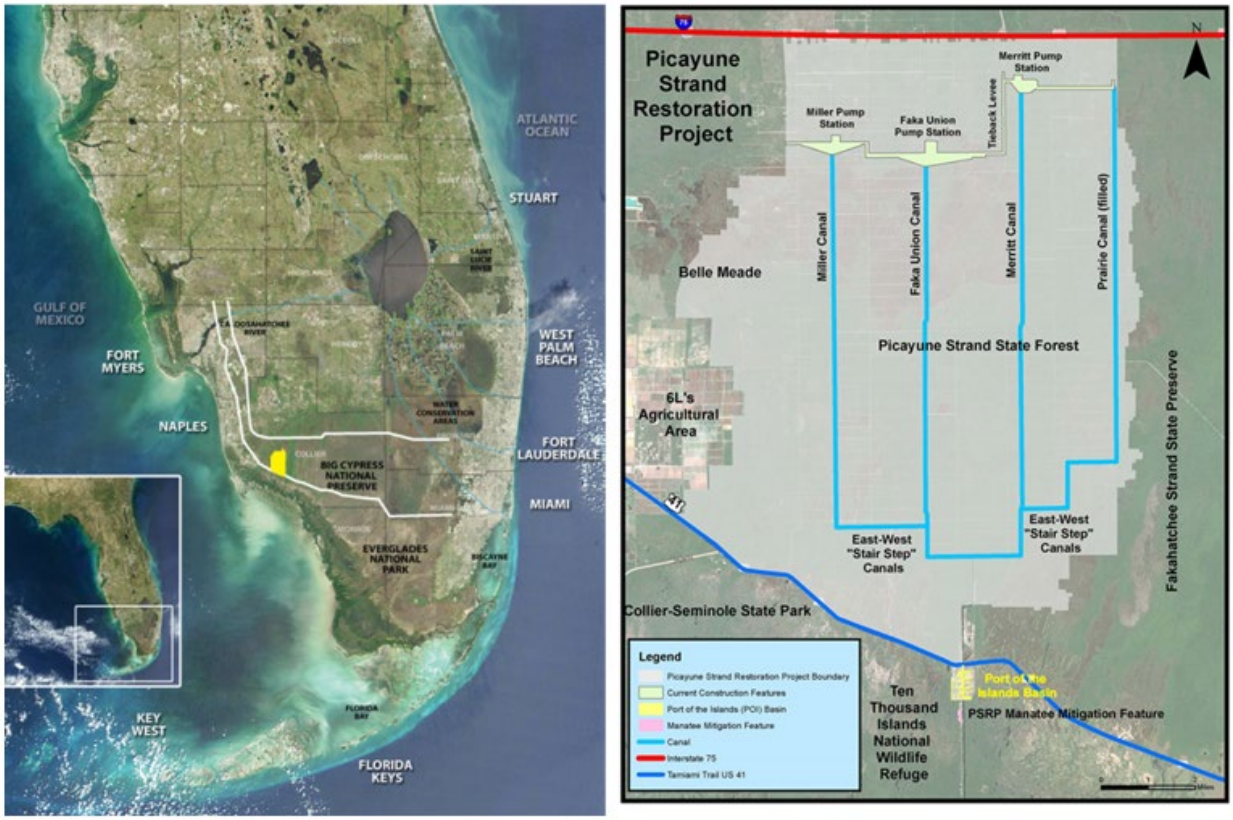

Figure 1: Map of Location of the PSRP. The left map shows the regional location of the PSRP. The right map shows the local footprint of the PSRP (PSRP Project Area).

The Faka Union Canal watershed is approximately 189 square miles containing approximately 708 miles of canals with 12 weir structures. This watershed starts at Immokalee Rd. (CR-846) between Everglades Blvd and DeSoto Blvd. (Figure 2), extends south through the NGGE, PSRP, eastern South Belle Meade, western Fakahatchee Strand, Collier Seminole State Park and discharges into the Ten Thousand Islands NWR. This watershed contains portions of the NGGE, South Belle Mead Tract, Picayune Strand State Forest, Florida Panther National Wildlife Refuge, Fakahatchee Strand Preserve State Park, Port of the Islands, Collier Seminole State Park, Rookery Bay State Aquatic Preserve, Rookery Bay National Estuarine Research Reserve, and Ten Thousand Islands NWR. Several major roads intersect the Faka Union Canal watershed including Immokalee Rd., Oil Well Rd. Golden Gate Blvd, I-75, US-41, and CR-92.

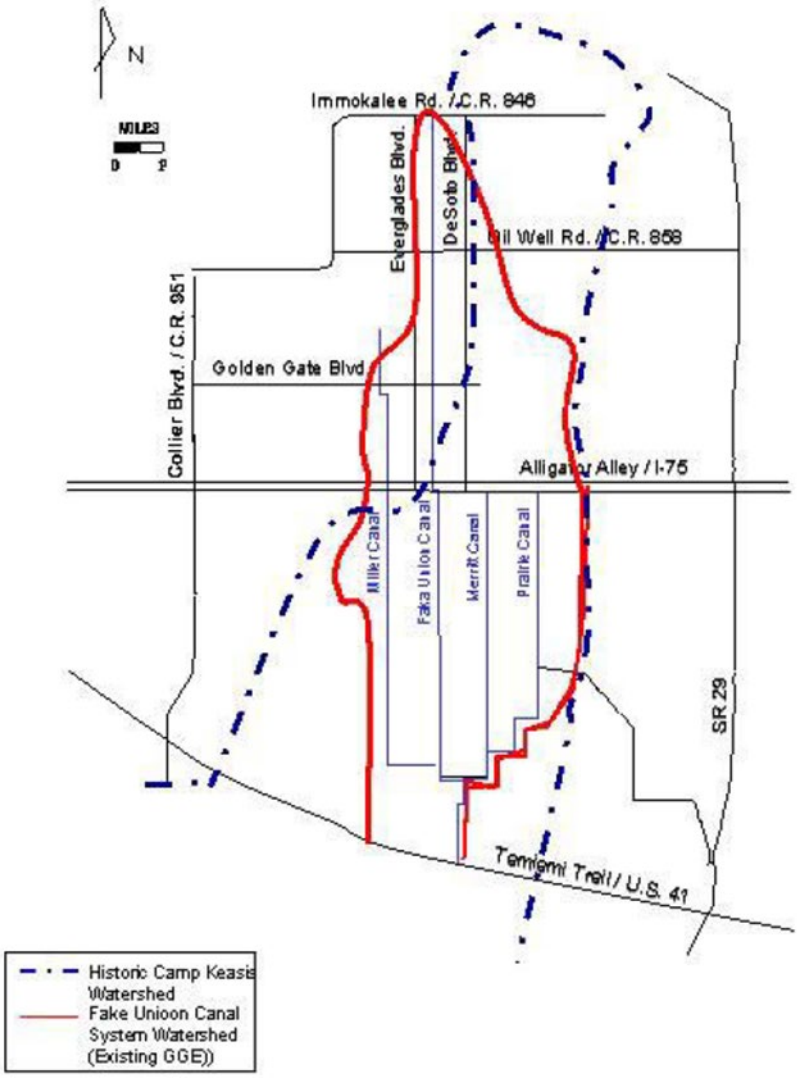

Figure 2: Map of the existing Faka Union Canal watershed (solid red line) in reference to the historic Camp Keasis Watershed (dashed blue line) (USACE 2004).

The Faka Union Canal systems included four canals (Miller, Faka Union, Merritt, and Prairie [west to east] with the Faka Union Canal being the longest (Figure 1 and Figure 3). The Faka Union Canal is located through the center (north to south) of the PSRP, starting in the northern NGGE and flowing south through Port of the Islands (POI) to discharge in the Ten Thousand Islands NWR.

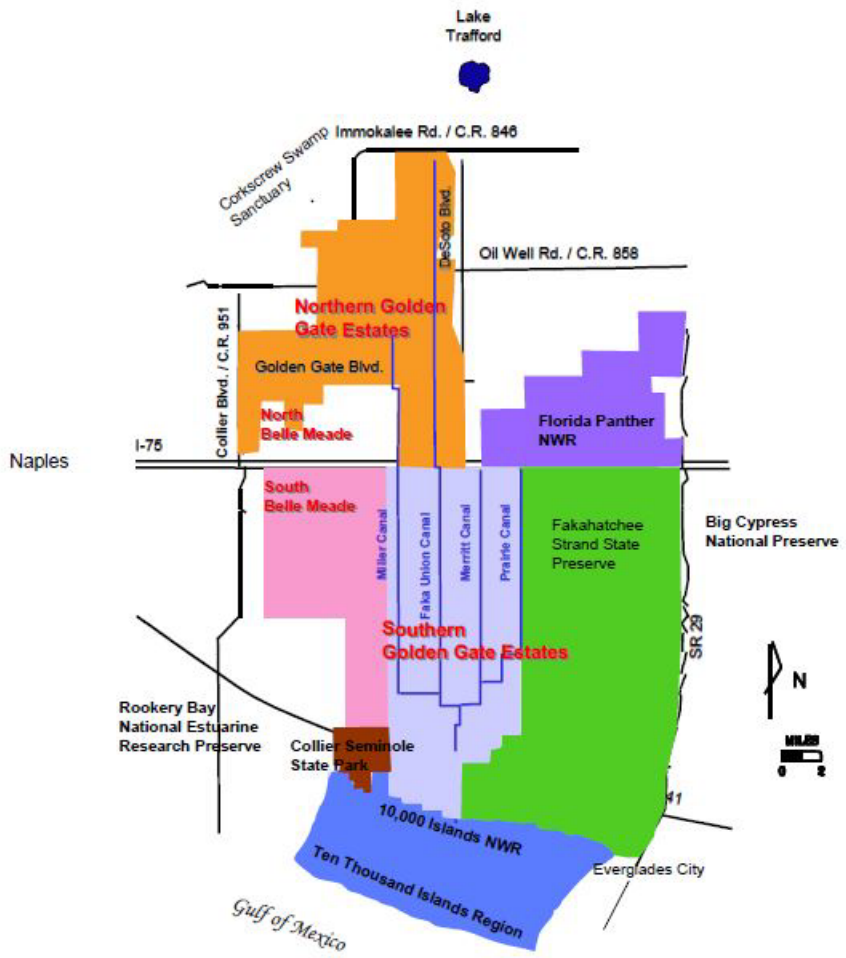

Figure 3: Orientation of the Faka Union Canal System within the PSRP Study Area (USACE 2004).

1.4 Project History

A detailed project history can be found within Section 1 of the 2004 PIR/EIS and is incorporated into this document by reference (USACE 2004). The PSRP was authorized for construction in WRDA 2007. Under the Acceler8 initiative, the South Florida Water Management District (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 USACE 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 included the Merritt Pump Station, tieback levee, spreader basin, road removal, and Merritt Canal plugging. The construction on the Merritt Pump Station was completed in September 2014 and transferred to SFWMD in June 2016.

The Faka Union Pump Station construction contract was awarded in November 2010 with construction starting in January 2011. The Faka Union construction phase included the Faka Union Pump Station,

tieback levee, spreader basin, and road removal. The Faka Union construction was completed in January 2016 and transferred to SFWMD in January 2018.

The Miller Pump Station construction contract was awarded in September 2013. The Miller Pump Station construction phase included the Miller Pump Station, tieback levee, and spreader basin. The Miller Pump Station was completed in May 2018 and transferred to SFWMD in May 2020.

SFWMD constructed the Manatee Mitigation Feature to mitigate for the effect of the project on West Indian manatees in the Faka Union Canal. Construction was completed in April 2016. The USACE and SFWMD executed a Project Partnership Agreement (PPA) Amendment to grant SFWMD the authority to request credit for this feature in June 2019.

The plugging and clearing of the Eastern Stair Step Canal began in July 2017. Due to onsite conditions during the wet season, work has been limited to the dry season. Originally planned to be completed in May 2020, the anticipated completion of this phase has shifted to be completed by May 2021 due to the outbreak of COVID-19.

Other phases initiated are the Northern Road Removal phase and the Miller Tram and Road Removal phase. The northern road removal phase includes removing roads and returning spoil to natural grade north of the tieback levee. This phase began in July 2017 and is approximately 75% complete. The Miller Tram and Road Removal phase contract was awarded in September 2019 with anticipated completion in September 2022.

1.5 Related Environmental Documents

THE USACE has authored a number of environmental documents relevant to the Proposed Action. Information contained within the previous NEPA documents listed below is incorporated by reference into this Supplemental EA and Proposed Finding of No Significant Impact (FONSI).

- Authorization of Golden Gate Estates Feasibility Study by Congress, House Document No. 39, 90th U.S. Congress, 1978
- Golden Gate Estates Reconnaissance Report, U.S. Army Corps of Engineers, 1980
- Golden Gate Estates Feasibility Report, U.S. Army Corps of Engineers, 1986
- Central and Southern Florida Project Comprehensive Review Study Integrated Feasibility Report and Programmatic Environmental Impact Statement, Comprehensive Everglades Restoration Plan, U.S. Army Corps of Engineers, 1999
- Picayune Strand Restoration Project Final Integrated Project Implementation Report and Environmental Impact Statement, U.S. Army Corps of Engineers, Jacksonville District, 2004
- Limited Reevaluation Report and Environmental Assessment, U.S. Army Corps of Engineers, Jacksonville District, 2013

1.5.1 Related Biological Opinions

- Biological Opinion for Picayune Strand Restoration Project, U.S. Fish and Wildlife Service, South Florida Ecological Services Office, 2009

- Endangered Species Act Programmatic Biological Opinion: Comprehensive Everglades Restoration Plan (CERP), National Marine Fisheries Service, Southeast Regional Office, 2013
- Biological Opinion: Florida Bonneted Bat – Eastern Stairsteps Feature Picayune Strand Restoration Project, U.S. Fish and Wildlife Service, South Florida Ecological Services Office, 2016

1.6 Decisions to be Made

The No Action Alternative and other reasonable alternatives for the Proposed Action are studied in detail to determine the Preferred Alternative. This EA will determine whether a FONSI or an EIS is warranted based on comments received during public review of this EA. The primary decision to be made is whether or not to adopt the Preferred Alternatives (Alternative PC2 for the SWPF and conveyance features; Alternative 5 for the plugging of the Faka Union Canal). Reference Section 1.2 (Project Purpose and Need) for agency goals and objectives and Section 2 (Description of Alternatives) for additional information on alternatives considered.

1.7 Scoping and Issues

Reference Section 6 and Appendix A of this Supplemental EA for pertinent correspondence related to the PSRP. Additional scoping information can also be found in Section 10 of the 2004 PIR/EIS (USACE 2004) and in Section 6 of the 2013 LRR (USACE 2014). Issues discussed during agency coordination associated with the Proposed Action include: (1) updates to the panther habitat credit worksheet for the PSRP; (2) conveyance of water south of US-41 that include agricultural flow and restoration flow as it relates to water quality; (3) potential impacts to the red-cockaded woodpecker; (4) potential impacts to Old Marco Rd in Collier Seminole State Park; and (5) impacts to recreation.

1.8 Permits, Licenses and Entitlements

This section identifies some of the environmental, regulatory, construction (including blasting), and operational authorizations required for the PSRP flood risk management levees, canal backfill, pump station, and road removal features. Permits (Table 1) identified in this section fulfill requirements for Coastal Zone Management Act (CZMA) consistency and Clean Water Act (CWA) Section 401 water quality certification. Final concurrence of consistency with the Coastal Zone Management Program (CZMP) and CWA will be determined during environmental permitting processes, as applicable. All required permits and/or modifications to existing permits will be acquired prior to implementation of the Proposed Action. A list of current project permits is below (Table 1):

Table 1: List of Current Project Permits for the Picayune Strand Restoration Project

Permit Title	Permit Holder	Permit Type	Permit Number	Date Issued	Expiration Date
Merritt Pump Station Operations	SFWMD	CERPRA	0221670-012	16 December 2015	16 December 2020
Manatee Mitigation Feature	SFWMD	CERPRA	0221670-013	15 April 2016	15 April 2021

Permit Title	Permit Holder	Permit Type	Permit Number	Date Issued	Expiration Date
Faka Union Pump Station Operations	SFWMD	CERPRA	0221670-014	9 February 2017	9 February 2022
Miller Pump Station Operations	SFWMD	CERPRA	0221670-015	28 February 2019	28 February 2024
Merritt, Faka Union, and Miller Canal Pump Stations and Road Removal—Renewal	USACE	CERPRA	0288313-010	5 May 2015	5 May 2020

1.8.1 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 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 USACE will be responsible for constructing, the USACE 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. To date, a CERPRA permit has been obtained for the pump stations, manatee mitigation feature, tieback levee, spreader canals, canal plugs and road removal features associated with Prairie Canal, Merritt Canal, and the Eastern Stair Steps. A CERPRA permit must be obtained (or modify an existing CERPRA permit) from the FDEP for compliance with Section 401 of the Clean Water Act and consistency with the CZMA for the SWPF and additional conveyance features, partial plugging of Faka Union Canal, as well as any future planned phases.

A wetlands assessment, the Uniform mitigation Assessment Method (UMAM), is required to fulfill the mandate of subsection 373.414(18), F.S., in order to determine the amount, or if, mitigation is needed to offset adverse impacts to wetlands and other surface waters for all PSRP features.(FDEP 2019). Due to the project size and anticipated acreage of wetlands to be restored, the project benefits are expected to be greater than the limited direct impacts to wetlands as has been the case for the Merritt, Faka Union, Miller, Tieback Levee, Manatee Mitigation Feature, and Eastern Stair Steps project phases.

1.8.2 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.

1.8.3 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 DESCRIPTION OF ALTERNATIVES

As stated in Section 1.1, the Recommended Plan (Figure 4) for the PSRP, as outlined in the 2004 PIR/EIS, was approved by the Office of the Chief of Engineers on 15 September 2005 and authorized for construction by Section 1001(15) of WRDA 2007, P.L. 110-114. The authorized project was later modified to add the manatee mitigation feature and tieback levee by Section 1401 (9)5 of the WRDA of 2016, Public Law 114-332. The alternatives discussed in this section will include design refinements to the features that have been previously authorized and addressed under previous legislation (WRDAs and previous NEPA documents) as they relate to the PSRP.

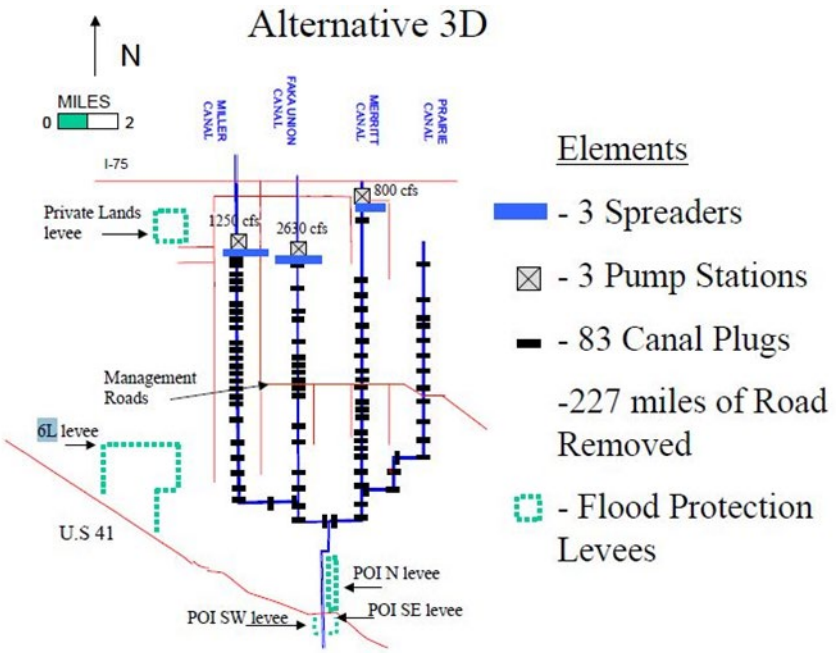

Figure 4: Authorized Restoration Plan as described in the 2004 PIR/EIS (USACE 2004).

The following alternatives (design refinements) described in this section were evaluated against the project purposes and goals and associated environmental impacts were considered. Both the construction of the SWPF and plugging of the Faka Union Canal are incorporated in the restoration plan described in the 2004 PIR/EIS (Figure 4) and updated in the revised restoration plan described in the 2013 LRR (Figure 5). Section 2.1 describes the alternatives for the SWPF including design refinements for conveyance to address the ponding of water north of US-41. These alternatives differ by the inclusion of a levee feature: (1) of different length; (2) absence/presence of a gap at the southern terminus of the levee; (3) addition of conveyance design refinement options. Section 2.2 describes the alternatives for the plugging of the Faka Union Canal to extend hydrological restoration over a larger area without increasing flood risk to the agricultural lands southwest of the project or to the environmentally sensitive area for red-cockaded woodpeckers on the western boundary of the PSRP. The alternatives for plugging the Faka Union Canal differ based on the length of plugging starting from the southern end of the Faka Union Spreader Berm.

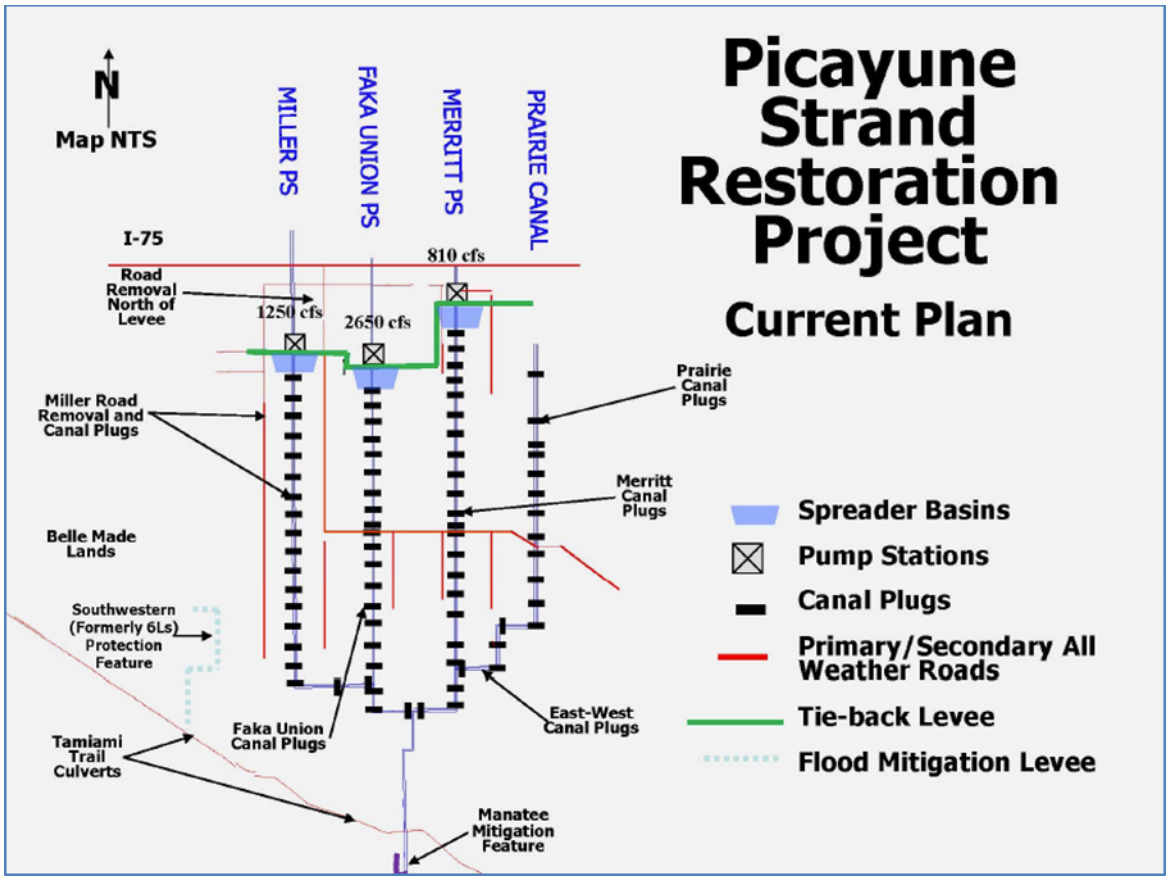

Figure 5: Updated restoration plan for the PSRP (USACE 2014)

2.1 Southwest Protection Feature with Additional Conveyance Features

The 2013 LRR, while reducing the footprint and immediate impact of the SWPF levee, contained new analysis, based on more recent LIDAR and an updated model (GSSHA model platform instead of the MIKE SHE model platform) that revealed increased ponding of water for longer periods of time along the north side of US-41 further into the project footprint. The need to provide additional conveyance of freshwater south of US-41 was identified to resolve the following concerns:

1. Maintain flood risk reduction of the agricultural lands adjacent to the southwest corner of the project and reduce potential impacts to their operations
2. Reduce the risk of degradation to US-41
3. To achieve estuarine benefits described in the 2004 PIR/EIS
4. To prevent ecological degradation for threatened and endangered species

Prior to the final development of alternatives, determination of general design for the levee was evaluated for initial resolution of increased hydrology in the southwest corner of the PSRP footprint. Three concepts for general levee design were evaluated: the No Action AlternativeNo Action Alternative (without project), the conceptual levee design in the 2013 LRR, and a modified concept of the 2013 LRR levee that included a gap between US-41 and the southern end of levee.

Modeling analysis also showed that the SWPF levee could be reduced from 17.25 miles (2004 PIR/EIS) to 8.75 miles (2013 LRR) due to lack of flood risk on the northern and western sides of Lipman and Deseret Farms (Figure 4 and Figure 5). The analysis included in the 2013 LRR modified the 2004 PIR/EIS SWPF levee as 8.5 miles of additional levee did not provide additional flood protection.

The SWPF and conveyance features are required to maintain flood risk reduction for the agricultural lands southwest of the PSRP. To move forward with the full implementation of the PSRP, this feature has to be completed. Plugging of the remaining canals (Miller, southern portion of Faka Union, and the Western Stair Steps) cannot proceed without the completion of the SWPF and conveyance features. Thus, without the SWPF, a majority of the project benefits will not be achieved.

2.1.1 Alternatives

Table 2 provides a description of alternatives for the SWPF with additional conveyance features considered for the Proposed Action.

Table 2: Description of Alternatives for the SWPF and Conveyance Features.

ALTERNATIVE	DESCRIPTION
2 -No action	PSRP has been implemented; implementation of the levee described in the 2013 LRR (no gap); canals are plugged (reduced flow through the Faka Union Canal; pump stations and spreader berms provide sheetflow throughout the PSRP; includes a conveyance canal between the SWPF levee and existing farm levee that discharges at US-41.
1A	PSRP has been implemented; implementation of the levee described in the 2013 LRR (no gap); canals are plugged (reduced flow through the faka union canal) ; pump stations and spreader berms provide sheetflow throughout the PSRP; increased conveyance south of US-41 through gap under US-41 (just west of the US-41 and CR-92 intersection).
1Aw	PSRP has been implemented; implementation of the levee described in the 2013 LRR (but with a gap at the southern terminus); canals are plugged (reduced flow through the Faka Union Canal); pump stations and spreader berms provide sheetflow throughout the PSRP; increased conveyance south of US-41 through gap under US-41 (just west of the US-41 and CR-92 intersection).
1B	PSRP has been implemented; implementation of the levee described in the 2013 LRR (no gap); canals are plugged (reduced flow through the faka union canal) ; pump stations and spreader berms provide sheetflow throughout the PSRP; increased conveyance south of US-41 through gap under US-41 (east of the US-41 and CR-92 intersection).
1Bw	PSRP has been implemented; implementation of the levee described in the 2013 LRR (but with a gap at the southern terminus); canals are plugged (reduced flow through the Faka Union Canal); pump stations and spreader berms provide sheetflow throughout the PSRP; increased conveyance south of US-41 through gap under US-41 (east of the US-41 and CR-92 intersection).
2w	PSRP has been implemented; implementation of the levee described in the 2013 LRR (but with a gap at the southern terminus); canals are plugged (reduced flow through the Faka Union Canal); pump stations and spreader berms provide sheetflow throughout the PSRP; includes a conveyance canal between the SWPF levee and existing farm levee that discharges at US-41 through an enlarged gap at the southern terminus.

ALTERNATIVE	DESCRIPTION
3	PSRP has been implemented; implementation of the levee described in the 2013 LRR (no gap); canals are plugged (reduced flow through the Faka Union Canal); pump stations and spreader berms provide sheetflow throughout the PSRP; includes the restoration of the former Duda Fields east of Lipman Farms.
3w	PSRP has been implemented; implementation of the levee described in the 2013 LRR (but with gap at the southern terminus); canals are plugged (reduced flow through the Faka Union Canal); pump stations and spreader berms provide sheetflow throughout the PSRP; includes the restoration of the former Duda Fields east of Lipman Farms.
PC2	PSRP has been implemented; hybrid alternative; implementation of a modified version of the levee described in the 2013 LRR. The SWPF levee includes conveyance canal, conveyance culverts, and extended gap at the southern terminus; additional conveyance under US-41 just east of Tomato Rd.; additional conveyance under entrance to the Indian Village; additional conveyance under CR-92.

2.1.1.1 No Action Alternative Change

Evaluation of the No Action Alternative is a requirement of NEPA. In the memorandum to agencies on the forty most asked questions concerning the Council of Environmental Quality's (CEQ) NEPA Regulations (46 Fed. Reg. 18026 (3 March 1981) as amended (1986)), Section 1502.14(d) requires:

> *Section 1502.14(d) requires the alternatives analysis in the EIS (EA) to "include the alternative of no action." There are two distinct interpretations of "no action" that must be considered, depending on the nature of the proposal being evaluated. The first situation might involve an action such as updating a land management plan where ongoing programs initiated under existing legislation and regulations will continue, even as new plans are developed. In these cases "no action" is "no change" from current management direction or level of management intensity. To construct an alternative that is based on no management at all would be a useless academic exercise. Therefore, the "no action" alternative may be thought of in terms of continuing with the present course of action until that action is changed. Consequently, projected impacts of alternative management schemes would be compared in the EIS (EA) to those impacts projected for the existing plan. In this case, alternatives would include management plans of both greater and lesser intensity, especially greater and lesser levels of resource development.*
>
> *The second interpretation of "no action" is illustrated in instances involving federal decisions on proposals for projects. "No action" in such cases would mean the proposed activity would not take place, and the resulting environmental effects from taking no action would be compared with the effects of permitting the proposed activity or an alternative activity to go forward.*

Following 46 Fed. Reg. 18026 (3 March 1981) as amended (1986), Section 1502.14(d), the "no action" alternative for this action is the updated SWPF levee as described in the 2013 LRR. Flood risk management was identified as a need to provide protection to private landowners adjacent and within the PSRP boundary in the 2004 PIR/EIS. One of these protection features was a 17.25 mile levee surrounding the agricultural lands adjacent to the southwest corner of the project boundary (Figure 4). The use of new modeling data and LIDAR in the 2013 LRR provided detail on flood risk associated with the project. Analysis revealed a need for only an 8.75 mile levee along the east and northeast side of these same

agricultural lands starting at US-41 (Figure 6). The 2013 LRR decreased the footprint of the levee by 8.5 miles thereby reducing environmental impact and overall project cost (Figure 5 and Figure 6).

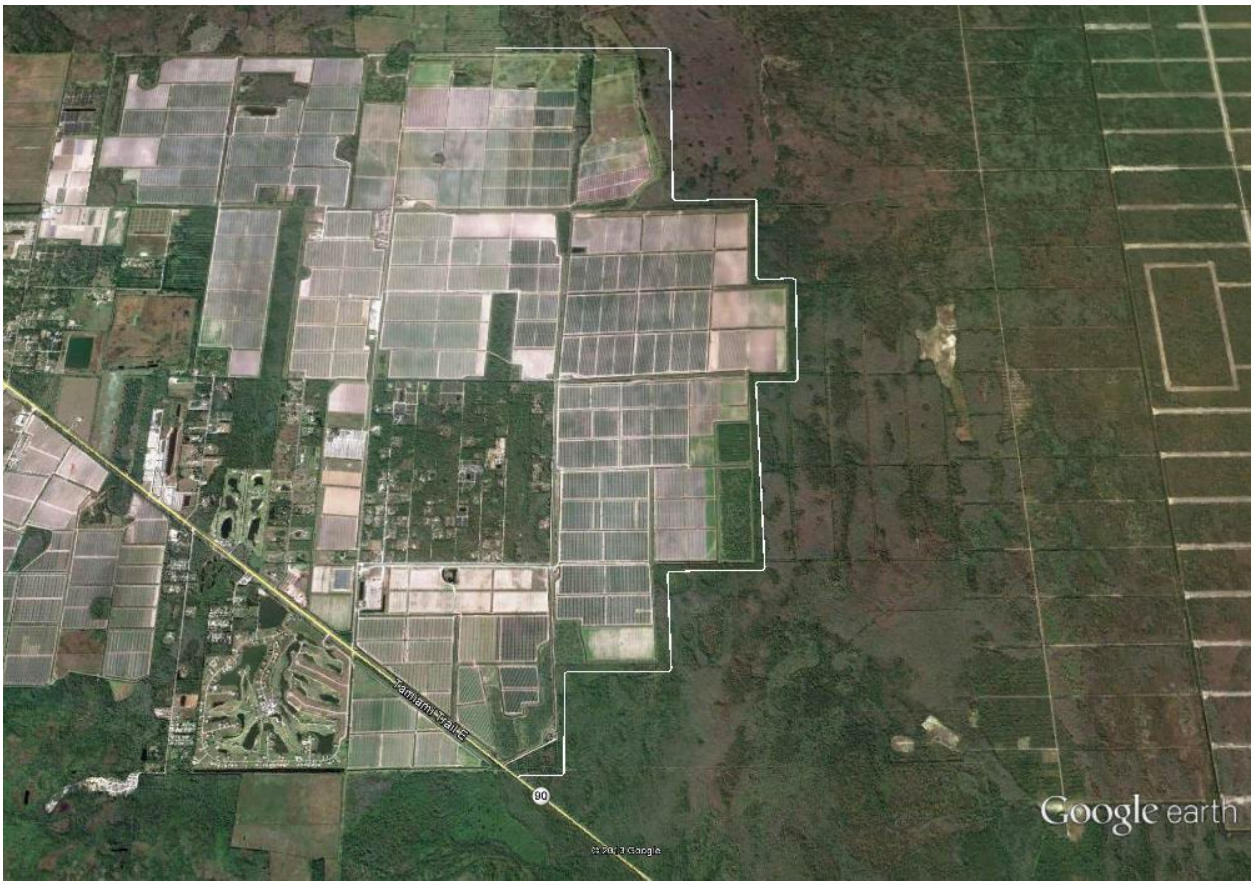

Figure 6: Map of the 2013 PSRP LRR SWPF Levee with no gap at the southern terminus (USACE 2014).

Prior to the drafting of this EA, the No Action AlternativeNo Action Alternative determined for this project approximately four/five years ago (2015-16) was an alternative that included future hydrologic conditions without the existence of the PSRP. No completed features, features in construction, or authorized features were included. This No Action Alternative was in violation of 46 Fed. Reg. 18026 (3 March 1981) as amended (1986), Section 1502.14(d) as it did not continue with the present course of action as described in the existing authorized plan.

This supplemental EA, changed the No Action Alternative based on 46 Fed. Reg. 18026 (3 March 1981) as amended (1986), Section 1502.14(d) from the previous no action plan (no PSRP) to Alternative 2 which best represents the No Action Alternative as outlined in 46 Fed. Reg. 18026 (3 March 1981) as amended (1986), Section 1502.14(d). It is important to note, that Alternative 2, which is described in more detail in Section 2.1.1.2, does include a seepage/conveyance canal that has been incorporated into the SWPF levee design. However, this seepage/conveyance canal is located on the east side of the SWPF canal in the GSSHA model simulations provided for this project. In reality, the conveyance feature will be between the SWPF and the existing levee (Figure 6).

The USACE understands that this simulated modeling effort results in higher ponding depths and hydroperiods directly adjacent to the east side of the levee that is reduced in the real world. The USACE

has determined the effects to be similar as water will be meet the SWPF flowing from the northwest and flow along the SWPF to south. Additionally, rainfall and discharge from the agricultural lands southwest of the project will be diverted south between the existing farm levee and the SWPF. Water from both of these aspects will be discharged along the north side of US-41 into existing drainage features. Ponding depth and hydroperiod simulated in Alternative 2 (the new No Action Alternative) may have hydrological output that may be slightly lower than should be in a few locations in the southwest corner of the project. The USACE does not expect these differences to be significant enough to warrant a delay and additional cost to this project.

2.1.1.2 Alternative 2 – No Action Alternative

Following 46 Fed. Reg. 18026 (3 March 1981) as amended (1986), Section 1502.14(d), the No Action Alternative, Alternative 2, incorporates the authorized project as described in the 2013 LRR (Figure 5) which have previously been reviewed under the NEPA process. Thus, Alternative 2 incorporates the following features that have already been completed: (1) plugging of Prairie Canal; (2) plugging of Merritt Canal; (3) construction of the Merritt, Faka Union, and Miller pump stations; (4) construction of the Merritt, Faka Union, and Miller spreader berms; (5) construction of the Tieback Levee; (6) removal of roads east of Miller Canal; (7) plugging of the northern 3.5 miles of the Eastern Stair Step Canal; (8) construction of the manatee mitigation feature; (9) removal of roads north of the Tieback Levee; and (10) operation of the Merritt pump station. In addition to these completed features, Alternative 2 features currently in construction: (1) southern 1.5 miles of the Eastern Stair Step Canal and (2) road and logging trams west of Miller Canal. Lastly, features authorized as part of the PSRP under previous legislation are incorporated into the alternative as well, including: (1) the SWPF; (2) plugging of Faka Union Canal; (3) operation of the Faka Union pump station; (4) plugging of the Miller Canal; and (5) operation of the Miller pump station.

The SWPF levee is 8.5 miles long as described in the 2013 LRR. There is no gap at the southern terminus of the levee. The southern end of the levee ends at the drainage canal on the north side of US-41, east of Tomato Rd. The left box in Figure 7 shows the model version of the levee. Here you can see the end of the SWPF levee at US-41.

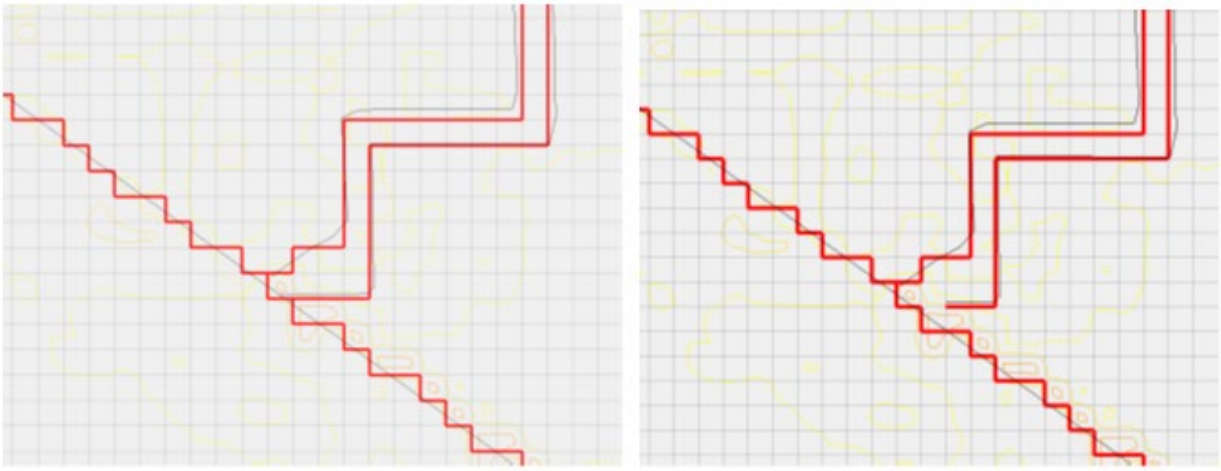

Figure 7: GSSHA Model depiction of the southern terminus of the SWPF described in the 2013 LRR. The left box shows the GSSHA model SWPF levee without a gap. The right box shows the GSSHA model SWPF levee with gap at the southern terminus.

2.1.1.3 Alternative 1A - Increased Conveyance Under US-41 Location A without Levee Gap

Alternative 1A is a "with project" alternative that includes all of the completed, currently in construction, and future features listed in for the No Action Alternative in section 2.1.1.2. Alternative 1A increases conveyance under US-41 by adding a "break" in US-41 (Figure 8). This "break" simulates a conveyance feature such as a bridge or culverts that will provide additional flow of water to the estuaries south of US-41. The purpose of the "break" is to relieve the dam function that US-41 provides which is a barrier to freshwater flow to the downstream estuaries. This alternative allows more water to flow to downstream estuaries and decreases stages upstream. Alternative 1A has a 960 m, or 0.6 mile, simulated "break" in US-41, acting as a bridge, located just west of the intersection of US-41 and CR-92. Alternative 1A incorporates the 2013 LRR levee (Figure 6 and Figure 7).

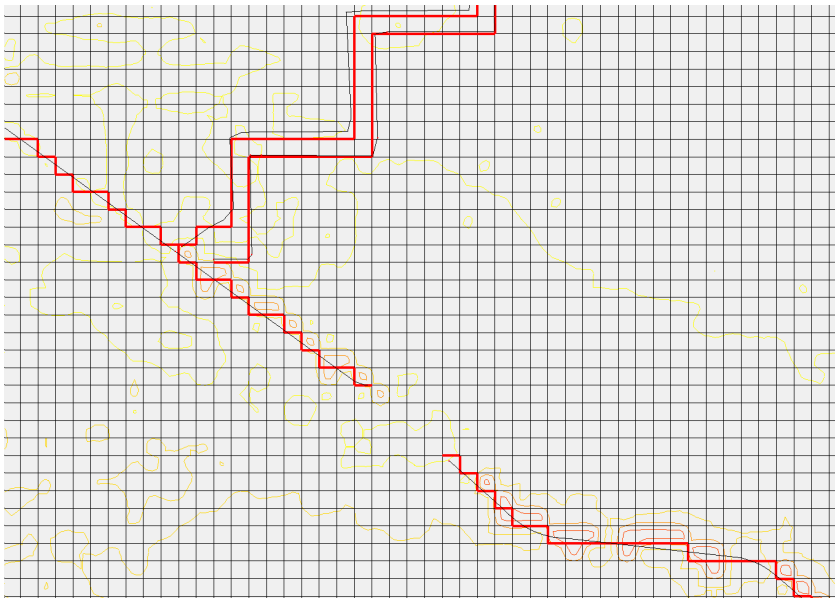

Figure 8: Simulated conveyance under US-41 just east of CR-92 in the GSSHA Model

2.1.1.4 Alternative 1Aw - Increased Conveyance Under US-41 Location A with Levee Gap

Alternative 1Aw is a "with project" alternative that includes all of the completed, currently in construction, and future features listed in for the No Action Alternative in section 2.1.1.2. Alternative 1Aw is virtually the same as Alternative 1A with one exception (Figure 7). Alternative 1Aw incorporates the 2013 LRR levee but with a gap at the southern terminus (Figure 9). The gap on the south end of the levee is also one model cell long, 120 m or 393.7 ft, further reducing the length of the SWPF levee to approximately 8.68 miles in length for this levee scenario.

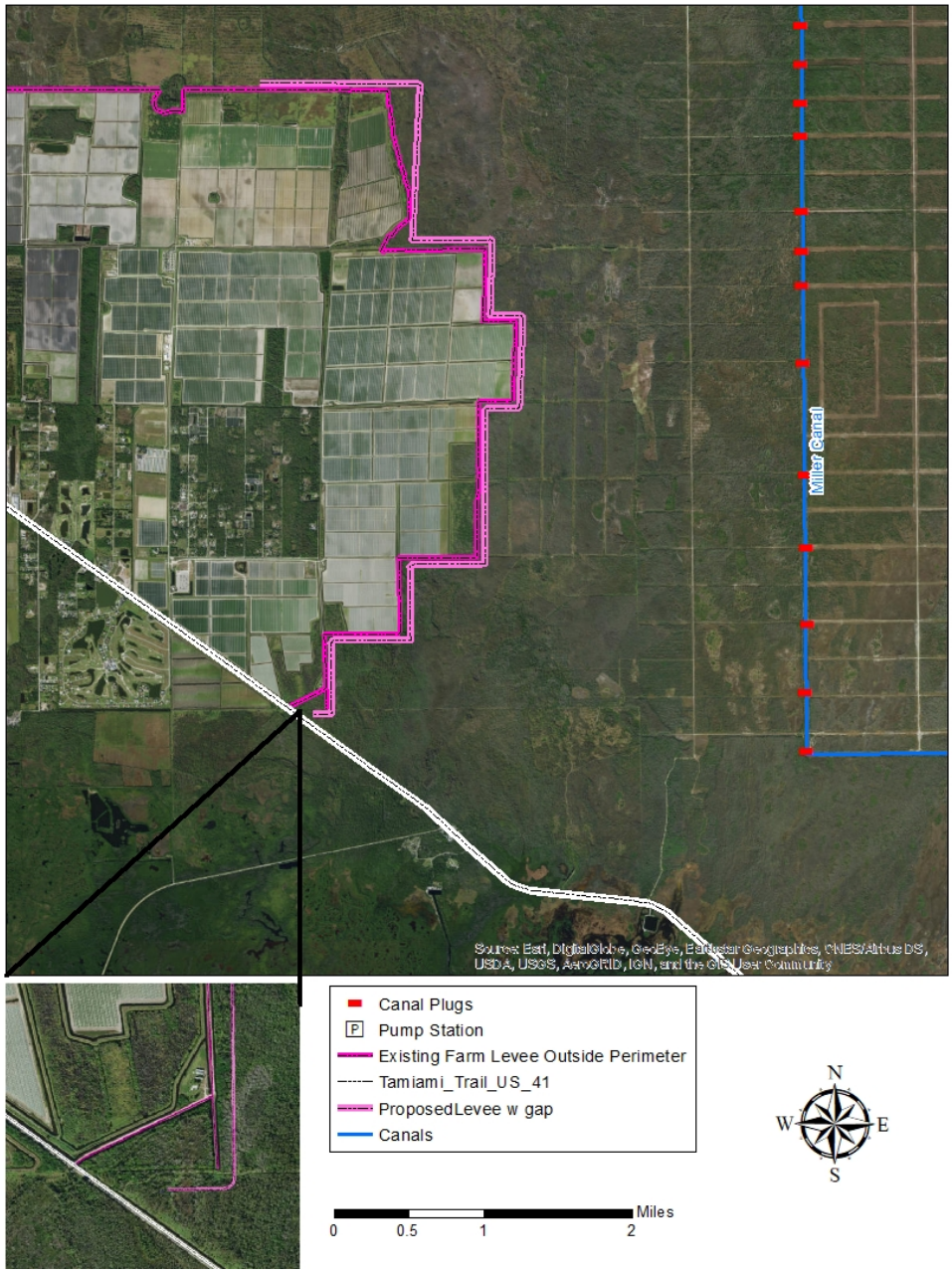

Figure 9: Map of the 2013 LRR SWPF Levee with gap at the southern terminus.

2.1.1.5 Alternative 1B - Increased Conveyance Under US-41 Location B without Levee Gap

Alternative 1B is a "with project" alternative that includes all of the completed, currently in construction, and future features listed in for the No Action Alternative in section 2.1.1.2. Alternative 1B is a "with project" alternative that increases conveyance under US-41 by adding a "break" in US-41 (Figure 10). This "break" simulates a conveyance feature such as a bridge or culverts that will provide additional flow of water to the estuaries south of US-41. The simulated break in this alternative is 1680 m, or 5,511.8 ft (just over one mile) located east of the Collier Seminole State Park main entrance on US-41 (Figure 10). Alternative 1B incorporates the 2013 LRR levee (Figure 6).

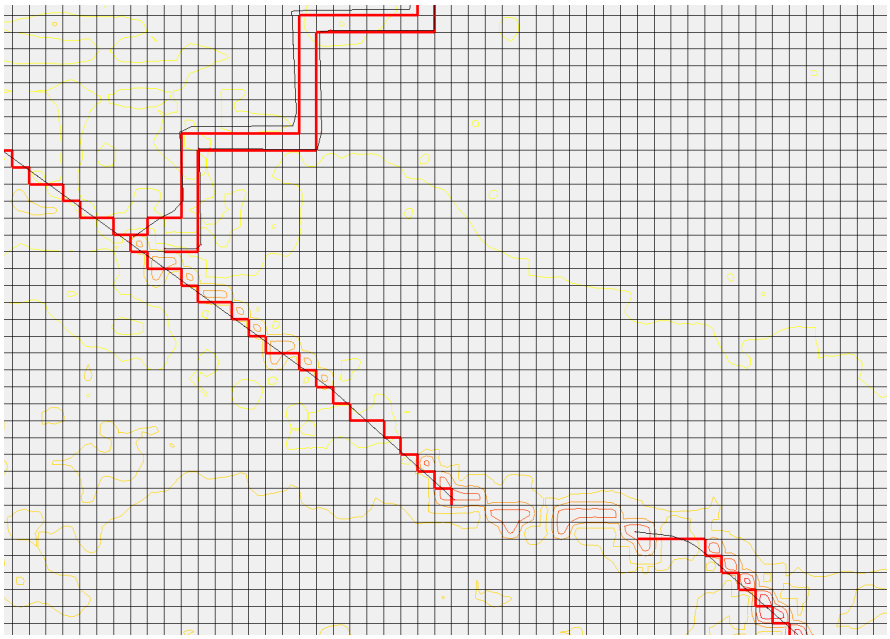

Figure 10: Simulated conveyance under US-41 west of CR-92 in the GSSHA Model

2.1.1.6 Alternative 1Bw -Increased Conveyance Under US-41 Location B with Levee Gap

Alternative 1Bw is a "with project" alternative that includes all of the completed, currently in construction, and future features listed in for the No Action Alternative in section 2.1.1.2. Alternative 1Bw is virtually the same as Alternative 1B with one exception. Alternative 1Bw incorporates the 2013 LRR levee but with a gap at the southern terminus (Figure 9). The gap on the south end of the levee is also one model cell long, 120 m or 393.7 ft, further reducing the length of the SWPF levee to approximately 8.68 miles in length for this levee scenario.

2.1.1.7 Alternative 2w - Seepage Canal with Levee Gap

Alternative 2w is a "with project" alternative that includes all of the completed, currently in construction, and future features listed in for the No Action Alternative in section 2.1.1.2. Alternative 2w is virtually the same as Alternative 2 (No Action Alternative) with one exception. Alternative 2w includes the 2013 LRR levee with gap described in Section 2.1.1.3. The gap on the south end of the levee is also one model cell long, 120 m or 393.7 ft, further reducing the length of the SWPF levee to approximately 8.68 miles in length for this levee scenario. Alternative 2w incorporates the 2013 LRR levee but with a gap at the southern terminus (Figure 9).

2.1.1.8 Alternative 3 - Restoration of Duda Fields without Levee Gap

Alternative 3 is a "with project" alternative that includes all of the completed, currently in construction, and future features listed in for the No Action Alternative in section 2.1.1.2. Alternative 3 restores former agricultural fields known as the "Duda Fields" (Figure 11). Restoration includes the removal of existing spoil piles and backfilling existing ditches associated with the former Duda Farm fields that currently obstruct overland flow within the PSSF. Alternative 3 incorporates the 2013 LRR levee with no gap (Figure 6) described in Section 2.1.1.3.

Figure 11: Location of Duda fields in reference to the agricultural lands southwest of the PSRP

2.1.1.9 Alternative 3w - Restoration of Duda Fields with Levee Gap

Alternative 3w is a "with project" alternative that includes all of the completed, currently in construction, and future features listed in for the No Action Alternative in section 2.1.1.2. Alternative 3w is virtually the same as Alternative 3 with one exception. Alternative 3w includes the 2013 LRR levee with gap (Figure 9) described in Section 2.1.1.4. The gap on the south end of the levee is also one model cell long, 120 m or 393.7 ft, further reducing the length of the SWPF levee to approximately 8.68 miles in length for this levee scenario.

2.1.1.10 Alternative PC2 – Hybrid

Alternative PC2 is a "with project" alternative that includes all of the completed, currently in construction, and future features listed in for the No Action Alternative in section 2.1.1.2. Alternative PC2 is a hybrid alternative that incorporates some of the features described in previously discussed alternatives with supplementary features to provide additional conveyance to the downstream estuaries, further reducing the ponding of water north of US-41. This alternative includes a modified version of the 2013 LRR Levee with gap (Figure 12). Alternative PC2 has an enlarged gap at the south end of the SWPF levee further reducing the levee length to 7.5 miles (Figure 12), a levee culvert structure consisting of two 5-ft diameter culverts with flap gates, a levee access road conveyance structure consisting of three 5-ft diameter culverts at the crossings over the existing agricultural ditch and new conveyance canal, a 20-ft wide by 4-ft deep conveyance canal between the existing farm levee and the SWPF, new opening under US-41 consisting of a series of three 12-ft x 4-ft box culverts spaced 120 ft apart, construction of an additional 3-ft culvert to the existing three 3-ft culverts at the entrance to the small village on the north side of US-41 just east of the intersection of US-41 and CR-92 (San Marco Rd), and a new 10-ft x 3-ft box culvert under CR-92, west of the Collier Seminole State Park campground.

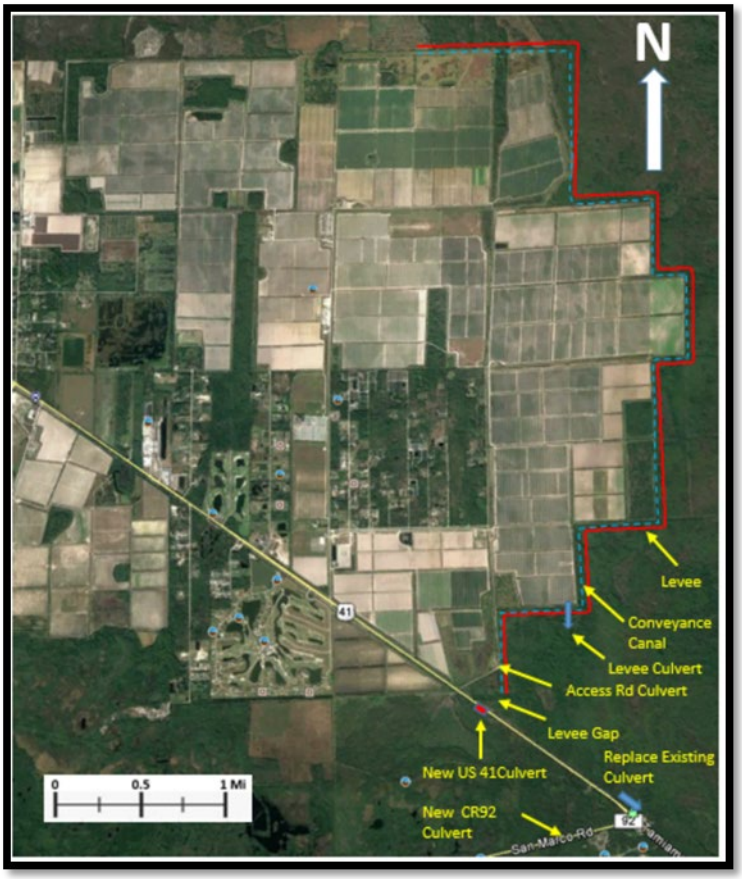

Figure 12: Map of Alternative PC2.

2.1.2 Issues and Basis for Choice

The alternatives were evaluated based on their ability to protect the agricultural lands to the west of the project area and convey water south of US-41 in the southwest corner of the PSRP footprint proper and reduce the ponding of water north of US-41. Alternatives were also evaluated in terms of relationship/effect on the Savings Clause (maintenance of flood protection and water supply) and Section 902 Limit (cost).

The Savings Clause is outlined in Section 601(h)(5) of WRDA 2000. The Savings Clause requires that implementation of the Plan will not reduce levels of service for flood protection that were in existence on the date of enactment of WRDA 2000 (11 December 2000) and in accordance with applicable law. The Savings Clause also requires analysis to ensure water supply is not lost. However, the PSRP didn't affect water supply and only affected levels of service for flood protection, which is the focus of evaluating alternative designs in this EA.

The Section 902 Limit refers to Section 902 of WRDA 1986. Section 902 of WRDA 1986 defines the maximum amount that a project may cost. The Section 902 Limit includes, "the maximum project cost which includes the authorized cost (adjusted for inflation), the current cost of any studies, modifications, and action authorized by WRDA 1986 or any later law, and 20% of the authorized cost (without adjustment for inflation). The cost of modifications required by law is to be kept separate and added to other

allowable costs." These components equal the maximum project cost allowed by Section 902 of WRDA 1986.

Cost to implement the SWPF and conveyance features was factor in the development of alternatives for the SWPF and conveyance features. The PDT agreed that the cost of this phase of the PSRP should not cause the overall PSRP to exceed the Section 902 Limit of WRDA 1986 even though a Post Authorization Change Report (PACR) could have been completed. The Section 902 Limit was used as the level cost guiding the development and choice of alternatives for the SWPF and conveyance features. Of note, the Section 902 Limit, ultimately, did not result in the elimination of any alternatives, but, was used in guiding decisions for alternatives for the SWPF and conveyance features.

2.1.3 Preferred Alternative

Based on the analysis provided in this Supplemental EA, on the potential issues identified, and on the ability to convey freshwater south of US-41 to the downstream estuaries, Alternative PC2 is recommended for implementation as a design refinement to the SWPF included in the 2004 PIR/EIS and 2013 LRR. Alternative PC2 is the preferred alternative because it: (1) maintains flood risk reduction to Lipman and Deseret Farms; (2) reduces stacking, or ponding, of water north of US-41; (3) minimizes and avoids impacts to fish and wildlife resources within the PSRP; (4) increases downstream conveyance into the estuaries; and (5) reduces impacts of increased hydrology resulting from the "damming" effect presented by US-41 as a restriction to southward freshwater sheetflow from the restoration project. Alternative PC2 reduces the footprint length of the SWPF levee to 7.5 miles compared to an 8.75 mile long levee conceptualized in the 2013 LRR. Additional benefits of this alternative is the further reduction of impacted land due to the use of existing roads as access for the SWPF levee. The increased gap on the south end of the SWPF levee, along with the lack of need of a new access road, increases the length of available surface for project water and levee discharge water to intersperse and mix, while reducing the velocity of water mixing in closer proximity to US-41.

2.1.4 Alternatives Eliminated from Detailed Evaluation

Table 3 summarizes the screening of conveyance design refinements for consideration as part of the PSRP SWPF. Alternatives 1A, 1AW, 1B, and 1BW were eliminated from detailed evaluation because they may be deemed to be a taking of lands adjacent to the project or possibly violate the Savings Clause of WRDA 2000 due to potential reduction in levels of service for flood protection. Alternative 2w was eliminated because the seepage canal was included as part of the SWPF levee design.

Table 3: Screening of the alternatives for the SWPF and additional conveyance features.

ALTERNATIVE	SCREENING/REASON FOR SCREENING	STATUS
1A	Violation of Savings Clause	Eliminated
1Aw	Violation of Savings Clause	Eliminated
1B	Violation of Savings Clause	Eliminated
1Bw	Violation of Savings Clause	Eliminated
2w	Seepage Canal incorporated into SWPF levee design for all alternatives (Seepage Canal no longer a stand-alone feature)	Eliminated
3	Minimal effect; does not contain the levee gap	Eliminated

2.2 Partial Faka Union Plugging

The 2013 LRR contained new hydrological analyses that showed flood protection features would be needed before the Faka Union and Miller Canals could be plugged. Hydrological analysis in the 2013 LRR concluded:

1. Miller Canal will not be plugged prior to the completion of the SWPF in order not to flood adjacent lands.

2. As the largest canal within the project area, the Faka Union Canal will not be plugged prior to the completion of the SWPF in order not to flood adjacent lands.

3. Since the majority of flows into the POI Basin are from the Faka Union Canal, the manatee mitigation feature must be complete prior to the plugging of this canal.

The USACE estimates that only 20% to 30% of the project benefits are being realized given that approximately 80% of the budget has been expended. For project benefits to increase, restoration of the remaining project area were discussed by the USACE and the SFWMD, the non-federal sponsor. With the Manatee Mitigation Feature completed in April 2016, modeling was conducted for partial plugging of the Faka Union Canal. The Interagency Modeling Center (IMC) performed a series of plugging iterations starting at the Spreader Basin on the Faka Union Canal to assess the potential for restoring some portion of the Faka Union Canal without increasing flood risk to the adjacent agricultural lands to the southwest of the project area (USACE 2019).

Table 4 provides a description of alternatives for the SWPF with additional conveyance features considered for the Proposed Action.

Table 4: Description of alternatives for the partial plugging of the Faka Union Canal.

ALTERNATIVE	DESCRIPTION
No action	No plugging of the Faka Union Canal; full action will proceed after completion of the SWPF.
1	Partial plugging of the Faka Union Canal; plugging of 0.6 miles of the Faka Union Canal starting at the southern end of the Faka Union Spreader Berm.
2	Partial plugging of the Faka Union Canal; plugging of 1.2 miles of the Faka Union Canal starting at the southern end of the Faka Union Spreader Berm.
3	Partial plugging of the Faka Union Canal; plugging of 1.8 miles of the Faka Union Canal starting at the southern end of the Faka Union Spreader Berm.
4	Partial plugging of the Faka Union Canal; plugging of 2.4 miles of the Faka Union Canal starting at the southern end of the Faka Union Spreader Berm.
5	Partial plugging of the Faka Union Canal; plugging of 3.3 miles of the Faka Union Canal starting at the southern end of the Faka Union Spreader Berm.
6	Full plugging of the Faka Union Canal; representative of any partial plugging of 3.6 miles or greater starting at the southern end of the Faka Union Spreader Berm.

2.2.1 Description of Alternatives

2.2.1.1 Modeling Assumptions

The following assumptions were applied to partial plugging project conditions (USACE 2019):

- Merritt and Prairie Canals are fully plugged.
- Merritt and Faka Union Pump Stations are operational.
- Faka Union Canal partially plugged starting at the downstream end of the spreader basin for the distance of each alternative (0.6, 1.2, 1.8, 2.4, 3.3, and full length).
- Miller Canal is open and not plugged.
- Miller Pump Station is not operational.
- Four 5-day synthetic storm events simulated (5-, 10-, 25-, 100-year).

2.2.1.2 No Action Alternative

The No Action Alternative represents no change in the timing sequence for the plugging of the Faka Union Canal as described in the 2013 LRR. The Faka Union Canal will not be plugged until after the completion of the SWPF. Once the SWPF and conveyance features are completed, the full Faka Union Canal will be plugged.

2.2.1.3 Alternative 1 (Northern 0.6 Miles)

This alternative allows for the plugging of the northern 0.6 miles of the Faka Union Canal (Figure 13). Alternative 1 will have a plug placed at 66th Ave, 68th Ave, 70th Ave, 72nd Ave, and 0.6 miles south of the Faka Union Spreader Berm. These plugs will make use of spoil at the end of these roads adjacent to the west side of the Faka Union Canal. Approximately 300 ft of spoil is present along the west side of the Faka Union south of the Faka Union Spreader Berm. Additional spoil from the west side of the Faka Union Canal and south of the Faka Union Pump Station will be used as needed to complete these plugs. If needed, additional spoil along the Faka Union Canal (both sides) north of the Faka Union Pump Station will be used if additional spoil is needed to complete the plugs (Figure 14). North of the Faka Union Pump Station, the approximate amount of spoil along the west side of the canal (between 64th Ave and I-75) contains approximately 80.4 acres of spoil available for use of plugging the Faka Union Canal. North of the Faka Union Pump Station, the approximate amount of spoil along the east side of the canal (between 52nd Ave and I-75) contains approximately 26.2 acres of spoil available for use of plugging the Faka Union Canal.

The project components of Alternative 1 incorporate the already constructed tie back levee and the Faka Union spreader berm. Approximately 0.6 miles of the Faka Union Canal will be plugged from the tieback levee and spreader weir extending southward. The Faka Union Canal will be plugged with adjacent existing fill from along the Faka Union Canal and fill from spoil piles located north of the tieback levee. For this phase of the project, canal plugs will be constructed beginning at approximately 66th Avenue and ending just south of 72nd Avenue. The canal plugs at the avenues will be approximately 100 feet long at the top and slope at 6H:1V on either end to the existing canal bottom. The plug fill will be end dumped into the canal without dewatering. The fill will be placed until the plug surface is at the required elevation and provides a surface which can be proof-rolled without pumping. A turbidity barrier will be placed

downstream of the southernmost plug in each work area. Excess fill that is available north of the tie-back levee will be hauled in and will be used to create additional plugs in order to fill as much of the canal as possible.

Special canal plugs will also be constructed at the tieback levee and spreader weir. The special canal plugs at the tieback levee and spreader weir will be approximately 400 feet long at the top and slope at 6H:1V on either end to the existing canal bottom. The canal will be demucked, filled, and compacted to construct the plugs. The tie-back levee and spreader weir special canal plugs were previously authorized.

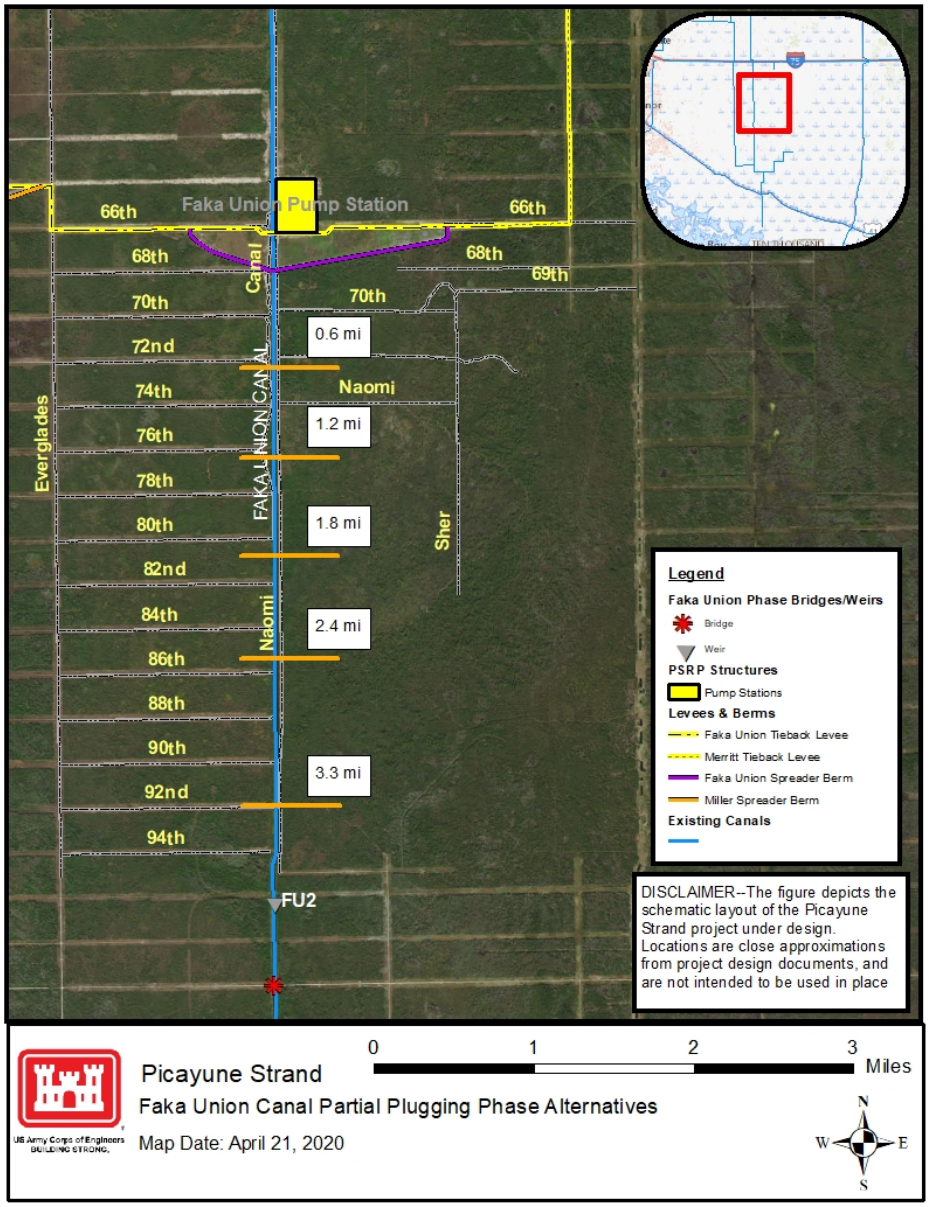

Figure 13: Map of the Faka Union Partial Plugging Alternatives

Figure 14: Map of spoil areas north of the Tieback Levee along the Faka Union Canal.

2.2.1.4 Alternative 2 (Northern 1.2 Miles)

This alternative allows for the plugging of the northern 1.2 miles of the Faka Union Canal (Figure 13). Alternative 2 will have a plug placed at 66th Ave, 68th Ave, 70th Ave, 72nd Ave, 74th Ave, 76th Ave, and 1.2 miles south of the Faka Union Spreader Berm. These plugs will make use of spoil at the end of these roads adjacent to the west side of the Faka Union Canal. Approximately 300 ft of spoil is present along the west side of the Faka Union south of the Faka Union Spreader Berm. Additional spoil from the west side of the Faka Union Canal and south of the Faka Union Pump Station will be used as needed to complete these plugs. Each plug are designed to be 100 ft long at minimum. If needed, additional spoil along the Faka Union Canal (both sides) north of the Faka Union Pump Station will be used if additional spoil is needed to complete the plugs (Figure 14). North of the Faka Union Pump Station, the approximate amount of spoil along the west side of the canal (between 64th Ave and I-75) contains approximately 80.4 acres of spoil available for use of plugging the Faka Union Canal. North of the Faka Union Pump Station, the approximate amount of spoil along the east side of the canal (between 52nd Ave and I-75) contains approximately 26.2 acres of spoil available for use of plugging the Faka Union Canal.

The project components of Alternative 2 incorporate the already constructed tie back levee and the Faka Union spreader berm. Approximately 1.2 miles of the Faka Union Canal will be plugged from the tieback levee and spreader weir extending southward. The Faka Union Canal will be plugged with adjacent existing fill from along the Faka Union Canal and fill from spoil piles located north of the tieback levee. For this phase of the project, canal plugs will be constructed beginning at approximately 66th Avenue and ending just north of 76th Avenue. The canal plugs at the avenues will be approximately 100 feet long at the top and slope at 6H:1V on either end to the existing canal bottom. The plug fill will be end dumped into the

canal without dewatering. The fill will be placed until the plug surface is at the required elevation and provides a surface which can be proof-rolled without pumping. A turbidity barrier will be placed downstream of the southernmost plug in each work area. Excess fill that is available north of the tie-back levee will be hauled in and will be used to create additional plugs in order to fill as much of the canal as possible.

Special canal plugs will also be constructed at the tieback levee and spreader weir. The special canal plugs at the tieback levee and spreader weir will be approximately 400 feet long at the top and slope at 6H:1V on either end to the existing canal bottom. The canal will be demucked, filled, and compacted to construct the plugs. The tie-back levee and spreader weir special canal plugs were previously authorized.

2.2.1.5 Alternative 3 (Northern 1.8 Miles)

This alternative allows for the plugging of the northern 1.8 miles of the Faka Union Canal (Figure 13). Alternative 3 will have a plug placed at 66th Ave, 68th Ave, 70th Ave, 72nd Ave, 74th Ave, 76th Ave, 78th Ave, 80th Ave and 1.8 miles south of the Faka Union Spreader Berm. These plugs will make use of spoil at the end of these roads adjacent to the west side of the Faka Union Canal. Approximately 300 ft of spoil is present along the west side of the Faka Union south of the Faka Union Spreader Berm. Additional spoil from the west side of the Faka Union Canal and south of the Faka Union Pump Station will be used as needed to complete these plugs. Each plug are designed to be 100 ft long at minimum. If needed, additional spoil along the Faka Union Canal (both sides) north of the Faka Union Pump Station will be used if additional spoil is needed to complete the plugs (Figure 14). North of the Faka Union Pump Station, the approximate amount of spoil along the west side of the canal (between 64th Ave and I-75) contains approximately 80.4 acres of spoil available for use of plugging the Faka Union Canal. North of the Faka Union Pump Station, the approximate amount of spoil along the east side of the canal (between 52nd Ave and I-75) contains approximately 26.2 acres of spoil available for use of plugging the Faka Union Canal.

The project components of Alternative 3 incorporate the already constructed tie back levee and the Faka Union spreader berm. Approximately 1.8 miles of the Faka Union Canal will be plugged from the tieback levee and spreader weir extending southward. The Faka Union Canal will be plugged with adjacent existing fill from along the Faka Union Canal and fill from spoil piles located north of the tieback levee. For this phase of the project, canal plugs will be constructed beginning at approximately 66th Avenue and ending just south of 80th Avenue. The canal plugs at the avenues will be approximately 100 feet long at the top and slope at 6H:1V on either end to the existing canal bottom. The plug fill will be end dumped into the canal without dewatering. The fill will be placed until the plug surface is at the required elevation and provides a surface which can be proof-rolled without pumping. A turbidity barrier will be placed downstream of the southernmost plug in each work area. Excess fill that is available north of the tie-back levee will be hauled in and will be used to create additional plugs in order to fill as much of the canal as possible.

Special canal plugs will also be constructed at the tieback levee and spreader weir. The special canal plugs at the tieback levee and spreader weir will be approximately 400 feet long at the top and slope at 6H:1V on either end to the existing canal bottom. The canal will be demucked, filled, and compacted to construct the plugs. The tie-back levee and spreader weir special canal plugs were previously authorized.

2.2.1.6 Alternative 4 (Northern 2.4 Miles)

This alternative allows for the plugging of the northern 2.4 miles of the Faka Union Canal (Figure 13). Alternative 4 will have a plug placed at 66th Ave, 68th Ave, 70th Ave, 72nd Ave, 74th Ave, 76th Ave, 78th Ave, 80th Ave, 82nd Ave, 84th Ave, and 2.4 miles south of the Faka Union Spreader Berm. These plugs will make use of spoil at the end of these roads adjacent to the west side of the Faka Union Canal. Approximately 300 ft of spoil is present along the west side of the Faka Union south of the Faka Union Spreader Berm. Additional spoil from the west side of the Faka Union Canal and south of the Faka Union Pump Station will be used as needed to complete these plugs. Each plug are designed to be 100 ft long at minimum. If needed, additional spoil along the Faka Union Canal (both sides) north of the Faka Union Pump Station will be used if additional spoil is needed to complete the plugs (Figure 14). North of the Faka Union Pump Station, the approximate amount of spoil along the west side of the canal (between 64th Ave and I-75) contains approximately 80.4 acres of spoil available for use of plugging the Faka Union Canal. North of the Faka Union Pump Station, the approximate amount of spoil along the east side of the canal (between 52nd Ave and I-75) contains approximately 26.2 acres of spoil available for use of plugging the Faka Union Canal.

The project components of Alternative 4 incorporate the already constructed tie back levee and the Faka Union spreader berm. Approximately 2.4 miles of the Faka Union Canal will be plugged from the tieback levee and spreader weir extending southward. The Faka Union Canal will be plugged with adjacent existing fill from along the Faka Union Canal and fill from spoil piles located north of the tieback levee. For this phase of the project, canal plugs will be constructed beginning at approximately 66th Avenue and ending just north of 86th Avenue. The canal plugs at the avenues will be approximately 100 feet long at the top and slope at 6H:1V on either end to the existing canal bottom. The plug fill will be end dumped into the canal without dewatering. The fill will be placed until the plug surface is at the required elevation and provides a surface which can be proof-rolled without pumping. A turbidity barrier will be placed downstream of the southernmost plug in each work area. Excess fill that is available north of the tie-back levee will be hauled in and will be used to create additional plugs in order to fill as much of the canal as possible.

Special canal plugs will also be constructed at the tieback levee and spreader weir. The special canal plugs at the tieback levee and spreader weir will be approximately 400 feet long at the top and slope at 6H:1V on either end to the existing canal bottom. The canal will be demucked, filled, and compacted to construct the plugs. The tie-back levee and spreader weir special canal plugs were previously authorized.

2.2.1.7 Alternative 5 (Northern 3.3 Miles)

This alternative allows for the plugging of the northern 3.3 miles of the Faka Union Canal (Figure 15). Alternative 5 will have a plug placed at 66th Ave, 68th Ave, 70th Ave, 72nd Ave, 74th Ave, 76th Ave, 78th Ave, 80th Ave, 82nd Ave, 84th Ave, 86th Ave, 88th Ave, 90th Ave, and 3.3 miles (at 92nd Ave) south of the Faka Union Spreader Berm. These plugs will make use of spoil at the end of these roads adjacent to the west side of the Faka Union Canal. Approximately 300 ft of spoil is present along the west side of the Faka Union south of the Faka Union Spreader Berm (Figure 15). Additional spoil from the west side of the Faka Union Canal and south of the Faka Union Pump Station will be used as needed to complete these plugs. Each plug are designed to be 100 ft long at minimum. If needed, additional spoil along the Faka Union Canal (both sides) north of the Faka Union Pump Station will be used if additional spoil is needed to complete the plugs (Figure 14). North of the Faka Union Pump Station, the approximate amount of spoil along the west side of the canal (between 64th Ave and I-75) contains approximately 80.4 acres of

spoil available for use of plugging the Faka Union Canal. North of the Faka Union Pump Station, the approximate amount of spoil along the east side of the canal (between 52nd Ave and I-75) contains approximately 26.2 acres of spoil available for use of plugging the Faka Union Canal.

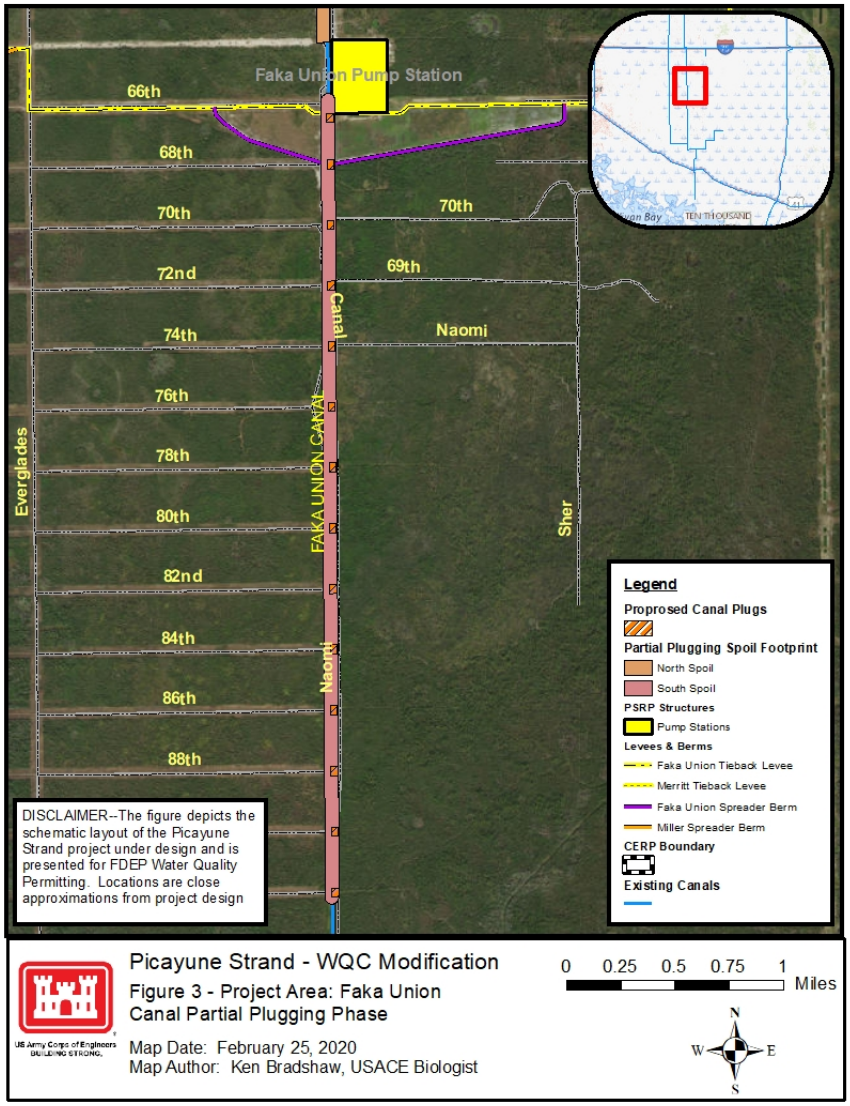

Figure 15: Faka Union Plugging Alternative 5

The project components of Alternative 5 incorporate the already constructed tie back levee and the Faka Union spreader berm. Approximately 3.3 miles of the Faka Union Canal will be plugged from the tieback levee and spreader weir extending southward. The Faka Union Canal will be plugged with adjacent existing fill from along the Faka Union Canal and fill from spoil piles located north of the tieback levee. For this phase of the project, canal plugs will be constructed beginning at approximately 66th Avenue and ending near 92nd Avenue. The canal plugs at the avenues will be approximately 100 feet long at the top and slope at 6H:1V on either end to the existing canal bottom. The plug fill will be end dumped into the canal without dewatering. The fill will be placed until the plug surface is at the required elevation and provides a surface which can be proof-rolled without pumping. A turbidity barrier will be placed downstream of

the southernmost plug in each work area. Excess fill that is available north of the tie-back levee will be hauled in and will be used to create additional plugs in order to fill as much of the canal as possible.

Special canal plugs will also be constructed at the tieback levee and spreader weir. The special canal plugs at the tieback levee and spreader weir will be approximately 400 feet long at the top and slope at 6H:1V on either end to the existing canal bottom. The canal will be demucked, filled, and compacted to construct the plugs. The tie-back levee and spreader weir special canal plugs were previously authorized.

2.2.1.8 Alternative 6 (Full Plugging)

This alternative allows for the full plugging of the Faka Union Canal (Figure 1). Alternative 6 will have a plug placed at each road intersection south of the Faka Union Pump Station to the intersection of the Faka Union Canal and the Western Stair Step Canal, a distance of approximately 7.9 miles. These plugs will make use of spoil at the end of these roads adjacent to the west side of the Faka Union Canal. Approximately 300 ft of spoil is present along the west side of the Faka Union south of the Faka Union Spreader Berm. Additional spoil from the west side of the Faka Union Canal and south of the Faka Union Pump Station will be used as needed to complete these plugs. Each plug are designed to be 100 ft long at minimum. If needed, additional spoil along the Faka Union Canal (both sides) north of the Faka Union Pump Station will be used if additional spoil is needed to complete the plugs (Figure 14). North of the Faka Union Pump Station, the approximate amount of spoil along the west side of the canal (between 64th Ave and I-75) contains approximately 80.4 acres of spoil available for use of plugging the Faka Union Canal. North of the Faka Union Pump Station, the approximate amount of spoil along the east side of the canal (between 52nd Ave and I-75) contains approximately 26.2 acres of spoil available for use of plugging the Faka Union Canal.

The project components of Alternative 6 incorporate the already constructed tie back levee and the Faka Union spreader berm. Approximately 7.9 miles of the Faka Union Canal will be plugged from the tieback levee and spreader weir extending southward. The Faka Union Canal will be plugged with adjacent existing fill from along the Faka Union Canal and fill from spoil piles located north of the tieback levee. For this phase of the project, canal plugs will be constructed beginning at approximately 66th Avenue and ending at the junction with the Western Stair Step Canal. The canal plugs at the avenues will be approximately 100 feet long at the top and slope at 6H:1V on either end to the existing canal bottom. The plug fill will be end dumped into the canal without dewatering. The fill will be placed until the plug surface is at the required elevation and provides a surface which can be proof-rolled without pumping. A turbidity barrier will be placed downstream of the southernmost plug in each work area. Excess fill that is available north of the tie-back levee will be hauled in and will be used to create additional plugs in order to fill as much of the canal as possible.

Special canal plugs will also be constructed at the tieback levee and spreader weir. The special canal plugs at the tieback levee and spreader weir will be approximately 400 feet long at the top and slope at 6H:1V on either end to the existing canal bottom. The canal will be demucked, filled, and compacted to construct the plugs. The tie-back levee and spreader weir special canal plugs were previously authorized.

2.2.2 Issues and Basis for Choice

The alternatives were evaluated based on their ability to provide restoration benefits south of the tieback levee, between Miller Canal and Merritt Canal without increasing flood risk to the agricultural areas southwest of the PSRP. The full plugging of the Faka Union Canal is part of the congressionally authorized

PSRP as outlined by the 2004 PIR/EIS and updated by the 2013 LRR. The partial plugging of the Faka Union Canal is considered a transitional state as the remainder of the Faka Union Canal will be plugged after the completion of the SWPF and conveyance features. With this transitional state, the GSSHA long-term environmental model was not used for this evaluation. Instead, the GSSHA storm-event model was used to assess the 5-, 10-, 25-, 100-year storm events to assess impacts to sensitive areas including the red-cockaded woodpecker (RCW) nesting areas west-southwest of the tieback levee and Miller Pump Station and the agricultural lands southwest of the PSRP. Iterations (different lengths) of partial plugging were modeled until flood risk increased west of Miller Canal. The intent of the partial plugging is to provide restoration benefits while avoiding impacts to the southwest agricultural lands (Lipman and Deseret Farms) or RCW nesting areas. Due to the nature of this modeling effort, earlier successful iterations (i.e., iterations where flood risk did not increase) were written over by the modeling program.

2.2.3 Preferred Alternative

Based on the analysis provided in this EA, on the potential issues identified, and on the ability to provide additional restoration (project benefits) without increasing flood risk to the agricultural lands southwest of the PSRP, Alternative 5 is recommended for implementation for the partial plugging of the Faka Union Canal. Alternative 5 is preferred since it maximizes the area of gained restoration benefits without increasing flood risk to the RCW nesting area and the southwest agricultural lands.

2.2.4 Alternatives Eliminated from Detailed Evaluation

Table 5 summarizes the screening of alternatives for the partial plugging of the Faka Union Canal. Alternatives 1, 2, 3, and 4 were eliminated from detailed evaluation because they were successfully superseded by a further plugging distance that showed no increase in flood risk to the agricultural lands southwest of the PSRP or the red-cockaded woodpecker nesting/roosting habitat west-southwest of the Miller Pump Station. Alternatives 1, 2, 3, and 4 did not maximize restoration benefits.

Table 5: Screening of alternatives for the partial plugging of the Faka Union Canal.

ALTERNATIVE	SCREENING/REASON FOR SCREENING	STATUS
1	Distance superceded without increased flood risk to agricultural lands southwest of the PSRP or red-cockaded woodpecker habitat west-southwest of the Miller Pump Station.	Eliminated
2	Distance superceded without increased flood risk to agricultural lands southwest of the PSRP or red-cockaded woodpecker habitat west-southwest of the Miller Pump Station.	Eliminated
3	Distance superceded without increased flood risk to agricultural lands southwest of the PSRP or red-cockaded woodpecker habitat west-southwest of the Miller Pump Station.	Eliminated
4	Distance superceded without increased flood risk to agricultural lands southwest of the PSRP or red-cockaded woodpecker habitat west-southwest of the Miller Pump Station.	Eliminated

3 AFFECTED ENVIRONMENT

3.1 General Environmental Setting

The PSRP is located in Collier County, Florida. It lies east of the city of Naples, between I-75 and US-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 I-75, southwest of the Florida Panther National Wildlife Refuge, north of the marine preserves (Rookery Bay NERR, Rookery Bay Aquatic Preserve) and refuges (Ten Thousand Islands NWR, Cape Romano) that constitute the Ten Thousand Islands Region, north-northeast of Collier Seminole State Park, and west of the Fakahatchee Strand Preserve State Park. 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 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 (USACE 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 USACE 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 flatwoods 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 I- 75 and west of Everglades Boulevard in NGGE. 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 was constructed in the Faka Union Canal just south of the POI and US-41.

3.2 Climate

The climate of south Florida is subtropical. Seasonal rainfall patterns in south Florida resemble the wet and dry season patterns of the humid tropics more than the winter and summer patterns of temperate latitudes. Of the 53 inches of rain that south Florida receives on average annually, 75% falls during the wet season months of May through October. Tropical storms and hurricanes also provide major contributions to wet season rainfall. During the dry season (November through April), rainfall is governed by large-scale winter weather fronts that pass through the region approximately weekly. However, due to the variability of climate patterns (La Niña and El Niño), dry periods may occur during the wet season and wet periods may occur during the dry season. High evapotranspiration rates in south Florida roughly equal annual precipitation. Mean annual temperature for the south Florida ecosystem ranges from 72° Fahrenheit (F) (22° Celsius [C]) in the northern Everglades to 76° F (24°C) in the southern Everglades (Thomas 1974). There is now evidence of anthropogenic changes to global climate patterns that will likely have an impact on south Florida in terms of rainfall, evapotranspiration, and temperature.

Typical of humid subtropical regions, the PSRP Study Area undergoes about a 7-month dry season and a 5-month wet season. The average annual temperature is about 75 degrees Fahrenheit, with record extremes ranging from 105 degrees in summer to 25 degrees in winter. Annual rainfall for nearby Naples averages 53 inches. Within Collier County, annual rainfall varies from a low of 30 inches to a high of 105 inches. Nearly 80 percent of the annual rainfall occurs during the May through October wet season. Much of the rainfall is returned to the atmosphere by evaporation from soil and free water surfaces, as well as transpiration through plants. Under natural conditions, the combined process of evapotranspiration accounts for an approximate loss of 45 inches of water per year. Thus, only about eight inches of average annual precipitation were and are available for surface runoff and groundwater recharge. Predrainage, natural surface runoff in the Study Area has been reported to be on the order of 0 to 10 inches annually (Kenner, W.E. 1966).

3.3 Geology and Soils

3.3.1 Geology

The PSRP Study Area lies within the lower coastal lowlands topographic division, in the Big Cypress physiographic region. Dominant geomorphic features are the gradual southwestern slope and reticulated coastal swamps. There is exposed limestone in the northeastern section of the Project Area, while the remainder of the area is shallow to limestone. Limestone and marine deposits underlying the area were formed during the pleistocene epoch. The geology of the PSRP Project Area has not changed substantially from the pre-drainage conditions present in the 1940s.

3.3.2 Soils

In the 1954 Collier County Soil Survey (Leighty, et. al 1954), the deepest of these flow-ways and basins are identified as a generic map unit labeled as Cypress Swamp (Cf). The survey names several soils that might be found within this map unit. Most of them have black or dark-gray mucky fine sand or peaty muck; in others it is brown peat. According to the current Soil Survey of Collier County Area, Florida (Luidahl, et. al. 1998), areas mapped as Cf in the 1954 survey have soils with sandy or mucky fine sands. A close study of 1940 and 1953 aerial photography also verifies the presence of these cypress communities within this map unit.

Duever (1984) classified four major soil groups (rock, sand, marl, and organics) in the Big Cypress National Preserve. These major soil groups are found in the PSRP Study Area and historically were subject to intermittent or prolonged flooding and are characterized as poorly or very poorly drained. Soils throughout the PSRP Study Area vary in thickness over limestone. If the thickness of the soil layer above the limestone is greater than four feet, soil-forming processes occur to either form stain layers or cause mineral movement within clay layers above the limestone. South of the four major canals that drain the PSRP Project Area, soils in the wet prairies have marl over sandy deposits on rock.

The drainage of the PSRP Project Area landscape and the consequent increase in wildfires has caused the oxidation of much of the organic soil. Lost organic soils in some of the deeper wetlands would require centuries to replace. In the meantime, either deeper wetland communities, such as pop ash or pond apple sloughs, or open water would dominate these sites. The detailed map units from the modern soil survey seem to indirectly qualify that oxidation through drainage or fire activity has thinned the organic surface layers.

3.3.2.1 Prime and Unique Farmland

The Natural Resources Conservation Service (NRCS) was contacted by telephone on 4 August 2001. Mr. Tony Polizos, District Conservationist for the NRCS Naples Field Office, stated that he was unaware of any prime or unique farmland within the PSRP project boundaries. A letter dated 15 January 2003 from NRCS State Soil Scientist Mr. Warren Henderson confirms that there is no land within the PSRP Project Area that meets the current criteria for prime or unique farmland. Based on the above information “Prime and Unique Farmland” will be dropped from discussion in the remainder of this document.

3.4 Study Area Land Use

Land use of the project area is depicted in Figure 16 which is a map based on the Florida Land Use Cover Classification System (FLUCCS). The existing land use within the study area varies throughout including agricultural, coniferous forested wetlands, hardwood forested wetlands, mixed forested wetlands, non-forested wetlands, rangeland, recreation, residential and water.

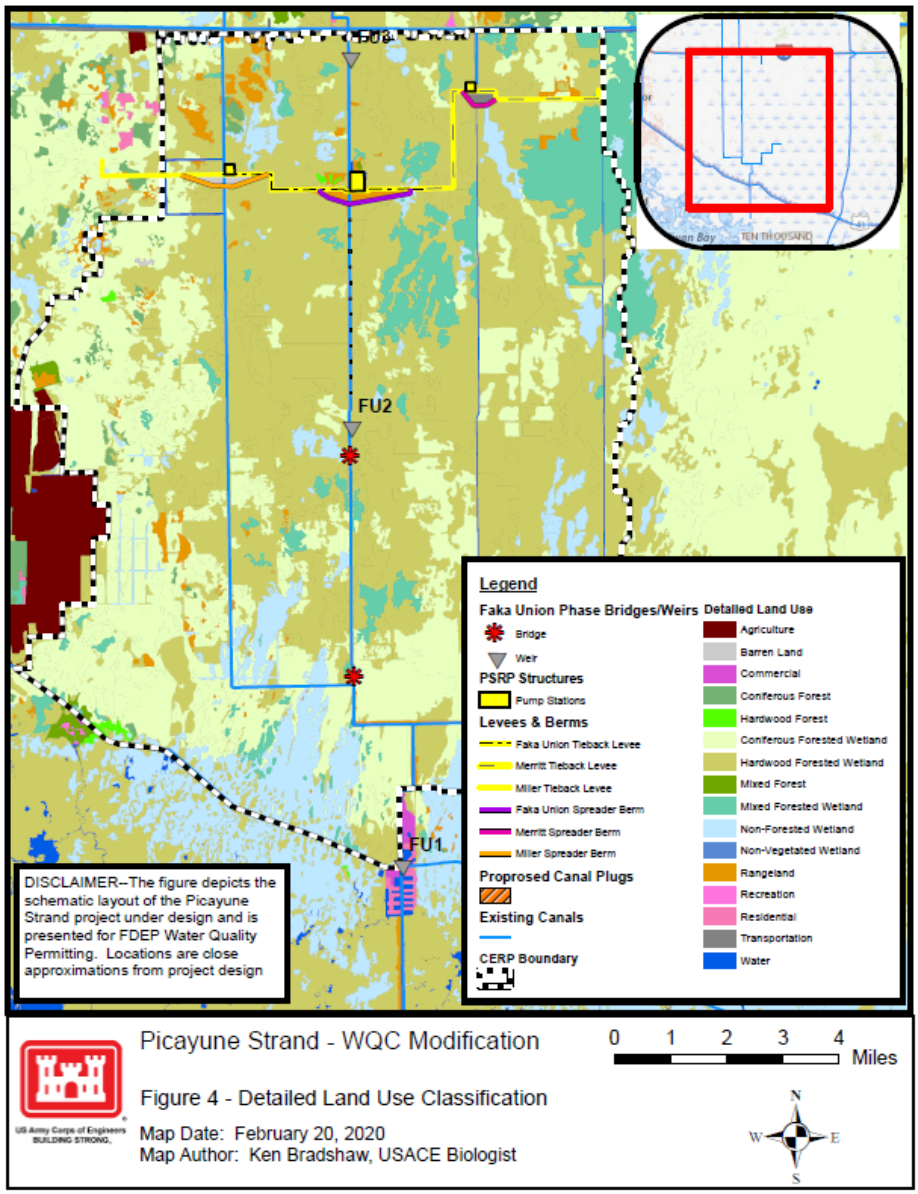

Figure 16: FLUCCS Map of the PSRP Area

3.5 Hydrology

Land drainage activities began in southwest Florida with the diversion and channelization of the Caloosahatchee River. Significant anthropogenic alterations of the hydrologic regime and vegetative communities have occurred within the PSRP Project Area since the cypress logging operations in the 1940s and 1950s. The greatest changes to the PSRP area began with the 1960s development. The area was subdivided into rectangular plots. A network of 279 miles of roads was laid out on a quarter mile grid. Roads were built above surrounding ground by excavation of borrow ditches on each side. The roads and ditches, oriented north-south and east-west, intercepted historic shallow flow paths, which were generally oriented in a NNE-SSW direction. To maintain a lower groundwater table and provide flood drainage, 48 miles of large artificial channels were built. The Merritt, Faka Union, Miller, and Prairie canals ultimately delivered all drainage to the lower end of the Faka Union (central) canal. These canals

additionally provided conveyance for water drained from Northern Golden Gate Estates, located outside the main study area, north of I-75. The operation of these large canals lowered groundwater throughout the PSRP Project Area landscape. Pre-drainage sheet flow was virtually eliminated; aquifer storage was reduced due to the generally lowered water table. Channeling all of the flow caused "shock load" discharges to the estuaries, releases of very large quantities of freshwater over a relatively small cross-sectional area of Faka Union Bay, during a relatively short time. Subdivision and road construction, as well as some land clearing on purchased lots inside the PSRP Project Area further changed the landscape by promoting invasion of upland and exotic vegetation, changes in species dominance in native communities, and increased wildfire. Beginning in 1985, the State of Florida started purchasing the PSRP Project Area lands with the purpose of restoring the hydrology and ecology of the area and combining the surrounding natural preserve units.

It is estimated that the Golden Gate and Faka Union Canal systems have increased drainage 16 times faster than historic conditions, lowered water tables by 2 to 4 feet, and reduced hydroperiods by 2 to 4 months, resulting in a dramatic increase in forest fires and annual runoff (Gore 1988).

Hydrologic monitoring across the main Fakahatchee flowway has shown seasonal prerestoration 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 four wet seasons monitored after the completion of the Prairie Canal backfilling, there was 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. Backfilling of the Merritt Canal was completed in 2014 which resulted in similar restoration of hydroperiods and increases in groundwater levels adjacent to Merritt Canal for the five wet seasons (i.e., October to May 2015 to 2019) following completion of the canal backfill (DBHYDRO groundwater data and stage duration curves at SGT2W4; accessed 20 April 2020). 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 remaining Faka Union and Miller Canals are filled (Duever, 2010).

3.6 Regional Water Management (Operations)

The PSRP is dependent on flow from NGGE to achieve restoration objectives. Concurrently, the PSRP has been designed to maintain the level of service for flood risk reduction (Savings Clause) for the NGGE. The PSRP project conveys water from NGGE to PSRP through Miller, Faka Union, Merritt Canals, and Prairie Canal. The water is then pumped into spreader canals that will act as plunge pools for energy dissipation and to aerate the water discharging from the pump stations. These spreader channels will also redirect the water from flowing southward within the canals to east and west directions perpendicular to the canals. As the water rises within the spreader channel, the water would overtop the southern, downstream bank of the channel and then flow over the land southward as sheet flow. As water flows south it will encounter the 83 canal plugs strategically placed throughout the Miller, Faka Union, Merritt and Prairie Canals and will spread as sheet flow toward structure FU-1 at the southern extent of the Project. The pump stations on the Miller, Faka Union and Merritt Canals will be used to maintain optimum canal stages upstream of the pump station maintaining the existing levels of flood protection in NGGE

residential areas. The term “optimum” refers to the water levels associated with water management operations resulting from extensive modeling that includes the Big Cypress Basin Manual of Water Control Structures dated July 2000.

The Miller Canal is located on the western extent of the project area approximately two miles west of the Faka Union Canal and is used to convey NGGE basin and PSRP basin runoff to the south. The Miller Canal runs south from the NGGE area north of I-75 into PSRP and approximately 11 miles south of I-75. The Miller Canal then runs east approximately two miles and terminates at the Faka Union Canal. Existing weir structures Miller-2 is still present north of the Miller Pump Station (will be removed) and Miller-1 will be nonfunctional. An optimum stage of 7.2 will be maintained upstream of the Miller Pump Station in the Miller Canal during the dry season and an optimum stage of 4.9 will be maintained upstream of the Miller Canal pump station during the wet season. The Miller Canal pump station is located on Miller Canal approximately 2.9 miles south of I-75 and will be used to regulate the stages in the Miller Canal.

The Faka Union Canal runs south from the NGGE area north of I-75 into the PSRP and approximately 11 miles south of I-75. The Faka Union Canal then runs east approximately one mile and south again, terminating at structure FU-1. Existing weir structure FU-3 is still present (will be removed) north of the Faka Union Pump Station and existing weir structure FU-2 will be nonfunctional. Existing structure FU-1 will remain functional as a saltwater barrier at the southern extent of the project. An optimum stage of 7.2 will be maintained upstream of the Faka Union Canal pump station in the Faka Union Canal during the dry season and an optimum stage of 4.9 will be maintained upstream of the Faka Union Canal pump station during the wet season. The Faka Union Canal pump station is located on Faka Union Canal approximately 2.9 miles south of I-75 and will be used to regulate the stages in the Faka Union Canal.

The Merritt Canal ran south from I-75 approximately 11 miles then ran west approximately 1 mile and terminates at Faka Union Canal. The Merritt Canal was plugged in 2014 creating an overland flow regime. Existing weir structure Lucky Lake will be removed and existing structure Merritt-1 will remain as nonfunctional. An optimum stage of 8.0 will be maintained upstream of the Merritt Canal pump station in the Merritt Canal during the dry season and an optimum stage of 5.2 will be maintained upstream of the Merritt Canal pump station during the wet season. The Merritt Canal pump station is located on Merritt Canal approximately 1.5 miles south of I-75 and will be used to regulate the stages in the Merritt Canal.

The Prairie Canal began approximately 1.7 miles south of I-75 and ran south approximately 7 miles then runs west approximately 1.1 miles then south approximately 1.1 miles then west approximately 1 mile and terminates at Merritt Canal. The Prairie Canal was plugged by the SFWMD in two phases with the first 67% completed in 2004 and the remaining 33% completed in 2006-2007, creating an overland flow regime. Existing structure Prairie-1 will remain as non-functional. Stages in the Prairie Canal remain unregulated.

3.7 Flood Risk Management

The major freshwater aquifers underlying the PSRP Study Area region are the water table, the Lower Tamiami, and the sandstone aquifers. The water table and Lower Tamiami are the primary sources of water supply and occur within the surficial aquifer system. Presently, the NGGE area is not served by any public water or sewerage utility. Potable water is self-supplied primarily from the Lower Tamiami Aquifer. The sandstone aquifer, a part of the intermediate aquifer system, is separated from the surficial system by low permeability sediments and is present only on the northern part of the watershed. Rainfall is the

primary source of recharge to the surficial aquifer system. Downward movement of water through the leaky confining beds underlying the water table recharges the Lower Tamiami aquifer. Since most of the PSRP Study Area canals are located in areas where the limestone of the shallow aquifer is within ten feet of the land surface, there is a direct hydraulic connection between the canal system and the upper portions of the surficial aquifer.

The agricultural lands southwest of the PSRP have an earthen levee system throughout and surrounding croplands. The levees throughout this system have a conveyance canals on both sides of these earthen levees. These canals convey water drained from farm fields to proper levels for growing tomato crops.

The City of Naples Eastern Golden Gate Well field is located along the Faka Union Canal between weirs Faka Union No. 4 and Faka Union No. 5, in the NGGE. With a maximum daily allocation of 21.0 million gallons per day, this well field provides the lion's share of the potable water for Naples and its unincorporated service area. Recharge from the canal influences the yield of the well field. Protection of the long-term sustained yield of this well field is one of the city's primary issues related to hydrologic restoration of the PSRP Project Area.

3.8 Vegetative Communities

In July 2001 the Natural Resources Conservation Service (NRCS) provided a detailed map, based on soil survey field data and aerial photographs, of the 1995 distribution of major plant community types in the PSRP Project Area (Figure 18). This NRCS map represents a valuable baseline of real world plant community acreages for current conditions. Using the MIKESHE model, South Florida Water Management District (SFWMD) produced an "existing conditions" model run of hydrologic conditions. Plant community distributions were predicted using the relationship between the hydrologic characteristics of each major community type (Figure 17) and the average wet season water depths (July 1 through October 1) as predicted by the model.

Average Wet Season Water Level (inches)	Hydroperiod (months)	SGGE Non-Tidal Plant Communities	Non-Hydrologic Influences	Relative Abundance in SGGE (Existing)
≤-6	0	Tropical Hammock	No Fire	++
≤2	≤1	Mesic Pine Flatwoods	Fire	+++
		Palmetto Prairie	>>>Fire	0
		Mesic Hammock	No Fire	++
		Brazilian Pepper	Exotic	++
		Palms in Flatwoods	Soils	+++
		Palms in Hammock	Soils	+++
2 – 6	1-2	HydricPine Flatwoods	Fire	+++
		Hydric Hammock	No Fire	+++
		Palms in Flatwoods	Soils	+++
		Palms in Hammock	Soils	+++
6 – 12	2-6	Wet Prairie	Fire	+++
12 – 24	6-10	Marsh	Fire	++
		Cypress Forest	< Fire	++++
>24	>10	Open Water	Canals	+
Relative abundance of plant communities is indicated by the number of pluses from low abundance (+) to high abundance (++++). A zero (0) indicates the community is not present under existing conditions.				

Figure 17: Factors maintaining major plant community types within the PSRP (USACE 2004).

Major changes to the hydrology and biology of the PSRP Project Area landscape began between 1968 and 1971, when the four canals that comprise the Faka Union Canal system and the 279-mile road system were completed. This construction led to a significant decline in the landscape's ecology, which is still occurring to this day. Historic plant community composition changed from that of wetland and transitional vegetation to more upland, invasive, and exotic dominated systems (such as Cx, Hp, Hx, and Pp) as shown in Figure 18. As historic cypress strands within the PSRP Project Area became drier due to the canal-induced draw down, there was a shift in vegetative succession toward a mixed cypress-hardwood-sabal palm system. Additionally, as a result of these abnormally dry conditions, hotter fires now frequently burn farther from prairies and flatwood communities into adjacent cypress strands or other hydric forested systems. Pines, sabal palms and saw palmettos that are adapted to drier conditions and more intensive fire regimes have replaced the cypress forest communities. Often invasive exotic species like Brazilian pepper (*Schinus terebinthifolius*) and melaleuca (*Maleleuca quinquenervia*) have become dominant or co-dominant in many of these formerly hydric communities.

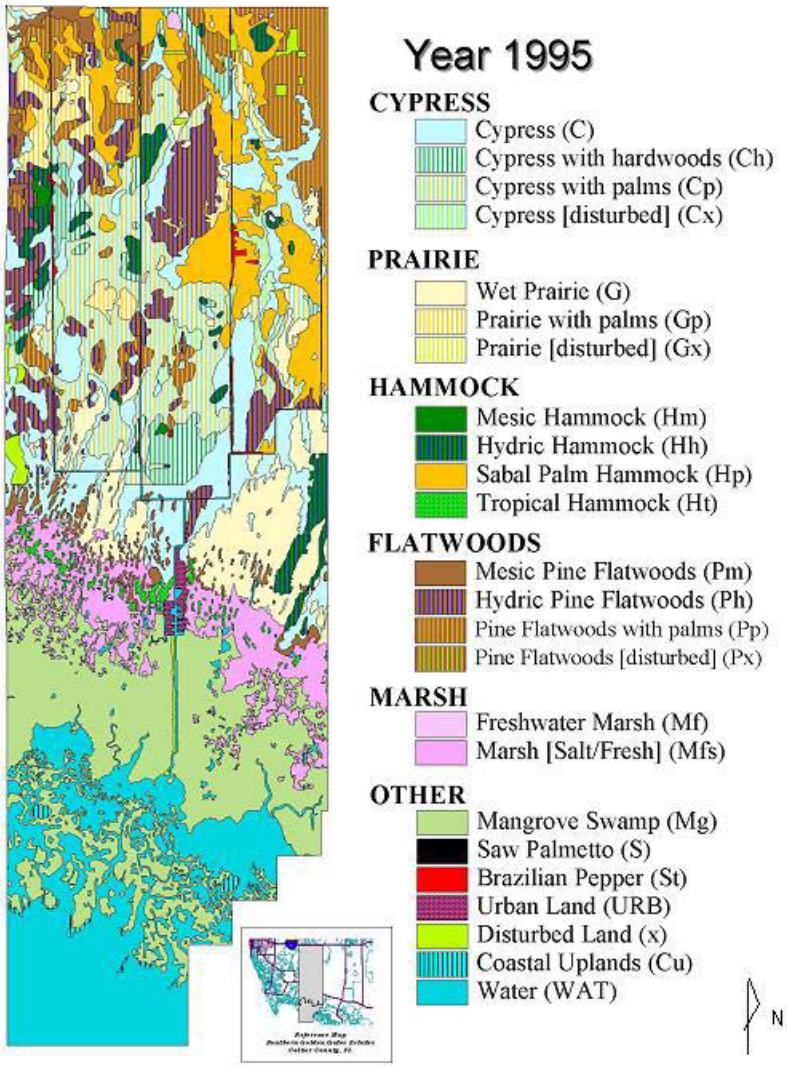

Figure 18: Vegetation map of the PSRP included in the 2004 PIR/EIS.

The native sabal palm (*Sabal palmetto*), also commonly called the cabbage palm, has become dominant throughout much of the PSRP Project Area during the past few decades. These palms form dense populations of similar sized, apparently young trees, beneath widely spaced individuals that appear to be very old. Ages of sabal palms here have been subjectively estimated, as features of their growth do not conform to annual or seasonal events, and ages cannot be accurately determined from their physical characters. Most areas with dense sabal populations do not appear to have had dense sabal palm populations on aerial photographs taken in 1940 and 1953. This suggests a sparse parent population that has given rise to a successful population of offspring, all at about the same time. The younger palms appear to be 2-3 decades old (again, ages determined subjectively), suggesting that the population increase occurred as the hydrology of the area changed. The sabal palm forest has now become almost a pure biotype within many areas of the PSRP Project Area. The Florida Forest Service (FFS) now considers this palm an invasive species by that needs to be controlled in order to maintain diversity in the ecosystem.

3.9 Fish and Wildlife Resources

By their nature, the hydroperiods of wetland systems are highly susceptible to the impacts of drainage projects. The shortened hydroperiods currently present in the PSRP Project Area clearly demonstrate the profound impacts of drainage projects on the shallow wetlands and the associated fish and wildlife in this part of SW Florida.

The drainage of the PSRP Project Area has increased fire frequency, accelerated the invasion of exotic and nuisance species, and degraded resources for vertebrates within and adjacent to the project area. A reduction in those species dependent on wetland systems for all or part of their life cycle, such as amphibians, some reptiles, and forage fish, is confirmed by ongoing surveys (Addison 2001). Plant diversity has been reduced as a result of replacement of historic cypress communities by monocultures of cabbage palm and non-native plant species. Radio telemetry information for the Florida panther indicates significantly less use of the project area than adjacent public lands to the east and west, possibly due to reduced prey availability and the disturbance related to human presence, which is exacerbated by a grid road system (Land 2001). Increased high intensity wildfire has eliminated pine canopy that could be utilized by migratory birds, the state-listed Southeastern American kestrel (*Falco sparverius paulus*) and Big Cypress fox squirrel (*Sciuris niger avicennia*), and the state and federally listed red-cockaded woodpecker (*Picoides borealis*), which is present on adjacent public lands with greater pine forest density.

The shortened hydroperiods and the rapid drainage that now occurs in the PSRP Project Area with the onset of the dry season have also impacted aquatic and terrestrial wildlife. For example, much of the decline in wading bird populations throughout South Florida is directly attributable to the loss of wetland function resulting from drainage. In the PSRP Project Area, the acreage of wetlands that once supported large populations of fish and aquatic invertebrates well into the dry season are now impaired in their ability to function as forage areas. While they can serve as foraging areas, the period of time that they can function in this capacity has been truncated. Areas that once retained water even in time of drought, no longer do so. Further, these wetlands can no longer function effectively as refugia for alligators, turtles, amphibians, and fish during droughts. The extent of this loss of function in the PSRP Project Area was demonstrated during the drought in 2001. No natural wetlands in the PSRP Project Area retained any water whatsoever. In the adjacent Fakahatchee Strand State Preserve, an area that has not been as seriously impacted by drainage, some of the deeper wetlands retained water and were refuges for wildlife (Nelson et al. 2001).

3.9.1 American Bald Eagle

As of 2004, Florida has the highest number of breeding bald eagles of any southeastern state, supporting approximately 70 percent of the occupied territories in this region (USACE 2004). Eagle sightings within the PSRP Study Area are common in particular along the edges of the Ten Thousand Islands Region. However, intensive conversion of natural plant communities to agricultural, residential, and commercial uses has encroached, and continues to encroach, on bald eagle nesting and foraging habitats. The drainage and development of the PSRP Project Area destroyed most of the wetlands that were bald eagle habitat. Eagle use varies in the PSRP Project Area but includes both nesting and foraging activities. At the time of the 2004 PIR/EIS, no known bald eagle nests were located in the PSRP Project Area. Although, one nest was located approximately 5 miles west of the PSRP in the Belle Meade Tract of the PSSF.

Bald eagles are known to nest around the study area. Nesting season occurs from October through May. The bald eagle mates for life and uses the same nesting site year after year, if the territory is available. A number of bald eagle nests occur within the project area (Figure 19 and Table 6).

Table 6: Status of American bald eagle nests in the vicinity of the PSRP from the FWC Bald Eagle Nest Locator Database.

NEST ID	LATITUDE	LONGITUDE	LAST KNOWN ACTIVE	LAST SURVEY	KNOWN YEARS ACTIVE 2013-2017
CO006	25.98833	-81.54300	2003	2017	0
CO011	25.99367	-81.58867	2016	2017	2
CO013	26.00800	-81.64567	2017	2017	2
CO015	26.14767	-81.64117	2008	2017	0
CO016	25.94600	-81.46950	2017	2017	4
CO037	26.03550	-81.64283	2017	2017	3
CO042	25.97233	-81.54133	2010	2017	0
CO055	26.01367	-81.66533	2017	2017	2
CO056	26.14850	-81.67950	2017	2017	2
CO058	26.13767	-81.49300	2017	2017	1

Figure 19: Map of American bald eagle nest locations as of 2017 from the FWC Bald Eagle Nest Locator Database (accessed 26 February 2020).

Prior to the drafting of this EA, USACE obtained bald eagle nest locations, status, and history for bald eagle nests within the study area of PSRP (Figure 19). The USACE also communicated with land managers, including PSSF, CSSP, and TTINWR about known locations of bald eagle nests within the study area that were not documented in the FWC bald eagle nest locator database. One bald eagle nest location was provided by the Florida Park Service (FPS) (Figure 20).

Figure 20: Map of an undocumented American bald eagle nest in Collier Seminole State Park provided by the Florida Park Service. This nest is not documented in the FWC Bald Eagle Nest Locator Database as of 2017.

3.10 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 (NMFS) has been conducted through a programmatic CERP consultation (NMFS 2013). A supplemental BA is included in this report that addresses the addition of the southwest protection feature, additional conveyance features, and partial plugging of the Faka Union Canal for species under the purview of the USFWS. The supplemental BA also includes evaluation of effects for additional species that have a “no effect” determination that are not highlighted in this section. The full supplemental BA can be found in Appendix A.

Federally listed species that are known to occur or potentially occur in the vicinity of PSRP include the threatened (similar appearance) American alligator (*Alligator mississippiensis*), threatened American crocodile (*Crocodylus acutus*), endangered Everglade snail kite (*Rostrhamus sociabilis plumbeus*), threatened wood stork (*Mycteria americana*), endangered Florida panther [*Felis* (=*Puma*) *concolor coryi*], threatened Eastern indigo snake (*Drymarchon corais couperi*), threatened West Indian manatee (*Trichechus manatus*), endangered red-cockaded woodpecker (*Picoides borealis*), endangered Florida bonneted bat (*Eumops floridanus*) and the candidate species, gopher tortoise (*Gopherus polyphemus*).

The PSRP and the vicinity downstream of the PSRP also contains designated critical habitat for the threatened loggerhead sea turtle, threatened piping plover, 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 continues to 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 sub-sections summarize information from the most recent supplemental BA on threatened and endangered species within the affected environment for the SWPF, additional conveyance features and partial plugging of the Faka Union Canal.

3.10.1 American Alligator

The USFWS lists the American alligator as threatened due similarity of appearance to the threatened American crocodile. This species occurs throughout south Florida primarily in freshwater and some estuarine habitats throughout the Everglades. Historically, American alligators were most abundant in the peripheral Everglades marshes and freshwater mangrove habitats, but are now most abundant in canals and the deeper slough habitats of the central Everglades. Water management practices including drainage of peripheral wetlands and increasing salinity in mangrove wetlands as a result of decreased freshwater flows has limited occurrence of American alligators in these habitats (Craighead 1968, Mazzotti and Brandt 1994). Similar effects have occurred within PSRP due to the creation of the PSRP infrastructure resulting in the loss of wetland habitat. Reduction of freshwater sheetflow throughout the PSRP and conveyance of freshwater into downstream estuarine habitat has resulted in higher salinity within these estuarine fringes. Areas that once retained water even in time of drought, no longer do so, meaning these wetlands can no longer function effectively as refugia for American alligators.

3.10.2 American Crocodile

The USFWS and the FWC list the American crocodile as threatened in the southeast US. 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. Increased salinity throughout the downstream estuaries due to the reduction of freshwater flow into the estuaries downstream of the PSRP plays a role in the limited population in the vicinity of the PSRP. A description of the American crocodile is included in the 2004 PSRP Final PIR/EIS and 2004 BO and remains relevant.

3.10.3 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.

3.10.4 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). In 2014, USFWS downlisted the wood stork from endangered to threatened. A thorough description of the wood stork is included in the 2004 PSRP Final PIR/EIS and is incorporated into this document by reference.

3.10.5 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.

3.10.6 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.

3.10.7 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 (ten'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). Since the completion of the 2013 LRR, the manatee mitigation feature has been completed and West Indian manatees have been observed utilizing the feature. 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.

3.10.8 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, ten 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.

3.10.9 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 Conservancy, 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 1 November 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.

3.10.10 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.

Prior to the drafting of this Supplemental EA, the USACE obtained gopher tortoise burrow locations and possible status of each burrow within areas of concern in Collier Seminole State Park (Figure 21). Data was collected and provided by staff from Collier Seminole State Park and the Conservancy of Southwest Florida. Further details regarding species background information and analysis are included in BA in Appendix A.

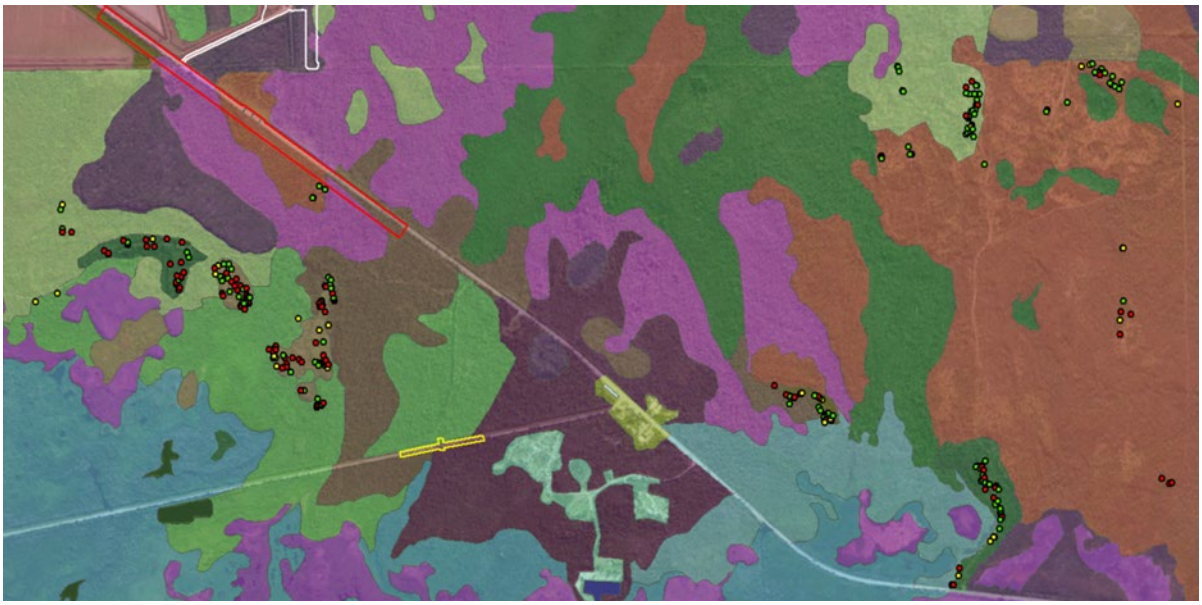

Figure 21: Results of gopher tortoise surveys conducted by Conservancy of Southwest Florida and Collier Seminole State Park in February and March 2020. Burrow labels are: potentially occupied burrows (green), abandoned (red), and occupied by another species (yellow). The map is overlaid on a FLUCCS map showing different habitats that are discussed in this section. Footprints shown are: SWPF (white), US-41 new opening footprint (red), and CR-92 culvert (yellow).

3.10.11 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 (*Chelonia mydas mydas*), and the endangered Hawksbill sea turtle (*Eretmochelys imbricata*) are being addressed under a CERP programmatic consultation with NMFS. The Programmatic CERP Biological Assessment was submitted to NOAA-NMFS on 2 July 2013. A concurrence of determination letter was provided to the USACE 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 of these species is included in the 2004 PSRP Final PIR/EIS and is incorporated into this document by reference.

3.11 Essential Fish Habitat

The existing Faka Union Canal system collects rainfall runoff from both NGGE and the PSRP Project Area. This water, which would have been shallow slow moving sheet flow under natural conditions, is channeled through the system as surge flows into Faka Union Bay. Fish habitat in Faka Union Bay is damaged by the high flows and all bays are damaged by the reduction in slowly infiltrating freshwater that is needed to maintain optimal salinities. The shallows, and feeder creeks that make up the estuaries of the six bays located within the Ten Thousand Islands Region are displayed in Figure 3. These estuaries provide Essential Fish Habitat (EFH) for both adult and juvenile brown shrimp (*Penaeus aztecus*), gray snapper (*Lutjanus griseus*), gulf stone crab (*Menippe adina*), pink shrimp (*Penaeus duorarum*), red drum (*Sciaenops ocellatus*), Spanish mackerel (*Scomberomorus maculates*), spiny lobster (panulirus argus), stone crab (Menippe mercenaria), and white shrimp (*Penaeus setiferus*). The EFH consists of shallow open waters, mangrove-lined tidal fringes, seagrasses, macroalgal assemblages, and oyster reefs.

Mangroves are considered EFH because of their role as exporters of large quantities of particulate detritus (leaf litter) and dissolved organic matter into the embayments, and because they provide tremendous shelter and forage within the prop root communities that line the shores and creek banks. Seagrass beds and shallow oyster reefs likewise provide structure and shelter for juvenile life stages and small prey fish. Small "forage" fishes of many species are prey for larger individuals of commercially important species. Some 80-90+ percent of all commercially important fish and shellfish species in southwest Florida depend on these shallow, highly productive habitats for completion of at least one stage of their life cycles.

3.12 Water Quality

The PSRP Project Area comprises of the southern portion of the Faka Union Canal system. The construction of canals, levees and roads within the Faka Union Basin have eliminated the historical freshwater sheet flow and resulted in changes to the timing, distribution and quantity of flow within the system that have influenced water quality conditions in the project area and impacted the downstream estuaries of the Ten Thousand Islands Region. From west to east, estuaries of Ten Thousand Islands National Wildlife Refuge that receive water from the upstream PSRP Project Area include: Goodland Bay, Sugar Bay, Palm Bay, Mud Bay, Buttonwood Bay, Blackwater River, Gill Rattle Creek, Whitney River, Pumpkin Bay, Pumpkin River, Little Wood River, Wood River, Faka Union Bay, and Fakahatchee Bay (USFWS 2019-- https://www.fws.gov/southeast/pubs/TenThousandIslands-tearsheet.pdf). In particular, salinity levels have been severely altered in three major estuarine systems including: Blackwater River, Pumpkin Bay, and Faka Union Bay, and in the smaller intervening estuaries. The large centralized freshwater inputs through the Faka Union Canal in the wet season contribute to large fluctuations in the salinity levels in the Faka Union Bay and extended hypersaline periods within the surrounding estuaries. Hypersaline periods are caused by reduction of sheetflow west of Faka Union Bay that artificially increases

salinity during the rainy season. This results in enormous shocks to the aquatic biota of the Faka Union Bay.

There are several monitoring efforts currently being conducted within the sphere of influence of this project area. The Collier County Pollution Control Department (CCPCD) monitors surface waters from at least eight sites that are classified as inflows or outflows to the PSRP Project Area. The Southeast Environmental Research Center of Florida International University (FIU) maintains an extensive monitoring network within the estuarine waters of the southwestern coast of Florida, including a site within the Faka Union Bay, located at the mouth of the canal. The FDEP Rookery Bay National Estuarine Research Reserve (NERR) is also collecting continuous data for the Faka Union Bay and Fakahatchee Bay. SFWMD also monitors stage and water quality at several monitoring stations along Tamiami Trail and at the Merritt Canal Pump Station.

The physical and chemical conditions of surface waters in the Class III freshwater bodies (recreation, fish and wildlife propagation) of the PSRP Study Area generally meet the water quality state standards. The quality of groundwater is also within the Florida Department of Environmental Protection's (FDEP) drinking water standard for potable supply. The upstream water body for the Faka Union Partial Plugging is the I-75 collector canal (Class III) and the receiving water body is Faka Union Bay via the Faka Union Canal. The upstream water body for the SWPF levee and the US-41 culverts is also the I-75 collector canal (Class III) and the receiving water body for the SWPF levee and US-41 New Culverts is the Tamiami Canal within Rookery Bay Inland East Segment, WBID 3278V (Class III). Sloughs downstream of the new culverts convey water to the Rookery Bay, Blackwater River (part of Ten Thousand Islands), and Gulf Islands (part of Ten Thousand Islands) estuaries. These sloughs do not have numeric nutrient criteria (NNC) where project water are conveyed, but the estuaries further south have been assigned the following NNC by FDEP: Rookery Bay Estuary has NNC of 4.9 ppb annual geometric mean (AGM) for Chl-a, 46 ppb AGM for Total Phosphorus (TP) and 0.30 ppm AGM for Total Nitrogen (TN); Blackwater River Estuary has NNC of 4.1 ppb AGM for Chl-a, 53 ppb AGM for Total Phosphorus and 0.41 ppm AGM for Total Nitrogen; and Gulf Islands Estuary has NNC of 3.4 ppb AGM for Chl-a, 38 ppb AGM for Total Phosphorus and 0.44 ppm AGM for Total Nitrogen.

The FDEP Water Quality Assessment Report (available on FDEPs Water Quality Assessments, TMDLs, and BMAPs Interactive Map) lists Rookery Bay Inland East Segment as impaired (category 4d) for dissolved oxygen. The upstream water bodies for the CR 92 culvert are Tamiami Canal within the Rookery Bay Inland East Segment, WBID 3287V, and marshes of the Rookery Bay Coastal Segment, WBID 3278U (Class II) in the northern part of the Rookery Bay Estuary. The downstream receiving water body is marshes of Ten Thousand Islands Estuary, WBID 3259M (Class II), in the northern part of the estuary. CR 92 forms the boundary between WBID 3278U and WBID 3259M. Rookery Bay Coastal Segment (WBID 3278U) is listed as impaired for Nutrients (Total Nitrogen—Category 4e) and Fecal Coliform Bacteria (Category 5). Ten Thousand Islands Estuary (WBID 3259M) is listed as impaired for Nutrients (Chlorophyll-a—Category 4d & Total Nitrogen—Category 4e), Fecal Coliform Bacteria (Category 5), and dissolved oxygen (category 4e).

Section 403.061(27), Florida Statues, grants FDEP the power to establish rules that provide for a special category of water bodies within the state, referred to as "Outstanding Florida Waters" (OFWs), which carry special protection because of their natural attributes. In particular, Section 62-302.700 F.A.C. states that no degradation of water quality, other than that allowed in subsections 62-4.242(2) and 62-

4.242(3) F.A.C., is to be permitted in OFWs and Outstanding Natural Resource Waters, respectively, notwithstanding any other FDEP rules that allow water quality lowering. Projects that are proposed within an OFW must not lower existing ambient water quality, which is defined for purposes of an OFW designation as the water quality at the time of OFW designation or the year before applying for a permit, whichever water quality is better (62-4.242(2)(c) F.A.C. The existing ambient water quality criteria were derived by FDEP in March of 2020 following the procedures outlined in Section 62-302.700 F.A.C. for the Collier Seminole State Park OFW. The baseline data for the PSRP project was the 2019 water year, because of the anticipated USACE CERPRA permit application for the SWPF and Conveyance Features sometime in 2020. The TAMTOM (Figure 42) location was determined as the location representative of water flowing into the OFW, and was used for determining the numeric criteria of 310 ± 50 ppb annual flow weighted mean concentration for TP, and 2.18 ppm annual flow-weighted mean concentration for TN.

Data from monitoring sites located at the boundaries of the PSRP were summarized over an 18 year period of record (2001 to 2019). Data at the inflows near the northern boundary of the project area along the Miller, Faka Union and Merritt Canals indicate median TP concentrations ranged between 10 and 20 parts per billion (ppb), and median TN concentrations ranged between 0.47 and 0.54 parts per million (ppm) during the 18 year period. Data from project area outflows near Faka Union Canal indicate median TP concentrations ranged between 11 and 13 ppb, and median TN concentrations ranged between 0.46 and 1.08 ppm. Agricultural activity near the western boundary of the PSRP has been identified as an area of potential concern for future hydrologic restoration activities due to high concentrations of nutrients in surface water, namely TP and TN. Data from monitoring locations near the southwestern boundary of the project are where surface water quality is impacted by agricultural land use indicate median TP concentrations ranged between 251 and 276 ppb, and median TN concentrations ranged between 1.29 and 1.59 ppm during the 18 year period.

3.13 Native Americans

No portion of the original proposed PSRP and/or the potential area of impact (APE) of the additional conveyance features exists within or adjacent to known Native American reservation lands or Traditional Cultural Properties. However, Native American groups have lived throughout this region in the past, and their descendants continue to live within the State of Florida and throughout the United States. Pursuant to Section 106 of the NHPA (16 USC 470), obligation regarding USACE Trust Responsibilities to federally-recognized Native American Tribes, and in consideration of the Burial Resources agreement between the USACE and the Seminole Tribe of Florida, consultation on the project will continue to be coordinated. Moreover, consultation with the appropriate federally-recognized tribes is ongoing and will be completed prior to signing of the FONSI.

On 4 November 2019, the South Florida Water Management District (SFWMD) received a letter of concern from the Miccosukee Tribe of Indians of Florida describing, among other issues, concerns over the loss of 805 acres of land in the southeastern corner of Picayune Strand (see attached letters; Appendix A). SFWMD's letter stated that Under Section 1.10.3 of the July 2007 Final Draft Guidance Memoranda to the Programmatic Regulations for Comprehensive Everglades Restoration Projects (CERP), flowage and conservation easements should be considered if the benefits of the project can still be achieved with less than fee simple. The SFWMD letter stated that the while not a CERP project, the Kissimmee River Restoration Project utilized this guidance such that the United State Army Corps of Engineers (USACE) approved the use of less than fee simple land for appropriate parcels within the project footprint. Following this example, and given the nature of the Picayune Strand Restoration Project (PSRP) impacts

to the 805 acres, mainly groundwater seepage and hydroperiod changes, SFWMD's letter stated that project benefits may be achieved with less than fee simple interest over this property. In order to uphold SFWMD's responsibilities to stakeholders and complete the PSRP, their letter requested that the USACE advise the District as to whether easements could be used to attain project purposes. In a letter dated 28 January 2020, USACE reaffirmed its commitments to the Miccosukee Tribe of Indians of Florida by committing to work together with the SFWMD to revisit the real estate interest requirements for the PSRP in accordance with Corps real estate policy. USACE stated that while the lands in question were acquired via fee simple acquisition, the USACE believes a flowage and/or conservation easement can be an appropriate real estate interest if such an easement would allow for the project benefits to be achieved while also being compatible with the Tribe's interests.

3.14 Cultural Resources

Many cultural resource surveys have been undertaken in support of the PSRP (Division of Historic Resources [DHR] Project File Nos.: 2009-2324, 2007-1512, 2006-8902,2006-3435, 2005-13469, 2005-8356, 2008-0386,2009-2324,2009-6082,2010-3099, 2011-1222, 2012-01654, 2014-5190). More recent project consultation included the 6L's protection levee, the Bell Meade wetland area, and Miller road removal that was subject to an intensive Phase 1 cultural resources investigation (DHR Project File No.: 2016-2891). As a result of this investigation, the USACE determined that sites 8CR1401 and 8CR1402 were potentially eligible for inclusion in the National Register of Historic Places, and that sites 8CR1399, 8CR1400,8CR 1403, 8CR 1404, and 8CR 1405 were ineligible. For consultation purposes, all of the USACE determinations of effects based on these previous surveys will be maintained. A full description of cultural resources can be found in the 2004 PIR/EIS and the 2013 LRR, and are incorporated by reference. In addition, by letters dated 7 November 2018, notification of the USACE determination of no adverse effects regarding construction and hydration within the PSRP APE was sent to the Florida SHPO and federally recognized tribes and no responses were received.

A review of the Florida Master Site File (FMSF) indicates six cultural resources (8CR34, 8CR125, 8CR927, 8CR928, 8CR933, and 8CR1088) are located within Collier Seminole State Park and within the vicinity of the proposed conveyance features and resulting hydration. Site 8CR34 is a multicomponent historic homestead (Grocery Place) and prehistoric midden containing no known burial resources and not as of yet evaluated by Florida SHPO for eligibility listing in the National Register of Historic Places (NRHP). Site 8CR125 is Collier Seminole State Park, designated an historic landscape and evaluated as potentially eligble for inclusion in the NRHP by Florida SHPO. Site 8CR927 is US-41, which has been evaluated by Florida SHPO as eligible for inclusion in the NRHP. 8CR928 is the Tamiami Canal running parallel along US-41; also evaluated by Florida SHPO as eligible for inclusion in the NRHP. Site 8CR933 is the Royal Palm Hammock resource group consisting of six buildings constructed circa 1928 to circa 1942. These buildings served various roadside functions including: a filling station, restaurant, motel, and recreation. All of these building have experienced modern modifications, and have been evaluated by Florida SHPO as ineligible for inclusion in the NRHP. Site 8CR1088 is the Old San Marco Road. The road was constructed in 1916, and ran from Royal Palm Hammock to Marco Junction at Shell Island Road, and currently functions as a biking and hiking trail in the Collier Seminole State Park. The road is a narrow single lane dirt road that extends for approximately 1.5 miles within the park and continues outside its boundaries an additional eight miles to Belle Meade crossing. The road’s eligibility for inclusion in the NRHP has not been evaluated by Florida SHPO. Moreover, the 2004 Collier Seminole State Park Unit Management Plan informs the need for additional research regarding the significance of the road.

3.15 Air Quality

Air monitoring reports are prepared annually by the FDEP to inform the public of the air pollutant levels throughout the State of Florida. All areas within the state are designated with respect to each of the six pollutants (carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), particle pollution (10 microns or less in diameter (PM_{10}), and 2.5 microns or less in diameter ($PM_{2.5}$), and sulfur dioxide (SO_2)) as attainment (i.e., in compliance with the standards); non-attainment (i.e., not in compliance with the standards); or unclassifiable (i.e., insufficient data to classify). Attainment areas can be further classified as maintenance areas. Maintenance areas are areas previously classified as non-attainment which have successfully reduced air pollutant concentrations to below the standard. Southwest Florida including Collier County continues to be classified by the USEPA as an attainment/maintenance area for ozone and ozone has been gradually decreasing in the state since the late 1990s. Data collected by the state of Florida for the USEPA particle pollution standards for PM_{10}, and $PM_{2.5}$ has never had a monitor with a design value exceeding either standard and $PM_{2.5}$ and PM_{10} levels are showing a decreasing trend across the state. (Florida's Ozone and Particulate Matter Air Quality Trends (FDEP Website "Florida Ozone PM Trends" last modified 22 August 2019)). Monitored ozone design values near the project area (Fort Myers, FL) for 2016 to 2018 were approximately 60 ppb and were below the 70 ppb NAAQS_ for ozone. Monitored PM2.5 concentrations near the project area for 2016 to 2018 were 14 µg/m3 for the 24-Hour average concentration and 6 µg/m3 average annual concentration, and below the 35 and 12 µg/m3 24-Hour average and annual average NAAQS concentrations, respectively.

3.16 Hazardous, Toxic, or Radioactive Wastes

Initial Environmental Site Assessment (ESA) were conducted in the early 2000s (2003 to 2006) to assess and identify areas of concern and confirm the presence, or absence, of soil/groundwater contamination or contaminated media associated with the previous and current activities conducted within the PSRP project area (See Appendix D of the 2004 PSRP PIR/EIS). The ESA was performed in general accordance with American Society for Testing and Materials Standard Practice for Environmental Site Assessments (ASTM Practice E 1527-00). This method has been used as a guide to ensure appropriate inquiry into the environmental characteristics and conditions of the site consistent with good commercial/customary engineering and environmental practices.

The SFWMD contracted with URS Corporation for Hazardous, Toxic, and Radioactive Waste (HTRW) Phase I, II, & III assessments on the PSRP Project Area and immediate surrounding area in 2002. The contract was completed on 30 September 2003 by delivery of the report entitled *Phase I/II Environmental Site & Ecological Risk Assessment*. Additionally the SFWMD contracted with Environmental Consulting & Technology, Inc (ECT) in March 2004, to delineate impacts in the Former Agricultural Area-West (FAW) portion of the PSRP and prepare a supplemental assessment a report entitled *Additional Scope Sampling Program*. Executive summaries for the URS and ECT reports, including instructions for accessing an electronic copy of each document, can be found in Appendix D of the 2004 PIR/EIS.

The URS report delineates the project area into four zones. In addition to the Interior Area of the PSRP Project Area, three former agriculture zones were identified within the project footprint. These former agricultural areas comprise approximately 2,800 acres or 5% of the PSRP Project Area. The following is a brief overview of the potential HTRW risks within each zone. Each of these specific zones can be located on Figure 22.

<u>(1) Interior Area</u>

The Interior Area represents approximately 50,000 acres of the PSRP. Ninety-three (93) soil samples were collected from six landscape nursery/grove areas and 10 soil samples were collected from smaller farm operations within the interior portion of the PSRP. In addition to the cultivated areas, soil samples were collected from areas of potential point sources (i.e. irrigation pump wells, agrochemical mixing areas, etc.). Soil samples were analyzed for organochlorine pesticides and chlorinated herbicides. The results of Phase I/II and Phase III Environmental Risk Assessment (ERA) for the Interior Area indicated that the residual levels of pesticides exhibited in the Interior Area do not appear to pose a significant risk to aquatic animals or terrestrial animals and it is not anticipated that it will affect the trustee species. Therefore, no significant HTRW impacts would inhibit the proposed restoration activities within this zone. However, it is recommended that the homesteads be surveyed for potential asbestos containing materials, the potable wells abandoned, and the septic systems decommissioned prior to the proposed restoration.

(2) Former Agricultural Area – Southeast (FASE)

The FASE zone is located in the southeast section of the PSRP Project Area. The FASE represents approximately 1,450 acres of cultivated land that was reportedly used for the cultivation of tomatoes in the 1930s. Soil sampling in this zone identified selenium above the USFWS interim one mg/kg guideline concentration established for screening agriculture property proposed for conversion to restored wetland or storm water treatment areas. The ERA results indicates that selenium as well as the organochlorine pesticides does not appear to pose any significant risk potential to aquatic plants or animals. Groundwater samples from two monitor wells installed in the FASE did not exhibit elevated concentrations of organochlorine pesticides or metals.

(3) Former Agricultural Area - Northeast (FANE)

The FANE zone is located in the northeast section of the PSRP Project Area. The FANE represents approximately 600 acres of cultivated and uncultivated land, which was used for the cultivation of landscape plants and groves from the 1970s to 2000. Soil sampling within the FANE identified the presence of 4,4-DDT and toxaphene. Confirmation soil samples collected indicated that residual organochlorine pesticides were not consistently applied over the FANE, and are limited to localized areas and at low concentrations. Groundwater samples collected from the FAW did not exhibit detectable concentrations of organochlorine pesticides. Concentrations of metals were detected in groundwater samples below their respective GCTLs. Additionally; levels of selenium above the USFWS one mg/kg guideline were detected. Based on the ERA, the levels of selenium in soils found in the FANE may pose a minimal risk potential for certain small ground foraging mammals but it is not likely to affect the trustee species.

(4) Former Agricultural Area – West (FAW)

The FAW zone is located in the western section of the PSRP Project Area. The FAW represents approximately 750 acres of cultivated and uncultivated land, which was cleared in the early 1960s and used for the cultivation of row crops. Soil sampling within the FAW indicated that organochlorine pesticides chlordane and dieldrin were detected above their SQAG. The impacted soils make up approximately 150 acres. Based on the sediment desorption, toxicity, and bioaccumulation tests, the levels of chlordane and dieldrin at the FAW does appear to pose a significant risk potential for sediment dwelling organisms, however, the residual organochlorine pesticides do pose some risk potential to aquatic receptors and piscivorous birds.

A supplementary assessment of FAW was conducted to confirm the extent of impacted soils that may require corrective action. Since no selenium was detected above the one mg/kg USFWS guidance concentration, no further action was proposed with respect to selenium impacts. Nevertheless, as discussed with the USFWS, the two grids were resampled to confirm results. It was anticipated that the selenium resampling would return results less than the guidance Concentration. Confirmation sampling confirmed selenium levels were not representative of site conditions.

Based on the results of the supplementary assessment, 38.5 acres of chlordane impacted soil on PSRP (formerly SGGE) and 30 acres of chlordane impacted soil on Belle Meade required additional assessment or corrective actions.

Groundwater samples collected from the FAW did not exhibit detectable concentrations of organochlorine pesticides.

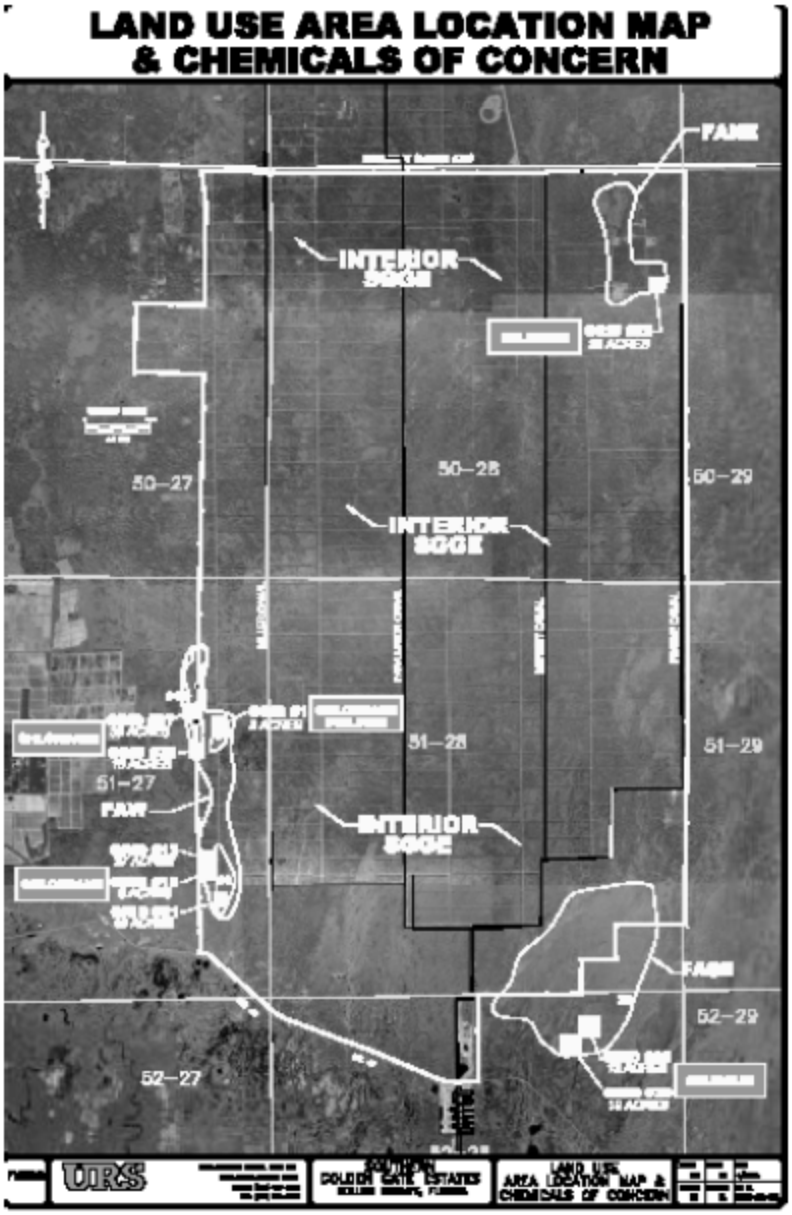

Figure 22: HTRW Zones and Chemicals of Concern

Since 2004, the non-federal sponsor (SFWMD) 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 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. A Phase I and II ESA was conducted on approximately 5,466 acres in the Belle Meade in July 2012. The Phase I/II ESA identified four solid waste disposal area and a small-arms target berm containing low concentrations of lead, arsenic, antimony, and copper. As a corrective action, SFWMD removed approximately 43 cubic yards of material of solid waste from the four locations and 23 tons of material from the small arms target berm. A Phase I and II ESA was conducted on approximately 3,980 acres of the Central Belle Meade and Former Wiggins Field Project area in October 2013. The Phase I/II identified elevated concentrations of

organochlorine pesticides at the Wiggins Field area and low levels of organochlorine pesticides and arsenic in soils at the Central Belle Meade Project area. Contaminant concentrations were compared to samples collected in 2006 and were found to have decreased substantially. Corrective actions are currently being planned by the NFS in the Wiggins Field area where the SWPF levee is planned. Corrective actions were not recommended elsewhere since it was determined that organochlorine concentrations were decreasing over time, in part, due to bio- and photodegradation. Areas where corrective actions for HTRW have occurred are shown in Figure 23. From approximately September 2018 through July 2019, PSI conducted a series of pre-demolition asbestos surveys at eight different residential sites in the Belle Meade project area. These sites contained houses, sheds/shacks trailers and residual debris piles. Following the asbestos surveys the required asbestos abatement was completed and the houses/structures demolished and the residual debris piles were removed. As a result all eight locations have been fully cleared and there is no HTRW present. Anticipated remediation activity still remains for the Belle Meade and Wiggins Field Project areas, located within the project operational flow way, pending completion of ongoing Phase I/II Remediation analyses by the SFWMD.

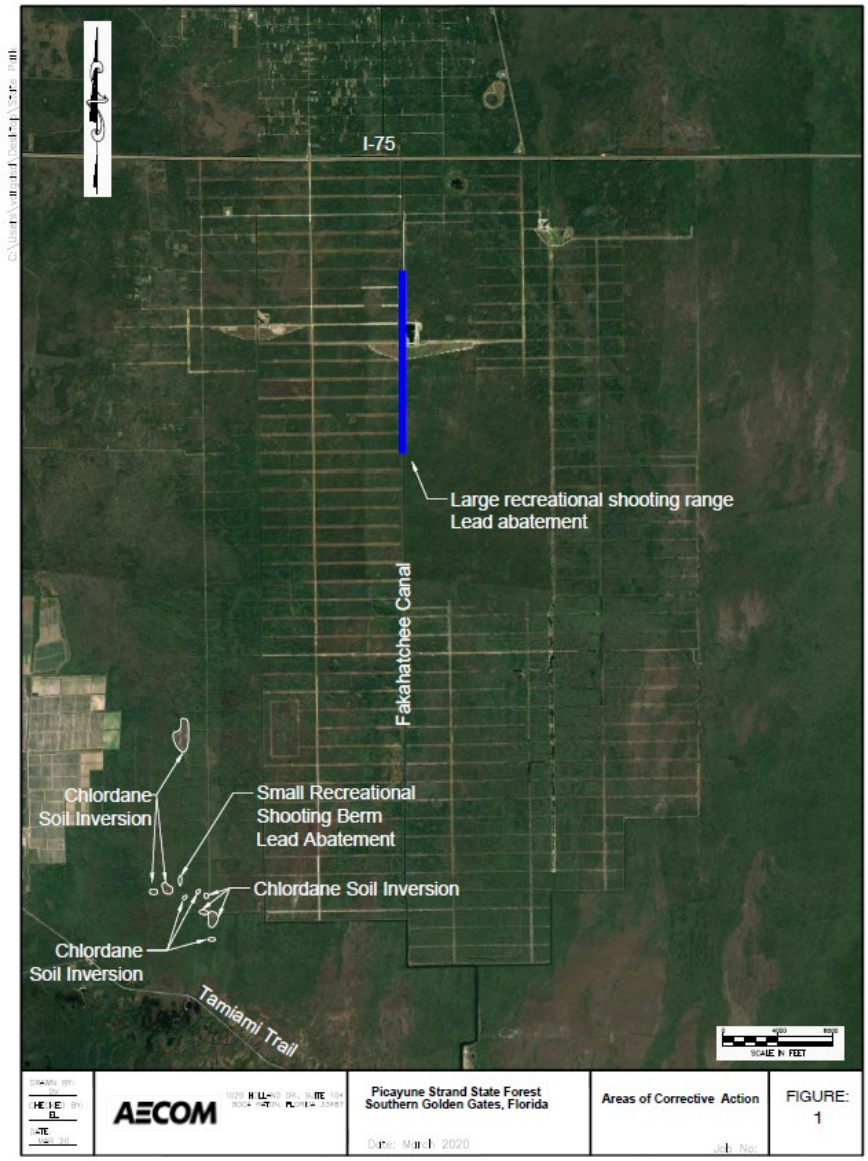

Figure 23: PSRP HTRW Corrective Action Areas.

3.17 Noise

Noise occurs from the general vehicular traffic on 279 miles of road within the PSRP Project Area. Swamp buggies, all-terrain vehicles (ATV), and outdoor recreational vehicles (ORV) are used off-road in a recreational manner. Indiscriminate shooting sometimes occurs.

3.18 Aesthetics

The visual characteristics of PSRP Project Area can be described according to the three dominant land use categories: natural areas, agricultural lands, and urban areas. Much of the PSRP is an unsuccessful subdivision where few lots were actually developed for housing with an infrastructure of 279 miles of roads laid out on a quarter mile grid with 48 miles of canals. The failed subdivision development left the existing environment disturbed.

Natural areas within the boundary of PSRP have shifted from a mosaic of upland and wetland natural communities to those more consistent with longer dry periods including infiltration of exotics and nuisance vegetation. Uplands are often dominated by pines and hardwoods. A number of state parks, state forests, state aquatic preserves, federal refuges, and federal estuarine reserve are in the vicinity of the PSRP project area. Bordering the southwest corner of the PSRP Project Boundary are agricultural lands associated with the Lipman Farms and Deseret Farms which produce tomatoes during the winter months (dry season). Urban development exists around the PSRP with housing developments associated with the POI and the NGGE. To the west, between the PSRP and the southwest Florida Coast lies the city of Naples. South of Naples lies the City of Marco Island.

Due to the network of roads, easy access enables the indiscriminate use of all types of vehicles. Illegal dumping of trash, poaching, and the irresponsible use of firearms are existing realities.

3.19 Socioeconomics

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 7 and Table 8.

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 7: Collier County Population Change (1950 - 2010)* (USACE 2014)

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 8: Florida and Collier County Population Demographics in 2010 (USACE 2014)

Population Category	Florida	Collier County
Overall Population, 2010	18,801,310	321,521
Change in Population (2000-2010)	15%	21.9%
Below Poverty Level, 2010	13.8%	12.2%
White, 2010	78.5%	90.2%
Black, 2010	16.5%	6.9%
Other, 2010	5%	2.9%
Hispanic Origin, 2010	22.9%	26.3%

The total annual average water use for 2000 in Collier County is estimated at 230 million gallons per day (MGD), with 202.5 MGD coming from groundwater and 27.5 MGD coming from surface water. These figures, compiled by the USGS, include domestic, commercial, industrial, recreational, agricultural and power generation demands. These figures do not include the environmental demand for water, which accounts for a majority of the water demanded in the PSRP Study Area. There are currently only a small number of residents residing in the PSRP Study Area, and they are utilizing private wells to fulfill their water demands. The Port of the Isles community is located outside the southern boundary of the Project Area and currently uses a community well field for water supply.

The PSRP Study Area is not currently suffering from a shortage of water, except for environmental concerns. Due to the relatively low number of persons and businesses in the existing area, the supply is sufficient for the demand.

The NGGE currently has a well field that supplies public water. There have been no unmet demands for water being supplied by the well fields. Recharge from the canal influences the yield of the well field. Protection of the long-term sustained yield of this well field is one of the city's primary issues related to hydrologic restoration of the PSRP Project Area. Most of the residents in NGGE have private wells to supply their water. There are shortages of water and saline problems during excessive droughts.

3.20 Agriculture

The agricultural industry is present within the vicinity of the PSRP with Lipman Farms and Deseret Farms adjacent to the southwest corner of the PSRP. These farms are located north of US-41 between Tomato Rd. to the east and Greenway Rd to the west. These farms main crop are tomatoes which are grown during the dry season (winter). Florida leads the United States in winter tomato production with Lipman Farms being one of the largest U.S. operations. Because of the cycle of wet and dry seasons in close proximity to the coast, farmland can be saturated. Farm operations generally need to drain surface water and groundwater from their fields in order to start and maintain their crops. Historically, these "agricultural" waters were discharged into the Picayune Strand State Forest which lies to the east. Currently, agricultural operations southwest of the PSRP continue to discharge east into the Picayune Strand State Forest.

3.21 Recreation

The Picayune Strand State Forest, Collier Seminole State Park, and Fakahatchee Strand Preserve State Park are the three main recreational resources in the project area. The PSRP comprises the eastern two-thirds of the Picayune Strand State Forest, which is popular for hunting, biking, camping, horseback riding,

fishing, and wildlife viewing. Documented in the 2004 PIR/EIS, off-road vehicle use was popular with the Florida Department of Agriculture and Consumer Services (FDACS) estimating approximately 40,000 user days per year of prohibited ATV usage. The FDACS estimated that there were 2000 user days of camping per year, 6,000 user days of horseback riding per year, and 400 user days of legal hiking in the forest at the time of the 2004 PIR/EIS.

Fakahatchee Strand Preserve State Park borders the Picayune Strand State Forest on the east where the current boundary of the PSRP slightly overlaps the State Park. This park offers bicycling, canoeing/kayaking, fishing, hiking, picnicking, and wildlife viewing. Annual Visitation for Fakahatchee Strand State Park is listed in Table 9 as it was available.

Table 9: Annual Visitation for Fakahatchee Strand Preserve State Park

FISCAL YEAR	ANNUAL VISITORS
1994-95	80,518
1995-96	80,662
1996-97	127,325
1997-98	139,069
1998-99	56,570
1999-2000	52,342
2000-01	42,931
2001-02	57,470
2002-03	57,470
2012-13	119,760
2013-14	126,164
2015-16	99,137
2016-17	91,444
2018-19	96,454

Collier Seminole State Park offers visitors recreational opportunities in the form of camping, bicycling, hiking, wildlife viewing, canoeing/kayaking, boating, picnicking, and fishing. Limited data on annual attendance to this park was found but recent years are listed in Table 10 where available (FDEP 2020). In contrast to the State totals, the usage has been decreasing since the late 1990's. The PSRP has 48 miles of canals that are available for fishing and small boats. A boat ramp is located on the Faka Union Canal.

Table 10: Annual Visitation for Collier Seminole State Park

FISCAL YEAR	ANNUAL VISITORS
2013-14	64,806
2015-16	22,021
2016-17	71,460
2018-19	79,420

4 ENVIRONMENTAL EFFECTS

The following includes anticipated changes to the existing environment including direct, indirect, and cumulative effects. This assessment of environmental effects evaluates the anticipated environmental effects of the alternatives (Section 4) compared to existing conditions described in Section 3 (Affected Environment), relative to the No Action Alternative. These potential effects are described within this section and are broadly summarized in Table 11. Reference Section 2 (Alternatives) for a description of each alternative.

For this analysis, intensity was rated as follows:

- Negligible effect to the resource or discipline is barely perceptible and not measurable and confined to a small area.
- Minor effect to the resource or discipline is perceptible and measurable and is localized.
- Moderate effect is clearly detectable and could have appreciable effect on the resource or discipline; or the effect is perceptible and measurable throughout the study area.
- Major effect would have a substantial, highly noticeable influence on the resource or discipline on a regional scale.

The duration of the effects in this analysis is defined as follows:

- No duration — no effect
- Temporary
- Short term — effects last less than one year
- Long term — effects that last longer than one year

Table 11: Summary table of effects for intensity and duration for the construction of the SWPF and conveyance features.

RESOURCE	ALTERNATIVE 3W	ALTERNATIVE PC2
Climate	No Effect	No Effect
Geology and Soils	No Effect	No Effect
Land Use	No Effect	No Effect
Hydrology	Minor Long Term Potential Beneficial Effect	Minor Long Term Potential Beneficial Effect
Regional Water Management (Operations)	No Effect	No Effect
Flood Risk Management	No Effect	No Effect
Vegetative Communities	Minor Long Term Potential Neutral Effect	Minor Long Term Potential Neutral Effect
Fish and Wildlife Resources	Minor Long Term Potential Beneficial Effect	Moderate Long Term Potential Beneficial Effect

RESOURCE	ALTERNATIVE 3W	ALTERNATIVE PC2
Threatened and Endangered Species	Minor Long Term Potential Beneficial Effect	Moderate Long Term Potential Beneficial Effect
Essential Fish Habitat	No Effect	Minor Long Term Potential Beneficial Effect
Water Quality	Minor Long Term Potential Beneficial Effect	Minor Long Term Potential Beneficial Effect
Native Americans	No Effect	No Effect
Cultural Resources	No Effect	No Effect
Air Quality	No Effect	No Effect
Hazardous, Toxic, or Radioactive Wastes	Minor Short Term Potential Adverse Effect	No Effect
Noise	No Effect	Minor Temporary Potential Adverse Effect
Aesthetics	No Effect	Minor Temporary Potential Adverse Effect
Socioeconomics	No Effect	Minor Temporary Potential Adverse Effect
Agriculture	No Effect	No Effect
Recreation	No Effect	No Effect

4.1 Southwest Protection Feature and Conveyance Features

4.1.1 General Environmental Effects

The objective of the SWPF and Conveyance Features, Alternative PC2 (Figure 24), is to provide flood risk management to the agricultural lands southwest of the PSRP and to increase conveyance of freshwater south of US-41 to prevent excess ponding of restoration sheetflow in the southwest corner of the PSRP north of US-41 and increase delivery of beneficial freshwater flow into the downstream estuarine system. This Alternative consists of a 7.5 mile levee along the shared boundary between Lipman and Deseret Farms and the PSRP, a conveyance canal between the existing Farm Levee and the SWPF levee, additional conveyance culvert structures towards the south end of the SWPF levee, additional conveyance under US-41 just east of Tomato Rd., upgraded conveyance under the entrance to Indian Village on the north side of US-41 and east of CR-92, and additional conveyance under CR-92.

In this section, the Preferred Alternative, Alternative PC2, is compared to the No Action Alternative (Alternative 2) and Alternative 3w. Alternative PC2 is a hybrid alternative that includes features from all alternatives except Alternative 3 and Alternative 3w. Alternative 3w is the restoration of former farm land, Duda Fields, east of Lipman Farms and represents the SWPF envisioned in the 2013 LRR with a 120 m levee gap at the southern terminus.

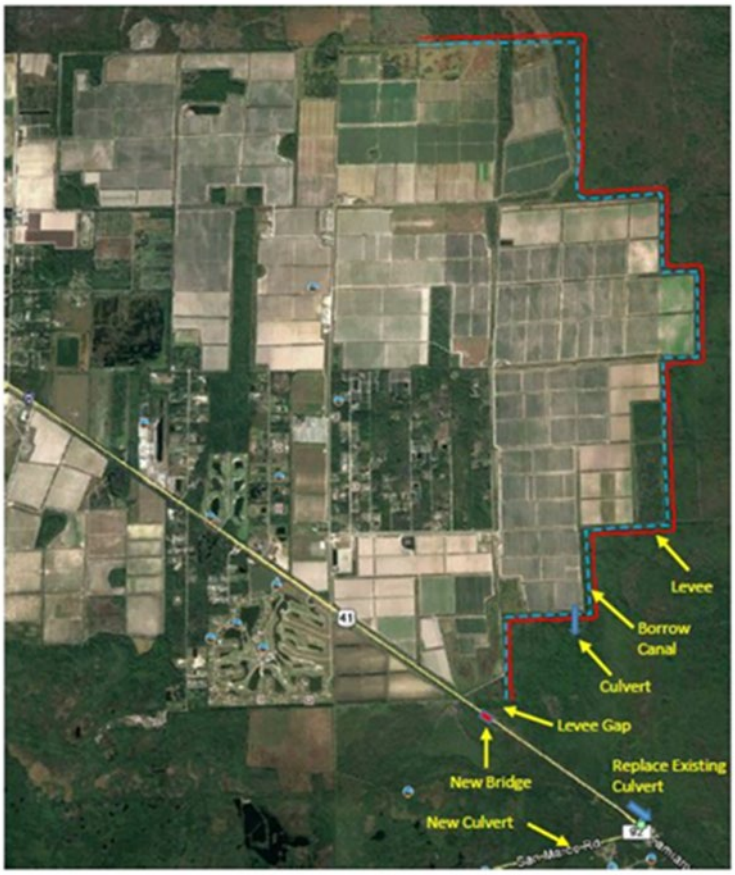

Figure 24: Map of Alternative PC2 including levee and additional conveyance features.

4.1.2 Climate

Implementation of the No Action Alternative, Alternative 3w, and Alternative PC2 would not result in significant impacts to the climate of southwest Florida. However, climate may have significant impacts to these three alternatives. Analysis provided in the 2013 LRR, shows the potential under varying sea level rise scenarios for the southern portion of the PSRP to be inundated by sea level rise. Evaluation of sea level rise (SLR) in the 2013 LRR included multiple scenarios of low SLR, intermediate SLR, and high SLR at 20, 50, and 100 years following the completion of project construction. Using historic SLR at NOAA's Key West tide station of 2.24 mm/yr, SLR was calculated for the 3 SLR scenarios at five year intervals per Engineering Circular (EC) 1165-2-211 guidance (Table 12 and Figure 25).

Table 12: Low, intermediate, and high projections of sea level rise over 100 span post construction starting in 2017.

Year of Analysis	Low Projection (Based on Historic Rate at Key West) (mm)	Intermediate (Based on NRC Curve I) (mm)	High (Based on NRC Curve III) (mm)	Low Projection (Based on Historic Rate) (inches)	Intermediate (Based on NRC Curve I) (inches)	High (Based on NRC Curve III) (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

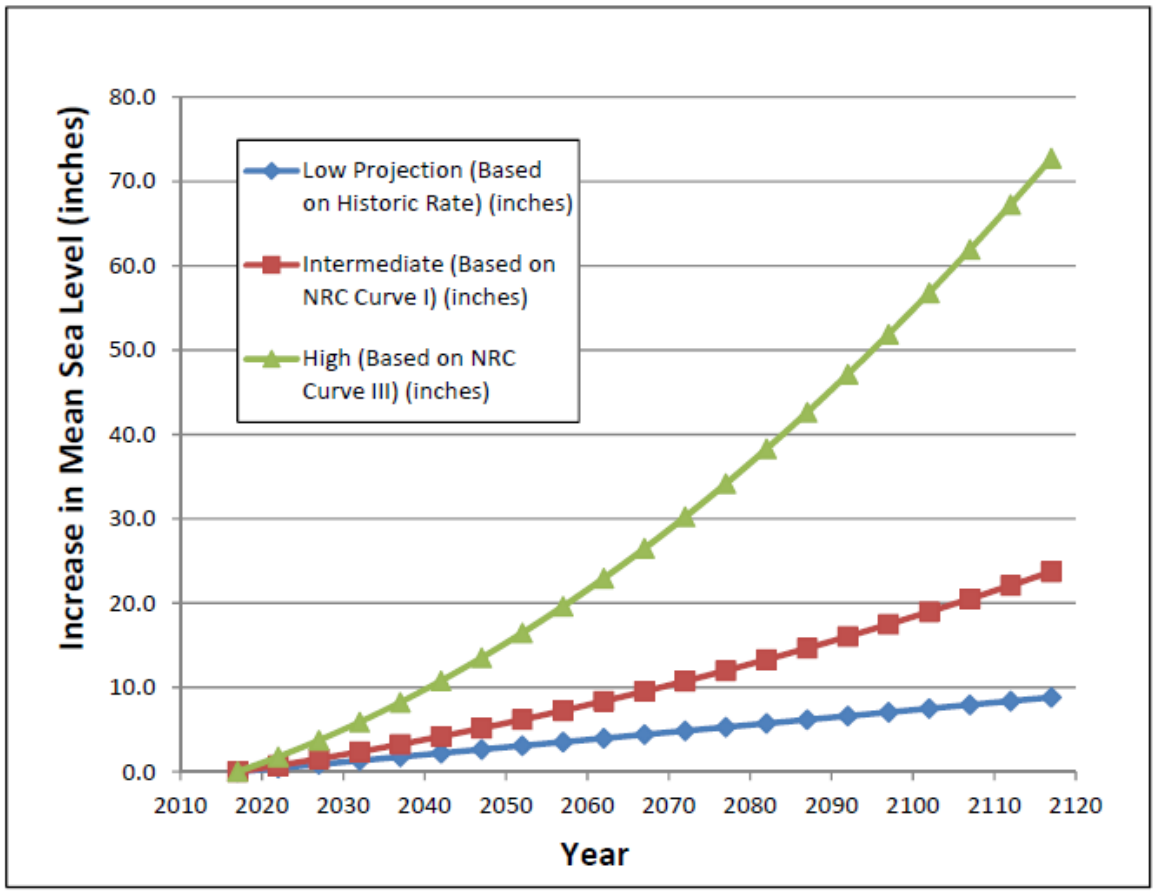

Figure 25: Project sea level rise at Picayune Strand beginning in 2017.

Since the 2013 LRR was completed, updated data from the NOAA tide station 8724580 in Key West, FL has shown an increase in relative sea level rise from 2.24 mm/yr to 2.47 mm/yr (Figure 26). NOAA sea level rise scenarios include six scenarios of global mean sea level (GMSL) rise by 2100: (1) Low (0.3 m rise); (2) Intermediate-Low (0.5 m rise); (3) Intermediate (1.0 m rise); (4) Intermediate-High (1.5 m) rise; (5) High (2.0 m rise); and (6) Extreme (2.5 m rise) (NOAA 2017). Figure 27 shows these GSML scenarios vs observed data since 1960 for comparison (NOAA 2020).

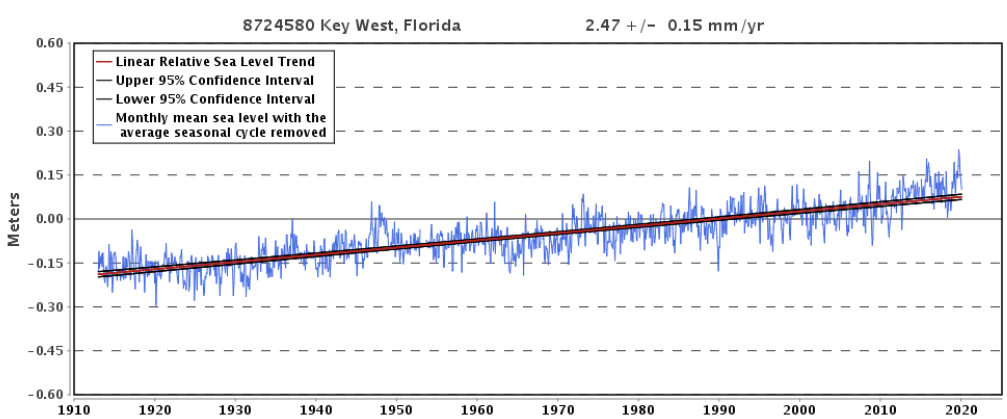

Figure 26: Relative Sea level Trend at NOAA Station 8724580 Key West, Florida (NOAA 2020).

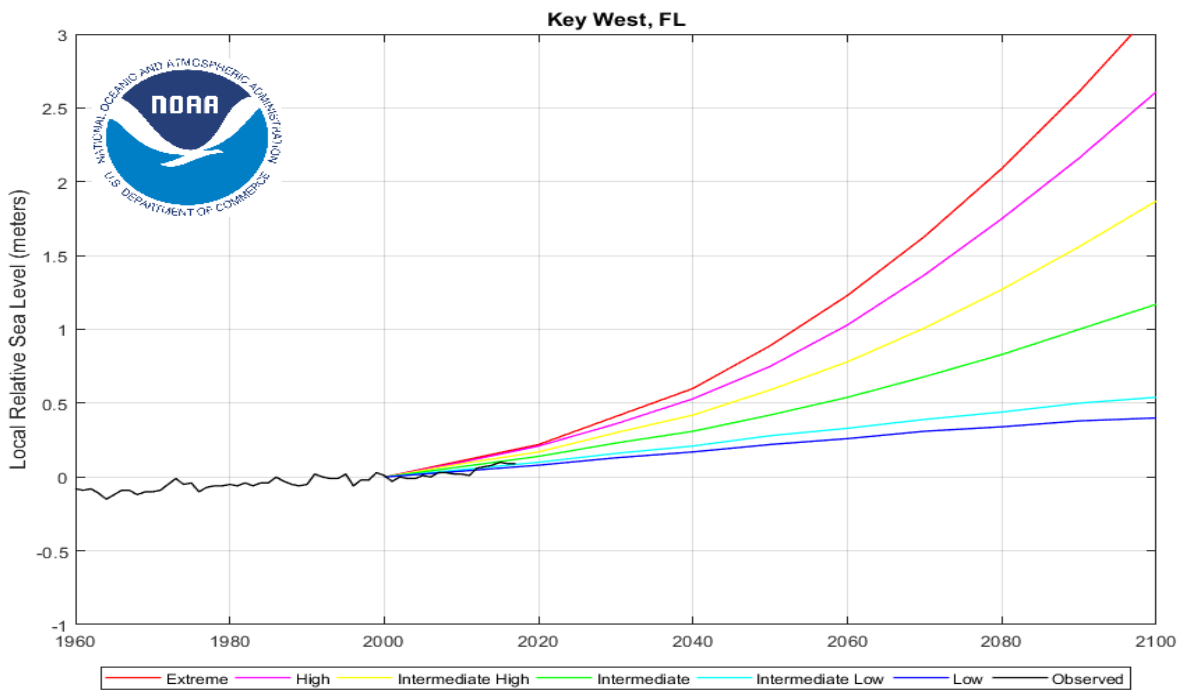

Figure 27: Annual mean sea level rise since 1960 and NOAA regional sea change scenarios for station 8724580 Key West, FL (NOAA 2020).

The highest elevation within PSRP is 10 feet North American Vertical Datum (NAVD) at I-75. The lowest elevation within PSRP is approximately three feet NAVD at US-41 with some sloughs being 0.5 to 2 feet lower in elevation. Without the implementation of PSRP, freshwater natural communities will shift to estuarine and marine communities, especially in the southern portions of the PSRP. Intermediate projection of sea level rise at 100 years post project estimate sea levels will rise approximately two feet in south Florida. This would result in a loss of approximately nine percent of the area in the southern PSRP.

While sea level rise may threaten to overtake the southern portions of the PSRP, implementation of PSRP including the SWPF and additional conveyance features will provide freshwater into the downstream estuaries reducing salinity to a concentration more conducive to productive estuarine process, habitats, and species. The SWPF is needed prior to the plugging of Miller and the southern portion of Faka Union Canal. The completion of this feature will allow the rest of the PSRP to be completed which will benefit the natural communities and species by limiting salt water intrusion and improving the salinity levels downstream.

Section 5.4 of the 2013 LRR provides additional analysis on the climate change effects in the PSRP which are still valid and incorporated here by reference. Uncertainty exists due to natural variability of erratic and unusual shifts in normal weather patterns associated with climate change.

4.1.3 Geology and Soils

4.1.3.1 No Action Alternative

Implementation of the No Action Alternative includes a SWPF levee that is approximately 8.75 miles long and averages 145 ft wide. The implementation of this alternative will result in the disturbance of geological processes resulting from the removal of vegetation and soil on approximately 153.79 acres. Similar to findings in the 2004 PIR/EIS, the No Action Alternative is not expected to significantly alter the geology and soils in the vicinity of the SWPF from expectations of geology and soil impacts as stated in the 2004 PIR/EIS.

The 2013 LRR discusses the implementation of a new feature, the tieback levee, that was constructed on existing roadways where soils had already been disturbed. Analysis of environmental effects in the EA associated with the 2013 LRR, inferred the hydrological restoration associated with this feature would not deviate from the effects of the PSRP on the geology and soils found within the PSRP footprint (USACE 2014). Analysis of effects from the 2004 PIR/EIS state that the authorized plan for PSRP would reestablish a more natural hydrology over the PSRP landscape. Restoration of water depth and duration and reestablishment of a higher ground water table would help arrest the destruction of organic soils by oxidation and fire (USACE 2004). Hydrologic comparison between ponding depths from the authorized PSRP described in the 2004 PIR/EIS (Figure 28) and the ponding depths from the No Action Alternative for the SWPF and conveyance features (Figure 29) refinement show similar hydrological change.

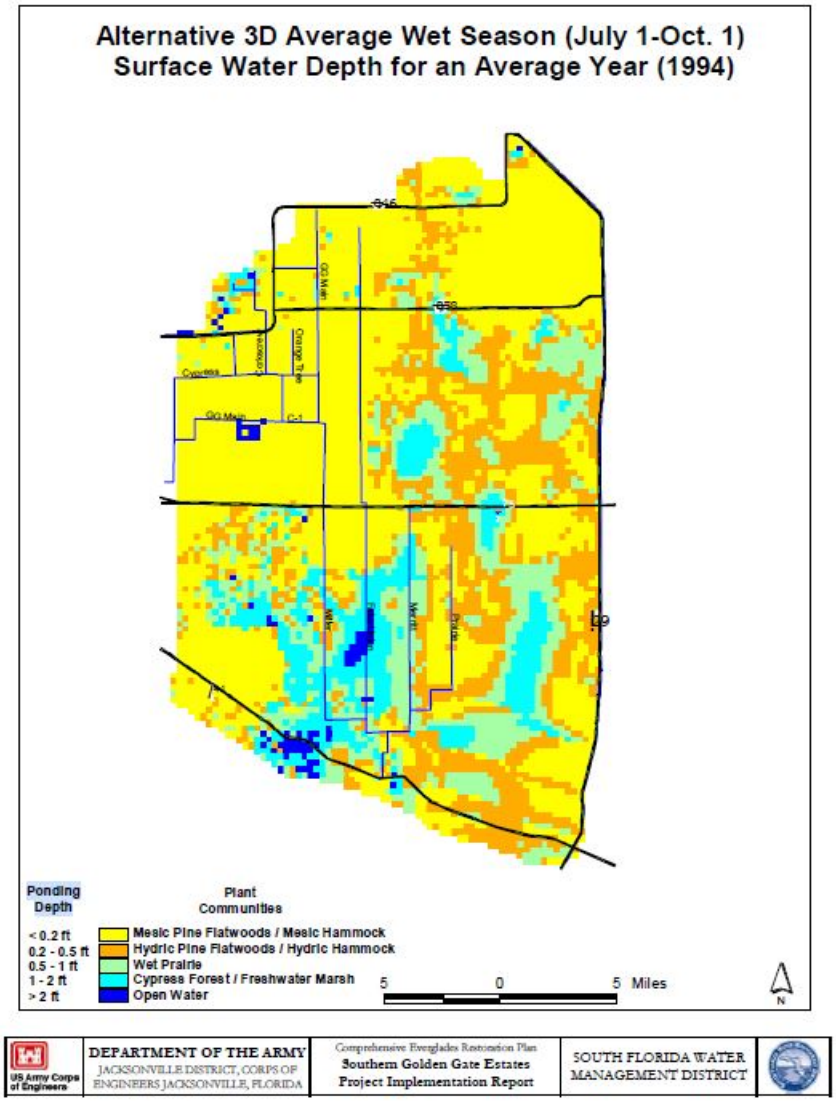

Figure 28: Ponding depths associated with natural community change for the authorized PSRP described in the 2004 PIR/EIS (USACE 2004).

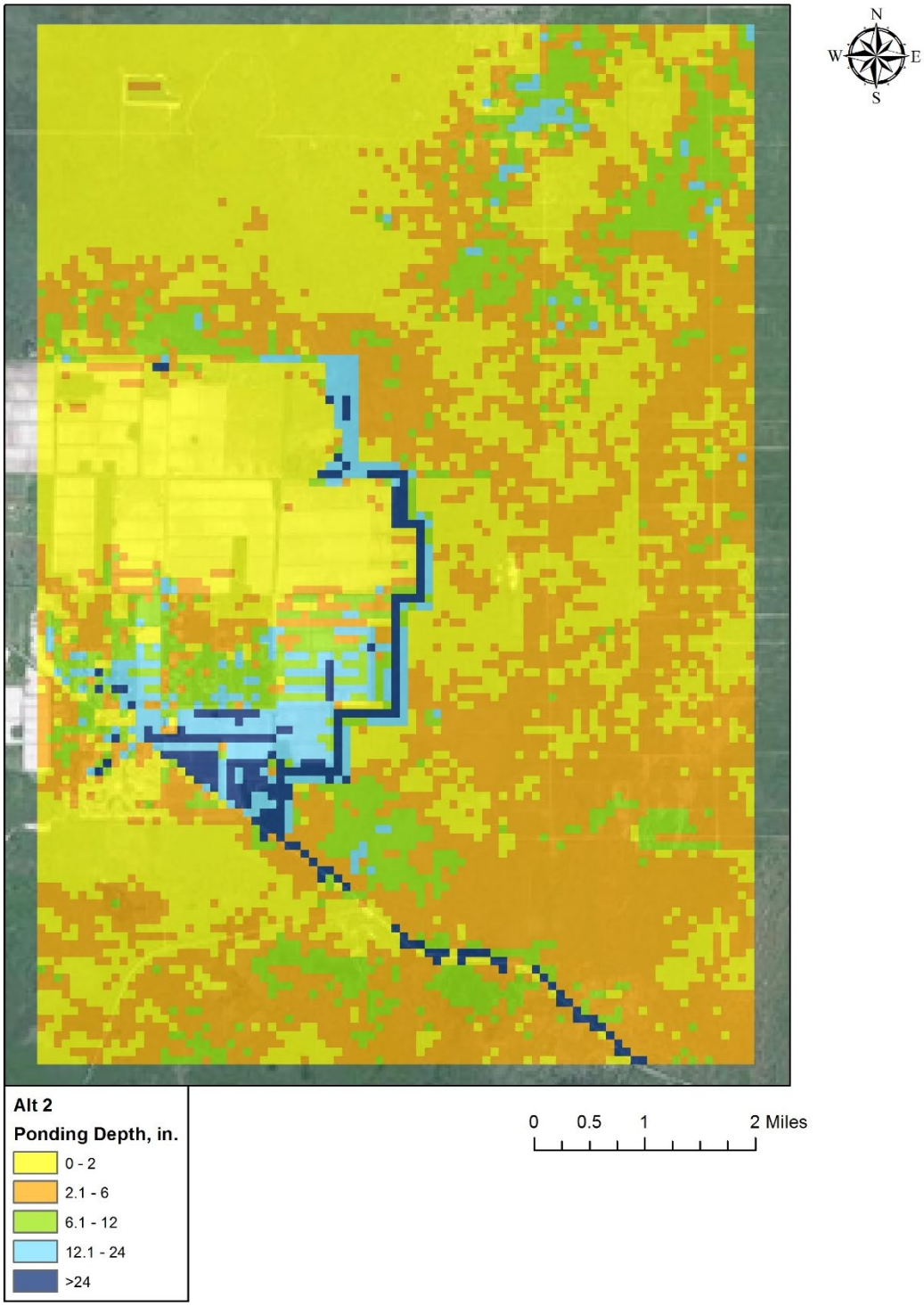

Figure 29: Ponding depths for the No Action Alternative. Note: ponding depths will be slightly higher east of the levee footprint due to the placement of the conveyance canal.

Based on similar modeled future hydrological results as the 2004 PIR/EIS, the geology and soils will not significantly deviate from the effects analysis for geology and soils in the 2004 PIR/EIS (Figure 30).

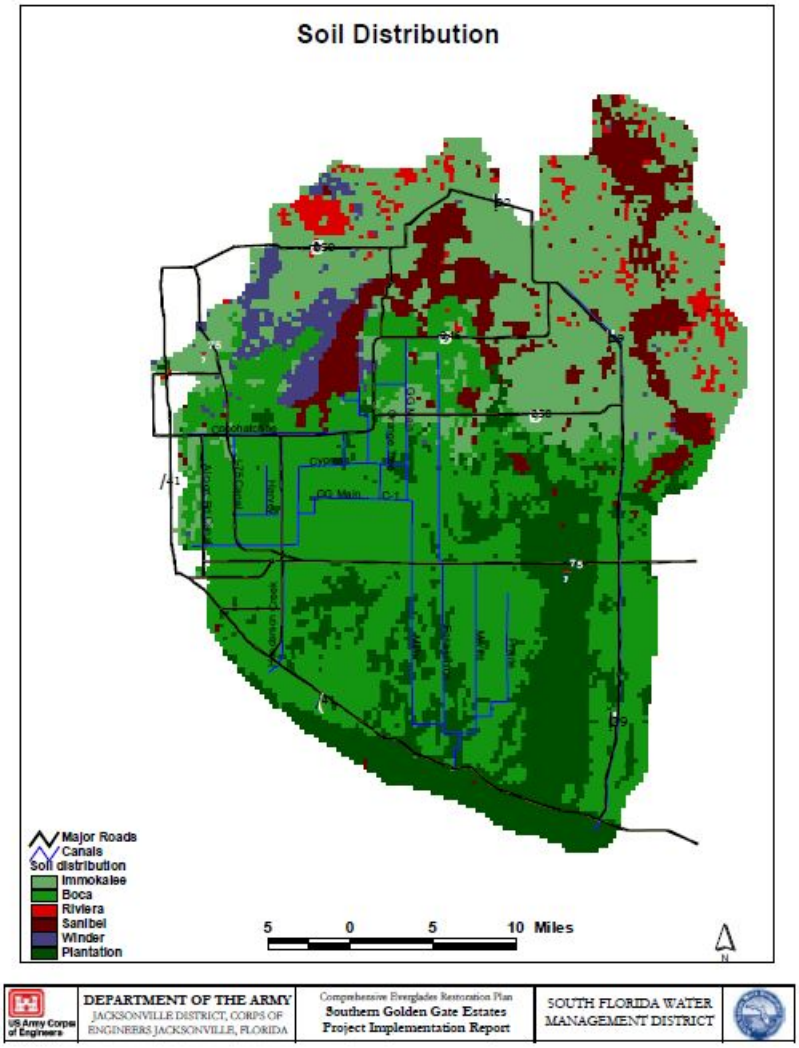

Figure 30: Distribution of soils throughout the PSRP study area (USACE 2004).

Without conveyance south of US-41, which the No Action Alternative does not provide, soils within the southwestern portion of Collier Seminole State Park will continue to be subjected to soil oxidation and, overtime with sea level rise, subject to salt water intrusion. However, this is not a deviation from current conditions. Therefore, the No Action Alternative would not cause any additional effects to the geology and soils of the area. Impacts to this area would be as described in the 2004 PIR/EIS.

4.1.3.2 Alternative 3w

Implementation of Alternative 3w includes a SWPF levee that is approximately 8.68 miles long and averages 145 ft wide. The implementation of this alternative will result in the disturbance of geological processes resulting from the removal of vegetation and soil on approximately 152.56 acres. Similar to findings in the 2004 PIR/EIS, Alternative 3w is not expected to significantly alter the geology and soils in the vicinity of the SWPF and Duda Fields (east of Lipman Farms and the SWPF). Modeling of Alternative 3w with full implementation of the PSRP shows sheetflow of water throughout the larger project area (Figure 31). The implementation of Alternative 3w would not cause any additional affects to the geology

and soils in the vicinity of the Proposed Action. As stated in the 2004 PIR/EIS, the restoration of water depth and duration (hydroperiod), along with the reestablishment of a higher ground water table would help arrest the destruction of organic soils by oxidation and fire. However, these improvements over the larger PSRP footprint are not a result of the implementation of Alternative 3w and are more a result of canal plugging reestablishing sheetflow across the PSSF.

Without conveyance south of US-41, which Alternative 3w does not provide, soils within the southwestern portion of Collier Seminole State Park (park lands south of US-41 and west of CR-92) will continue to be subjected to soil oxidation and, overtime with sea level rise, subject to salt water intrusion. However, this is not a deviation from current conditions. Alternative 3w will result in a minor long term potential adverse effect to the geology and soils within the construction footprint. Addition impacts would be as described in the 2004 PIR/EIS and 2013 LRR.

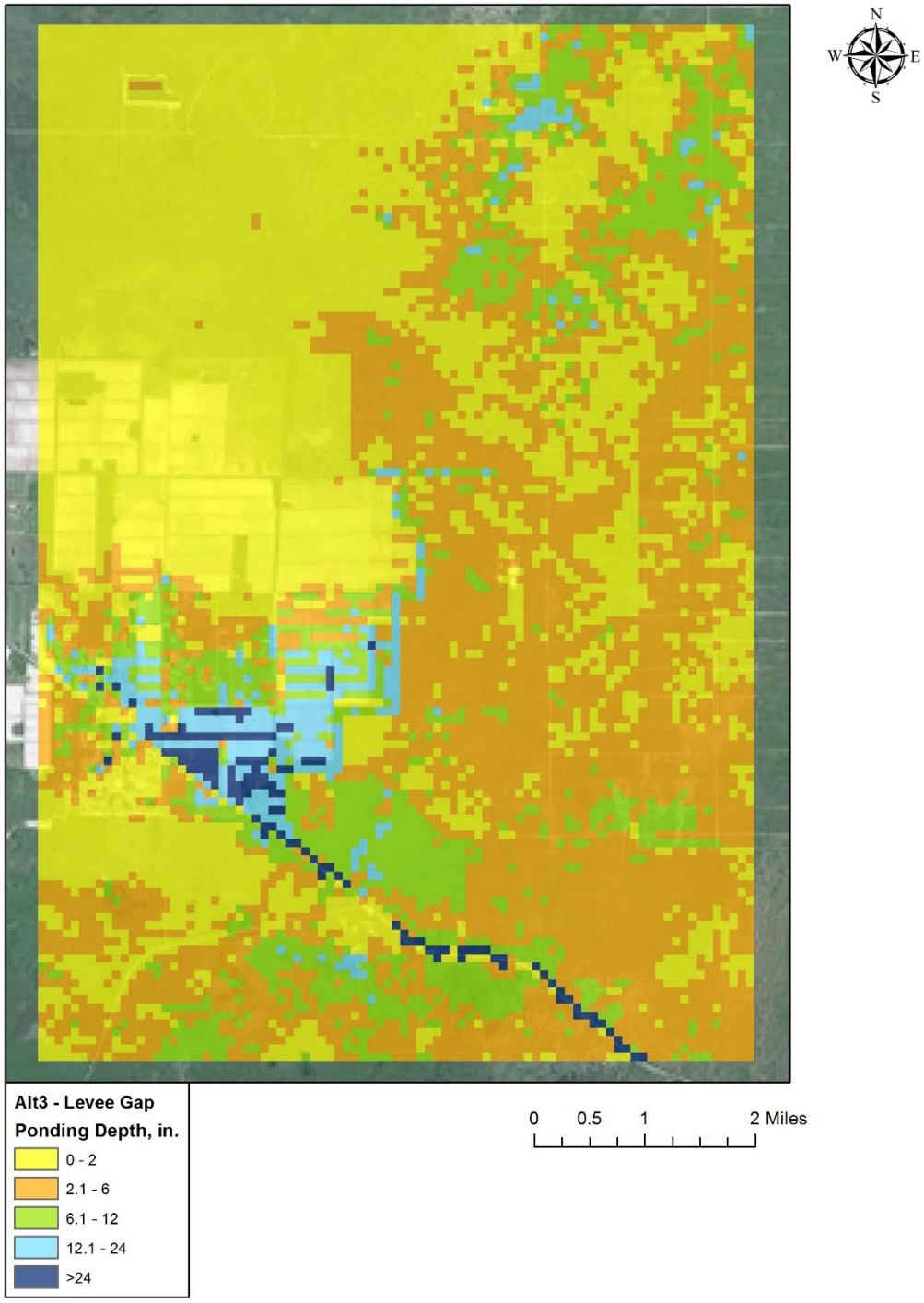

Figure 31: Ponding depth for Alternative 3w.

4.1.3.3 Alternative PC2

Implementation of Alternative PC2 includes a SWPF levee that is approximately 7.5 miles long and averages 145 ft wide. The implementation of this alternative will result in the disturbance of geological processes resulting from the removal of vegetation and soil on approximately 140.4 acres. Additionally,

approximately 14 acres of land will be impacted short term due to the construction of the conveyance features of Alternative PC2. Modeling of Alternative PC2 with full implementation of the PSRP shows sheetflow of water throughout the larger project area (Figure 32). The implementation of Alternative PC2 would not cause any additional affects to the geology and soils in the vicinity of the Proposed Action. As stated in the 2004 PIR/EIS, the restoration of water depth and duration (hydroperiod), along with the reestablishment of a higher ground water table would help arrest the destruction of organic soils by oxidation and fire. However, these improvements over the larger PSRP footprint are not a result of the implementation of Alternative PC2 and are more a result of canal plugging reestablishing sheetflow across the PSSF.

With conveyance south of US-41 provided by Alternative PC2, soils within the southwestern portion of Collier Seminole State Park (park lands south of US-41 and west of CR-92) will continue see improved hydrologic conditions that will reduce soil oxidation potential and, overtime combat salt water intrusion from sea level rise by moving the salinity gradient further downstream which is a benefit not provided by the No Action Alternative or Alternative 3w. Alternative PC2 will result in a minor long term potential adverse effect to the geology and soils within the construction footprint. Impacts would be as described in the 2004 PIR/EIS and 2013 LRR.

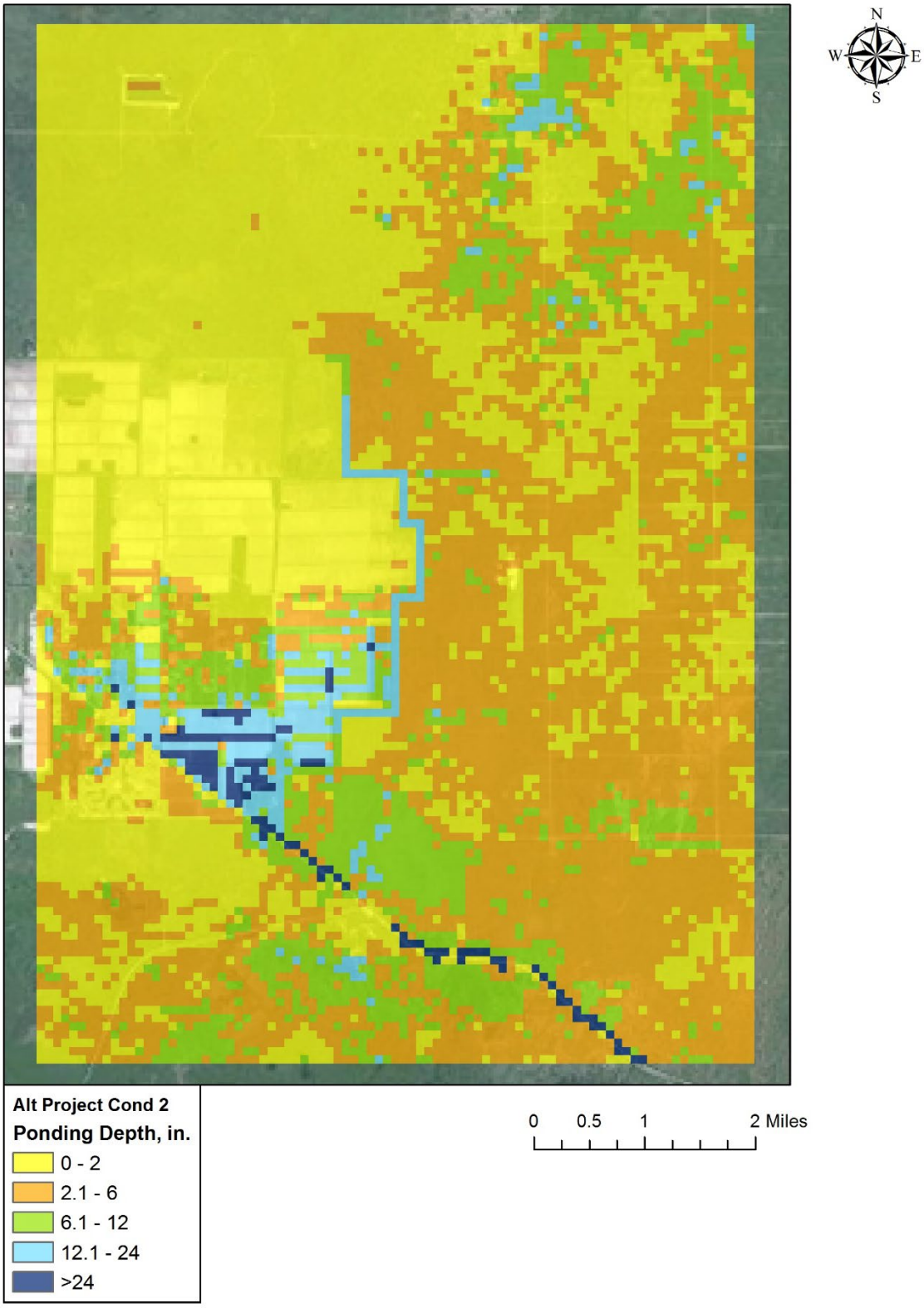

Figure 32: Ponding depth for Alternative PC2.

4.1.4 Study Area Land Use

Implementation of any of the three alternatives (No Action Alternative, Alternative 3w, Alternative PC2) will not result in significant impacts to the study area land use.

4.1.5 Hydrology

4.1.5.1 No Action Alternative

Implementation of the No Action Alternative would achieve the hydrological restoration authorized in the 2004 PSRP PIR/EIS and amended through the 2013 LRR. As stated in the 2004 PIR/EIS, the primary regional scale benefit of the PSRP project is to improve the timing and distribution of freshwater flows and reduce damaging point source flows through Faka Union Canal to the downstream estuary. Modeled transect flows south of US-41 (Figure 33) indicated distributed flows should increase from a future without average annual flow volume of approximately 21,500 kac-ft to approximately 131,500 kac-ft under the No Action Alternative. Under the No Action Alternative, a major flow-way through PSSF would be reconnected to its historical flow path, reestablishing a portion of the natural flows to the estuaries, rehydrating wetlands, and restoring ecological connectivity with surrounding public lands including Federal refuges, Federal estuaries, state parks, state forests, and state estuaries. Ponding depths at the western boundary of the project between indicate the seepage canal could drain the area between the SWPF and Miller Canal (Figure 29). The seepage would also create a preferential flow path along the eastern side of the SWFP levee, short-circuiting and reduce the benefits of sheet flows (i.e., shorter transport distance and retention times).

To assess conveyance of freshwater flow, flow transects were incorporated into the GSSHA model (Figure 33). Six transects were used to evaluate flows north of US-41 and eight transects were used to evaluate flows south of US-41. These flow rates for were used to assess relative changes (Figure 34 and Figure 35) in freshwater delivery to the southwest corner of the PSRP (flows north of US-41) and the conveyance of freshwater towards downstream estuaries (flows south of US-41) between the alternatives. Modeled average monthly transect flows are also shown for Alternative 3w (Figure 37 and Figure 38) and Alternative PC2 (Figure 40 and Figure 41)

Under the No Action Alternative, water would be redistributed as diffuse surface flow entering the coastal estuaries at many points, instead of a single point-source discharge through the Faka Union Canal (Figure 34 and Figure 35). Restoration of water depth and duration (hydroperiod), and reestablishment of a higher ground water table are also beneficial for reducing soil oxidation and fire frequency. Rehydration of PSSF wetlands and redistribution of flows to the Ten Thousand Islands regions would be a major beneficial long-term effect on hydrology.

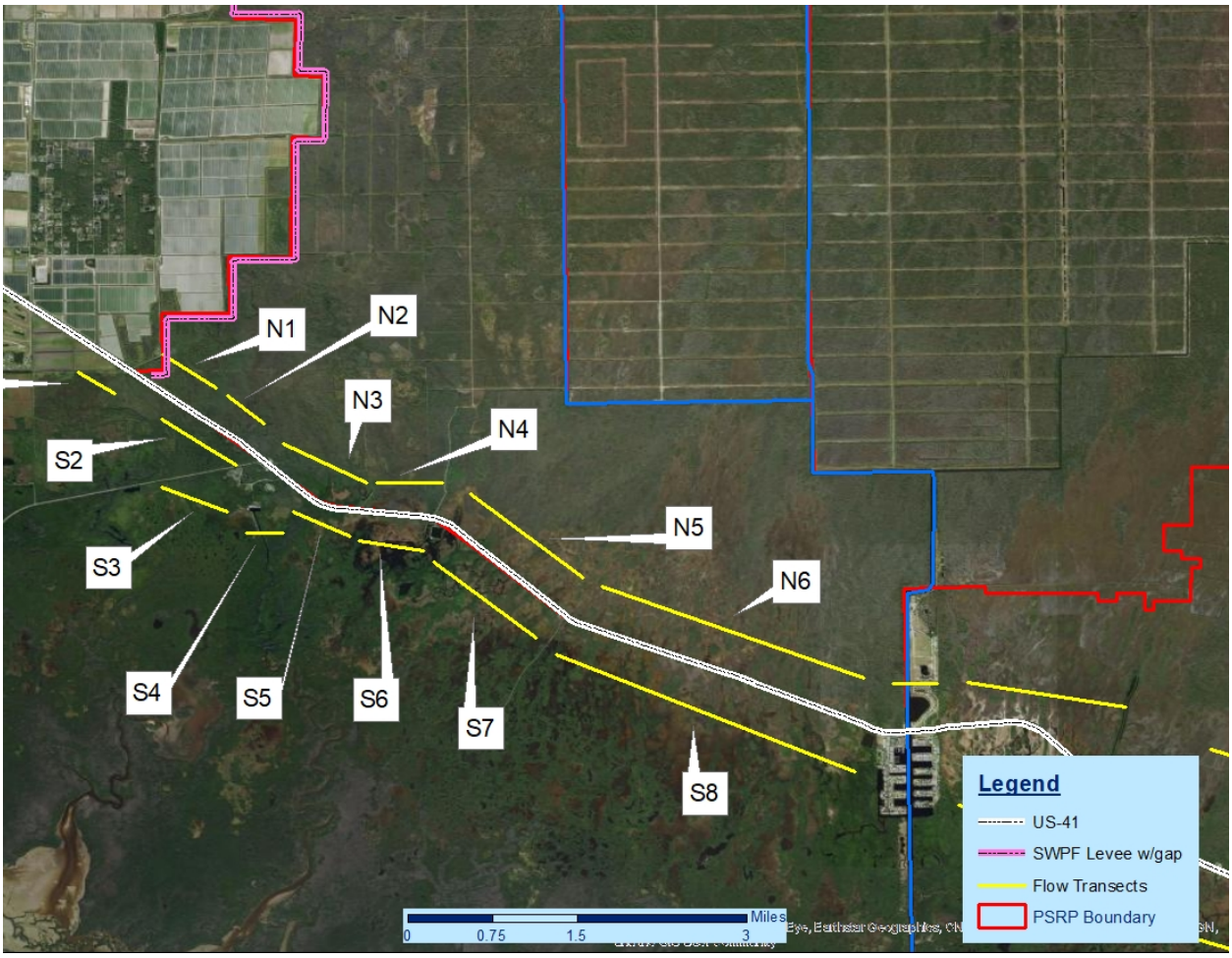

Figure 33: Location of Flow Transects included in the PSRP GSSHA Model.

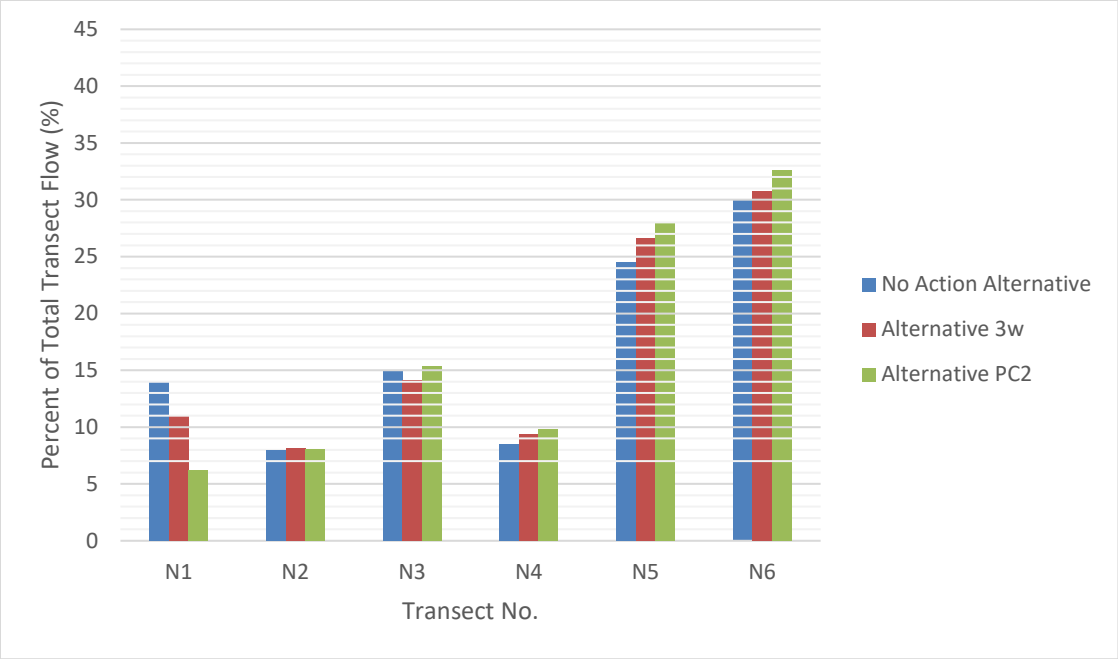

Figure 34: Percent of total annual flow across transects north of US-41 by alternative.

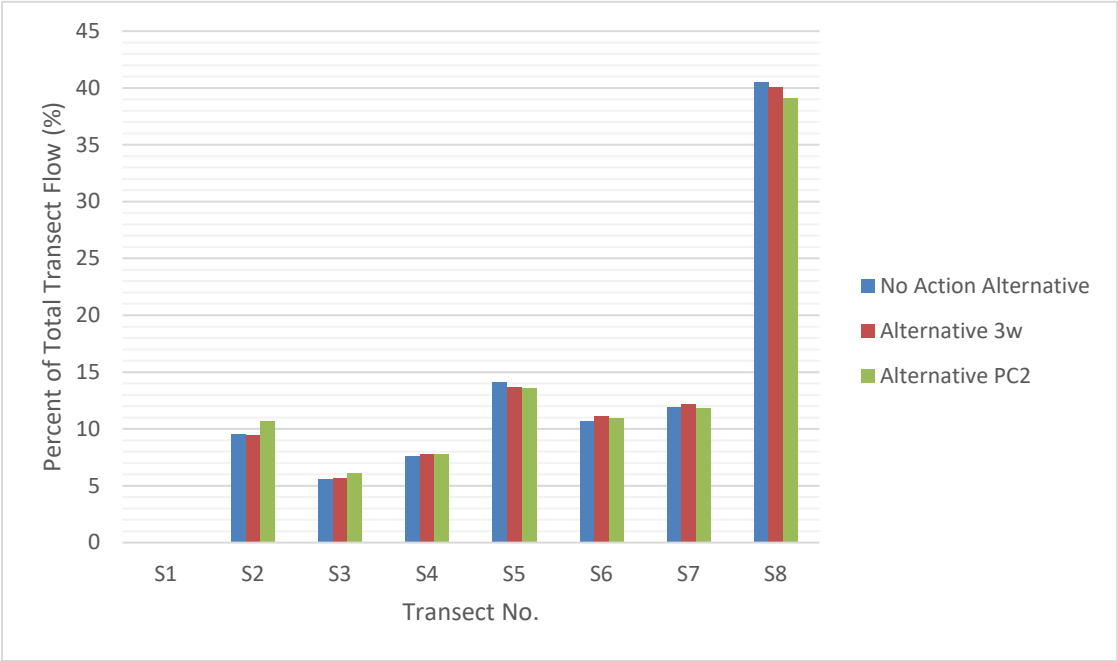

Figure 35: Percent of total annual flow across transects south of US-41 by alternative.

4.1.5.2 Alternative 3w

Implementation of the Alternative 3w would achieve the hydrological restoration authorized in the 2004 PSRP PIR/EIS and amended through the 2013 LRR. As stated in the 2004 PIR/EIS, the primary regional scale benefit of the PSRP project is to improve the timing and distribution of freshwater flows and reduce damaging point source flows through Faka Union Canal to the downstream estuary. Modeled transect flows south of US-41 (Figure 33) indicated distributed flows should increase from a future without average annual flow volume of approximately 21,500 kac-ft to approximately 144,200 kac-ft under Alternative 3w. Under the Alternative 3w, a major flow-way through PSSF would be reconnected to its historical flow path, reestablishing a portion of the natural flows to the estuaries, rehydrating wetlands, and restoring ecological connectivity with surrounding public lands including Federal refuges, Federal estuaries, state parks, state forests, and state estuaries.

Alternative 3w is a minor design refinement to the No Action Alternative that includes a borrow canal west of the SWPF and a gap at the southern terminus of the levee, but no additional conveyance. These design refinements reduced ponding depths where the No Action Alternative seepage canal was removed east of the SWPF levee (Compare Figure 29 and Figure 31) and increased ponding depths between the levee and Miller Canal. Under Alternative 3w, hydroperiods also increased on private lands southwest of the farms (Figure 36), and south of US-41. Relocation of the seepage canal west of the levee would reduce over drainage of the western part of the project area (Figure 31). The impact of the borrow canal west of the SWPF levee is similar to Alternative PC2 described in Section 4.1.5.3.

Similar to the No Action Alternative, under Alternative 3w water would be redistributed as diffuse surface flow entering the coastal estuaries at many points (Figure 37 and Figure 38), instead of a single point-source discharge through the Faka Union Canal (Figure 34 and Figure 35) but would result in marginal changes in relative flow distribution along the northern or southern model transects (Figure 34 and Figure 35) compared to the No Action Alternative. Restoration of water depth and duration, and reestablishment of a higher ground water table are also beneficial for reducing soil oxidation and fire frequency. Without conveyance south of US-41, which Alternative 3w does not provide, water would flow through existing conveyance and areas near the southwestern portion of Collier Seminole State Park (park lands south of US-41 and west of CR-92) would continue to be subjected to soil oxidation and, overtime with sea level rise, would be subject to salt water intrusion. Compared to the No Action Alternative, Alternative 3w would result in minor long-term beneficial benefits on hydrology by increasing water depths between the SWPF levee and Miller Canal, but could lead to ponding on private lands southwest of US-41.

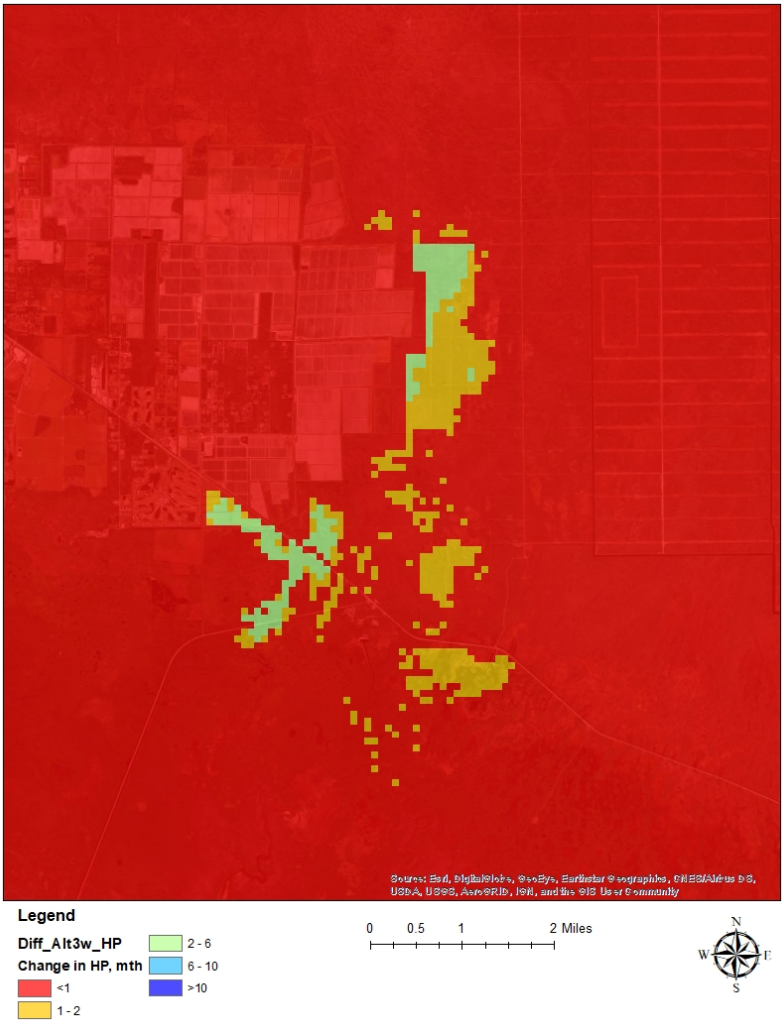

Figure 36: Difference in hydroperiod between Alternative 3w and the No Action Alternative.

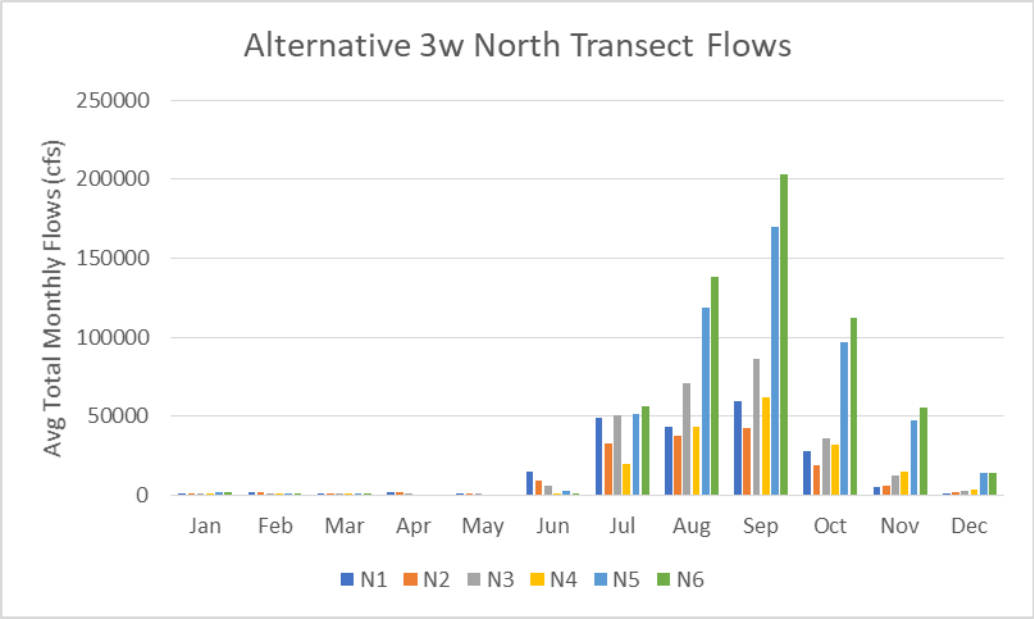

Figure 37: Average total monthly flows (cfs) from flow transects north of US-41 for Alternative 3w.

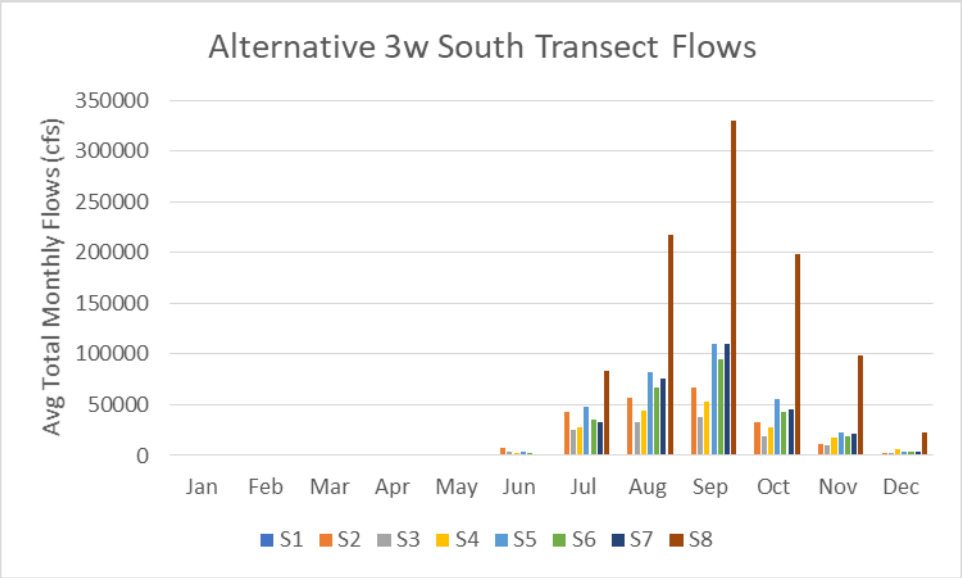

Figure 38: Average total monthly flows (cfs) from flow transects south of US-41 for Alternative 3w.

4.1.5.3 Alternative PC2

Implementation of Alternative PC2 would achieve the hydrological restoration authorized in the 2004 PSRP PIR/EIS and amended through the 2013 LRR. As stated in the 2004 PIR/EIS, the primary regional scale benefit of the PSRP project is to improve the timing and distribution of freshwater flows and reduce damaging point source flows through Faka Union Canal to the downstream estuary. Modeled transect flows south of US-41 (Figure 33) indicated distributed flows should increase from a future without average

annual flow volume of approximately 21,500 kac-ft to approximately 146,700 kac-ft under Alternative 3w. Under Alternative PC2, a major flow-way through PSSF would be reconnected to its historical flow path, reestablishing a portion of the natural flows to the estuaries, rehydrating wetlands, and restoring ecological connectivity with surrounding public lands including Federal refuges, Federal estuaries, state parks, state forests, and state estuaries.

Alternative PC2 is a minor design refinement to the No Action Alternative that includes a borrow canal west of the SWPF and a gap at the southern terminus of the levee, and additional conveyance. These design refinements reduced ponding depths where the No Action Alternative seepage canal was removed east of the SWPF levee (Compare Figure 29 and Figure 32) and increased ponding depths between the SWPF levee and Miller Canal. Under Alternative PC2 hydroperiods also decreased on private lands southwest of the farms and US-41 (Figure 39), and south of US-41. Relocation of the seepage canal west of the levee would reduce over drainage of the western part of the project area (Figure 32). Addition of a borrow canal west of the SWPF levee will capture approximately 30% of permitted farm discharges that would sheetflow south under the No Action Alternative. The water would be conveyed south in the borrow canal as preferential flow. Borrow canal flows would exit canal at the SWPF levee culvert and at the southern terminus of the borrow canal and sheetflow south toward US-41, mixing with restoration flows from the northeastern PSRP Project Area.

Similar to the No Action Alternative, under Alternative PC2 water would be redistributed as diffuse surface flow entering the coastal estuaries at many points (Figure 40 and Figure 41), instead of a single point-source discharge through the Faka Union Canal (Figure 34 and Figure 35) but would result in marginal changes in relative flow distribution along the northern and southern model transects (Figure 34 and Figure 35) compared to the No Action Alternative. Restoration of water depth and duration, and reestablishment of a higher ground water table are also beneficial for reducing soil oxidation and fire frequency. With implementation of Alternative PC2, conveyance through culverts near the southwestern boundary of the project area is expected increase at BR-39 and decrease at BR-36, BR-37, and BR-40 with the addition of the new US-41 conveyance (Figure 42 and Figure 43). With the additional conveyance of water south of US-41, water depth and hydroperiod will improve in the southwestern portion of Collier Seminole State Park (park lands south of US-41 and west of CR-92), which will reduce potential for soil oxidation and, overtime with sea level rise, would help to abate salt water intrusion. Compared to the No Action Alternative, Alternative PC2 would result in minor long-term beneficial benefits on hydrology by increasing water depths between the SWPF levee and Miller Canal and increasing conveyance towards the southwestern portion of Collier Seminole State Park.

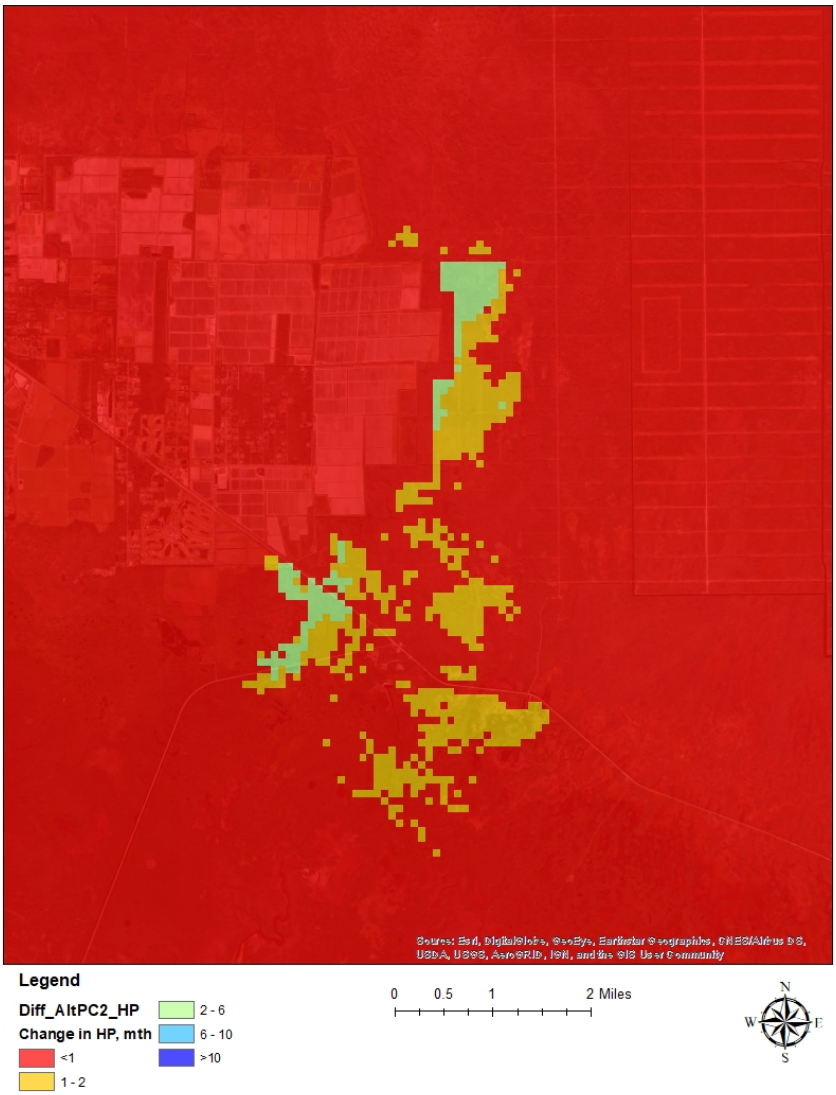

Figure 39: Difference in hydroperiod between Alternative PC2 and the No Action Alternative.

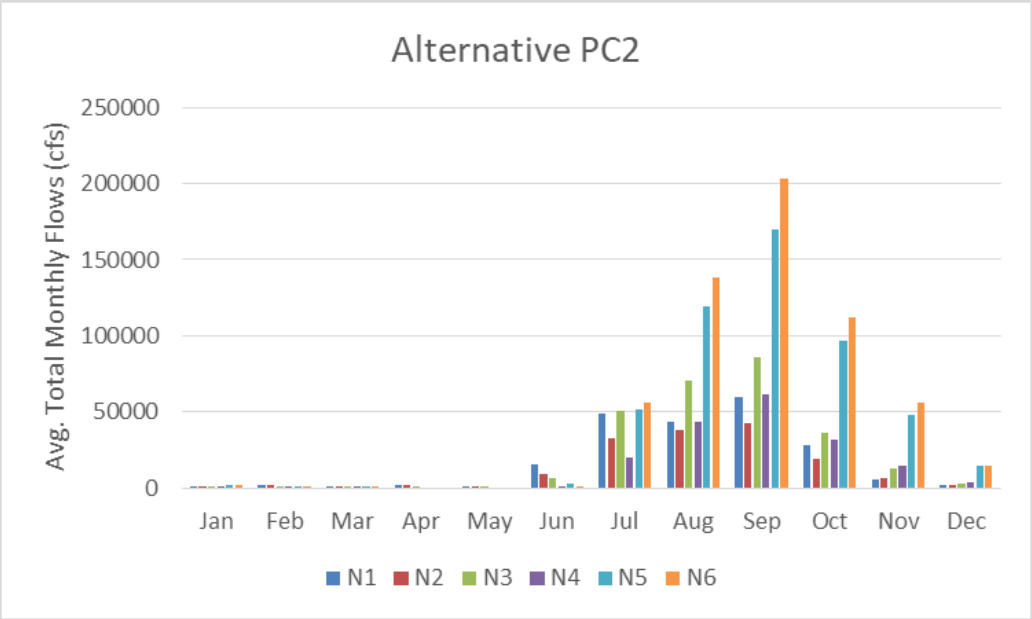

Figure 40: Average total monthly flows (cfs) from flow transects north of US-41 for Alternative PC2.

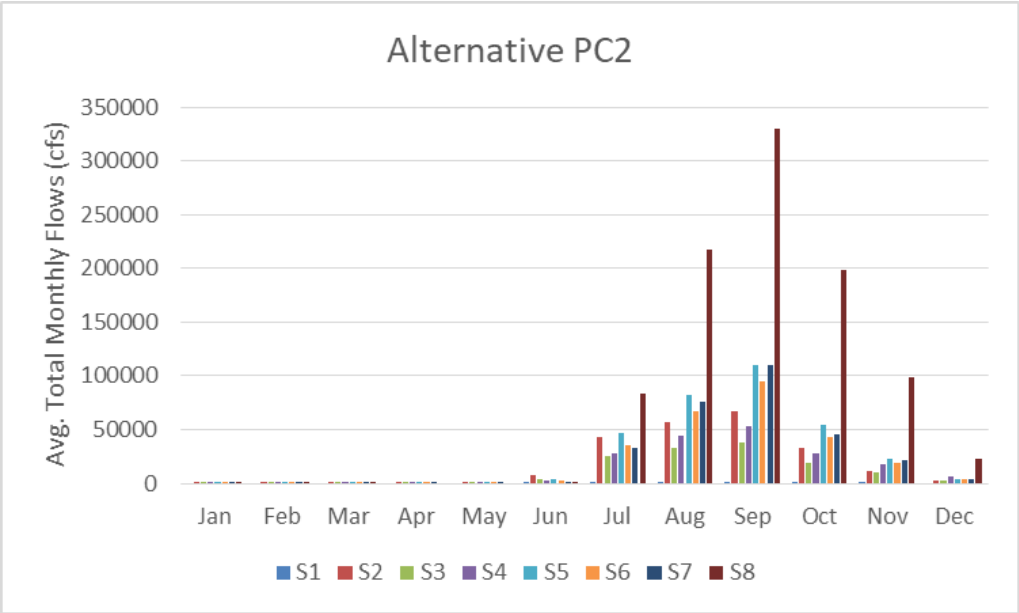

Figure 41: Average total monthly flows (cfs) from flow transects south of US-41 for Alternative PC2.

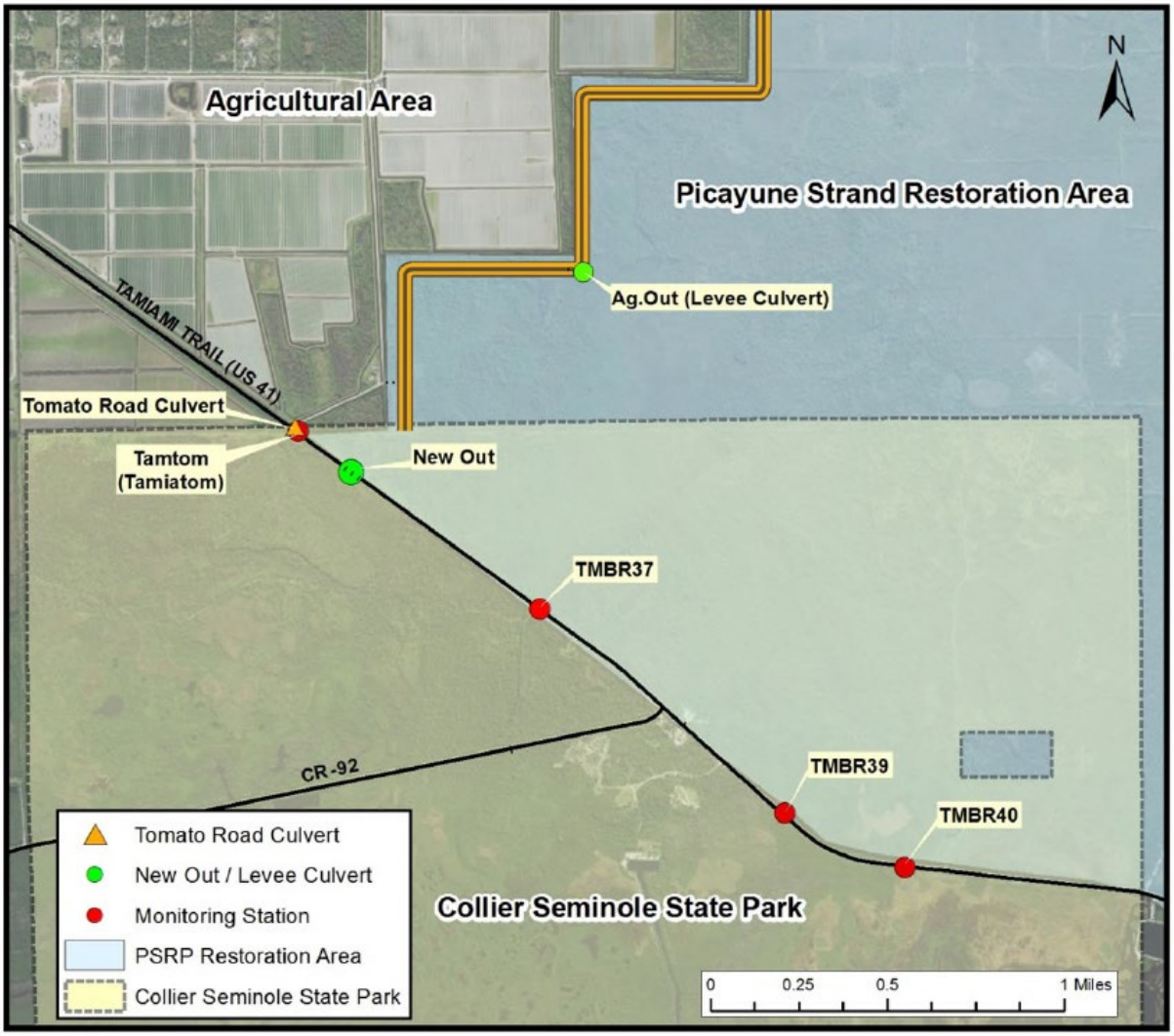

Figure 42: Locations of conveyance across US-41 in the southwest section of the project area for the Alternative PC2 (With Project).

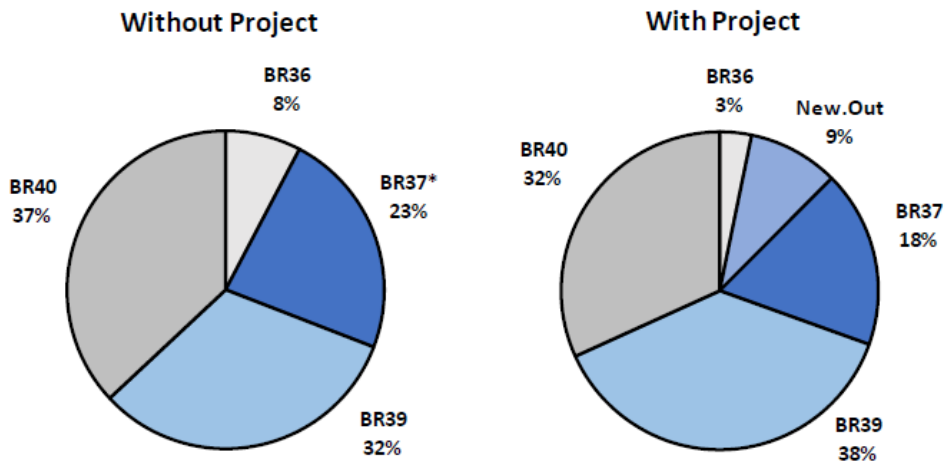

Figure 43: Comparison of distribution of flow across US-41 in the southwest section of the project area for the No Action Alternative (Without Project) and Alternative PC2 (With Project). Percentages are estimated using total flow across each structure for Water Year 2005 to 2013.

4.1.6 Regional Water Management (Operations)

4.1.6.1 No Action Alternative

Implementation of the No Action Alternative will provide additional flood risk management for the agricultural lands southwest of the PSRP. Upon completion of the Proposed Action, all of Faka Union Canal, Miller Canal, and the Western Stair Step Canal can be plugged. Both Miller and Faka Union pump stations will be operated to maintain flood risk management in NGGE and throughout the PSRP. The spreader berms on the south end of each pump station will provide freshwater sheetflow throughout the PSRP improving ground water recharge that would aid in protecting the city of Naples' Eastern Golden Gate well field. With the ability to complete the PSRP after implementation of the SWPF associated with the No Action Alternative, point source discharges of freshwater into the Ten Thousand Islands Region will be reduced. Without additional conveyance features, ponding depth and hydroperiod along US-41 will increase without improving freshwater conveyance south of US-41, as outline in the analysis for Alternative PC2.

4.1.6.2 Alternative 3w

Implementation of Alternative 3w will have the same effects on regional water management (operations) as the No Action Alternative.

4.1.6.3 Alternative PC2

Implementation of Alternative PC2 varies from that of the No Action Alternative and Alternative 3w by providing additional conveyance of water from the SWPF into the PSSF, as well as, additional conveyance south of US-41 and southeast of CR-92. However, regional water management (operations) will not deviate from either the No Action Alternative or Alternative 3w.

4.1.7 Flood Risk Management

4.1.7.1 No Action Alternative

Implementation of the No Action Alternative includes an 8.75 mile SWPF levee that ends at the drainage ditch along the northside of US-41 and approximately 556.8 ft southeast of Tomato Rd. The SWPF levee in the No Action Alternative will provide additional flood protection for the agricultural lands to the southwest of the PSRP compared to the existing farm levee (Figure 6). These farms would still have the ability to discharge their excess water into a conveyance canal between the existing farm levee and the SWPF levee. Agricultural discharged water would flow south between the two levees where it would exit at the southern terminus. Without additional conveyance measures, restoration freshwater will mix with agricultural discharge water in close proximity to US-41 resulting in a higher level of ponding along the north side of US-41. There is the potential during wetter periods for deeper ponding and extended hydroperiods to threaten the integrity of US-41 between Tomato Rd. and CR-92. No impacts to Collier Seminole State Park facilities are expected.

4.1.7.2 Alternative 3w

Implementation of Alternative 3w includes a SWPF levee with a 393.7 ft, gap between the southern terminus of the levee and US-41. The presence of this gap will provide additional time and distance for flows conveyed between the existing farm levee and the SWPF levee to disperse prior to entering the drainage ditch along the north side of US-41. However, this gap will not deviate from the effects described in for the No Action Alternative due to the minor differences in distance and time provided by Alternative 3w.

4.1.7.3 Alternative PC2

Implementation of Alternative PC2 includes a SWPF levee with a 950 foot gap between the southern terminus of the levee and US-41. The additional length of the gap at the southern terminus allows water from the conveyance canal between the two levees a larger distance and more time to disperse and sheet flow prior to hitting US-41. The addition of a culvert structure consisting of two culverts north of the southern terminus allows for additional conveyance of water into the Picayune Strand State Forest to sheetflow prior to hitting US-41 (Figure 12). The additional conveyance features under US-41 and CR-92 prevent flooding impacts to both US-41 and CR-92 (Figure 12). The SWPF levee included in Alternative PC2 improves upon the flood risk provided by the existing farm levee. No impacts to Collier Seminole State Park facilities are expected.

4.1.8 Vegetative Communities

The 2004 PIR/EIS uses ponding depth as the metric for evaluation, the PDT agreed in 2017 to do the same. Wet season (July through October) ponding depth and yearly hydroperiod are correlated. Ponding depths and hydroperiods represented in Figure 29 and Figure 44, respectively, associated with the implementation of the No Action Alternative will be more consistent with those of Alternative 3w and Alternative PC2. These hydrological parameters are shown lower than what will occur with implementation of the No Action Alternative due to the presence of a seepage/conveyance canal located on the eastern side of the SWPF in hydrological modeling of the No Action Alternative.

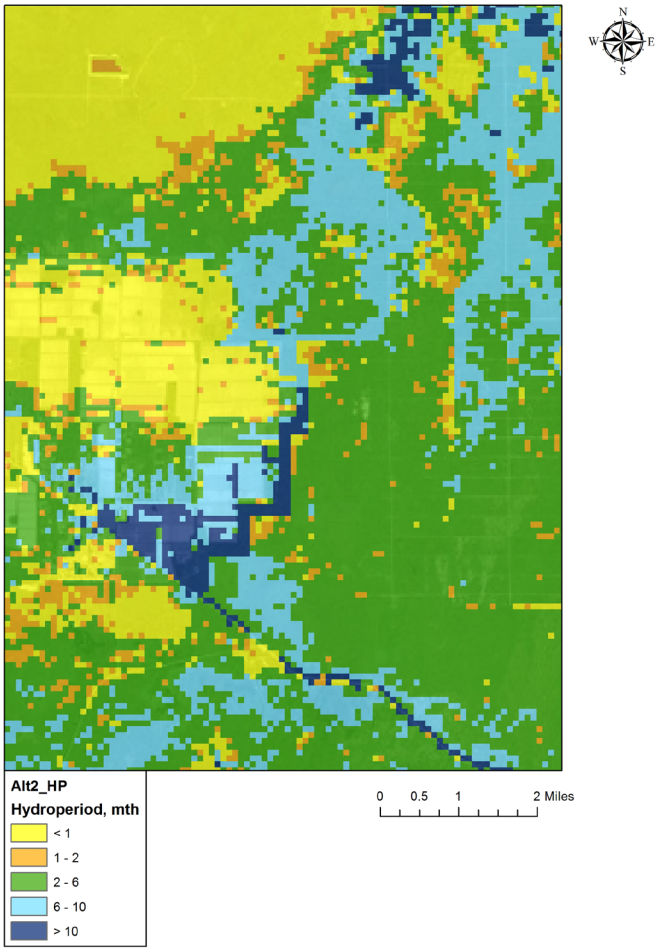

Figure 44: Hydroperiod map for the No Action Alternative.

4.1.8.1 No Action Alternative

Implementation of the No Action Alternative will increase the area of vegetative communities that are more tolerable or favorable of deeper ponding depths. The GSSHA model consists of 120m by 120m cells where ponding depth data and hydroperiod data are averaged for the cell. The topography within each cell is not uniform in elevation with variances in microtopography of each cell. Thus the analysis of effects on vegetation change will result in a mosaic of communities based on this microtopography. Data provided in this analysis uses the GSSHA model data that averages ponding depth and hydroperiod in each model cell. In reality, vegetation change will be less uniform and provide a mosaic or patchwork of various communities based on hydroperiod.

Based on ponding depth modeling from the GSSHA long term model, lands between the SWPF levee and Miller Blvd will consist of a mosaic of mesic and hydric pine flatwoods, palmetto prairie, and mesic and hydric hammocks based on ponding depths in the area that range between zero inches and six inches of ponding depth (Figure 29). Modeling of hydroperiods for this same area (Figure 44), between the SWPF levee and Miller Blvd, provide further detail on the succession of vegetative communities with implementation of the No Action Alternative. The vast majority of this area will become wet prairie with a mosaic of marsh and cypress forest interspersed.

The area southeast of the SWPF levee and north of US-41 will be a mosaic of hydric pine flatwoods, hydric hammock, wet prairie, marsh, and cypress forest based on ponding depth modeling results (Figure 29) and hydroperiod modeling results (Figure 44). Based on ponding depth, the area of Collier Seminole State Park southwest of US-41 and north of CR-92 will consist of mesic pine flatwoods, palmetto prairie, mesic hammock, for the majority of the area due to lack of additional conveyance under US-41. Areas between Old Marco Rd and US-41 will have vegetative communities consistent with hydric pine flatwoods, hydric hammock and wet prairie based on ponding depth modeling. Hydroperiods for the area south of Old Marco Rd in Collier Seminole State Park will be a wider range of communities based on modeling. Vegetative communities in this area, based on hydroperiod, are expected to be mesic pine flatwoods and wet prairie with a few small areas of hydric pine flatwoods and hydric hammock. Near US-41, longer hydroperiods suggest marsh or cypress forest will be present just south of US-41.

Due to construction of the SWPF levee, approximately 153.79 acres of habitat will be converted to make the SWPF levee. A breakdown of habitat acres by type is shown in Table 13.

Table 13: Vegetative community acres converted to earthen levee for the No Action Alternative.

Vegetation Type (FLUCCS Description)	Acres Converted
Fallow Cropland	6.3
Cypress	55.8
Mixed Shrubs	40.3
Hydric Pine Flatwoods	12.8
Row Crops	5.3
Mixed Wetland Hardwoods	0.9
Cypress-Mixed Hardwoods	5.4
Mixed Coniferous Forest	0.6
Wetland Forested Mixed	0.4
Mixed Hardwood Forests	24.8
Wetland Coniferous Forest	1.2
Total Acres	153.8

4.1.8.2 Alternative 3w

Implementation of Alternative 3w will have similar effects to vegetative communities as the No Action Alternative. Figure 31 for ponding depth and Figure 46 for hydroperiod show the extent of the hydrological differences between Alternative 3w and the No Action Alternative.

The difference in ponding depths between Alternative 3w and the No Action Alternative will be less than that shown in Figure 45 due to there not being a seepage/conveyance canal located on the east side of the SWPF levee in the No Action Alternative. Ponding depths associated with the No Action Alternative will be more consistent with those of Alternative 3w. The yellow area directly east of the agricultural lands in Figure 31 are shown to have ponding depths of two inches to six inches. However, anticipated ponding depths for the No Action Alternative east of these agricultural lands can be inferred to have a difference between zero inches and two inches at most. This area is expected to have ponding depths that will be favorable for hydric pine flatwoods and hydric hammock.

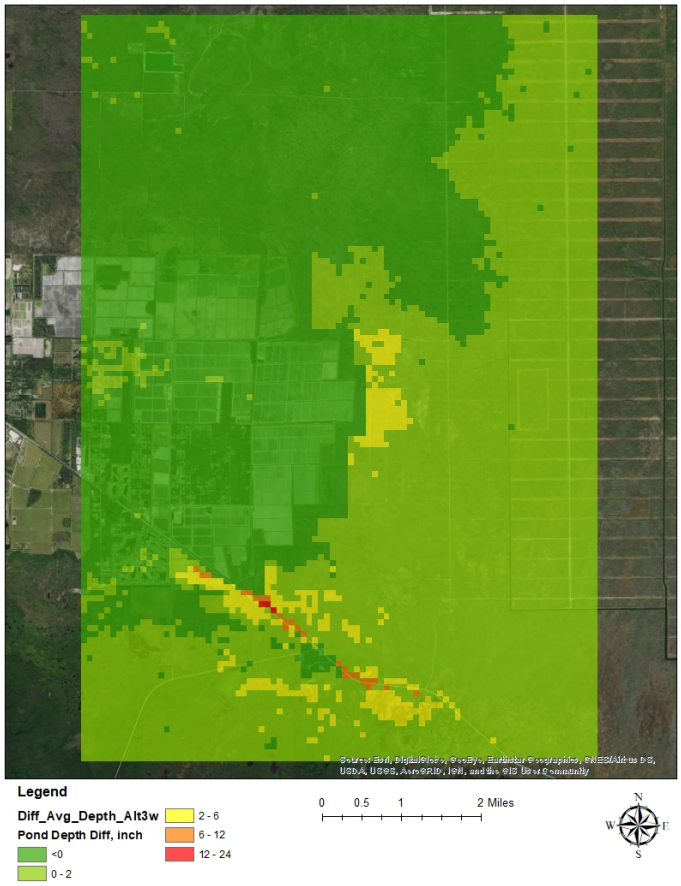

Figure 45: Ponding depth difference map between Alternative 3w and the No Action Alternative.

Ponding depth for the area southeast of the agricultural lands and north of US-41 are expected to have a more acreage of inundated lands at the six inches to 12 inches range meaning slightly more acres of wet prairie, marsh, and cypress. While more acreage will be converted to these vegetative communities, the difference in ponding depths southeast of these agricultural lands range from less than zero inches to six inches due to the presence of a small gap at the southern terminus of the SWPF levee in Alternative 3w compared to no gap in the No Action Alternative. Ponding depth southwest of US-41 and north of CR-92 in Collier Seminole State Park will have ponding depths that are generally two inches to six inches higher along the southern side of US-41. In the existing conveyance structures under US-41, ponding depth differences between Alternative 3w and the No Action Alternative range between six inches and 12 in. Just south of US-41, vegetative communities are expected to be a mosaic of hydric pine flatwoods, hydric hammock, wet prairie, marsh and cypress.

Similar to the difference in ponding depths shown in Figure 45, the difference in hydroperiod between Alternative 3w and the No Action Alternative will be less than what is shown in Figure 36 due to there not being a seepage/conveyance canal east of the SWPF levee in the No Action Alternative as modeled. Directly east of the agricultural lands, the difference in hydroperiods for Alternative 3w and the No Action Alternative are generally between less than one month up to six months. However, without a the modeled seepage/conveyance canal included in the modeling for the No Action Alternative, hydroperiods for the No Action Alternative will be more consistent with those represented in Alternative 3w and Alternative PC2. Expectations for the difference in hydroperiod between these alternatives will most likely be

between zero months and two months maximum. Hydroperiods for Alternative 3w should produce a mosaic of hydric pine flatwoods, wet prairie, marsh, and cypress.

Due to additional conveyance provided by the gap at the southern terminus of the SWPF levee in Alternative 3w, hydroperiods southeast of the agricultural lands and north of US-41 will have a slightly longer hydroperiod. Alternative 3w has a hydroperiod range that is one to six months longer which produces more acreage with a hydroperiod range of six to ten months. These range is expected to produce a greater acreage of marsh and cypress forest than that of the No Action Alternative. Open water is expected to be present in the existing drainage canals and current conveyance structures under US-41 as shown in modeling for both ponding depth and hydroperiod (Figure 31 and Figure 46). Southwest of US-41 and north of CR-92, most of the difference in hydroperiod between Alternative 3w and the No Action Alternative is along the southern side of US-41, similar to the pattern for ponding depth. The expected hydroperiod range in this area is mostly six to ten in with some vegetative pockets where two inches to six inches is expected along the southern side of US-41. The difference between Alternative 3w and the No Action Alternative is generally one month to six months. Based on modeled hydroperiods (Figure 46), the vegetative communities south west of US-41 should consist wet prairie, marsh, and cypress.

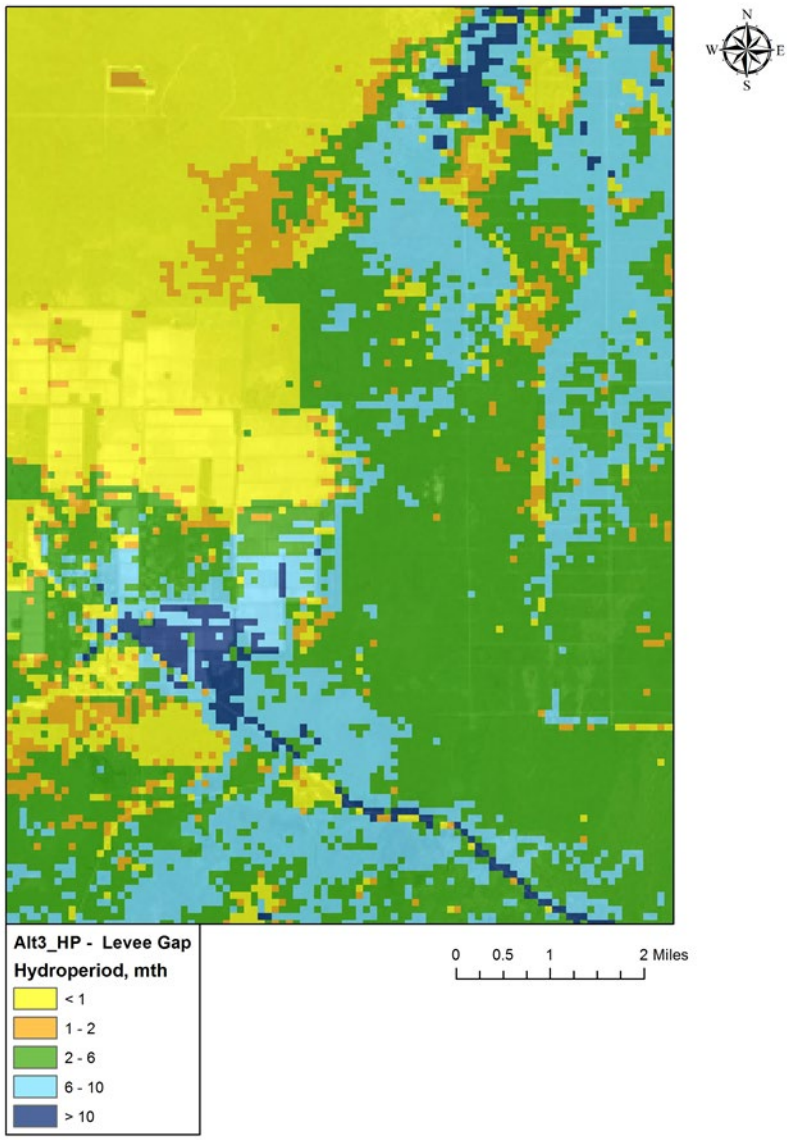

Figure 46: Hydroperiod map for Alternative 3w

Due to construction of the SWPF levee, approximately 153.79 acres of habitat will be converted to make the SWPF levee. A breakdown of habitat acres by type is shown in Table 14. Ultimately, there is not a drastic change in the expectations of vegetative communities between Alternative 3w and the No Action Alternative. Alternative 3w will have acres that are a little more wet for longer durations resulting in the development of more wet prairie, marsh, and cypress than the No Action Alternative. The interaction of ponding depth and hydroperiod for Alternative 3w will result in a mosaic of wetland communities including hydric pine flatwoods, hydric hammock, wet prairie, marsh, and cypress.

Table 14: Vegetative community acres converted to earthen levee for the Alternative 3w.

Vegetation Type (FLUCCS Description)	Acres Converted
Fallow Cropland	6.3
Cypress	55.8
Mixed Shrubs	40.3
Hydric Pine Flatwoods	12.8
Row Crops	5.3
Mixed Wetland Hardwoods	0.9
Cypress-Mixed Hardwoods	5.4
Mixed Coniferous Forest	0.6
Wetland Forested Mixed	0.4
Mixed Hardwood Forests	24.8
Total Acres	152.6

4.1.8.3 Alternative PC2

Effects to vegetative communities for Alternative PC2 are similar to those of Alternative 3w. Ponding depth maps of Alternative PC2 and Alternative 3w are very similar (Figure 32 and Figure 31), as are the hydroperiod maps for each of these alternatives. The difference maps comparing each Alternative with the No Action Alternative are similar as well (ponding depth difference: Figure 45 and Figure 47; hydroperiod difference: Figure 36 and Figure 39). Alternative PC2 will directly impact approximately 140.4 acres due to the construction of the SWPF levee (Table 15) and temporarily convert 14 acres for conveyance features for traffic bypass around construction areas. The direct impact to vegetative communities with in the construction footprint of the Alternative PC2 conveyance features will be a temporarily affect associated with temporary construction of a road bypass on US-41 around construction. Approximately 212 more acres will be indirectly affected by the construction of the SWPF levee due to habitat fragmentation. Conveyance of freshwater under US-41 into the western part of Collier Seminole State Park is expected to result in additional acreage of hydric pine flatwoods, hydric hammock and wet prairie depending on fire frequency and intensity (Figure 48).

Table 15: Vegetative community acres converted to earthen levee for the Alternative PC2.

Vegetation Type (FLUCCS Description)	Acres Converted
Fallow Cropland	6.3
Cypress	56.2
Mixed Shrubs	46.0
Hydric Pine Flatwoods	18.0
Row Crops	5.3
Mixed Wetland Hardwoods	0.9
Cypress-Mixed Hardwoods	5.4
Mixed Coniferous Forest	0.6

Wetland Forested Mixed	0.4
Mixed Hardwood Forests	1.2
Total Acres	140.4

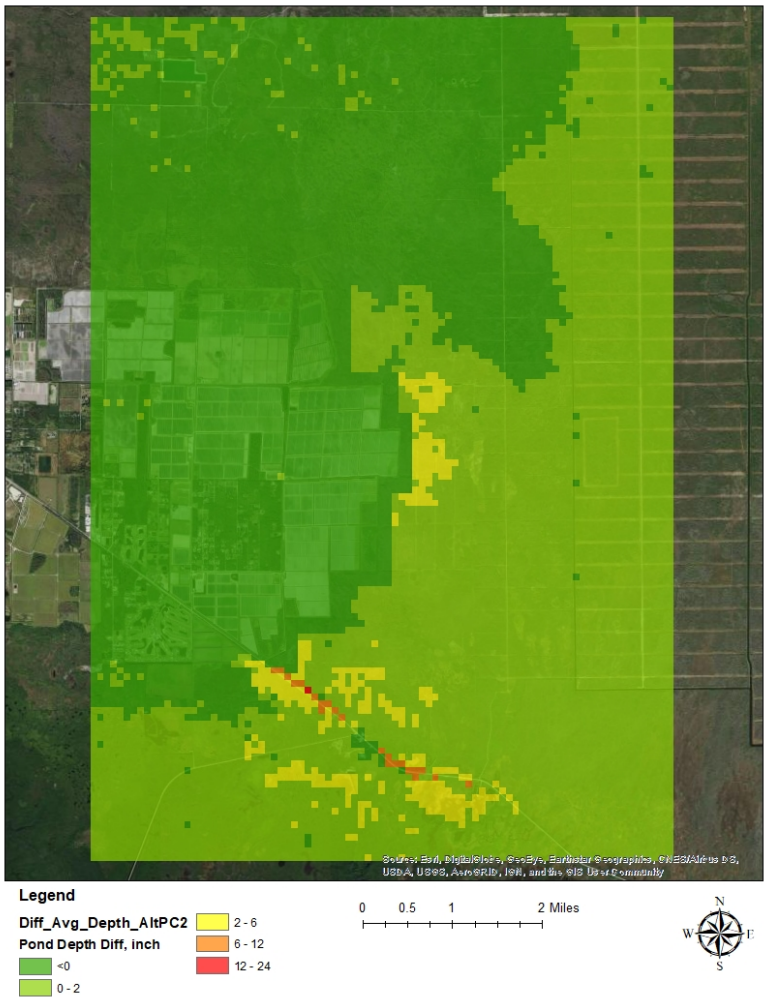

Figure 47: Ponding depth difference map between Alternative PC2 and the No Action Alternative.

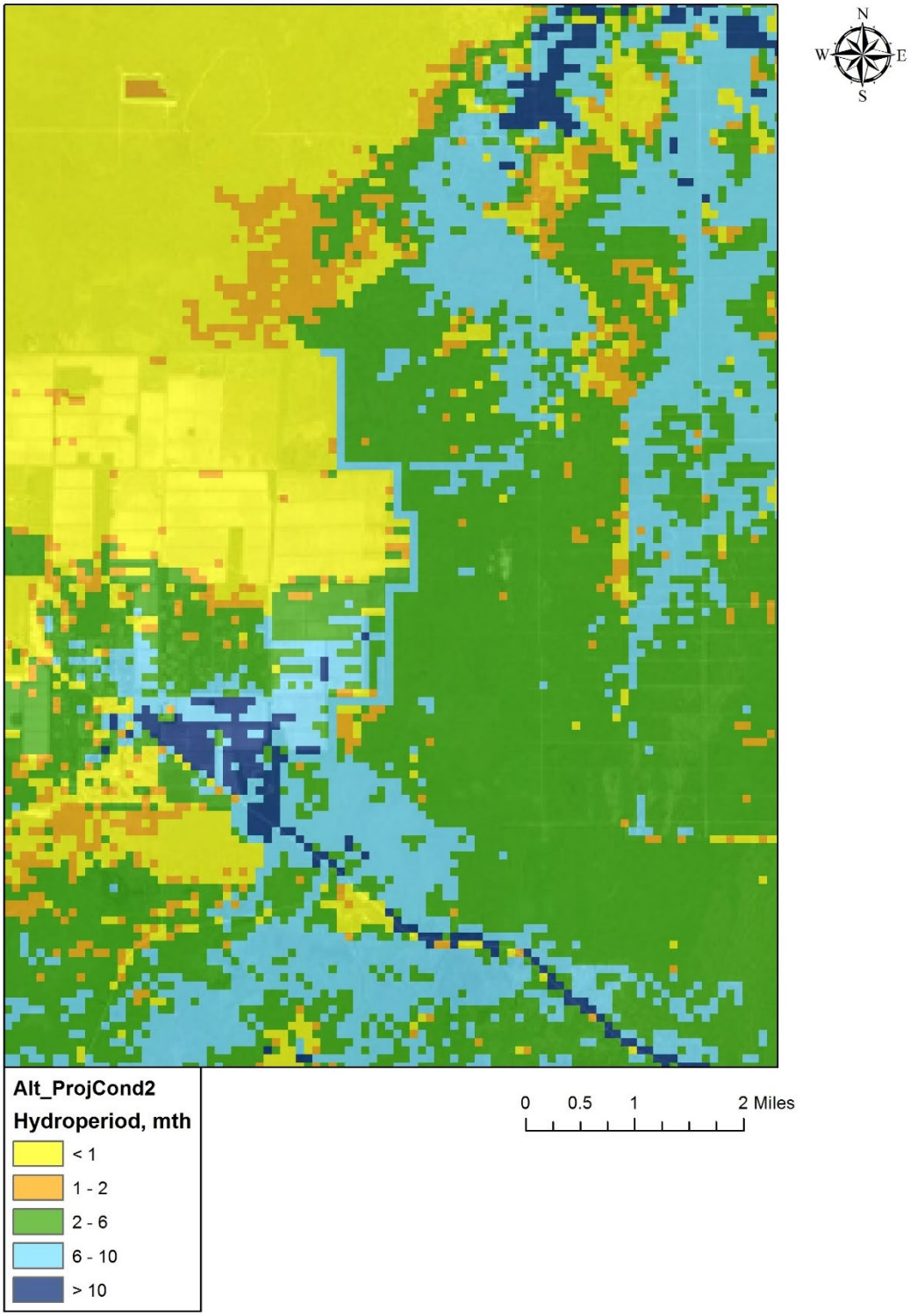

Figure 48: Hydroperiod map for Alternative PC2.

4.1.9 Fish and Wildlife Resources

4.1.9.1 No Action Alternative

The implementation of the No Action Alternative has the potential for minor beneficial effects on fish and wildlife resources in the southwest portion of the PSRP and to lands and estuaries south of US-41 by increasing the acreages of vegetative communities such as hydric pine flatwoods and cypress. The completion of the SWPF levee included in the No Action Alternative will allow for the full implementation of the PSRP including the plugging of remaining canals. The increase in the mosaic of wetland communities and reestablishment of more natural hydroperiods and sheetflow will benefit wetland dependent species including fish, aquatic invertebrates, amphibians, otters, wading birds, and reptiles. Populations of these species may potential increase as result of restoration of freshwater into the southwest corner of the PSRP. The forage base, including aquatic invertebrates and fish, will increase supporting greater populations at higher trophic levels. Conveyance of freshwater to the estuaries south of US-41 will not improve from existing conditions in the No Action Alternative. However, freshwater will flow into the estuaries through existing conveyance structures under US-41 which will be an improvement from existing conditions due to the increase of freshwater flow downstream (See Section 4.1.5 Hydrology). Hydrological restoration associated with the full implementation of the PSRP will more than offset any direct or indirect loss of habitat to due construction of the No Action Alternative.

Additionally, the SWPF levee design in No Action Alternative will result in the concentration of water through the conveyance canal between the existing farm levee and the SWPF which flows out into the drainage canal on the north side of US-41. This is a reduction of overland sheetflow of discharged water from the agricultural lands into the Picayune Strand State Forest further north will not occur as it does today. This reduction is expected to be a short term decrease until the PSRP is fully implemented when sheetflow will occur throughout the PSRP. Without additional conveyance, the only increase in freshwater deliveries into downstream estuaries will be from more sheetflow due to the full implementation of the PSRP.

4.1.9.2 Alternative 3w

Effects to fish and wildlife resources from the implementation of Alternative 3w will not significantly differ from that of the No Action Alternative. Ultimately, the restoration of Duda fields offers little change from the No Action Alternative and does not play a significant role in the ponding of water in the southwest corner of the PSRP. Similar to the No Action Alternative, the implementation of Alternative 3w will allow the full restoration of the PSRP to occur due to the continued flood risk reduction provided by the SWPF which will benefit fish and wildlife resources by restoring and/or reestablishing natural hydroperiods, sheetflow, native plant distribution, plant diversity and a mosaic of habitats. Degradation of these natural aspects have occurred since the construction of the infrastructure associated with the PSRP in the 1960s. Populations of aquatic invertebrates, fish, amphibians, reptiles, wading birds, and mammals are expected to benefit under these conditions.

Additionally, the SWPF levee design in Alternative 3w will result in the concentration of water through the conveyance canal between the existing farm levee and the SWPF which flows out near US-41. Due to the small gap at the southern end of the SWPF levee in Alternative 3w, sheetflow of water exiting the levee system will have a small increase in duration and distance, improving hydrological conditions over a slightly larger area than the No Action Alternative. Similar to the No Action Alternative, the reduction of overland sheetflow of discharged water from the agricultural lands into the Picayune Strand State Forest

further north will no longer occur. This reduction is expected to be a short term decrease until the PSRP is fully implemented when sheetflow will occur throughout the PSRP. Alternative 3w will deliver freshwater to downstream estuaries in a similar manner and rate as the No Action Alternative.

4.1.9.3 Alternative PC2

The implementation of Alternative PC2 will allow for the completion of the PSRP but will eliminate 140 acres of wetland habitat due to the construction of the SWPF levee and 14 acres associated conveyance features. Additionally, 212 acres of wetland habitat will be fragmented by the construction of the SWPF levee. The implementation of the SWPF levee does exacerbate ponding of water along the north side of US-41, compared to the No Action Alternative, potentially increasing wet season ponding depth by 2 to 6 inches resulting in an increase of cypress and marsh habitat in the southwest corner while reducing some acres of hydric pine flatwoods and mixed hardwoods. Additional conveyance of water south of US-41 will result in ponding depths conducive for mesic pine flatwoods, hydric pine flatwoods, hydric hammock, and wet prairie, dependent on fire frequency, fire intensity, and microtopography. Any loss of habitat for fish and wildlife resources will be compensated for by the hydrologic restoration associated with the PSRP.

The addition of conveyance culverts and levee gap will allow sheetflow out of the conveyance canal to sheetflow towards US-41. The implementation of Alternative PC2 will allow the full restoration of the PSRP to occur due to the continued flood risk reduction provided by the SWPF which will benefit fish and wildlife resources by restoring and/or reestablishing natural hydroperiods, sheetflow, native plant distribution, plant diversity and a mosaic of habitats. Degradation of these natural aspects have occurred since the construction of the infrastructure associated with the PSRP in the 1960s. Populations of aquatic invertebrates, fish, amphibians, reptiles, wading birds, and mammals are expected to benefit under these conditions.

Additionally, the SWPF levee design in Alternative PC2 combined with additional conveyance features will result in an increase in delivery of freshwater to downstream estuaries south of US-41. This increase in downstream freshwater conveyance will benefit species utilizing these estuaries by establishing a beneficial salinity regime conducive to higher productivity for estuarine aquatic vegetation, estuarine aquatic invertebrates, estuarine fish, and reptiles such as the American crocodile. Prey availability for wading birds, raptors, and mammals will increase as result of improved estuarine conditions.

4.1.9.4 American Bald Eagle

The American bald eagle occurs in various habitats near lakes, large rivers and coastlines. Most breeding eagles construct nests within several hundred yards of open water (USFWS 1999). Shorelines, such as the shorelines around Lake Okeechobee, the Okeechobee Waterway, and estuaries provide fishing and loafing perches, nest trees, and open flight paths for the bald eagle (USFWS 1999). The bald eagle primarily feeds on fish, but is known to occasionally prey on small mammals, turtles including terrapins, and will feed on carrion. Bald eagles are known to nest around the study area. Nesting season occurs from October through May. The bald eagle mates for life and uses the same nesting site year after year, if the territory is available. A number of bald eagle nests occur within the project area (Figure 19 and Table 6).

In south Florida, nests are often in the ecotone between forest and marsh or water, and are constructed in dominant or codominant living pines (*Pinus spp*.) or bald cypress (*Taxodium distichum*) (McKewan and Hirth 1979). Approximately 87% of eagle nests are in live pine trees, 10% are located in dead pine trees, while two to three percent occur in other species, such as Australian pine (*Casuarina equisetifolia*) and

live oak (*Quercus virginiana*). The stature of nest trees decreases from north to south (Wood et al., 1989) and in Florida Bay eagles nest in black (*Avicennia germinans*) and red mangroves (*Rhizophora mangle*) almost exclusively (96.9 percent), half of which are snags (Curnutt and Robertson 1994). Suitable habitat for bald eagles is any forested area with potential nesting trees that are within 1.9 miles (3 kilometers) of large open water, such as borrow pits, lakes, rivers, and large canals.

On 9 July 2007, the USFWS published the final rule in the Federal Register announcing the removal of the bald eagle from the Federal list of endangered and threatened wildlife. The rule became effective on 8 August 2007. However, this species remains protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act, therefore potential impacts from project activities are discussed below. Of note, it is unclear the current status of any bald eagle nest other than the nest location provided by Collier Seminole State Park (Figure 20) due to the impact of Hurricane Irma in September 2017.

4.1.9.4.1 No Action Alternative

The implementation of the No Action Alternative may have the potential to affect two known American bald eagle nests, CO011 (Figure 19 and Table 6) and an unrecorded nest in Collier Seminole State Park (Figure 44). Changes to the habitat where CO011 is located is anticipated to have a ponding depth range of 6.1 in to 12 in during the wet season (Figure 49) and a hydroperiod range of six to ten months (Figure 50). These hydrological conditions yield a mosaic of wet prairie, marsh, and cypress forest. Hydrological conditions under the No Action Alternative yield a ponding depth range of 2.1 to six inches and hydroperiod range of two to six months suggesting habitat is a mosaic of hydric pine flatwoods, hydric hammock and wet prairie.

Figure 49: Location of two bald eagle nests (CO011 and the undocumented CS bald eagle nest) in relation to ponding depths under the No Action Alternative.

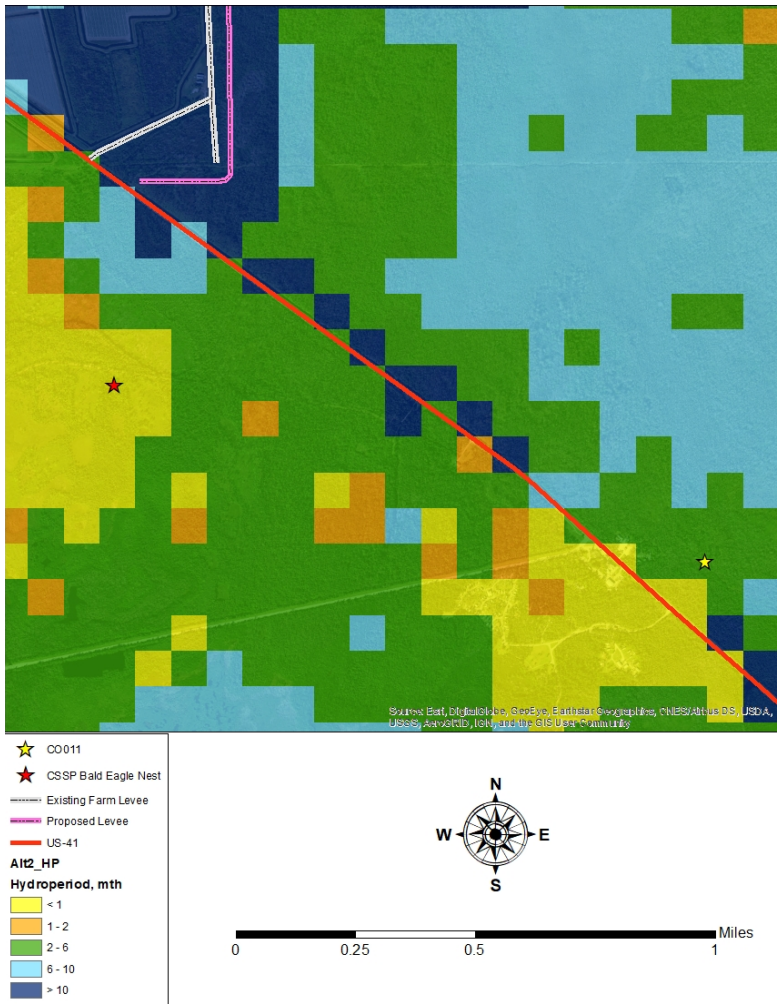

Figure 50: Location of two bald eagle nests (CO011 and the undocumented CS bald eagle nest) in relation to hydroperiods under the No Action Alternative.

The 2014-16 FLUCCS map shows this area to currently be classified as wetland coniferous forest – cypress/mixed hardwoods (Figure 51). The implementation of Alternative 3w is not anticipated to affect CO011. Hydrological restoration in the area associated with the implementation of Alternative 3w in conjunction with the full PSRP will produce conditions favorable to the stimulation of growth of cypress and pine flatwood communities, improve perch and nest habitat by stimulating tree growth, and provide improved foraging habitat.

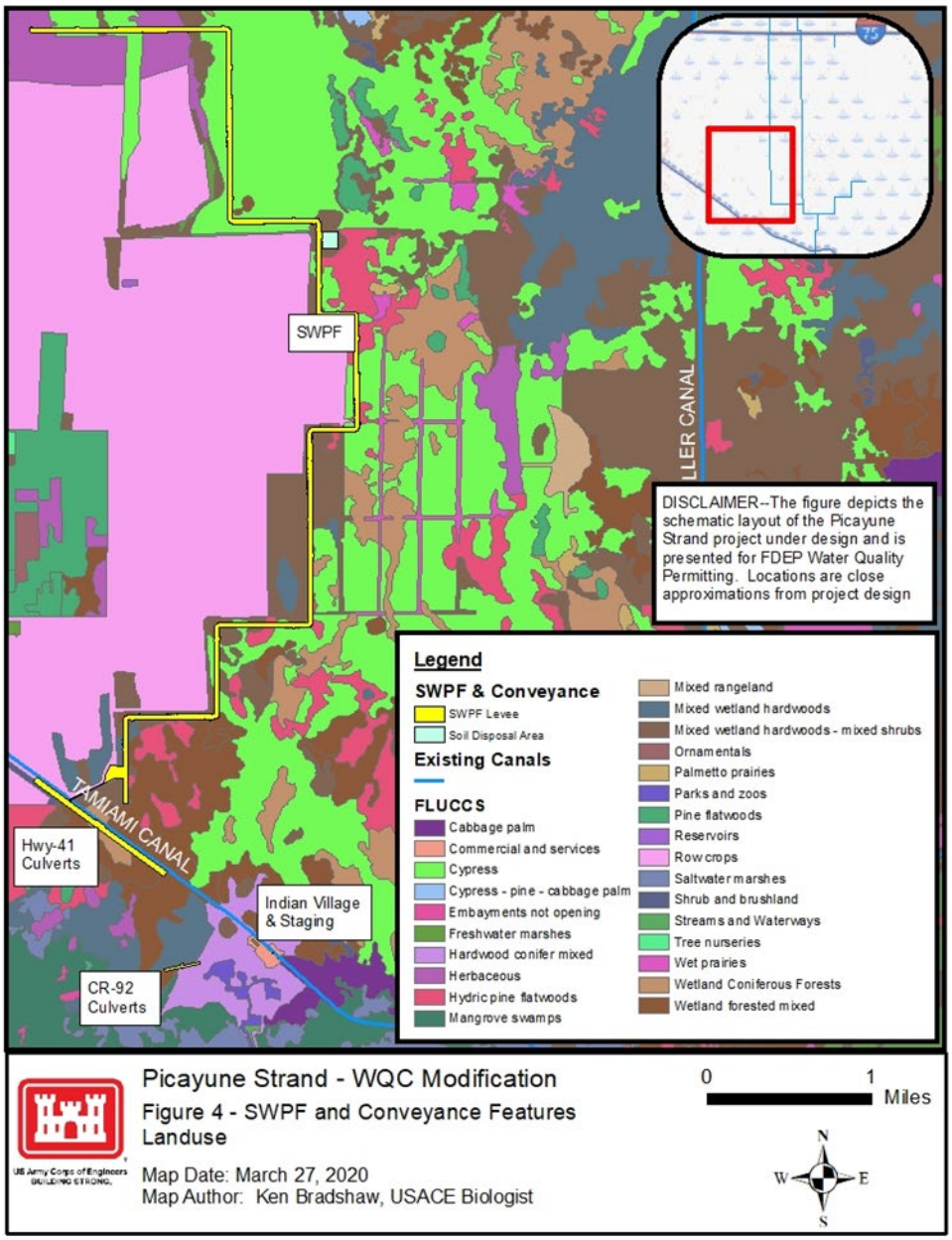

Figure 51: Map of land use near the SWPF.

The undocumented bald eagle nest in Collier Seminole State Park (Figure 20) provided by the Florida Park Service is located just south of Old Marco Rd and a ruderal feature, referred to by park staff as the "bicycle seat." This nest is located on the fringe of mesic pine flatwoods and hydric pine flatwoods based on 2014-2016 FLUCCS map. Hydrological conditions under the No Action Alternative consist of a ponding depth range of zero to two inches and a hydroperiod of less than one month. The hydrological conditions around this nest under Alternative 3w are no different than those under the No Action Alternative. Therefore, Alternative 3w will have no effect on this undocumented bald eagle nest.

4.1.9.4.2 Alternative 3w

The area surrounding American bald eagle nest CO011 will have an increase in ponding depth (Figure 52) and hydroperiod (Figure 53) under Alternative 3w compared to the No Action Alternative. However these increases are more favorable for cypress and wet prairie, both natural communities preferable to bald eagles as eagles prefer taller trees near open water or open wetland communities (USFWS 2007). Without additional conveyance under US-41 provided by either Alternative 3w or the No Action Alternative, hydrological conditions, ponding depth and hydroperiod, surrounding the undocumented bald eagles nest (Figure 20) are expected to be same for these two alternatives.

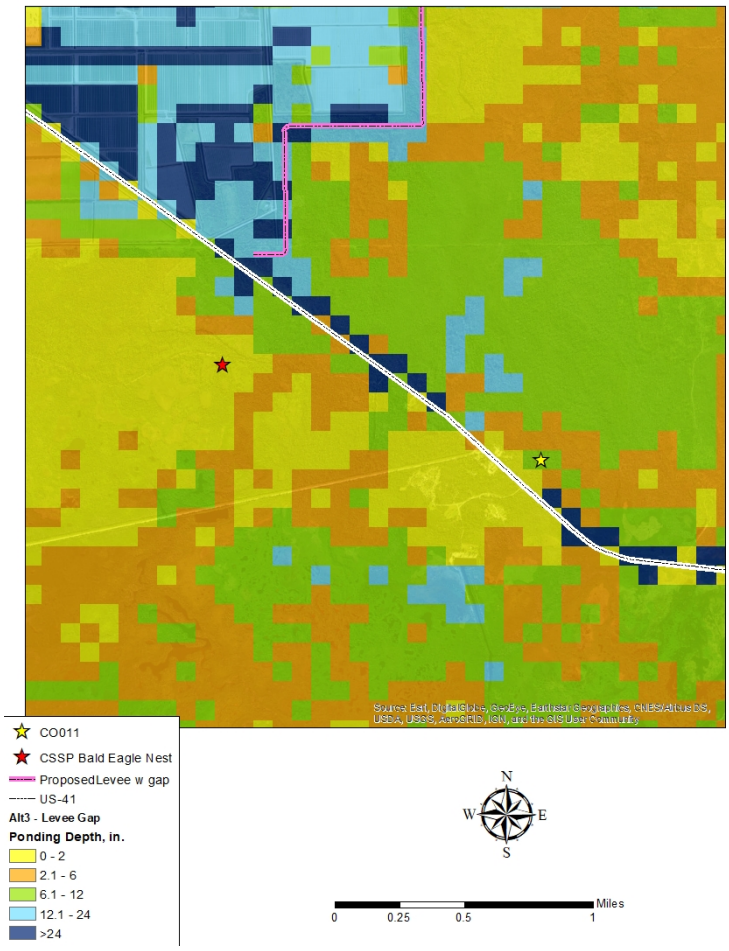

Figure 52: Location of two bald eagle nests (CO011 and the undocumented CS bald eagle nest) in relation to ponding depths under Alternative 3w.

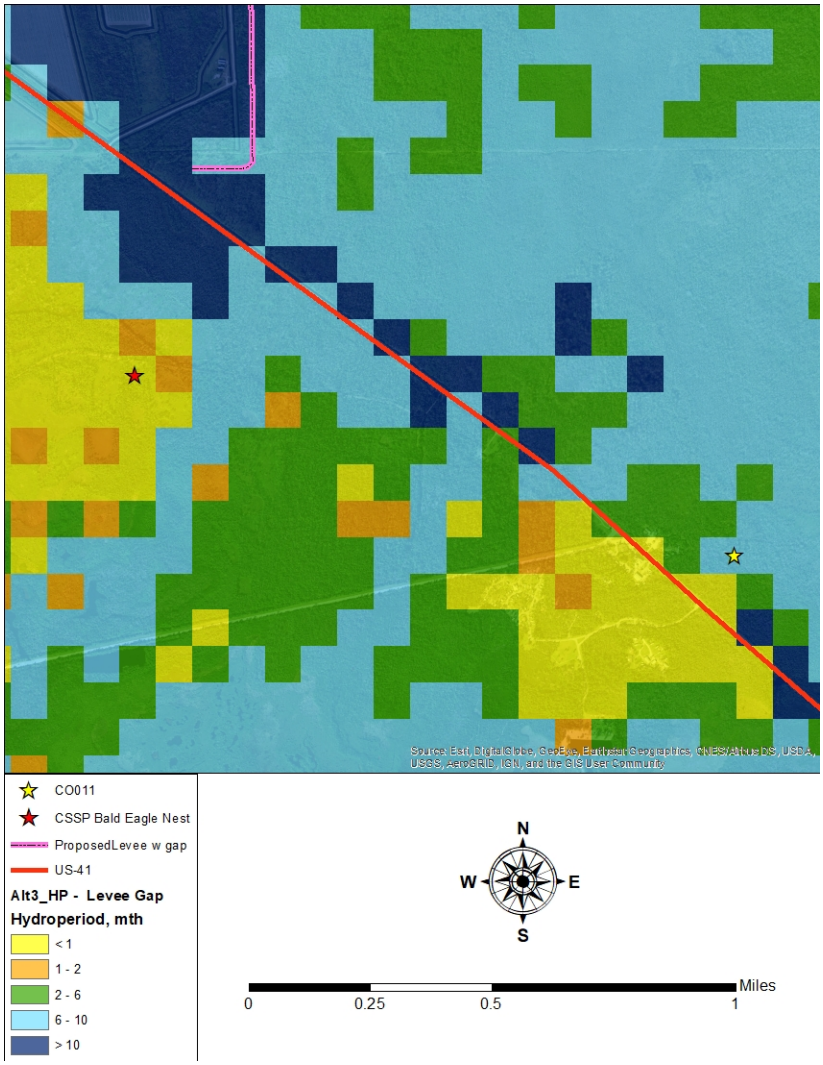

Figure 53: Location of two bald eagle nests (CO011 and the undocumented CS bald eagle nest) in relation to hydroperiod under Alternative 3w.

4.1.9.4.3 Alternative PC2

The implementation of Alternative PC2 may have the potential to affect two known American bald eagle nests, CO011 (Figure 19 and Table 6) and an unrecorded nest in Collier Seminole State Park (Figure 20). Changes to the habitat where CO011 is located is anticipated to have a ponding depth range of 6.1 in to 12 in during the wet season (Figure 54) and a hydroperiod range of six to ten months (Figure 55). These hydrological conditions yield a mosaic of wet prairie, marsh, and cypress forest. These conditions are the expected to be similar to those in Alternative 3w. Hydrological conditions under the Alternative PC2 are expected to yield natural communities, including cypress and wet prairie, that are preferable to the American bald eagle.

The 2014-16 FLUCCS map (Figure 51) shows this area to currently be classified as wetland coniferous forest – cypress/mixed hardwoods. The implementation of Alternative PC2 is not anticipated to affect CO011. Hydrological restoration in the area associated with the implementation of Alternative PC2 in conjunction with the full PSRP will produce conditions favorable to the stimulation of growth of cypress

and pine flatwood communities, improve perch and nest habitat by stimulating tree growth, and provide improved foraging habitat.

The undocumented bald eagle nest in Collier Seminole State Park (Figure 20) provided by the Florida Park Service is located just south of Old Marco Rd and a ruderal feature, referred to by park staff as the "bicycle seat." This nest is located on the fringe of mesic pine flatwoods and hydric pine flatwoods based on 2014-2016 FLUCCS map. Hydrological conditions under the No Action Alternative consist of a ponding depth range of zero to two inches and a hydroperiod of less than one month. The hydrological conditions around this nest under Alternative PC2 are no different than those under the Alternative 3w and the No Action Alternative. Therefore, Alternative PC2 will have no effect on this undocumented bald eagle nest.

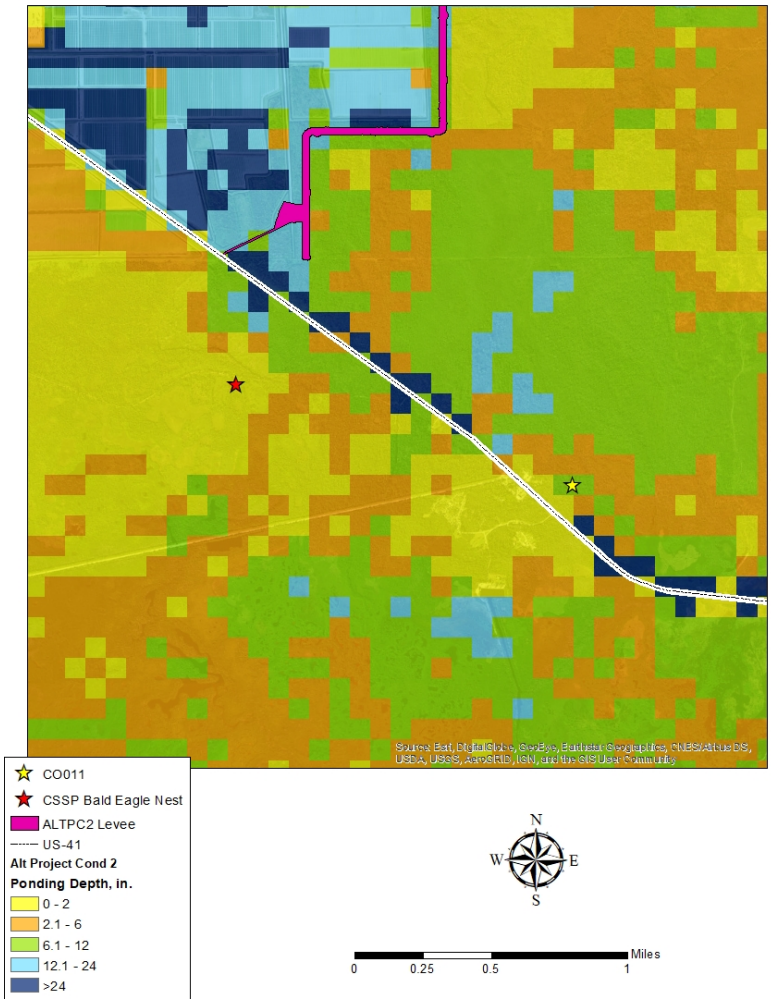

Figure 54: Location of two bald eagle nests (CO011 and the undocumented CS bald eagle nest) in relation to ponding depths under Alternative PC2.

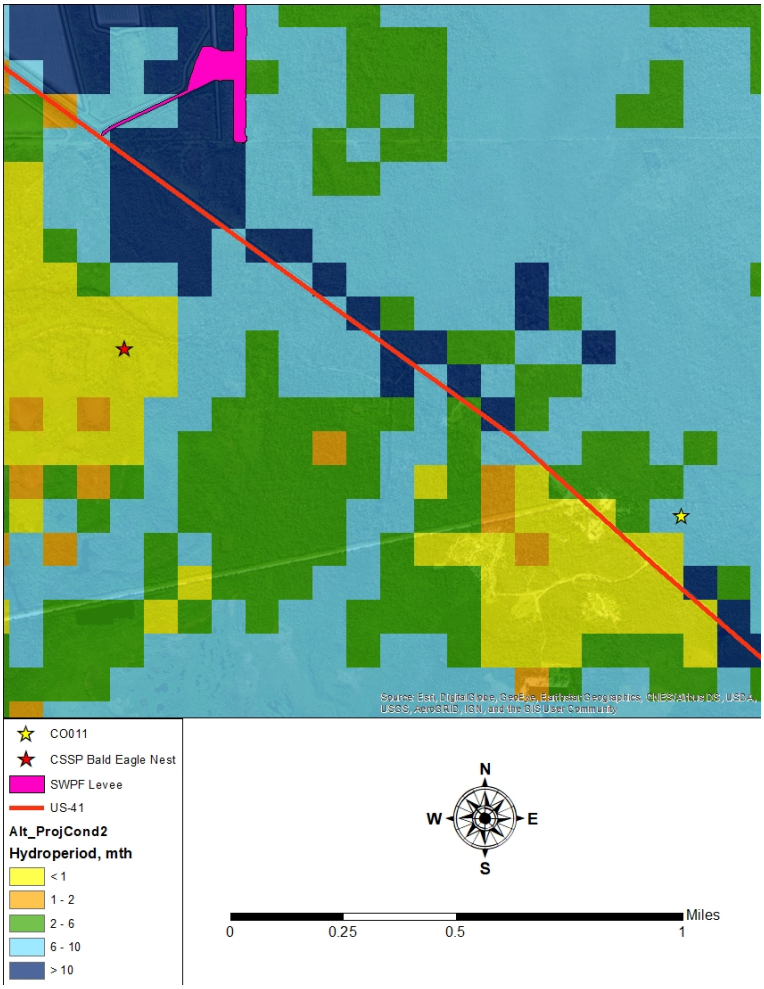

Figure 55: Location of two bald eagle nests (CO011 and the undocumented CS bald eagle nest) in relation to hydroperiod under Alternative PC2.

4.1.10 Threatened and Endangered Species

The effects for federally threatened and endangered species within the project area are listed in Table 16. The USACE initiated ESA consultation on the PSRP SWPF and Conveyance Features on 30 May 2017 with a letter of correspondence including a list of potential threatened and endangered species occurring within Collier County, FL. Informal consultation occurred in regularly scheduled project environmental calls and workshops between 30 May 2017 and 9 April 2020. The USACE submitted a biological assessment (BA) to USFWS on 6 April 2020 with its determinations (Table 16). The USACE determined that the implementation of the SWPF and additional conveyance features may affect but isn't likely to adversely affect the following listed species: American alligator, American crocodile, Everglade snail kite, wood stork, Florida panther, eastern indigo snake, and West Indian manatee. The USACE also determined that the implementation of Alternative PC2 may affect the following listed species: red-cockaded woodpecker, Florida bonneted bat, and the gopher tortoise. Species within the study area of the PSRP under the purview of NMFS are covered under the 2013 Programmatic BO provided by NMFS.

Effects to the threatened and endangered species in Table 16 will be as described in the 2004 PIR/EIS and 2013 LRR. The effects described in Table 16 for Alternative PC2 and further elaborated upon in the

Supplemental BA (Appendix A) are not significantly different than those that would occur under Alternative 3w.

Table 16: USACE effects determinations for threatened and endangered species included in the Supplemental BA

Common Name	Scientific Name	Federal Status	Determination
American alligator	*Alligator mississippiensis*	T (SA)	MANLAA
American crocodile	*Crocodylus acutus*	T	MANLAA
Loggerhead sea turtle	*Caretta caretta*	T, CH	No effect
Green sea turtle	*Chelonia mydas*	E	No effect
Leatherback sea turtle	*Dermochelys coriacea*	E	No effect
Hawksbill sea turtle	*Eretmochelys imbricata*	E	No effect
Kemp's ridley sea turtle	*Lepidochelys kempii*	E	No effect
Cape Sable seaside Sparrow	*Ammodramus maritimus mirabilis*	E	No effect
Florida scrub jay	*Aphelocoma coerulescens*	T	No effect
Ivory-billed woodpecker	*Campephilus principalis*	E	No effect
Piping plover	*Charadrius melodus*	T, CH	No effect
Red knot	*Calidris canutus rufus*	T	No effect
Audubon's crested caracara	*Polyborus plancus audubonii*	T	No effect
Everglade snail kite	*Rostrhamus sociabilis plumbeus*	E	MANLAA
Kirtland's Warbler	*Setophaga kirtlandii*	*(Delisted – Oct 2019)	No effect
Roseate tern	*Sterna dougallii dougallii*	T	No effect
Wood stork	*Mycteria americana*	T	MANLAA
Florida leafwing butterfly	*Anaea troglodyte floridalis*	E	No effect
Bartram's hairstreak butterfly	*Strymon acis bartrami*	E	No effect
Cassius blue butterfly	*Leptotes cassius theonus*	T (SA)	No effect
Ceraunus blue butterfly	*Hemiargus ceraunus antibubastus*	T (SA)	No effect
Miami blue butterfly	*Cyclargus thomasi bethunebakeri*	E	No effect
Nickerbean blue butterfly	*Cyclargus ammon*	T (SA)	No effect
Stock Island tree snail	*Orthalicus reses*	T	No effect
Florida prairie clover	*Dalea carthagenensis floridana*	E	No effect
Red-cockaded woodpecker	*Picoides borealis*	E	May affect
Florida bonneted bat	*Eumops floridanus*	E	May affect
Florida panther	*Puma concolor coryi*	E	MANLAA
Eastern indigo snake	*Drymarchon couperi*	T	MANLAA
West Indian manatee	*Trichechus manatus*	T, CH	MANLAA

Common Name	Scientific Name	Federal Status	Determination
Gopher tortoise	*Gopherus polyphemus*	C	May affect

E=Endangered; T=Threatened; C=Candidate; CH=Critical Habitat;
MANLAA=May Affect Not Likely To Adversely Affect

4.1.10.1 Red-cockaded Woodpecker

Modeling for hydrological conditions show an increase in ponding depth (Figure 29, Figure 31, Figure 32) and hydroperiod (Figure 44, Figure 46, Figure 48) northeast of the SWPF show similar results with the inclusion of full PSRP implementation. The ponding depth difference maps between the action alternatives (Alternative 3w and Alternative PC2) and the No Action Alternative (Figure 45 and Figure 47) show no difference in the area northwest of the SWPF levee where the RCW nest and roost trees are located. Additional modeling of the SWPF levee design in Alternative PC2 shows that the implementation of the SWPF and conveyance features are not the source of hydrological change that will promote changes in vegetation in the area (Figure 56 and Figure 57). The source of for the increase in ponding depth and hydroperiod is a result of the future restoration actions of plugging the Miller Canal and operations of the Miller Pump Station. Additional analysis on the red-cockaded woodpecker is included in the Supplemental BA (Appendix A). Section 4.7 provides more information on the environmental commitments that USACE will take to ensure the protection of this population of red-cockaded woodpeckers.

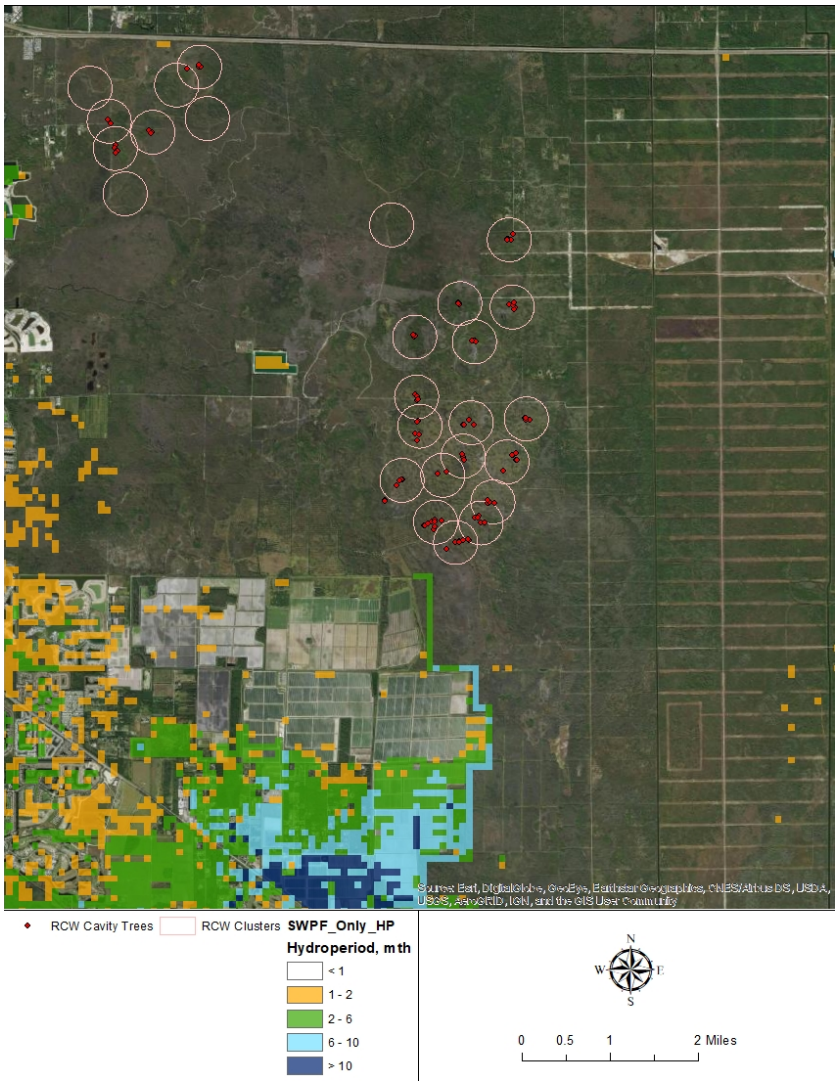

Figure 56: Hydroperiod map for the construction of the Alternative PC2 SWPF levee only.

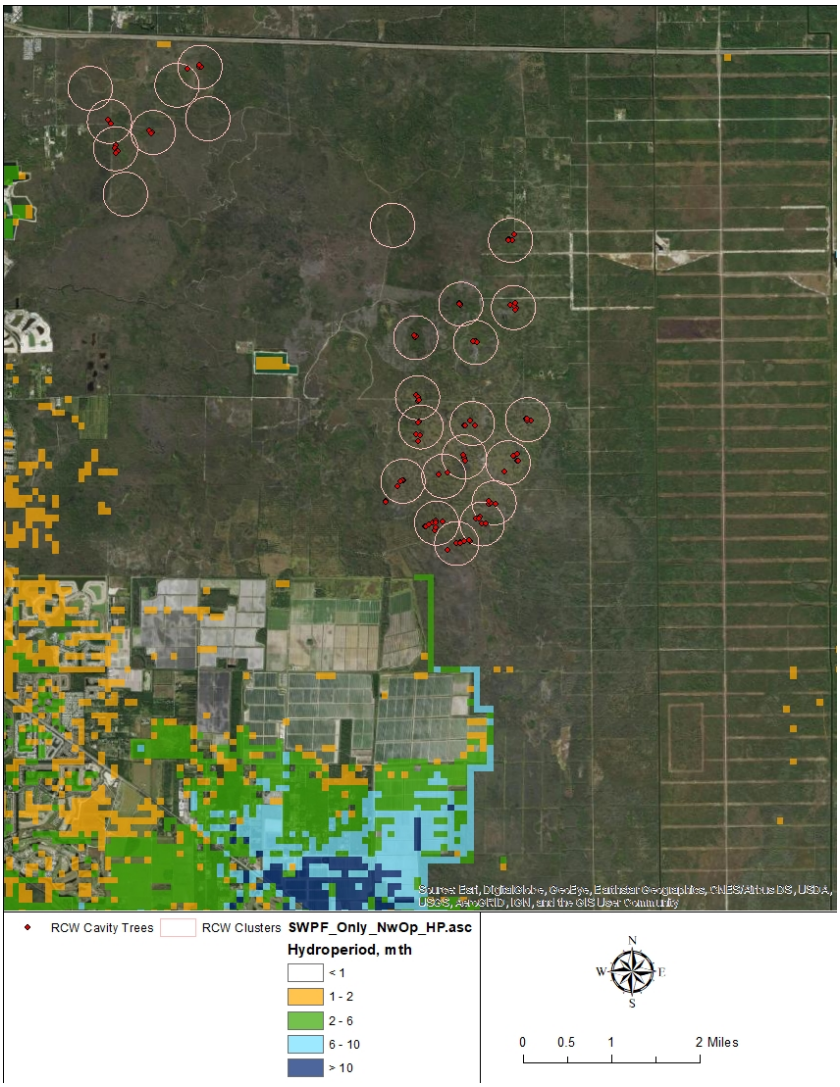

Figure 57: Hydroperiod Map for the completion of the Alternative PC2 SWPF and conveyance features (except the CR-92 culvert).

4.1.11 Essential Fish Habitat

4.1.11.1 No Action Alternative

The implementation of the No Action Alternative is expected to provide some benefits to the downstream estuaries. Without additional conveyance features, freshwater still ponds north of US-41 reducing the amount of freshwater flowing into the downstream estuaries. NMFS provided a letter to USACE on 17 December 2013 stating, "in addition to restoring freshwater wetlands, the project will improve estuarine water quality by increasing groundwater recharge and reducing large and unnatural freshwater inflows. However, without in an increase in conveyance, beneficial salinity envelops will not be as substantial and will have reduced benefits compared to Alternative PC2. Figure 35 shows less freshwater flow through south transects 2, 3, and 4 (Figure 33) meaning less freshwater will be distributed in Goodland Bay, Palm Bay, Sugar Bay, and possibly Addison Bay and Blackwater Bay (USFWS 2019; https://www.fws.gov/southeast/pubs/TenThousandIslands-tearsheet.pdf).

4.1.11.2 Alternative 3w

The effects of Alternative 3w on essential fish habitat are expected to be the same as those under the No Action Alternative.

4.1.11.3 Alternative PC2

The implementation of Alternative PC2 is expected to provide benefits of restored wetland communities and sheetflow of freshwater into coastal estuaries. NMFS provided a letter to the USACE on 17 December 2013 stating, "in addition to restoring freshwater wetlands, the project will improve estuarine water quality by increasing groundwater recharge and reducing large and unnatural freshwater inflows. Conveyance of freshwater into the downstream estuaries will reestablish a salinity envelope more favorable to estuarine species including the American alligator, American crocodile, various fish species (and their nurseries), West Indian manatee, and smalltooth sawfish. Figure 35 shows that Alternative PC2 provides more freshwater flow across south transects 2, 3, and 4 (Figure 33). Flow across these three transects will influence salinity in Goodland Bay, Palm Bay, and Sugar Bay. Addison Bay is farther west and has the potential to have an increase in freshwater flow. However, there was no substantial difference in flows amongst alternatives across southern transect one (Figure 35).

4.1.12 Water Quality

4.1.12.1 No Action Alternative

Implementation of the No Action Alternative would achieve the hydrological restoration authorized in the PSRP and would benefit water quality by changing the timing and distribution of flows (i.e., sheetflow vs canal flow) and improving hydroperiods across the project area. As stated in the 2004 PIR/EIS, the primary regional scale benefit of the PSRP project is to improve the timing and distribution of freshwater flows and reduce damaging point source flows through Faka Union Canal to the downstream estuary. Under the No Action Alternative, a major flow-way through PSSF would be reconnected to its historical flow path, reestablishing a portion of the natural flows to the estuaries, rehydrating wetlands, and restoring ecological connectivity with surrounding public lands including Federal refuges, Federal estuaries, state parks, state forests, and state estuaries. Ponding depths at the western boundary of the project indicate the seepage canal could drain the area between the SWPF and Miller Canal (Figure 29). The seepage canal would create a preferential flow path along the eastern side of the SWFP levee, short-circuiting flows and reducing water quality benefits of sheet flows and increased hydroperiod by creating conditions where soils would dry out, oxidize, and release nutrients.

Under the No Action Alternative, water would be redistributed as diffuse surface flow entering the coastal estuaries at many points, instead of a single point-source discharge through the Faka Union Canal (Figure 34 and Figure 35), which would reduce impacts to estuarine salinity from large freshwater pulses. Water with improved water quality (i.e., lower nutrient concentrations) would flow through the existing conveyance features as no additional conveyance features are included in the No Action Alternative. Restoration of water depth and duration, and reestablishment of a higher ground water table are also beneficial for reducing soil oxidation and subsequent nutrient release, and fire frequency. Overall, rehydration of PSSF wetlands and redistribution of flows to the Ten Thousand Islands regions would have a moderate long-term beneficial effect on water quality because water with lower nutrient concentrations would be delivered to the estuary as dispersed sheet flow, and point-source freshwater pulses from Faka Union Canal would be reduced and more consistent salinity levels would be maintained in the estuaries.

4.1.12.2 Alternative 3w

No additional sources of nutrients will be added from the implementation of Alternative 3w, however, the addition of a borrow canal between the farm levee and the Alternative 3w levee would capture farm discharges and associated nutrients that are not directed south as preferential flow under the No Action Alternative. The water would be conveyed south towards US-41 through a new preferential flow path (i.e., the SWPF borrow canal). The additional flow captured by the borrow canal would sheetflow south once water exits from the levee gap at the southern terminus of the levee, and mix with restoration flows that are then distributed to the estuaries through the existing conveyance (Figure 49 – Note that Alternative 3w water volumes are expected to be similar to Alternative PC2 water volumes). Short-circuiting of flows east of the SWPF would not occur under Alternative 3w because the seepage canal would not exist, compared to the No Action Alternative. Under Alternative 3w, ponding depths would increase east of the SWPF levee towards Miller Canal, which is expected to benefit water quality by decreasing soil oxidation and related nutrient releases caused by dry-outs compared to the No Action Alternative.

As stated in the 2004 PIR/EIS, the primary regional scale benefit of the PSRP project is to improve the timing and distribution of freshwater flows and reduce damaging point source flows through Faka Union Canal to the downstream estuary. Under the Alternative 3w, a major flow-way through PSSF would be reconnected to its historical flow path, reestablishing a portion of the natural flows to the estuaries, rehydrating wetlands, and restoring ecological connectivity with surrounding public lands including Federal refuges, Federal estuaries, state parks, state forests, and state estuaries. Discharges from the project will be redistributed as diffuse surface flow entering the coastal estuaries at many points, instead of a single point source discharge through the Faka Union Canal (Figure 32 and Figure 33). Improvements to water quality over the larger PSRP footprint are not a result of the Alternative 3w features, but are more a result of canal plugging reestablishing sheetflow across the PSSF.

Without additional conveyance within the southwestern portion of Collier Seminole State Park (park lands south of US-41 and west of CR-92), which Alternative 3w does not provide, water will continue to flow through the existing conveyance. Overall impacts to salinity in the estuaries under Alternative 3w would be similar to the No Action Alternative. Under Alternative 3w, impacts to nutrients would be similar to Alternative BC2 described in Section 4.1.12.3. Compared to the No Action Alternative, Alternative 3w would have minor long-term beneficial effects on water quality (i.e., nutrients) from increased ponding and depths and hydroperiods east of the SWPF that reduce dryouts and related nutrient releases.

4.1.12.3 Alternative PC2

No additional sources of nutrients will be added from the implementation of Alternative PC2, however, the addition of a borrow canal between the farm levee and the Alternative PC2 levee would capture farm discharges and associated nutrients that sheetflow away from the farm to the east and south under the No Action Alternative and convey them south towards US-41 through a new preferential flow path (i.e., the SWPF borrow canal). The additional water would sheetflow south once it exits from the levee gap and levee culvert near the southern terminus of the SWPF levee, and mix with restoration flows that are then distributed to the estuaries through the new and existing conveyance (Figure 58). Alternative PC2 with full implementation of the PSRP is expected to lower nutrient concentrations of water flowing to the Outstand Florida Water (OFW—Collier Seminole State Park) and to the estuaries. Water quality for nutrients (phosphorus and nitrogen) is expected to meet the 2019 OFW baseline of 310 ± 50 ppb for TP and 2.18 ± 0.21 ppm for TN at the OFW boundary (Figure 59). Short-circuiting of flows east of the SWPF

would not occur under Alternative PC2 because the eastern seepage canal would not exist, compared to the No Action Alternative. Under Alternative PC2, ponding depths would increase east of the SWPF levee towards Miller Canal, which is expected to benefit water quality by decreasing soil oxidation related nutrient releases caused by dry-outs compared to the No Action Alternative (Figure 32).

As stated in the 2004 PIR/EIS, the primary regional scale benefit of the PSRP project is to improve the timing and distribution of freshwater flows and reduce damaging point source flows through Faka Union Canal to the downstream estuary. Under the Alternative PC2, a major flow-way through PSSF would be reconnected to its historical flow path, reestablishing a portion of the natural flows to the estuaries, rehydrating wetlands, and restoring ecological connectivity with surrounding public lands including Federal refuges, Federal estuaries, state parks, state forests, and state estuaries. Discharges from the project will be redistributed as diffuse surface flow entering the coastal estuaries at many points, instead of a single point source discharge through the Faka Union Canal (Figure 40 and Figure 41). Improvements to water quality over the larger PSRP footprint are not a result of the implementation of Alternative PC2 features, but are more a result of canal plugging reestablishing sheetflow across the PSSF.

Conveyance through culverts near the southwestern boundary of the project area is expected increase at BR-39 and decrease at BR-36, BR-37, and BR-40 with the addition of the new US-41 conveyance, but water quality expected to meet the 2019 OFW baseline (Figure 43, Figure 58, Figure 59). With the additional conveyance of water south of US-41, which Alternative PC2 provides, water depth and hydroperiod will improve in the southwestern portion of Collier Seminole State Park (park lands south of US-41 and west of CR-92), which will reduce potential for soil oxidation and, overtime with sea level rise, subject to salt water intrusion. Overall impacts to salinity in the estuaries under Alternative PC2 would be similar to the No Action Alternative. Compared to the No Action Alternative, Alternative PC2 would have minor long-term beneficial effects on water quality (i.e., nutrients) from increased ponding depths and hydroperiods east of the SWPF that reduce dryouts and nutrient related releases. The southwestern portion of Collier-Seminole State Park would also benefit similarly from restoration of water levels and hydroperiods.

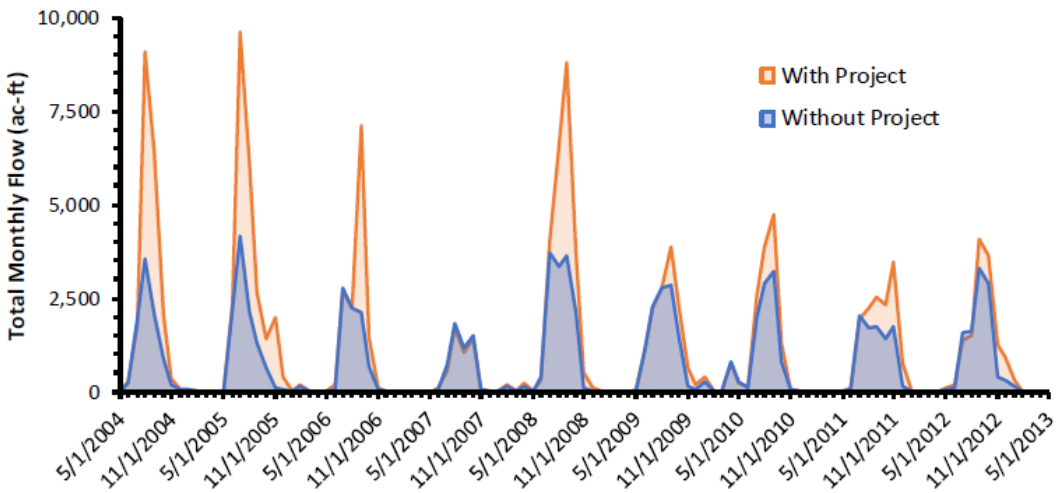

Figure 58: Comparison of estimated total monthly flow (ac-ft) at US-41 in the southwest section of the project area for the No Action Alternative (Without Project) and Alternative PC2 (With Project) for Water Year 2005 to 2013.

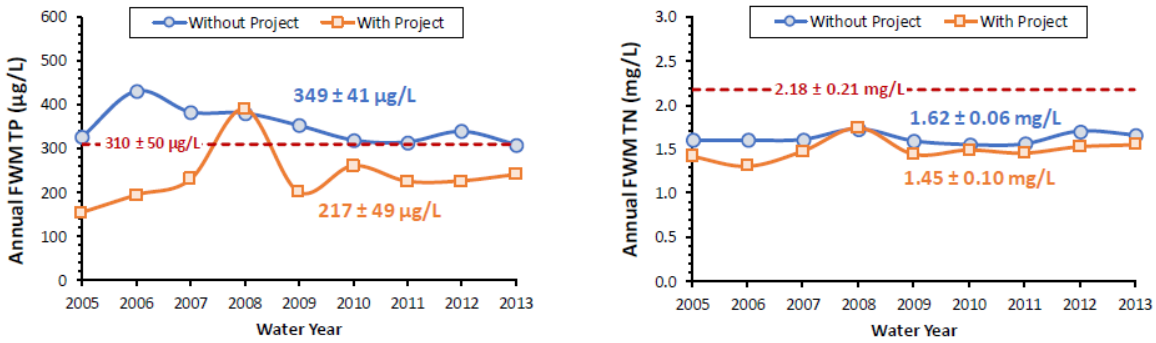

Figure 59: Annual flow weighted mean (FWM) TP and TN concentration compared to the 2019 Outstanding Florida Water (OFW) baseline (red hash) at the southwest boundary of the project area for the No Action Alternative (Without Project) and Alternative PC2 (With Project) for Water Year 2005 to 2013.

4.1.13 Native Americans

4.1.13.1 No Action Alternative

Implementation of the No Action Alternative will have no effect Native American resources.

4.1.13.2 Alternative 3w

No portion of Alternative 3w is located within or adjacent to known Native American owned lands, reservation lands, or Traditional Cultural Properties. Consultation is ongoing with Native American tribes having ancestral ties to this region, including the Seminole Tribe of Florida, the Seminole Nation of Oklahoma, the Miccosukee Tribe of Indians of Florida, and the Thlopthlocco Tribe. Pursuant to Section 106 of the NHPA, obligations regarding the USACE's Trust Responsibilities to federally recognized Native American Tribes, and in consideration of the Burial Resources Agreement between the USACE and the Seminole Tribe of Florida, consultation with the appropriate federally-recognized tribes on the Proposed Action is ongoing and will be completed prior to signing of the FONSI.

4.1.13.3 Alternative PC2

No portion of Alternative PC2 (the Preferred Alternative) is located within or adjacent to known reservation lands or Traditional Cultural Properties. Consultation is ongoing with Native American tribes having ancestral ties to this region, including the Seminole Tribe of Florida, the Seminole Nation of Oklahoma, the Miccosukee Tribe of Indians of Florida, and the Thlopthlocco Tribe. Pursuant to Section 106 of the NHPA, obligations regarding the USACE's Trust Responsibilities to federally-recognized Native American Tribes, and in consideration of the Burial Resources Agreement between the USACE and the Seminole Tribe of Florida, consultation with the appropriate federally-recognized tribes on the Proposed Action is ongoing and will be completed prior to signing of the FONSI.

4.1.14 Cultural Resources

4.1.14.1 No Action Alternative

Implementation of the No Action Alternative will have no effect on cultural resources or historic properties eligible for inclusion in the NRHP.

4.1.14.2 Alternative 3w

Alternative 3w includes a SWPF levee that is approximately 8.68 miles long and averages 145 ft wide. This alternative is a reduction in construction design footprint and is therefore incorporated under the USACE previous consultation and overall determination of no adverse effects for the PSRP construction and hydration APE in letters sent to the Florida SHPO and appropriate federally-recognized tribes dated 7 November 2018. The implementation of this alternative will result in the ground disturbance of approximately 152.56 acres. Findings reported in the 2004 PIR/EIS indicate restoration of the hydrology of Duda Fields (east of Lipman Farms and the SWPF). Modeling of Alternative 3w with full implementation of the PSRP shows increased sheetflow of water throughout the larger project area. The implementation of Alternative 3w would not cause any additional affects to historic properties in the vicinity of the Proposed Action. The implementation would restore water depth and hydroperiod duration and sheetflow across the PSRP. Without conveyance south of US-41, which Alternative 3w does not provide, historic properties within the Collier Seminole State Park (south of US-41 and west of CR-92) will continue to be subjected to existing conditions. Implementation of this alternative is therefore consistent with the USACE previous determination of effects and will have no adverse effect on historic properties.

4.1.14.3 Alternative PC2

The proposed SWPF is a reduction in construction design footprint from 17.25 miles in the 2004 PIR/EIS to 7.5 miles. The SWPF is located within the previously consulted PSRP APE, and is therefore incorporated under the USACE previous consultation and overall determination of no adverse effects for the PSRP construction and hydration APE in letters sent to the Florida SHPO and federally recognized tribes dated 7 November 2018. The proposed conveyance features are within previously disturbed roadway contexts; therefore, the proposed conveyance features will have no effect on historic properties eligible for inclusion in the NRHP. All hydration for the Alternative PC2 will not exceed historic predrainage patterns or velocities; therefore, the USACE has determined hydration will have no adverse effect on historic properties eligible for inclusion in the NRHP. The 2004 PIR/EIS provides an overall characterization of the environmental conditions that existed in the APE prior to logging, subdivision development, drainage, and other anthropogenic activities. The 2004 PIR/EIS illustrates the pre-drainage or natural Pre-1940 ponding depths using the SFWMD MIKESHE model that produced a "natural systems" base condition for the pre-drainage hydrology. When evaluated with GSSHA modeling difference maps, the ponding and hydroperiod durations resulting from the installation of additional conveyance features are minimal (zero - two inches and no change to less than one month, respectively). The cultural resources within the APE for the PSRP additional conveyance features are not subject to any significant hydrologic fluctuations exceeding those experienced for the historic pre-1940 conditions. Based on the evaluation of information from the previous MIKESHE and GSSA modeling detailed in the 2004 PIR/EIS and 2013 LRR, and more recent HEC-RAS modeling results, the Corps has determined by letter dated 6 May 2020 that hydration within the new APE resulting from the installation of the additional conveyance features will have no adverse effect on historic properties eligible for inclusion in the NRHP. The USACE will continue to monitor all ground disturbing activities within the PSRP and those disturbances associated with installation of additional conveyance features for cultural resources.

4.1.15 Air Quality

Air quality conditions within the project area are in compliance under all alternatives (No Action Alternative, Alternative 3w, Alternative PC2). Air quality will not differ amongst alternatives and will not change from current conditions. However, during construction, there would be negligible short-term impacts to air quality from equipment emissions and dust from construction activities.

4.1.16 Hazardous, Toxic, or Radioactive Wastes

4.1.16.1 No Action Alternative

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

4.1.16.2 Alternative 3w

As discussed in Section 3.16 Affected Environment, the area designated as "FAW" contains cultivated and uncultivated land cleared in the early 1960s and used for cultivation of row crops. Soil sampling within the FAW indicated the presence of chlordane and dieldrin (both organochlorine pesticides). The area of impacted soils is approximately 150 acres. Levels of chlordane and dieldrin were determined to pose a significant risk potential for sediment dwelling organisms, as well as some risk potential to aquatic receptors and piscivorous birds. Alternative 3w includes the restoration of "Duda Fields" which is the

name given to the former farmland. The NFS is responsible for HTRW remediation prior to construction of any project features. Restoration and earth moving work would potentially have to avoid these contaminated soils within the Duda Fields area which is consistent with the FAW footprint.

4.1.16.3 Alternative PC2

Alternative PC2 is not expected to require any remediation for HTRW, however, if contaminated areas are identified the NFS would be responsible for remediation prior to the construction of any project features at 100% their cost.

4.1.17 Noise

Noise levels within the project area would not be expected to have any long term change or impairment as a result of implementation of any of the three alternatives: No Action Alternative, Alternative 3w, or Alternative PC2. Short term increase in noise level will be generated from the operation of construction equipment during construction. All local and state noise regulations would be adhered to during construction phase. Additional noise may be associated with the construction of the conveyance features on US-41 and CR-92 included in Alternative PC2.

4.1.18 Aesthetics

4.1.18.1 No Action Alternative

Construction of this project will have some temporary impacts such as access restrictions, noise, and smoke associated with construction sites, but these are not expected to last for a sustained period of time. Access restrictions, noise and smoke associated with construction sites will interfere to an extent with enjoyment of the area and may disturb wildlife in the immediate area of work. Once work is completed, wildlife will once again inhabit the area around the construction sites and restrictions on access will be lifted.

The construction of an additional levee may be considered an additional impact to the aesthetics in the southwest corner of the PSRP. However, an existing farm levee has been present for decades in the same location. Thus, the impact of the new levee on the aesthetics within the PSRP will not be significant.

4.1.18.2 Alternative 3w

Implementation of Alternative 3w will not have any additional impacts on aesthetics outside of those resulting from implementation of the No Action Alternative.

4.1.18.3 Alternative PC2

Construction of this project will have some temporary impacts such as access restrictions, noise, and smoke associated with construction sites, but these are not expected to last for a sustained period of time. Access restrictions, noise and smoke associated with construction sites will interfere to an extent with enjoyment of the area and may disturb wildlife in the immediate area of work. Once work is completed, wildlife will once again inhabit the area around the construction sites and restrictions on access will be lifted.

The construction of an additional levee may be considered an additional impact to the aesthetics in the southwest corner of the PSRP. However, an existing farm levee has been present for decades in the same location. Thus, the impact of the new levee on the aesthetics within the PSRP will not be significant. Additional temporary impacts to aesthetics may occur will construction of the additional conveyance features on US-41 and on CR-92.

4.1.19 Socioeconomics

4.1.19.1 No Action Alternative

The No Action Alternative may result in socioeconomic impacts. The completion of the SWPF levee would provide flood risk management to the adjacent agricultural lands southwest of the PSRP. There is a potential for impacts to US-41 in years with more substantial wet seasons due to ponding depth along the north side of US-41 potentially reducing travel access between CR-92 and Tomato Rd. Residents of POI could be impacted as well as other travelers using US-41 for travel to and from Naples, FL.

4.1.19.2 Alternative 3w

Alternative 3w may result in socioeconomic impacts similar to those of the No Action Alternative but the potential effects would be less due to improvements in conveyance north of US-41 provided by the gap between the southern terminus of the SWPF levee and US-41 which is not present in the No Action Alternative. There is a potential for impacts to US-41 in years with more substantial wet seasons due to ponding depth along the north side of US-41 potentially reducing travel access between CR-92 and tomato Rd. Residents of POI could be impacted as well as other travelers using US-41 for travel to and from Naples, FL. Modeling shows there is not an appreciable difference between Alternative 3w and the No Action Alternative along US-41.

4.1.19.3 Alternative PC2

Alternative PC2 would not result in socioeconomic impacts. The completion of the SWPF levee would provide flood risk management to the adjacent agricultural lands southwest of the PSRP. Additional conveyance would reduce hydrological impacts to US-41. During construction, temporary lanes to US-41 and CR-92 will likely be added on a temporary basis to complete construction of some of the conveyance features including the construction of culverts under US-41 east of Tomato Rd and construction associated with the culvert under CR-92 near the Collier Seminole State Park Campground.

4.1.20 Agriculture

4.1.20.1 No Action Alternative

The No Action Alternative increases the management of flood risk for agriculture in the area and would not result in impacts to agriculture in the area. Agricultural practices are not expected to change due to the No Action Alternative. This alternative provides for and includes current discharges from the farms allowed under their current permits. During wetter periods, water continues to pond on the north side of US-41 including the where the SWPF levee conveyance canal discharges. Water ponding within the SWPF conveyance canal could impact the ability for agricultural excess water discharge into the conveyance canal.

4.1.20.2 Alternative 3w

Alternative 3w increases the management of flood risk for agriculture in the area. During wetter periods, water continues to pond on the north side of US-41 including the where the SWPF levee conveyance canal discharges. Water ponding within the SWPF conveyance canal could impact the ability for agricultural excess water discharge into the conveyance canal. However, these impacts are not as great due to the gap between the southern terminus of the SWPF levee and US-41 which allows for more flow out of the conveyance canal between the existing farm levee and the SWPF.

4.1.20.3 Alternative PC2

Alternative PC2 is not expected to negatively affect agriculture in the area. Additional conveyance features reduce ponding north of US-41. With increased conveyance, the potential for water to back up through the conveyance canal is minimal.

4.1.21 Recreation

Implementation of the any of the potential alternatives (No Action Alternative, Alternative 3w, Alternative PC2) would not impact most recreational activities. Some recreational activities would benefit from the implementation of Alternative 3w including fishing, frogging, wildlife viewing including bird observation, and migratory bird hunting. Accessibility may limit some recreational activity within the project area due to an increase in ponding depth and hydroperiod along the southern portions of the Picayune Strand State Forest Wildlife Management Area north of US-41. The area directly north of US-41 in the southwest corner is part of Collier Seminole State Park where hunting is prohibited year round. No appreciable difference in recreational opportunity is expected amongst the alternatives.

4.2 Partial Plugging of the Faka Union Canal

The following includes anticipated changes to the existing environment including direct, indirect, and cumulative effects. This assessment of environmental effects evaluates the anticipated environmental effects of the alternatives (Section 4) compared to existing conditions described in Section 3 (Affected Environment), relative to the No Action Alternative. These potential effects are described within this section and are broadly summarized in Table 17. Reference Section 2 (Alternatives) for a description of each alternative.

For this analysis, intensity was rated as follows:

- Negligible effect to the resource or discipline is barely perceptible and not measurable and confined to a small area.

- Minor effect to the resource or discipline is perceptible and measurable and is localized.

- Moderate effect is clearly detectable and could have appreciable effect on the resource or discipline; or the effect is perceptible and measurable throughout the study area.

- Major effect would have a substantial, highly noticeable influence on the resource or discipline on a regional scale.

The duration of the effects in this analysis is defined as follows:

- No duration — no effect
- Temporary
- Short term — effects last less than one year
- Long term — effects that last longer than one year

Table 17: Summary table of effects for intensity and duration for the plugging of the Faka Union Canal prior to the construction of the SWPF.

RESOURCE	ALTERNATIVE 5	ALTERNATIVE 6
Climate	No Effect	No Effect
Geology and Soils	Minor Long Term Potential Beneficial Effect	Minor Long Term Potential Beneficial Effect
Land Use	No Effect	No Effect
Hydrology	minor long term potential beneficial effect	moderate long term potential beneficial effect
Regional Water Management (Operations)	moderate long term potential effect	moderate long term potential effect
Flood Risk Management	No Effect	moderate short term potential adverse effect
Vegetative Communities	Minor Long Term Potential Beneficial Effect	Moderate Long Term Potential Beneficial Effect
Fish and Wildlife Resources	Minor Long Term Potential Beneficial Effect	Moderate Long Term Potential Beneficial Effect
Threatened and Endangered Species	Minor Long Term Potential Beneficial Effect	Moderate Long Term Potential Beneficial Effect
Essential Fish Habitat	Minor Long Term Potential Beneficial Effect	Moderate Long Term Potential Beneficial Effect
Water Quality	Minor Long Term Potential Beneficial Effect	Moderate Long Term Potential Beneficial Effect
Native Americans	No Effect	No Effect
Cultural Resources	No Effect	No Effect
Air Quality	No Effect	No Effect
Hazardous, Toxic, or Radioactive Wastes	No Effect	No Effect
Noise	Minor Temporary Potential Adverse Effect	Minor Temporary Potential Adverse Effect
Aesthetics	Minor Long Term Potential Beneficial Effect	Minor Long Term Potential Beneficial Effect
Socioeconomics	No Effect	No Effect
Agriculture	No Effect	Moderate Short Term Potential Adverse Effect
Recreation	Minor Long Term Potential Beneficial Effect	Minor Long Term Potential Beneficial Effect

4.2.1 General Environmental Effects

The Faka Union Canal is located down the center of the PSRP (Figure 1 and Figure 3). To maintain existing levels of flood protection for the agricultural lands southwest of the PSRP, the 2013 LRR stated that the Miller and Faka Union Canals would not be plugged until the completion of the SWPF. Incremental plugging distances of the Faka Union Canal, starting at the southern end of the Faka Union Spreader Berm were modeled in order to assess if any of the Faka Union Canal could be plugged without reducing flood protection to the agricultural lands to the southwest of the PSRP. Analysis of incremental plugging showed that plugging beyond the northern 3.3 miles showed increases in ponding of water in the southwest corner of the PSRP. However, plugging the northern 3.3 miles of the Faka Union Canal does not impact the southwest corner or the RCW nesting areas west-southwest of the Miller Pump Station and west end of the tieback levee.

This partial plugging (distance of 3.3 miles) is an intermediate state to restoring the historic flow patterns and hydroperiods in PSRP. After the implementation of the SWPF and Conveyance Features, the remaining portion of the Faka Union Canal will be completed, resulting in a complete feature as described in the 2004 PIR/EIS. As an intermediate condition, the partial plugging of the Faka Union Canal was modeled using the GSSHA Storm Event Tool for the 5-, 10-, 25-, and 100-yr storm event (5 days). Plugging of the northern 3.3 miles of the Faka Union Canal will have little to no effect west of the Miller Canal, as the Miller Canal will continue to drain the western side of the PSRP, conveying water south through the remaining canal system towards the POI. Alternative 6 represents the full plugging of the Faka Union Canal. It is important to note that modeling efforts for any plugging beyond that of Alternative 5, starting with an incremental step south (plugging the northern 3.6 miles of the Faka Union Canal) results in a decrease in flood protection (increase of flood risk) west of Miller Canal towards the southwest corner of the PSRP.

4.2.2 Climate

Implementation of the No Action Alternative, Alternative 3w, and Alternative PC2 would not result in significant impacts to the climate of southwest Florida. However, climate may have significant impacts to these three alternatives. Analysis provided in the 2013 LRR, shows the potential under varying sea level rise scenarios for the southern portion of the PSRP to be inundated by sea level rise. Evaluation of sea level rise (SLR) in the 2013 LRR included multiple scenarios of low SLR, intermediate SLR, and high SLR at 20, 50, and 100 years following the completion of project construction. Using historic SLR at NOAA's Key West tide station of 2.24 mm/yr, SLR was calculated for the 3 SLR scenarios at five year intervals per Engineering Circular (EC) 1165-2-211 guidance (Table 12 and Figure 25).

The highest elevation within PSRP is 10 feet North American Vertical Datum (NAVD) at I-75. The lowest elevation within PSRP is approximately 3 feet NAVD at US-41 with some sloughs being 0.5 to two feet lower in elevation. Without the implementation of PSRP, freshwater natural communities will shift to estuarine and marine communities, especially in the southern portions of the PSRP. Intermediate project of sea level rise at 100 years post project estimate sea levels will rise approximately two feet in south Florida. This would result in a loss of approximately nine percent of the area in the southern PSRP.

While sea level rise may threaten to overtake the southern portions of the PSRP, the partial plugging of the Faka Union Canal will increase the hydrologically restored area within the PSRP and permanently change some of the point source discharged freshwater into sheetflow throughout the PSRP.

4.2.3 Geology and Soils

4.2.3.1 No Action Alternative

The No Action Alternative will have no impact on geology and soils of the area.

4.2.3.2 Alternative 5

Implementation of Alternative 5 will result in the short term disturbance of approximately 100 acres of land along the northern 3.3 miles of the Faka Union Canal starting at the south point of the Faka Union Spreader Berm. Overall, long term effects will be beneficial due to the restoration of sheet flow influencing approximately 8,352 acres between the Faka Union Spreader Berm to the north, 92nd Ave. to the south, Miller Canal to the west, and Merritt Canal to the east. Restored hydrology will be beneficial in restoring proper hydration of soils due to improved groundwater recharge and surface hydrology.

4.2.3.3 Alternative 6

Implementation of Alternative 6 will result in the short term disturbance of approximately 310 acres of land along the full length of the Faka Union Canal between the Faka Union Spreader Berm and the junction with the Western Stair Step Canal. Overall, long term effects will be beneficial due to the restoration of sheet flow influencing approximately 19,678 acres between the Faka Union Spreader Berm to the north, the junction of Faka Union Canal and the Western Stair Step Canal to the south, Miller Canal to the west, and Merritt Canal to the east. Restored hydrology will be beneficial in restoring proper hydration of soils due to improved groundwater recharge and surface hydrology.

4.2.4 Study Area Land Use

4.2.4.1 No Action Alternative

Implementation of the No Action Alternative would not result in significant impacts to study area land use.

4.2.4.2 Alternative 5

Implementation of the Alternative PC2 would not result in significant impacts to study area land use.

4.2.4.3 Alternative 6

Implementation of the Alternative PC2 would not result in significant impacts to study area land use.

4.2.5 Hydrology

4.2.5.1 No Action Alternative

The No Action Alternative will not have an effect on hydrology. Implementation of the No Action Alternative will not greatly impact the hydrological restoration authorized in the PSRP, but would result in no incremental restoration benefit associated with plugging Faka Union Canal prior to completion of the SWPF. Point source discharge would continue at current levels through the Faka Union Canal to discharge in the Ten Thousand Islands Region until the Faka Union. For perspective, a number of project

objectives as described in the 2004 PIR/EIS would not be met for 43,918 of 59,294 acres with the loss of the Faka Union and Miller canal plugging within the PSRP (USACE 2014).

4.2.5.2 Alternative 5

Alternative 5 is expected to have similar hydrological effects as the plugging of the Merritt and Prairie Canals for the 3.3 miles of plugged canal directly south of the Faka Union Pump Station, between Miller Canal and the former Merritt Canal. As stated in the 2013 LRR, 26 years of monthly water level monitoring documenting the effects of Prairie Canal across the Fakahatchee Strand (east of the PSRP) show that draw-down effects due to canal drainage can extend one to 1.5 miles from the canal during the wet season and two to three miles during the dry season (USACE 2014). The canals within the PSRP are approximately two miles apart. Thus the majority of hydrological change will occur east of the Faka Union Canal further improving hydrology in previously restored areas of along the former Merritt Canal and Prairie Canal. The remaining Faka Union Canal and Miller Canal will continue to exert influence on hydrology by draining the western and southern PSRP.

Depth time series model data was extracted from the Storm Event Tool of the GSSHA model for three different locations (north to south as shown in Figure 60). Depth hydrographs for the four 5-day simulated 5-, 10-, 25-, and 100-year storm events show a quick response in drainage due to the influence of an unplugged Miller Canal and approximately 4.5 miles of unplugged Faka Union Canal (Figure 61, Figure 62, Figure 63).

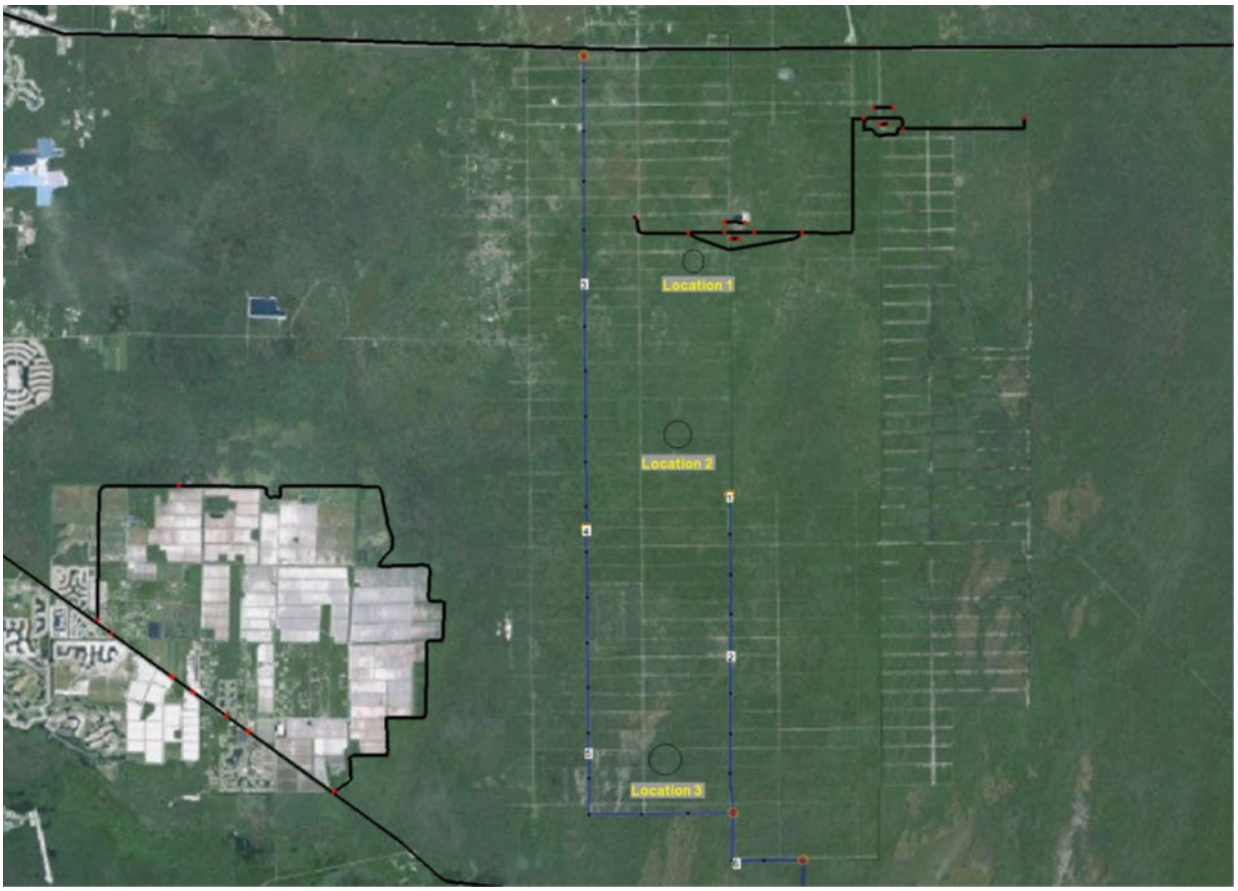

Figure 60: Selected locations for extraction of depth time series model data.

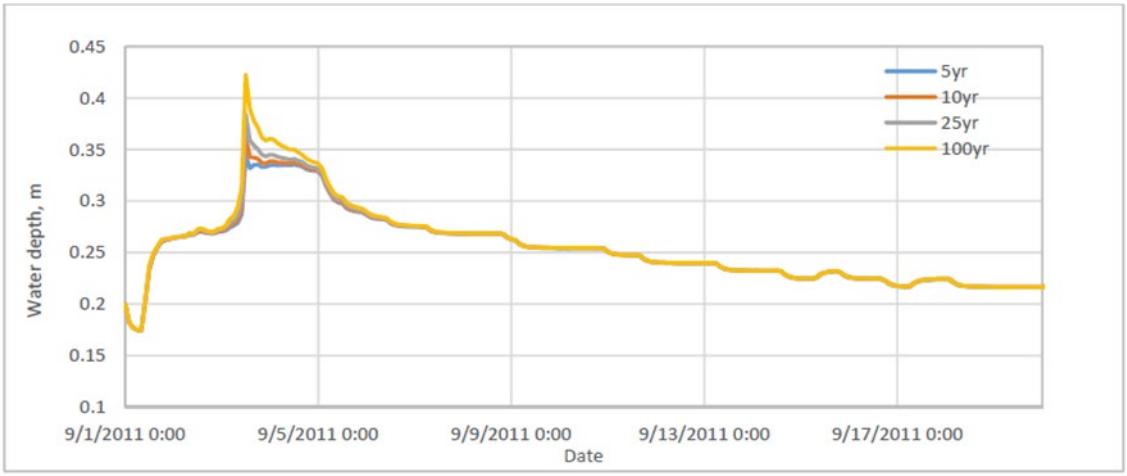

Figure 61: Depth hydrographs for the four storm events at Location 1.

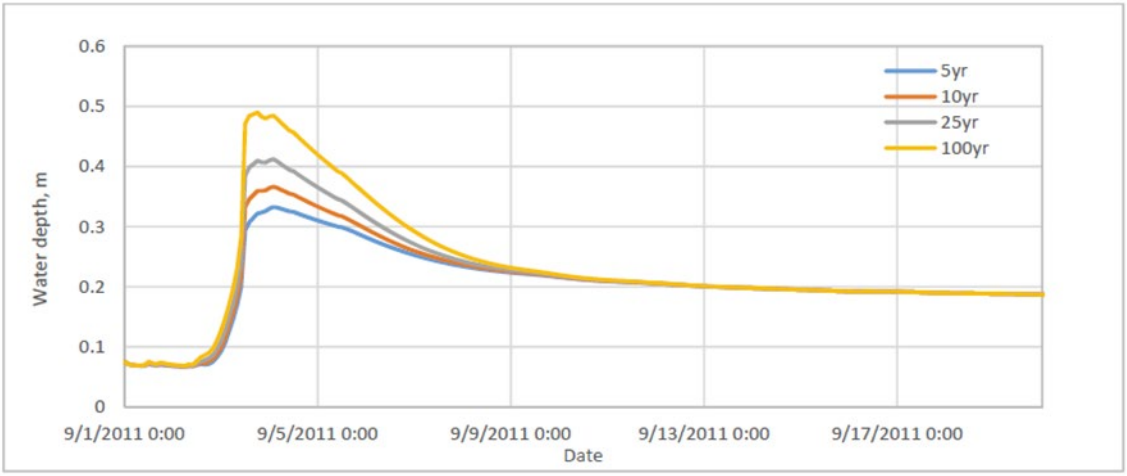

Figure 62: Depth hydrographs for the four storm events at Location 2.

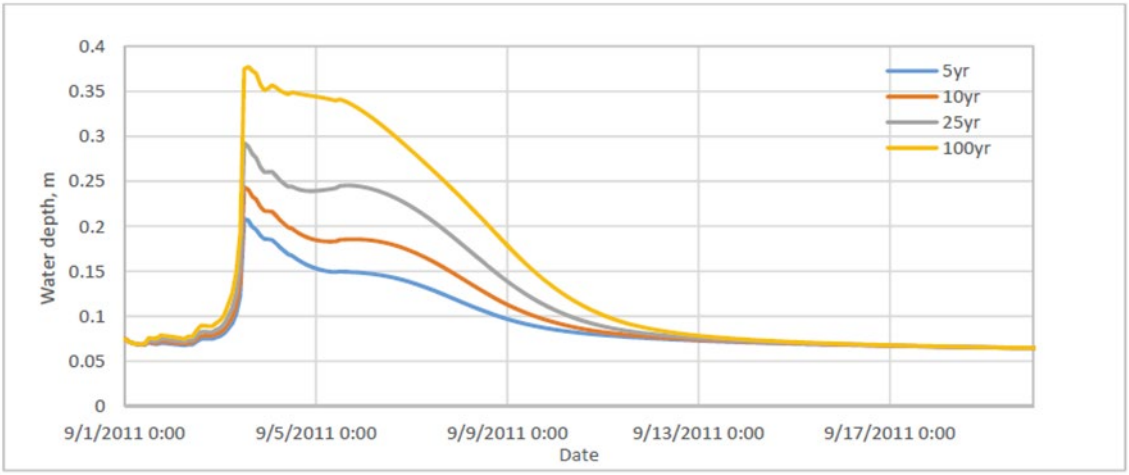

Figure 63: Depth hydrographs for the four storm events at Location 3.

Partial plugging of the Faka Union Canal is an incremental step to restoring the historic flow patterns and hydroperiods in the PSRP. Plugging the upper 3.3 miles of the Faka Union Canal will increase water depths and hydroperiods within the extents described in the simulated storm difference maps (Figure 65, Figure 66, Figure 67, Figure 68), but is not expected to increase depths or hydroperiods more than what has been shown with long-term modeling of the full with project condition (USACE 2019). Alternative 5 is expected to slightly decrease flow at the Faka POI stream gage (Figure 64) because less water will preferentially flow down the canal, and will instead be dispersed as sheetflow downstream of the Faka Union Pump Station, and away from the plugged canal, following natural topography (USACE 2019). This incremental decrease in freshwater discharge to Faka Union Bay is beneficial to the estuary, and is not expected to reduce flows any more than the full with-project condition. Changes to flow distribution at culverts and bridges along Hwy 41, between Tomato RD and Faka POI, are not expected to occur during this phase of the project because Miller Canal and the lower section of Faka Union canal will capture sheetflow that reach the canals and route the water through the remaining canal system, therefore, additional water from partially plugging Faka Union canal is not expected to sheetflow as far south as Tamiami Trail (USACE 2019).

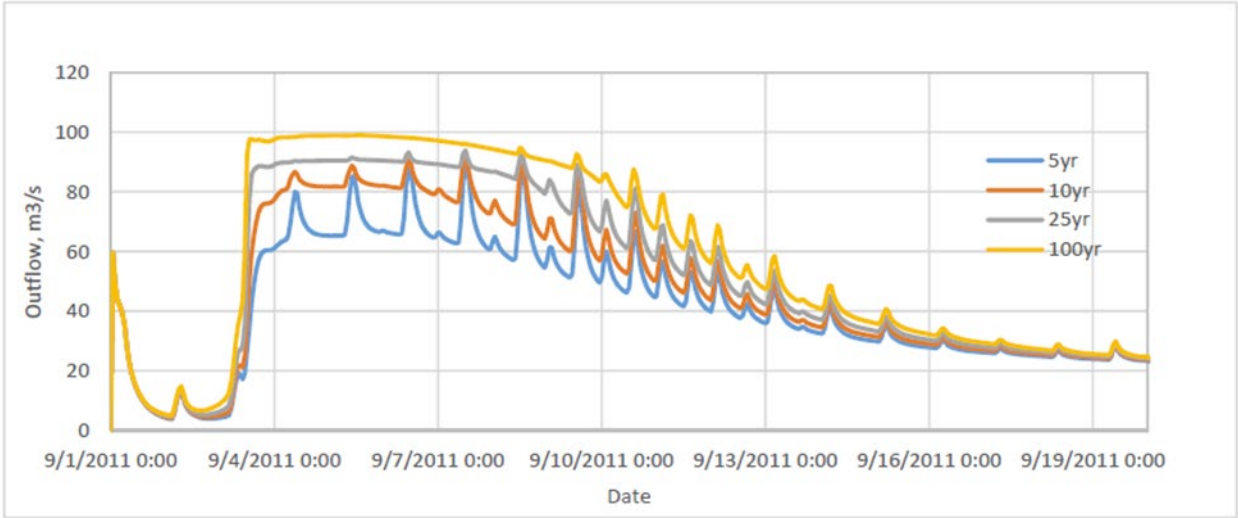

Figure 64: Outlet flow hydrograph for the GSSHA Storm Event Model scenarios. The outlet is located at the junction of the Faka Union Canal and the Gulf of Mexico. The peaks and valleys in these storm hydrographs are representative of the influence of tidal conditions.

4.2.5.3 Alternative 6

Alternative 6 is expected to have similar hydrological effects as the plugging of the Merritt and Prairie Canals for the Faka Union Canal. As stated in the 2013 LRR, 26 years of monthly water level monitoring documenting the effects of Prairie Canal across the Fakahatchee Strand (east of the PSRP) show that draw-down effects due to canal drainage can extend one to 1.5 miles from the canal during the wet season and two to three miles during the dry season (USACE 2014). The canals within the PSRP stand at two miles apart. Thus the majority of hydrological change will occur east of the Faka Union Canal further improving hydrology in previously restored areas of along the former Merritt Canal and Prairie Canal. Miller Canal will continue to exert influence on hydrology by draining the western PSRP and influencing draw-down in the area between Miller and Faka Union.

During the wet season, the amounts of water received via upstream flow and local rainfall may be more than the Miller Canal can effectively drain by itself, leading to the potential for increased ponding in the southwest corner at a level below that shown for full with project conditions in the 2013 LRR, due to the unplugged Miller Canal and unplugged Western Stair Step Canal.

4.2.6 Regional Water Management (Operations)

4.2.6.1 No Action Alternative

The No Action Alternative will not have an effect on current regional water management and operations.

4.2.6.2 Alternative 5

The implementation of Alternative 5 will allow for operations of the Faka Union Pump Station in accordance with the PSRP Project Operating Manual. Upon completion of Alternative 5, the Faka Union Pump Station will pump water out of the Faka Union Canal into the Faka Union Spreader basin allowing water to spill over the twenty spreader berm weirs, south of the Tieback Levee, into the Picayune Strand

State Forest providing sheet flow within the project area. This will provide, at minimum, partial hydrologic restoration for approximately 8,352 acres between Miller Canal and Merritt Canal (west to east) and between the Faka Union Spreader Berm and the 3.3 mile plug (north to south) (Figure 17). The Faka Union Pump Station will be operated in accordance with the final approved project operating manual.

4.2.6.3 Alternative 6

The implementation of Alternative 6 will allow for operations of the Faka Union Pump Station in accordance with the PSRP Project Operating Manual. Upon completion of Alternative 5, the Faka Union Pump Station will pump water out of the Faka Union Canal into the Faka Union Spreader basin allowing water to spill over the twenty spreader berm weirs, south of the Tieback Levee, into the Picayune Strand State Forest providing sheet flow within the project area. This will provide, at minimum, partial hydrologic restoration for approximately 19,678 acres between Miller Canal and Merritt Canal (west to east) and between the Faka Union Spreader Berm and the junction of Faka Union Canal and the Western Stair Step Canal (north to South) (Figure 17). The Faka Union Pump Station will be operated in accordance with the final approved project operating manual.

4.2.7 Flood Risk Management

4.2.7.1 No Action Alternative

The No Action Alternative will not have an effect on flood risk management.

4.2.7.2 Alternative 5

Alternative 5 does not significantly increase the risk of flooding to the agricultural lands southwest of the PSRP or the red-cockaded woodpecker nesting and roosting areas. Modeling of four 5-day synthetic storm events, 5-, 10-, 25-, 100-year, (Figure 65, Figure 66, Figure 67, Figure 68) show limited impacts west of Miller Canal as Miller Canal and the remaining part of Faka Union Canal continue to drain western Picayune Strand State Forest. Drainage provided by un-plugged canals is too effect, in that they rapidly shunt water draining from the north and east (higher elevations) down the remaining waterways and out into the Ten Thousand Islands (USACE 2014).

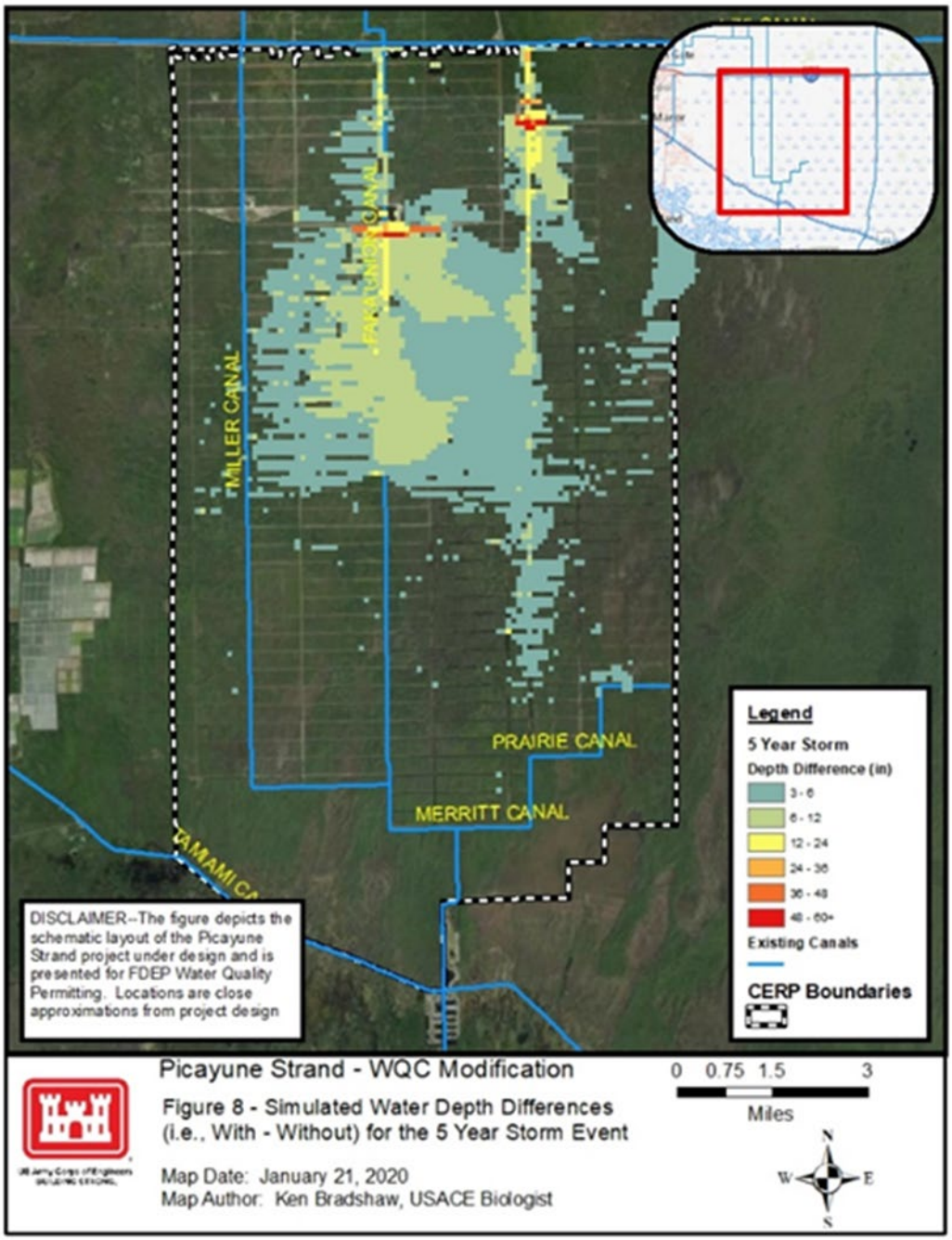

Figure 65: Simulated water depth differences (Alternative 5 minus No Action Alternative) for a 5-year storm.

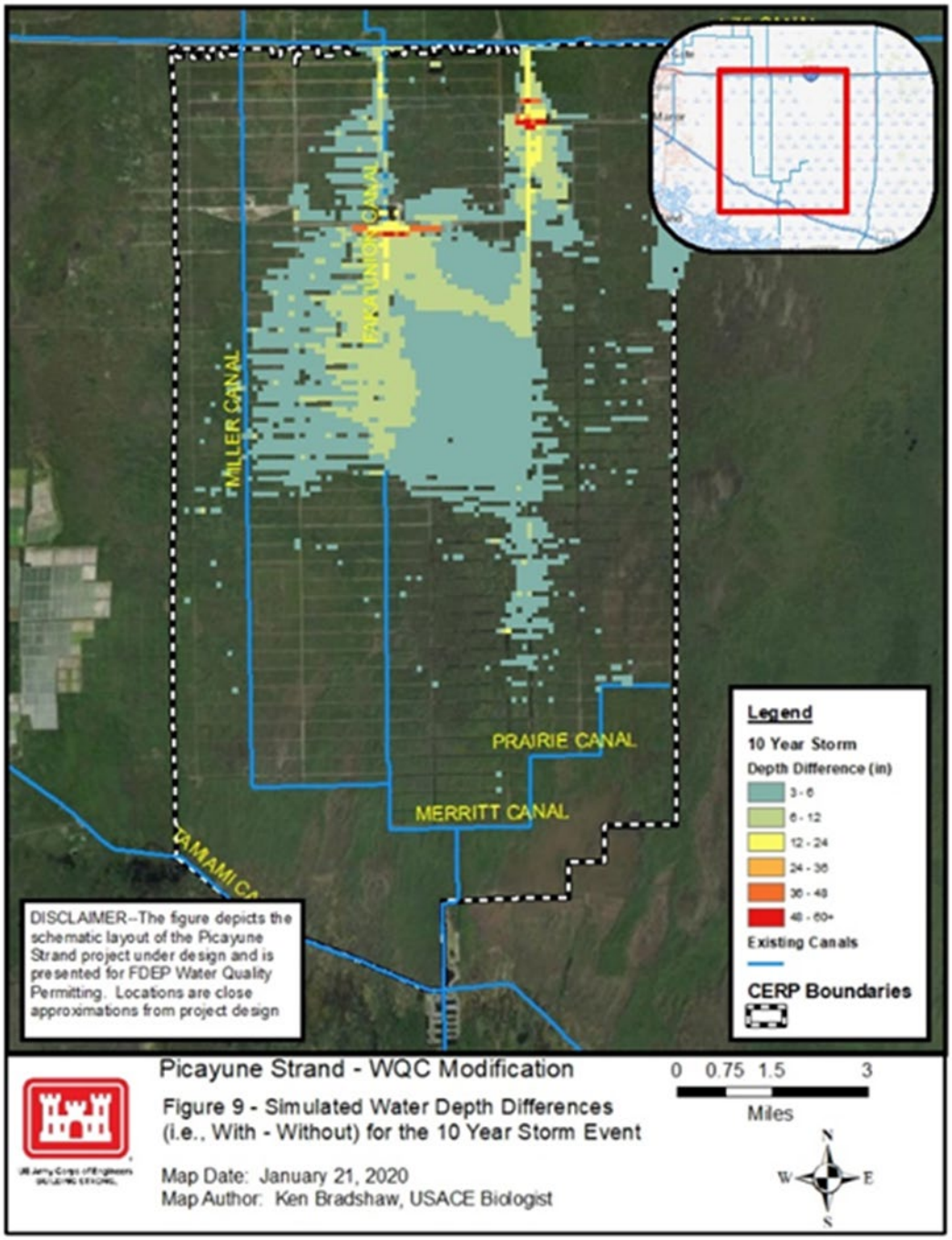

Figure 66: Simulated water depth differences (Alternative 5 minus No Action Alternative) for a 10-year storm.

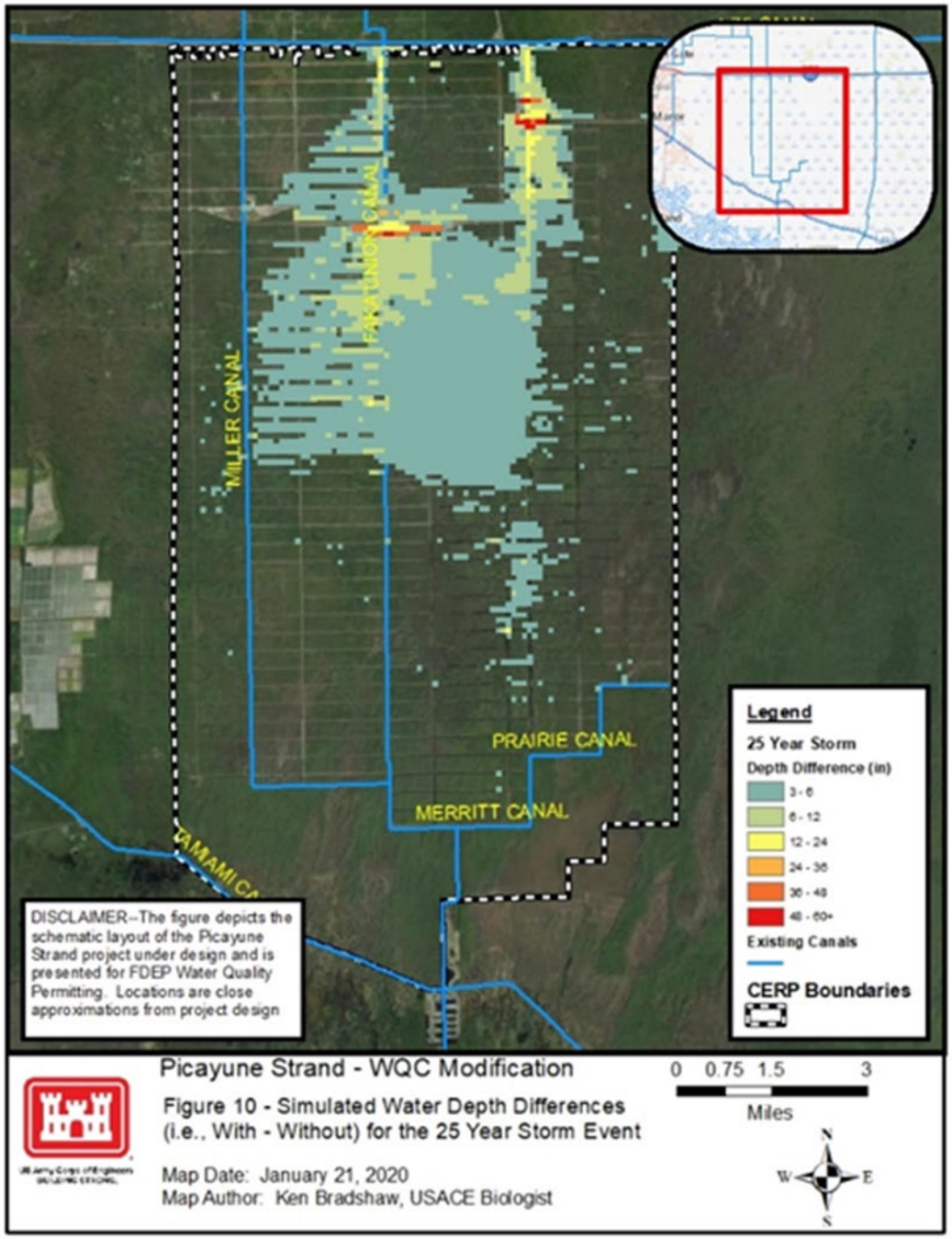

Figure 67: Simulated water depth differences (Alternative 5 minus No Action Alternative) for a 25-year storm.

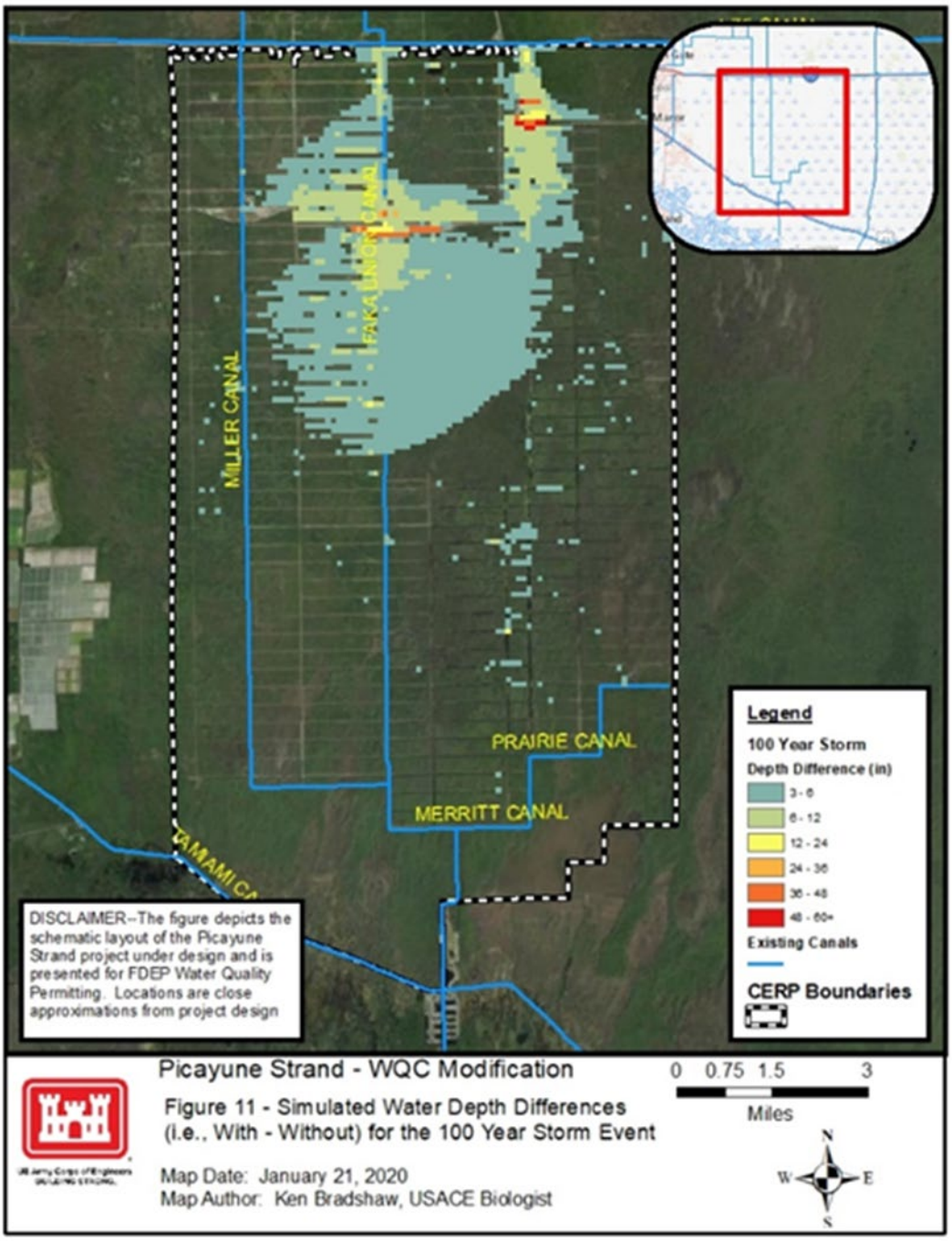

Figure 68: Simulated water depth differences (Alternative 5 minus No Action Alternative) for a 100-year storm.

4.2.7.3 Alternative 6

Alternative 6 does significantly increase the risk of flooding to the agricultural lands southwest of the PSRP. Modeling revealed that any plugging prior to the implementation of the SWPF beyond the northern 3.3 miles (3.6 miles to full Faka Union Canal plugging) results in increased risk of flooding to the agricultural lands southwest of the PSRP.

4.2.8 Vegetative Communities

4.2.8.1 No Action Alternative

No additional effects to vegetation will occur in excess of those described in the 2004 PIR/EIS and 2013 LRR under the No Action Alternative.

4.2.8.2 Alternative 5

Implementation of Alternative 5 will have an immediate effect along the northern 3.3 miles of the Faka Union Canal starting at the southern tip of the Faka Union Spreader Berm due to plugging of the canal. After completion, approximately 3.3 miles of open water canal will be available for natural succession. Hydrological restoration benefits, as described in the 2004 PIR/EIS and 2013 LRR, would increase for approximately 8,352 acres that have received no or partial hydrological restoration.

Modeling of four 5-day synthetic storm events, 5-, 10-, 25-, 100-year, (Figure 65, Figure 66, Figure 67, Figure 68) show limited impacts west of Miller Canal as Miller Canal and the remaining part of Faka Union Canal continue to drain western Picayune Strand State Forest. Ponding depth difference ranges from 3 in to 6 in throughout the area of plugging between Miller Canal and Merritt canal (Figure 65, Figure 66, Figure 67, Figure 68). Some areas (surrounding the plugged Faka Union Canal) between Everglades Blvd. and Sher Blvd. have ponding depth ranges between six inches and 12 inches. Based on ponding depth cross references in Figure 19, these hydrologic conditions favor hydric pine flatwood, hydric hammock, and wet prairie communities which is in line with expectations from the 2004 PIR/EIS and 2013 LRR.

4.2.8.3 Alternative 6

Implementation of Alternative 6 will have an immediate effect along the Faka Union canal from the Faka Union Spreader Berm to the “T” intersection of Faka Union Canal and the Stair Step Canals towards the end of the canal system due to plugging of the canal. After completion, approximately 7.5 miles of open water canal will be available for natural succession. Hydrological restoration benefits, as described in the 2004 PIR/EIS and 2013 LRR, would increase for approximately 19,678 acres that have received no or partial hydrological restoration.

4.2.9 Fish and Wildlife Resources

A discussion of the fish and wildlife resources for the overall PSRP can be found in the 2004 PIR/EIS and 2013 LRR and is incorporated into this document by reference. The following sections related to fish and wildlife resources will specifically address the feature being proposed.

4.2.9.1 No Action Alternative

Without any plugging of the Faka Union Canal prior to the completion of the SWPF, no effects to fish and wildlife resources will occur.

4.2.9.2 Alternative 5

The beneficial effects of restoration detailed in the 2004 PIR/EIS and 2013 LRR will partially be achieved with the implementation of Alternative 5. Hydrological improvements to habitat for foraging,

reproduction, and refuge will occur over approximately 8,352 acres where partial or no hydrological restoration has occurred benefiting fish and wildlife.

4.2.9.3 Alternative 6

The effects to fish and wildlife resources will be those discussed in the 2004 PIR/EIS and 2013 LRR due to the plugging of the Faka Union Canal between the Faka Union Spreader Berm and the "T" intersection with the stair step canals at the southern end of the canal system.

4.2.10 Threatened and Endangered Species

A discussion of threatened and endangered species within the PSRP can be found in the 2004 PIR/EIS and is incorporated into this document by reference. Following the 2004 PIR/EIS, a second supplemental BA discussing design refinements in the EA for the 2013 LRR was completed in 2008 with the USFWS BO completion in 2009. A summary of the effects determinations for coordinated through the 2008 USACE BA and 2009 USFWS BO is shown in Table 18. Detailed information on the threatened and endangered species located in the project are can be found in the following documents: 2004 PIR/EIS, 2013 LRR, 2009 USFWS BO.

Table 18: Federally listed threatened (T), endangered (E), or candidate (C) species that might occur within the Faka Union Canal plugging footprint under the purview of the USFWS.

COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS	EFFECT DETERMINATION
American crocodile	*Crocodylus acutus*	T	No effect
Gopher tortoise	*Gopherus polyphemus*	C	No effect
Eastern indigo snake	*Drymarchon corais couperi*	T	MANLAA
Everglade snail kite	*Rostrhamus sociabilis plubeus*	E	No effect
Red-cockaded woodpecker	*Picoides borealis*	E	MANLAA
Wood stork	*Mycteria americana*	T	MANLAA
Florida Panther	*Puma concolor coryi*	E	MANLAA
West Indian manatee	*Tichechus manatus*	E	No effect
Florida bonneted bat	*Eumops floridanus*	E	No effect

4.2.11 Essential Fish Habitat

4.2.11.1 No Action Alternative

The No Action Alternative will not result in a change to the effects to Essential Fish Habitat as stated in the 2004 PIR/EIS and 2013 LRR.

4.2.11.2 Alternative 5

Alternative 5 will improve downstream EFH, compared to the No Action Alternative, by reducing the flow in the Faka Union Canal which is a point source discharge into the downstream estuaries.

4.2.11.3 Alternative 6

Alternative 6 will improve downstream EFH by reducing the flow in the Faka Union Canal which is a point source discharge into the downstream estuaries. The reduction in flow in the Faka Union Canal will result in less point source discharge than that provided by Alternative 5.

4.2.12 Water Quality

4.2.12.1 No Action Alternative

The No Action Alternative will not result in a change to water quality as described in the 2004 PIR/EIS. As stated in the 2004 PIR/EIS, the primary regional scale benefit of the PSRP project is to improve the timing and distribution of freshwater flows and reduce damaging point source flows through Faka Union Canal to the downstream estuary. Improved timing and distribution of flows would still occur under the No Action Alternative once all canals are plugged, but restoration benefits would not occur until after the SWPF is completed. Discharges from the project will be still be redistributed as diffuse surface flow entering the coastal estuaries at many points, instead of a single point source discharge through the Faka Union Canal (Figure 37 and Figure 38), but benefits would not occur until after the SWPF is complete.

4.2.12.2 Alternative 5

Alternative 5 may cause minor short-term impacts to water quality prior to completion of the SWPF by incrementally reducing point source freshwater discharges to the estuary from the Faka Union canal, and by incrementally increasing sheetflow and hydroperiods adjacent to the Faka Union Canal until the remainder of the PSRP canals are plugged. Overall, impacts to PSRP and the estuaries would be as described in the 2004 PIR/EIS.

4.2.12.3 Alternative 6

Alternative 6 would have impacts to water quality similar to Alternative 5.

4.2.13 Native Americans

4.2.13.1 No Action Alternative

Implementation of the No Action Alternative will have no effect Native American resources.

4.2.13.2 Alternative 5

No portion of Alternative 3w is located within or adjacent to known Native American owned lands, reservation lands, or Traditional Cultural Properties. Consultation is ongoing with Native American tribes having ancestral ties to this region, including the Seminole Tribe of Florida, the Seminole Nation of Oklahoma, the Miccosukee Tribe of Indians of Florida, and the Thlopthlocco Tribe. Pursuant to Section 106 of the NHPA, obligations regarding the USACE's Trust Responsibilities to federally recognized Native American Tribes, and in consideration of the Burial Resources Agreement between the USACE and the Seminole Tribe of Florida, consultation with the appropriate federally-recognized tribes on the Proposed Action is ongoing and will be completed prior to signing the FONSI.

4.2.13.3 Alternative 6

No portion of Alternative 6 is located within or adjacent to known Native American owned lands, reservation lands, or Traditional Cultural Properties. Consultation is ongoing with Native American tribes having ancestral ties to this region, including the Seminole Tribe of Florida, the Seminole Nation of Oklahoma, the Miccosukee Tribe of Indians of Florida, and the Thlopthlocco Tribe. Pursuant to Section 106 of the NHPA, obligations regarding the USACE's Trust Responsibilities to federally recognized Native American Tribes, and in consideration of the Burial Resources Agreement between the USACE and the Seminole Tribe of Florida, consultation with the appropriate federally-recognized tribes on the Proposed Action is ongoing and will be completed prior to signing the FONSI.

4.2.14 Cultural Resources

4.2.14.1 No Action Alternative

Implementation of the No Action Alternative will have no effect on cultural resources or historic properties eligible for inclusion in the NRHP.

4.2.14.2 Alternative 5

4.2.14.3 The plugging of Faka Union Canal and implementation of Alternative 5 will result in the short term disturbance of approximately 100 acres of land along the northern 3.3 miles of the Faka Union Canal starting at the south point of the Faka Union Spreader Berm. Sheet flow will be restored not exceed historic pre-drainage hydrology to approximately 8,352 acres between the Faka Union Spreader Berm to the north, 92nd Ave. to the south, Miller Canal to the west, and Merritt Canal to the east. The proposed plugging of Faka Union Canal for Alternative 5 is a change in construction sequencing. The Faka Union Canal is located within the previously consulted PSRP APE, and is therefore incorporated under the USACE previous consultation and overall determination of no adverse effects for the PSRP construction and hydration APE in letters sent to the Florida State Historic Preservation Office and federally-recognized tribes dated November 7, 2018. Under this Alternative the USACE would continue to monitor all ground disturbing activities within the PSRP consistent with our previous determination.Alternative 6

4.2.15 The plugging of Faka Union Canal and implementation of Alternative 6 will result in the short term disturbance of approximately 310 acres of land along the full length of the Faka Union Canal between the Faka Union Spreader Berm and the junction with the Western Stair Step Canal. Sheet flow will be restored not exceeding historic pre-drainage hydrology to approximately 19,678 acres between the Faka Union Spreader Berm to the north, the junction of Faka Union Canal and the Western Stair Step Canal to the south, Miller Canal to the west, and Merritt Canal to the east. The proposed plugging of Faka Union Canal for Alternative 5 is a change in construction sequencing. The Faka Union Canal is located within the previously consulted PSRP APE, and is therefore incorporated under the USACE previous consultation and overall determination of no adverse effects for the PSRP construction and hydration APE in letters sent to the Florida State Historic Preservation Office and federally-recognized tribes dated November 7, 2018. Under this Alternative the USACE would continue to monitor all ground disturbing activities within the PSRP consistent with our previous determination.Air Quality

4.2.15.1 No Action Alternative

Air quality conditions within the project area are in compliance under the No Action Alternative. Air quality within the project area would not change from current conditions.

4.2.15.2 Alternative 5

Air quality conditions within the project area are in compliance under Alternative 5. Air quality within the project area would not change from current conditions.

4.2.15.3 Alternative 6

Air quality conditions within the project area are in compliance under Alternative 6. Air quality within the project area would not change from current conditions.

4.2.16 Hazardous, Toxic, or Radioactive Wastes

4.2.16.1 No Action Alternative

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

4.2.16.2 Alternative 5

Alternative 5 would not require any remediation for HTRW.

4.2.16.3 Alternative 6

Alternative 6 would not require any remediation for HTRW

4.2.17 Noise

4.2.17.1 No Action Alternative

Noise levels within the project area would not be expected to change from current conditions with the implementation of the No Action Alternative.

4.2.17.2 Alternative 5

Noise levels within the project area would not be expected to change long term from current conditions with the implementation of Alternative 5. Short term increases in noise level during construction is expected.

4.2.17.3 Alternative 6

Noise levels within the project area would not be expected to change long term from current conditions with the implementation of Alternative 6. Short term increases in noise level during construction is expected.

4.2.18 Aesthetics

4.2.18.1 No Action Alternative

The No Action Alternative will not affect the aesthetics within the PSRP.

4.2.18.2 Alternative 5

The implementation of Alternative 5 will improve the aesthetics of approximately 100 acres of canal system that will be plugged and natural succession will be allowed to transpire.

4.2.18.3 Alternative 6

The implementation of Alternative 5 will improve the aesthetics of approximately 310 acres of canal system that will be plugged and natural succession will be allowed to transpire.

4.2.19 Socioeconomics

4.2.19.1 No Action Alternative

The No Action Alternative would not cause any changes to socioeconomics in the area.

4.2.19.2 Alternative 5

Implementation of Alternative 5 would not cause any changes to socioeconomics in the area.

4.2.19.3 Alternative 6

Implementation of Alternative 6 would cause a significant increase in flood risk to the agricultural farms southwest of the PSRP.

4.2.20 Agriculture

4.2.20.1 No Action Alternative

The No Action Alternative would not result in any impacts to agriculture in the area. Agricultural practices are not expected to change due to the No Action Alternative.

4.2.20.2 Alternative 5

Alternative 5 would not result in any impacts to agriculture in the area. Agricultural practices are not expected to change due to the No Action Alternative.

4.2.20.3 Alternative 6

Alternative 6 would result in increased flood risk to the agricultural lands southwest of the PSRP. Impacts increasing flood risk for these agricultural properties begins at a plugging distance equal to the northern 3.6 miles of the Faka Union Canal. Flood risk increases, starting at 3.6 miles, as more of the Faka Union Canal is plugged, ending with full plugging of the Faka Union Canal. Full plugging of the Faka Union Canal represents the greatest flood risk to the southwest corner of the PSRP without the SWPF to manage the flood risk.

4.2.21 Recreation

4.2.21.1 No Action Alternative

The No Action Alternative would not result in a change in recreation or recreational opportunities from what was discussed in the 2004 PIR/EIS under current conditions.

4.2.21.2 Alternative 5

Alternative 5 would provide an incremental step in providing recreation and recreational opportunities discussed in the 2004 PIR/EIS for the approved PSRP. Full recreation and recreational opportunities will be achieved upon completion of the remaining plugging of the Faka Union Canal after the completion of the SWPF.

4.2.21.3 Alternative 6

Alternative 6 would not result in a change in recreation or recreational opportunities from what was discussed in the 2004 PIR/EIS and 2013 LRR for the approved PSRP.

4.3 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 SWPF with conveyance features and partial plugging of the Faka Union Canal 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 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 (SWFCWP) recommends the implementation of many important ecosystem restoration projects in Southwest Florida (USACE 2015). The SWFCWP was developed by a multiagency team consisting of: the USACE, USFWS, University of Florida Institute of Food and Agricultural Sciences, Everglades National Park, Southwest Florida Regional Planning Council, FDACS, FWC, FDEP, Lee County, Collier County, among others (USACE 2015). The SWFCWP looked at the potential for restoration projects across the multi-county region of southwest Florida that included the following counties: Charlotte, Glades, Lee, Hendry, Collier, and Monroe Counties (Figure 69 and Figure 70). The primary objective of the SWFCWP was to present a comprehensive restoration plan that systematically identified and prioritized restoration opportunities in southwest Florida (USACE 2015). The restoration opportunities outlined in the SWFCWP, if implemented would help restore hydrological and ecological function and improve connectivity across four major watersheds in southwest Florida including: the Freshwater Caloosahatchee Watershed, Tidal Caloosahatchee Watershed, Estero Watershed, and the Big Cypress Watershed (Figure 71).

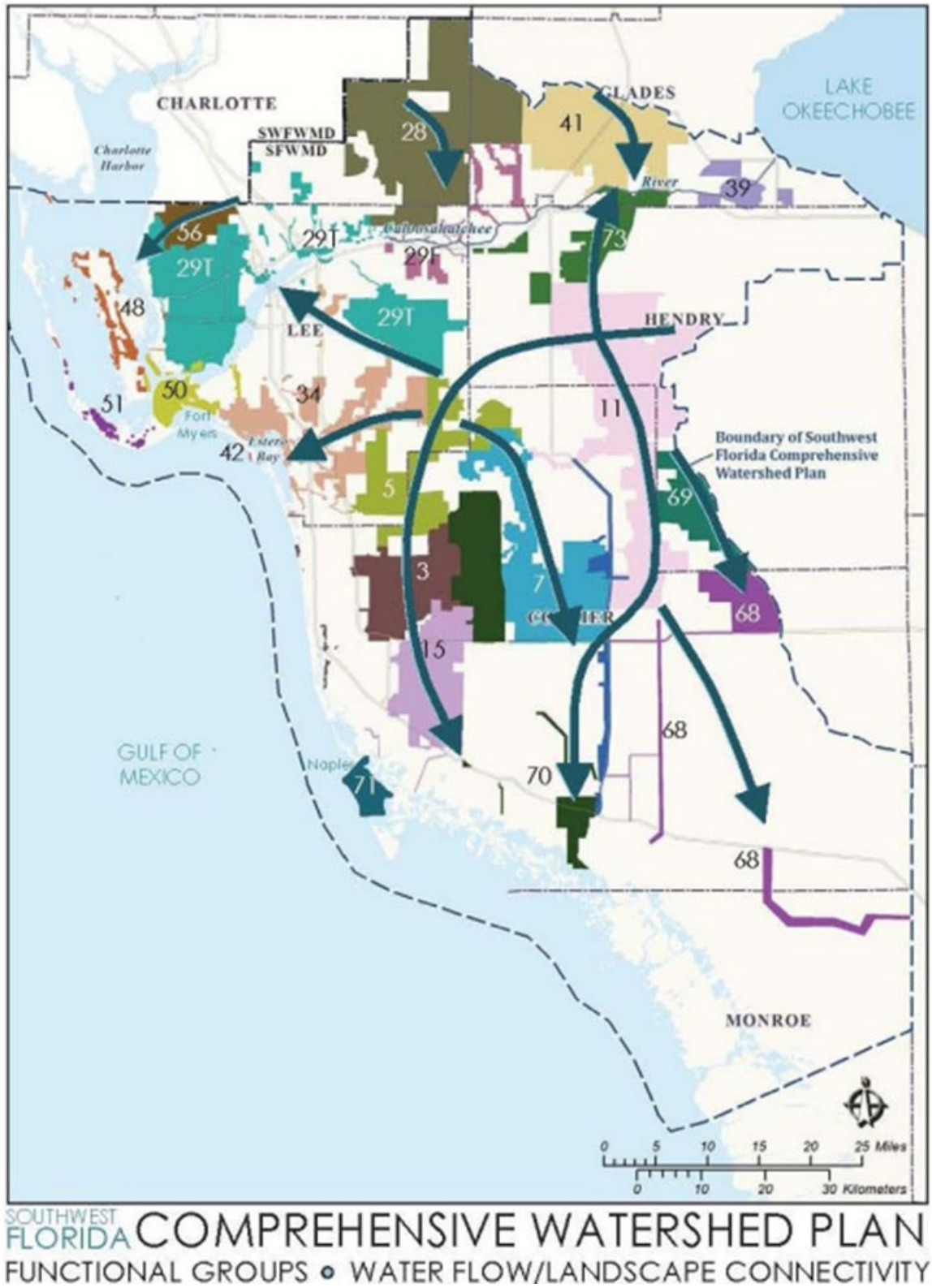

Figure 69: Map and orientation of potential restoration projects outlined by the SWFCWP (USACE 2015).

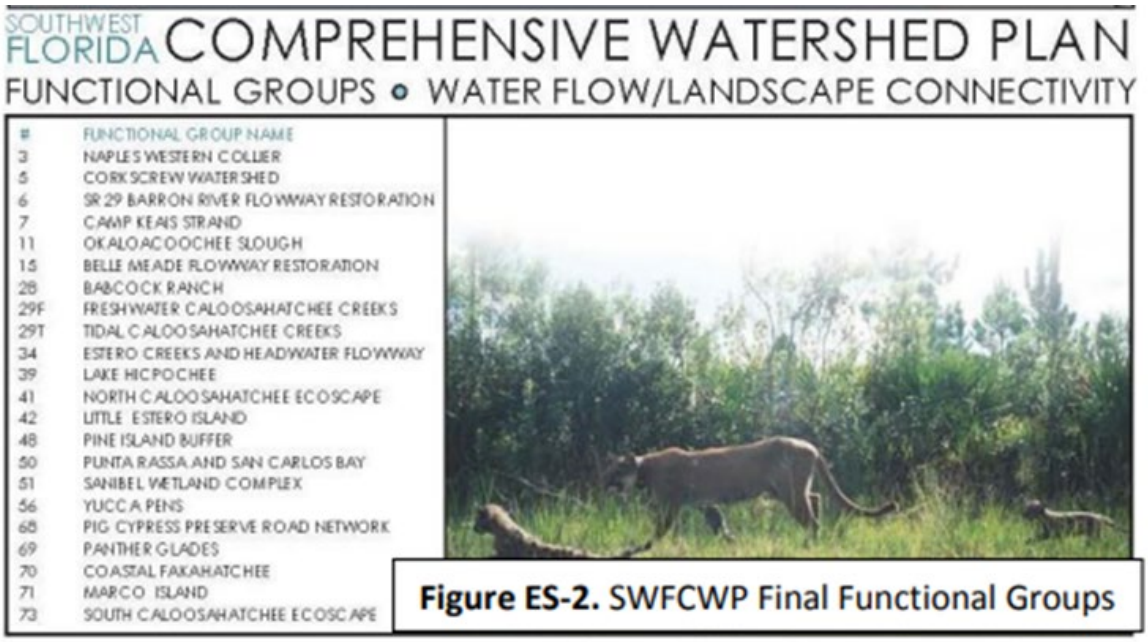

Figure 70: Legend for identification of functional groups included in Figure 69 (USACE 2015).

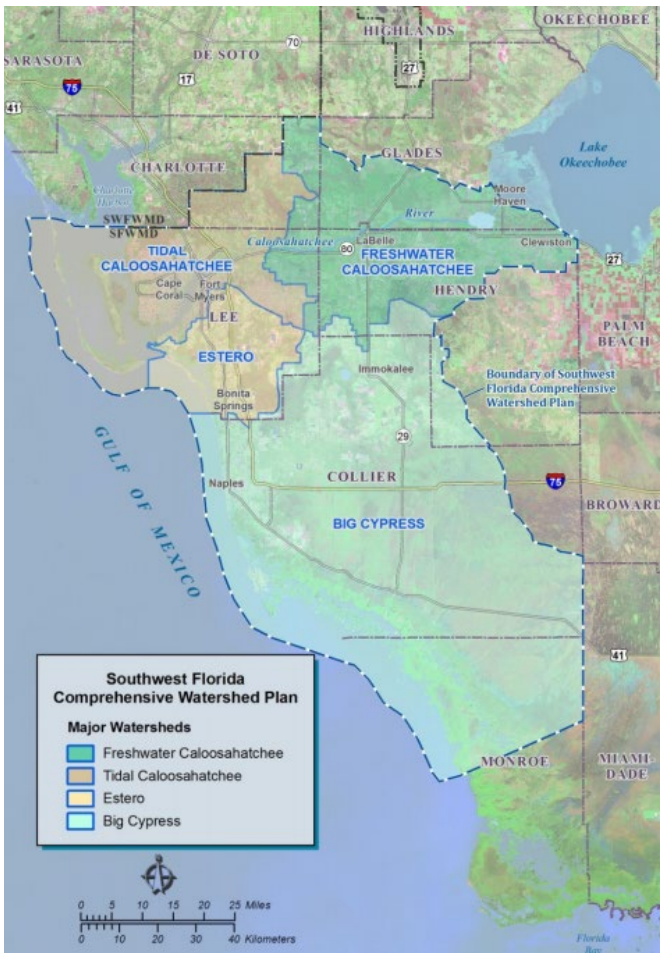

Figure 71: Major watersheds within the SWFCWP boundary (USACE 2015).

Prior and ongoing environmental restoration projects in Southwest Florida are shown in Figure 72. The Tamiami Trail Critical Project involved road resurfacing and the construction of new culverts under US-41 to facilitate the more natural 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.

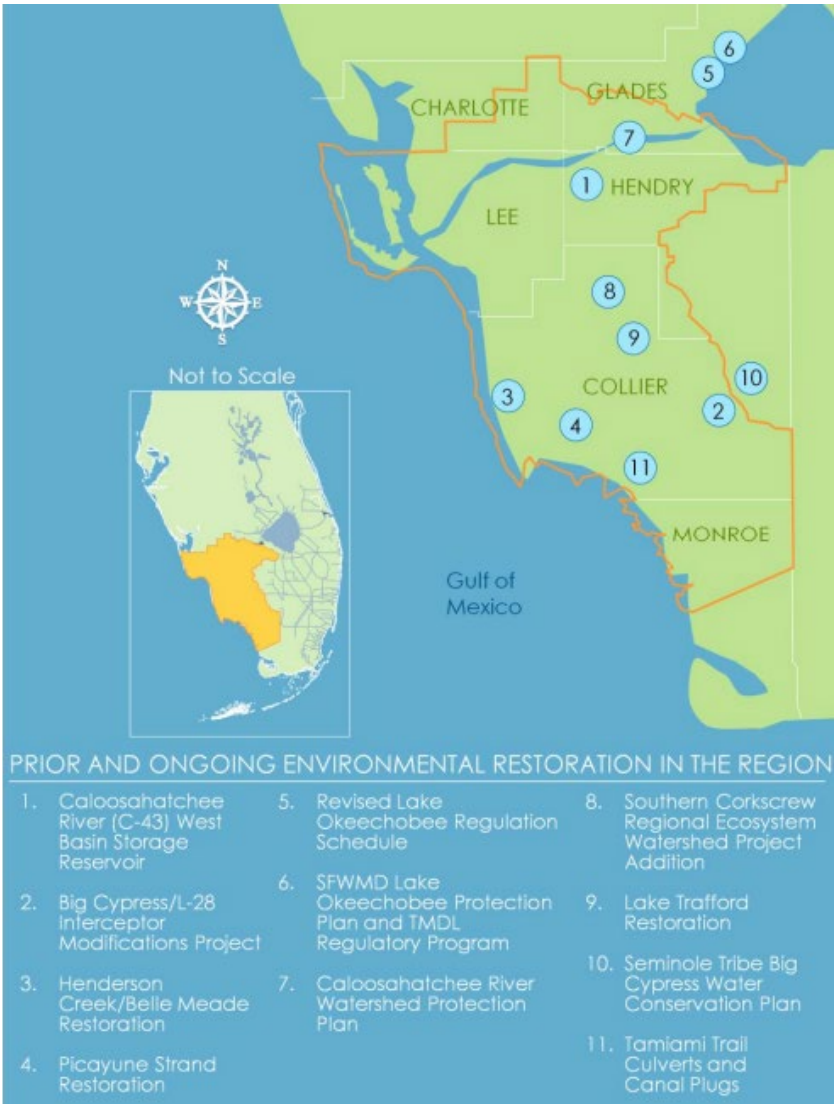

Figure 72: Prior and ongoing environmental restoration projects occurring in southwest Florida (USACE 2015).

Several potential projects outlined in the SWFCWP may work in conjunction with the PSRP to provide additional hydrological and environmental benefits over a larger area. Those potential projects include: Naples Western Collier, Coastal Fakahatchee, Camp Keais Strand, Belle Meade Flowway Restoration, and Marco Island (Figure 69 and Figure 70). The intent of the potential Coastal Fakahatchee Restoration Project is to improve sheetflow from within the Fakahatchee Strand to Everglades National Park and through the Picayune Strand to Ten Thousand Islands National Wildlife Refuge (USACE 2015). The intent of the potential Camp Keais Strand Restoration Project is to protect the largest natural lake in southwest

Florida and secure a hydrologic and wildlife corridor between Corkscrew Swamp and public conservation lands to the south (including Picayune Strand) (USACE 2015). The Naples Western Collier County Restoration Project will have a lesser influence and interaction with the Picayune Strand Project. This potential restoration project is intended to create watershed storage to facilitate hydrologic and water quality improvements in inland and coastal wetlands and intends to restore estuarine wetlands (USACE 2015). The intent of the potential Marco Island Restoration Project will be to install a centralized sewer system and other measures to improve water quality in the surrounding estuary (USACE 2015). Of these potential projects, the Belle Meade Flowway Restoration Project is the only restoration project within the PSRP Study Area (Figure 3) that is currently being planned and/or designed.

The government of Collier County is currently planning for the Belle Meade Flowway Restoration. The intent of the Belle Meade Flowway Restoration is to restore hydrologic and fire regimes, and control a severe invasion of exotic vegetation in a major flowway and to protect a large area of important habitat for wading birds and wide-ranging wildlife (USACE 2015). This project shares a boundary with the PSRP on the PSRP's western boundary (Figure 73). Collier County aims to restore: (1) the natural hydrology to about 9,000 acres of the Picayune Strand State Forest (not within the footprint of the PSRP) on the Belle Meade Tract; (2) avoid/minimize impacts to RCW habitat; (3) increase wet season flows to Rookery Bay; and (4) decrease wet season flows to Naples Bay (Collier County 2019).

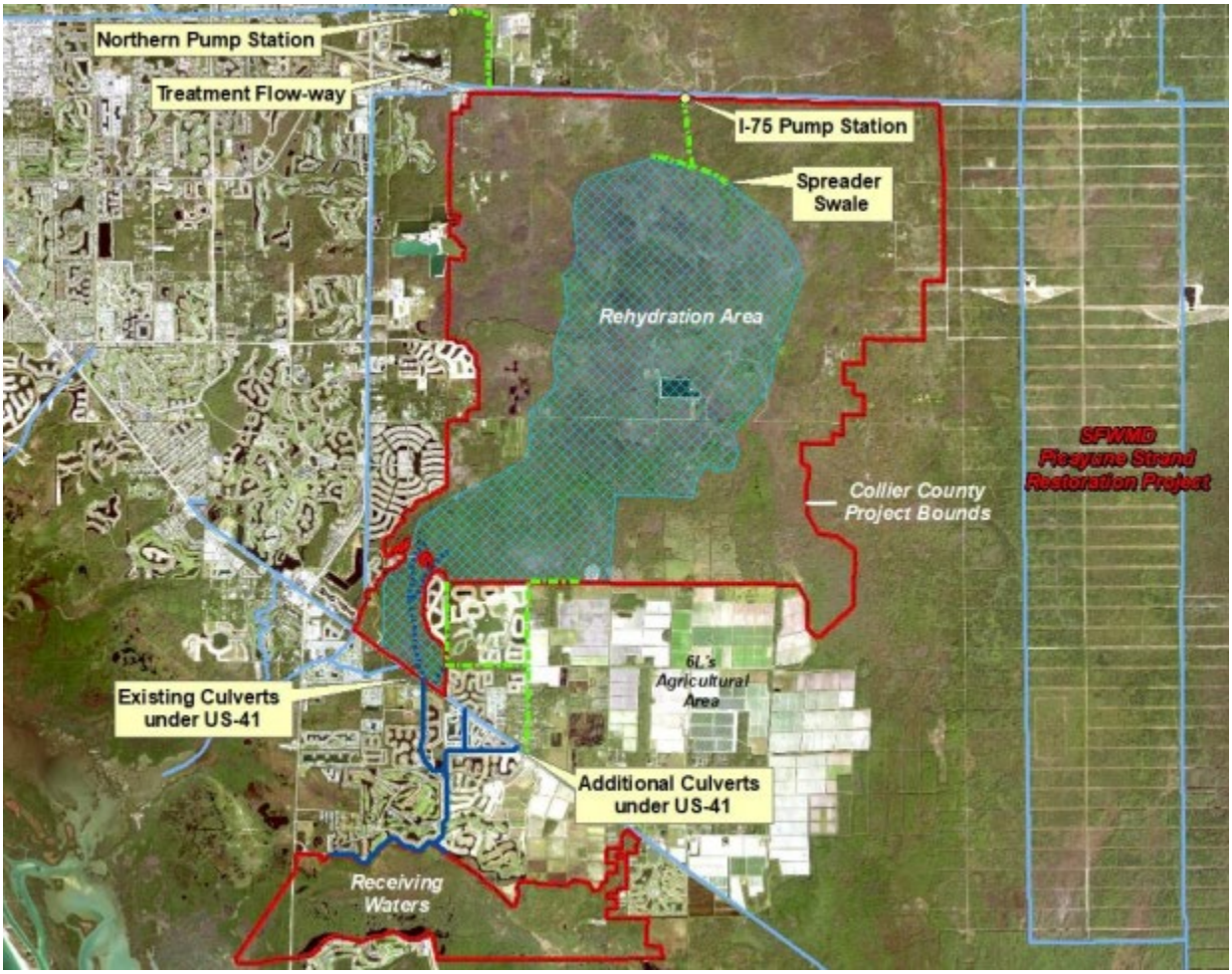

Figure 73: Collier County plan for the Belle Meade Flowway Restoration Project (Collier County 2019).

Collier County expects surface water level (ponding depth) changes inside the core rehydration area (Figure 74) to have two to eight inches of additional standing water for approximately 10 months (hydroperiod) per year (Collier County 2019). Outside of the core rehydration area but in the primary flowway (Figure 74), surface water level (ponding depth) is expected to have less than two inches of water above the surface for one to two months (hydroperiod) of the year (Collier County 2019). Outside of the primary flowway but inside the secondary flowway (Figure 74), Collier County expects ponding depths to increase less than one inch and have an a less than one month increase in hydroperiod (Collier County 2019).

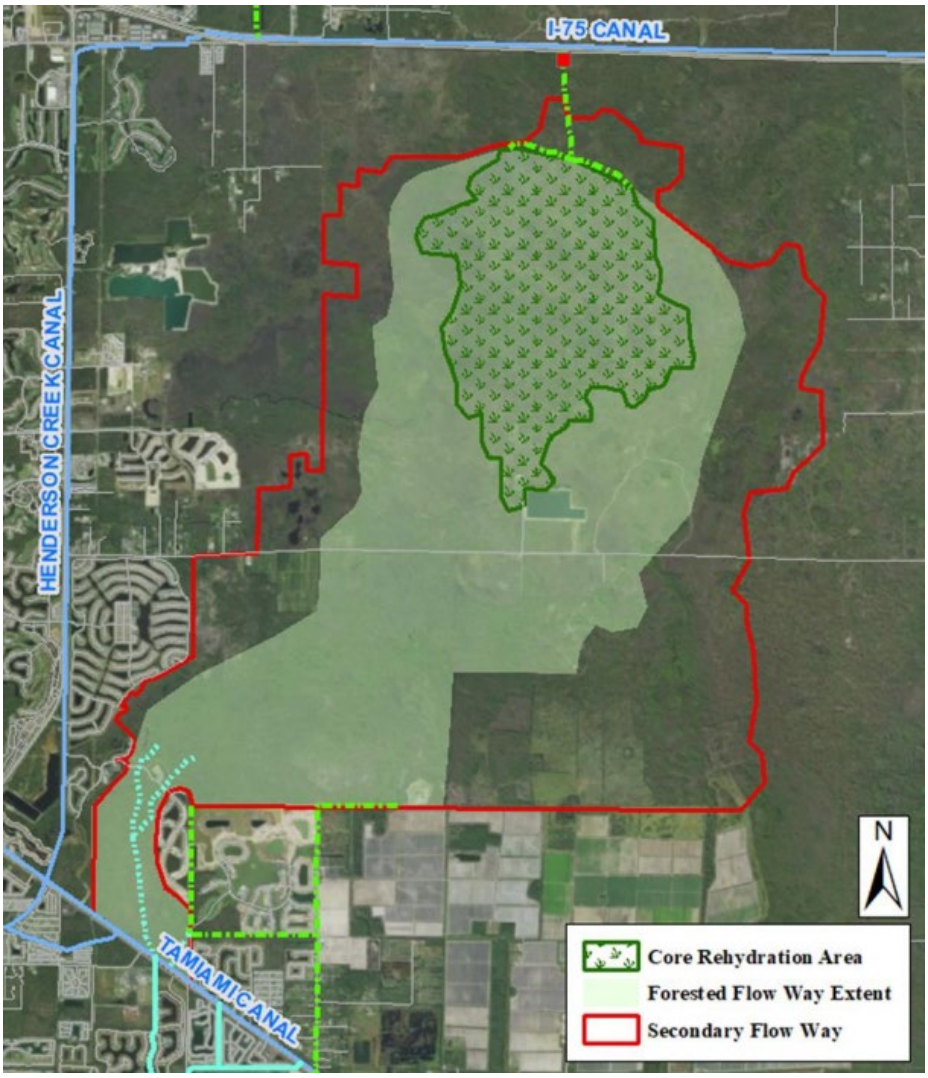

Figure 74: Map of the hydrological component areas of the Belle Meade Flowway Restoration Project (Collier County 2019).

The proposed actions included in this Supplemental EA in conjunction with the full implementation of the PSRP will not have a direct impact on Collier County's proposed restoration project in Belle Meade and vice versa. The proposed actions of the USACE is also not expected to increase the ponding depth within the footprint of Collier County's Belle Meade project (Figure 32). Similarly, hydroperiods inside Collier County's Belle Meade project is not expected to be impacted by the PSRP (Figure 48). However, both of

these projects will cumulatively restore altered hydrology in the region, improving conditions for local wildlife, regional migrant species, as well as long distance migrant species. These projects will also cumulatively improve freshwater deliveries to estuaries south of US-41 improving estuarine salinity conditions that will benefit fish and other faunal and floral estuarine species. These projects will improve conditions for native floral species to thrive, reducing the potential presence of exotic or nuisance floral species. The hydrological restoration also will provide the opportunity for improved fire management cumulatively across the Picayune Strand State Forest and Collier Seminole State Park, while potentially reducing overall wildfire severity and frequency, potentially reducing catastrophic habitat loss.

4.4 Irreversible and Irretrievable Commitment of Resources

Irreversible and irretrievable commitment of resources would occur with the conversion of habitat with the construction of the SWPF and conveyance features within their footprints. Under the preferred alternative, Alternative PC2, approximately 154 acres (approximately 140 acres for the levee and 14 for conveyance features) would be lost to the construction of the SWPF and conveyance features. An additional 212 acres of habitat would become fragmented between the existing farm levee and the newly constructed SWPF levee.

Irreversible and irretrievable commitment of resources would occur in the loss of approximately 3.3 miles of open water canal infrastructure due to the preferred alternative (Alternative 5) for the partial plugging of the Faka Union Canal.

4.5 Unavoidable Adverse Environmental Effects

Environmental effects for each resource are discussed in Section 4. Temporary minor adverse impacts may occur during the wet season due to increases in ponding depth and hydroperiod due to the implementation of the SWPF and conveyance features, as well as, the partial plugging of the Faka Union Canal.

4.6 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 discuss new conflicts and controversy identified as a result of the Proposed Actions.

4.6.1 Red-cockaded Woodpecker

During the evaluation process for the SWPF and Conveyance Features, several meetings were dedicated to the concern that the implementation of Alternative PC2 would result in hydrological changes detrimental to the red-cockaded woodpecker, specifically their nesting and roosting areas west-southwest of the Miller Pump Station. Initial interagency discussions on the topic occurred at a two day workshop in Naples, FL on 28-29 August 2019. Various agencies provided information and input relevant to this topic. An interagency subteam consisting of staff from the USACE, USFWS, FDEP, FFS, and FWC met in Naples, FL on 10 December 2019 to further discuss this concern and to develop potential ways to avoid and minimize any potential impacts to the red-cockaded woodpecker as a result of the Proposed Action. The USACE tasked the IMC to model one scenario where the openings in the entire west side of the Miller Canal Spreader Berm were closed to prevent sheetflow to the west-southwest. The USACE provided analysis to the PSRP Environmental Team showing the impacts to the red-cockaded woodpecker were due to the future plugging of the Miller Canal and not the implementation of Alternative PC2. The

USACE provided commitments to partnering agencies to address this issue prior to the implementation of Miller Canal plugging. Analysis on this issue is included in the Supplemental BA in Appendix A.

4.6.2 Old Marco Road (Collier Seminole State Park)

During evaluation of the SWPF and Conveyance Features, concerns were also expressed that implementation of Alternative PC2 could potentially result in negative impacts to hydrological changes (i.e., too much water) could impact historic Old Marco Road located in Collier Seminole State Park. Initial interagency discussions on the topic occurred at a two day workshop in Naples, FL on 28-29 August 2019, and further discussions occurred regarding Old Marco Road during subsequent monthly interagency project meetings, and regarding Old Marco Road during a two day teleconference workshop on 16-17 March 2020.

To address concerns with changes in hydrology near Old Marco Road, the USACE reviewed hydrologic modeling assumptions and model outputs and presented findings to FDEP on 29 January 2020. During that meeting FDEP identified inconsistencies between culvert sizes found in the field compared to sizes assumed for modeling hydrology. Stakeholders were concerned that Old Marco Trail culverts may fail and water would overtop the road during rain events where as modeling indicated the road is frequently overtopped in its current condition and the project would not cause or contribute to more frequent overtopping or significantly increased water depths in that area. Stakeholders also identified inconsistencies with the modeled versus actual integrity of a berm identified as the “bicycle seat” west of Collier Seminole State Park. Model results indicated the “bicycle seat” would allow water to pass through the area during storms, whereas local stakeholders were concerned that more of the flow would be diverted east towards Collier Seminole State Park because the berm was relatively intact. The USACE reviewed model assumptions and added additional details regarding water depths expected near the Old Marco Road area and frequency of the road being over-topped an presented that review at the 16-17 March 2020 two-day teleconference to provide more detail, however stakeholder concerns were unresolved.

4.6.3 Water Quality

During evaluation of the SWPF and Conveyance Features, concerns were also expressed that implementation of Alternative PC2 could potentially result in negative impacts to 1) water quality from changing the distribution of agricultural discharges from sheetflow to canal flow. Initial interagency discussions on the topic occurred at a two day workshop in Naples, FL on 28-29 August 2019, and further discussions occurred regarding water quality during subsequent monthly interagency project meetings, and during a two day teleconference workshop on 16-17 March 2020. Additional meetings were also held between the USACE, SFWMD, and FDEP to determine the appropriate analysis needed to analyze impacts to water quality.

To address water quality concerns, the USACE tasked IMC conduct a modeling scenario where restoration flows were turned off to determine relative flow volume contributions from the agricultural area compared to the entire restoration area, and to quantify how those flows were distributed through US-41 without and with project. The USACE provided the model outputs to the SFWMD to analyze impacts to water quality and the Collier-Seminole State Park OFW based on the 2019 OFW Baseline for Collier State Park developed by FDEP, and SFWMD provided a report summarizing their analysis to support water quality certification. Results of the water quality analysis were also presented at the 16-17 March 2020 two-day workshop, where concerns were still identified with overall impacts to water quality from

construction of the SWPF and Conveyance Features. In addition, stakeholders identified concerns with the methods used by FDEP to determine the OFW Baseline for the Collier-Seminole State Park OFW.

The water quality analysis used modeled flows and nutrient (i.e., TN and TP) data measured at water quality monitoring stations in the PSRP project are to determine if nutrient concentration were expected to increase from implementation of the project. TP and TN concentrations were estimated separately for agricultural water and restoration flows, and applied to the respective agricultural and restoration flow volumes to determine the expected concentration that would flow into the OFW with full restoration (i.e., Alternative PC2). These nutrient concentrations were compared to the OFW Baseline developed by FDEP in 2020 for the baseline water year, 2019. The analysis indicated that TP concentrations are expected to decrease with implementation of the PSRP, and TN concentrations would decrease or stay about the same as they are currently. Nutrient concentrations are not expected to increase above the OFW baseline numeric criteria of 310 ± 50 ppb for TP and 2.18 ± 0.21 ppm for TN at the OFW boundary. It is important to note that the SWPF and additional conveyance features are critical components to the full implementation of the PSRP. As stated in the 2004 PIR/EIS, the primary regional scale benefit of the PSRP project is to improve the timing and distribution of freshwater flows and reduce damaging point source flows through Faka Union Canal to the downstream estuary. Discharges from the project will be redistributed as diffuse surface flow entering the coastal estuaries at many points, instead of a single point source discharge through the Faka Union Canal and are expected to improve water quality in the downstream estuaries. Improvements to water quality over the larger PSRP footprint are not a result of the implementation of Alternative PC2 and are more a result of canal plugging reestablishing sheetflow across the PSSF.

4.7 Environmental Commitments

Red-cockaded Woodpecker

Modeling of the full restoration associated with the PSRP in conjunction with the SWPF showed potential hydrological impacts to the red-cockaded woodpecker. During the evaluation of impacts to the red-cockaded woodpecker from the implementation of the SWPF and additional conveyance features, additional requests to model the SWPF only and the SWPF with additional conveyance features sans CR-92 conveyance (which did not incorporate any other PSRP features) was completed by the IMC in late February 2020. The modeling results from these requests showed no hydrological impacts to RCW foraging and RCW nesting/roosting as a result of the implementation of the SWPF and conveyance features. A hydrological flow way was starting near the Miller Spreader Berm and running west southwest into the eastern side of the RCW nesting area was identified. At the request of the PSRP environmental lead, an additional request was made of IMC to model a scenario where the entire western half of the Miller Spreader Berm was blocked to prevent flow directly entering the hydrological flow way west-southwest of the Miller Spreader Berm. Modeling results from this effort did show a reduction in hydroperiod and water depth, especially in the vicinity of red-cockaded woodpecker nesting and roosting indicating that hydrological impact to the red-cockaded woodpecker is a related to the plugging of Miller Canal and Miller Pump operations.

In order to avoid and minimize the potential impact to the red-cockaded woodpecker, the USACE commits to: (1) conducting further analysis including additional design, modeling, and evaluation; (2) continuing work with partner agencies, including USFWS, FWC, and FFS for both development and evaluation of strategies to reduce or avoid impacts to the red-cockaded woodpecker; (3) develop a strategy that will

avoid and minimize impacts to red-cockaded woodpecker nesting and roosting habitat; and (4) develop a strategy that will avoid and minimize impacts to red-cockaded foraging habitat.

Water Quality and Monitoring

Full implementation of the PSRP will increase flows across Tamiami Trail (US-41) between Faka Union Canal and Tomato Road, and introduce new conveyance where new culverts are installed in the SWPF levee, US-41, and CR-92. Water quality analysis indicated that the project would not degrade the existing ambient water quality for total phosphorus and total nitrogen, as defined by F.A.C. 62-4.242(2), in the Collier-Seminole State Park OFW. Additionally, reductions in TP and TN concentrations are expected once the PSRP is completed and restored flows are not expected to adversely impact nutrient concentrations in the tidal creeks or the estuarine OFWs. However due to the concerns identified with introducing flows and nutrient loads to new locations, and concerns with downstream water quality impacts in the estuaries The USACE committed to working with the State of Florida in continued coordination with project stakeholders to develop and implement a monitoring and adaptive management framework to characterize and address impacts related water quality resulting from implementation of PSRP, should they occur.

Hydrology in Collier Seminole State Park

Hydrologic modeling indicated water level increases would not negatively impact Old San Marco Trail from implementation of the SWPF and Conveyance and full implementation of the PSRP. However, there are uncertainties regarding the ability of models to adequately capture the appropriate level of detail to ensure Old San Marco Trail will not be negatively impacted given the data available at the time the modeling was conducted. Due to this uncertainty, the USACE committed to continued coordination with Collier-Seminole State Park, FDEP, and SFWMD to develop a monitoring and adaptive management framework for the Old San Marco Trail region to characterize and address impacts to Old San Marco Trial, should they occur, and to provide reasonable assurance that the PSRP will not negatively impact Collier-Seminole State Park. Monitoring would include assessment of hydrologic changes and erosion that would indicate whether there was a need to improve additional conveyance under Old Marco Trail. Additional conveyance would be covered by the USACE in partnership with SFWMD during O&M.

4.8 Compliance with Environmental Requirements

The following documents compliance of the Proposed Action with environmental requirements.

4.8.1 National Environmental Policy Act of 1969

Environmental information on the project has been compiled and this Supplemental EA and Proposed FONSI has been prepared and coordinated for public, state, and Federal agency review. The Proposed Action will be in compliance with NEPA.

4.8.2 Endangered Species Act of 1973

Upon completion of an assessment for species under NMFS purview it was determined that the Proposed Action falls under the guidance issued by the NMFS Programmatic BO dated 17 December 2013; therefore, additional consultation with NMFS was not necessary as the effects of the Proposed Actions are consistent with that which was analyzed in the programmatic BO. The USACE requested written confirmation of federally listed threatened and endangered species that are either known to occur or are likely to occur

within the study area from the USFWS by correspondence dated 30 May 2017. In correspondence dated 7 July 2017, the USFWS provided a revised list for the PSRP SWPF and conveyance features. A Biological Assessment was submitted to USFWS on 6 April 2020. Reference Appendix D for pertinent correspondence. The Proposed Action is being coordinated under the Endangered Species Act and will be in full compliance with the Act upon receipt of a BO from the USFWS.

4.8.3 Fish and Wildlife Coordination Act of 1958, as Amended

The Fish and Wildlife Coordination Act (FWCA; 16 U.S.C. 661 et seq., March 10, 1934, as amended 1946, 1958, 1978, and 1995) requires Federal agencies to consult with the USFWS regarding the impacts to fish and wildlife resources and the proposed measures to mitigate these impacts. Additional coordination authorities exist through the review process of the NEPA (NEPA; 42 U.S.C. 4321-4347, January 1, 1970, as amended 1975 and 1982) and the consultations required under the ESA of 1973 (ESA; 7 U.S.C. 136, 16 U.S.C. 1532 ET SEQ. December 28, 1973). The USACE has requested formal ESA consultation with the submission of a BA submitted 6 April 2020. Coordination between the USACE and USFWS regarding FWCA requirements has been ongoing for the Proposed Action since 26 September 2017. USACE will coordinate completion of the FWCA with USFWS upon submission of this Supplemental Draft EA. The Proposed Action is will be compliant upon receipt of a BIO and confirmation from the USFWS that intent of the FWCA has been met.

4.8.4 National Historic Preservation Act of 1966

The Proposed Action is in compliance with Section 106 of the National Historic Preservation Act, as amended (Public Law 89-665). As part of the requirements and consultation process contained within the National Historic Preservation Act implementing regulations of 36 CFR 800, this project is also in compliance through ongoing consultation with the Archaeological and Historic Preservation Act, as amended (Public Law 93-291), Archaeological resources Protection Act (Public Law 96-95), American Indian Religious Freedom Act (Public Law 95-341), Native American Graves Protection and Repatriation Act (NAGPRA) (Public Law 101-601), Executive Order 11593, 13007, and 13175, the Presidential Memo of 1994 on Government to Government Relations and appropriate Florida Statutes. Presentations and face-to-face meetings were conducted, as well as email and phone correspondence with state, federal, and tribal government staff members to brief them on the project development and to discuss issues of concern. Formal letters requesting consultation on potential effects to cultural resources were sent to the SHPO, Seminole THPO, Miccosukee Tribal Representative, and the Seminole Nation of Oklahoma THPO, on 6 May 2020. The USACE has determined that the Proposed Actions will have no adverse effect on historic properties eligible or potentially eligible for listing in the National Register of Historic Places. Consultation with the SHPO, Seminole Tribe of Florida, and Miccosukee Indians of Florida, Seminole Nation of Oklahoma, and the Thlopthlocco Tribal Town on this determination was sent on 6 May 2020 and is ongoing. Consultation will be complete prior to finalization of this EA.

4.8.5 Clean Water Act of 1972

Pursuant to the Clean Water Act (CWA) of 1972, as amended, the discharge of dredged or fill material associated with the preferred plan has been found to be compliant with Section 404(b) (1) Guide-lines (40 CFR 230). The CWA 404(b)(1) Guidelines evaluation is found in Appendix C of this Supplemental EA. Water quality certification pursuant to Section 401 of the CWA will be obtained from the State of Florida prior to construction. Full compliance with this Act will be evaluated upon the issuance of water quality

certification by the State of Florida. All conditions in the water quality certification will be implemented in order to avoid or minimize adverse impacts to water quality.

4.8.6 Clean Air Act of 1972

The Proposed Action is being coordinated with the State of Florida. The Proposed Action is in compliance with Section 176 of the Clean Air Act, known as the General Conformity Rule. The Proposed Action will not cause or contribute to violations of the National Ambient Air Quality Standards.

4.8.7 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. The USACE will coordinate the consistency determination pursuant to the CZMA through circulation of this Draft EA. The USACE has determined that the Proposed Action is consistent to the maximum extent practicable with the enforceable policies of Florida's approved CZMP. Final concurrence of consistency with the CZMP will be determined during environmental permitting processes, as applicable.

4.8.8 Farmland Protection Policy Act of 1981

The USDA-NRCS provided correspondence on 15 January 2003 prior to preparation of the Draft 2004 PIR/EIS. No prime or unique farmland would be impacted by implementation of this project. The project is in compliance with this Act.

4.8.9 Wild and Scenic River Act of 1968

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

4.8.10 Marine Mammal Act of 1972

Previous consultation between the USACE, SFWMD, FWC, USFWS and NMFS resulted in the development of monitoring protocols and best management practices to prevent take of any marine mammal due to restoration of the PSRP. These monitoring protocols and best management practices will ensure no marine mammals will be harmed, harassed, injured or killed as a result of the Proposed Action. Therefore, the Proposed Action is in compliance with this Act.

4.8.11 Estuary Protection Act of 1968

In the 2004 PSRP Final PIR/EIS, the USACE 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. The Proposed Actions would not change the findings in the 2004 PIR/EIS. This project is in compliance with this Act.

4.8.12 Federal Water Project Recreation Act of 1965, as Amended

Recreation and fish and wildlife enhancement have been given full consideration in the Proposed Action. Implementation of Proposed Action would not result in significant impacts to recreational resources. The

Proposed Action may create beneficial effects for nature based recreation in the project area. The Proposed Action is in compliance with this Act.

4.8.13 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.

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

There are no designated coastal barrier resources within the project area. This Act is not applicable.

4.8.15 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

Implementation of the Proposed Action is not expected to result in the discovery of additional HTRW given past surveys throughout the PSRP Study Area. The Proposed Action has a very low risk for increased mobilization of existing HTRW where it might exist within the study area. The Proposed Action is in compliance with these Acts.

4.8.16 Rivers and Harbors Act of 1899

The Proposed Action would not obstruct navigable waters of the United States. The Proposed Action is in full compliance with this Act.

4.8.17 Safe Drinking Water Act of 1974, as Amended

The Proposed Action would not impact safe drinking water standards. The Proposed Action is in full compliance with this Act.

4.8.18 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 Action. This Act is not applicable.

4.8.19 Anadromous Fish Conservation Act

Anadromous fish species would not be affected by the Proposed Action. The Proposed Action is in compliance with this Act.

4.8.20 Bald and Golden Eagle Protection Act

Bald Eagles have been observed within the study area and are known to nest, forage, and breed within the Action Area. The Proposed Action has been evaluated for impacts to known bald eagle nest locations within or near the Action Area (Section 4.1.9.4). The Proposed Action is not expected to destroy bald eagles, their active nests, their eggs, or their eaglets. The Proposed Action will not pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb any bald eagle, alive or dead, or any part, nest, or egg of a bald eagle. Implementation of the Proposed Action is not expected to impact previously

used nest sited when bald eagles are not present or if present, is not expected to interfere or interrupt any bald eagle's normal breeding, feeding, sheltering habits, cause injury, death, or nest abandonment. The Proposed Action is in compliance with this Act.

4.8.21 Migratory Bird Treaty Act and Migratory Bird Conservation Act

Migratory and resident bird species have been observed within the PSRP Study Area and are likely to use available habitat for foraging, nesting, and breeding. The Proposed Action is not expected to destroy migratory birds, their active nests, their eggs, or their hatchlings. The Proposed Action will not pursue, hunt, take, capture, kill or sell migratory birds. Wildlife surveys will be completed by the USFWS prior to start of construction. During construction of the Proposed Action, the contractor will be required to inform the USACE of the potential presence of migratory birds in the work area. The need for construction conservation measures would be determined at that time to avoid and minimize for adverse effects on migratory birds, to the extent practicable. The Proposed Action is in compliance with these Acts.

4.8.22 Marine Protection, Research and Sanctuaries Act

The Marine Protection, Research and Sanctuaries Act does not apply to the Proposed Action. Ocean disposal of dredge material is not proposed as part of the Proposed Action.

4.8.23 Magnuson-Stevens Fishery Conservation and Management Act of 1976

The Proposed Action will have a beneficial effect on Essential Fish Habitat due to additional freshwater delivery (conveyance) to the estuaries south and southwest of Collier Seminole State Park (Section 4.1.11). Point source discharge through the Faka Union Canal will be reduced by the Proposed Action (Section 4.2.11). The draft EA will be shared with NMFS to provide opportunity to comment, even though EFH consultation is not required based on this determination by the USACE. The Proposed Action is in compliance with this Act.

4.8.24 E.O. 11990, Protection of Wetlands

The Proposed Action is expected to have beneficial effects on wetlands. The Proposed Action is in compliance with the goals of this Executive Order (E.O.).

4.8.25 E.O. 11988, Floodplain Management

The purpose of the E.O. is to discourage federally induced development in floodplains. Project lands are for restoration and will not have future development outside of authorized activities of the PSRP. The project is in compliance with the intent of this E.O.

4.8.26 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. The Proposed Action would not result in disproportionately high and adverse human health or environmental effects on minority populations and low-income populations. The Proposed Action is in compliance with this E.O.

4.8.27 E.O. 13089, Coral Reef Protection

No coral reefs would be impacted by the Proposed Action. This E.O. does not apply.

4.8.28 E.O. 13112, Invasive Species

The project will help reduce the abundance and variety of invasive plant species in the project area by restoring natural hydrology. Best management practices will be implemented during the construction phase to preclude the introduction of additional invasive species. The project is in compliance with this E.O.

4.8.29 E.O. 13045, Protection of Children

E.O. 13045, requires each Federal agency to "identify and assess environmental risk 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 action has no environmental safety risks that may disproportionately affect children. The Proposed Action is in compliance.

4.8.30 E.O. 13186, Responsibilities of Federal Agencies to Protect Migratory Birds

Migratory and resident bird species have been observed within the PSRP Study Area and are likely to use available habitat for foraging, nesting, and breeding. The Proposed Action is not expected to destroy migratory birds, their active nests, their eggs, or their hatchlings. The Proposed Action will not pursue, hunt, take, capture, kill or sell migratory birds. Wildlife surveys will be completed by the USFWS prior to start of construction. During construction of the Proposed Action, the contractor will be required to inform the USACE of the potential presence of migratory birds in the work area. The need for construction conservation measures would be determined at that time to avoid and minimize for adverse effects on migratory birds, to the extent practicable. The Proposed Action is in compliance with this E.O.

5 LIST OF PREPARERS

The following individuals listed were responsible for contributing to the preparation, review, and technical editing of the EA and proposed Finding of No Significant Impact (FONSI):

Name	Role
Michael Simmons	Biologist, NEPA Coordination, Environmental Technical Lead
Ken Bradshaw	Water Quality and Hydrology
Marc Tiemann	Cultural Resources
Joel Gaillard	Engineering Technical Lead
Steve Nguyen	Hydrology and Hydraulics
Andy LoSchiavo	Restoration and Resources Section Chief
Melissa Nasuti	NEPA Team Lead
Steve Baisden	Project Manager

6 PUBLIC INVOLVEMENT

The following section details public involvement during development of the Proposed Action.

6.1 Scoping and EA

Reference Section 1.7 and Appendix A of this EA document for pertinent correspondence related to the PSRP. Additional information can also be found in Section 10 of the 2004 PIR/EIS (USACE 2004) and in Section 6 of the 2013 LRR (USACE 2014). Issues discussed during agency coordination associated with the Proposed Action include: (1) updates to the panther habitat credit worksheet for the PSRP; (2) conveyance of water south of US-41 that include agricultural flow and restoration flow; (3) potential impacts to the red-cockaded woodpecker; (4) potential impacts to Old Marco Rd in Collier Seminole State Park; and (5) impacts to recreation.

6.2 Agency Coordination

The USACE is in continuous coordination with other Federal and state agencies, Tribal representatives, and members of the general public. This extensive coordination is a result of the magnitude of USACE efforts underway to implement restoration projects in south Florida. All agency coordination letters related to the Proposed Action are included in Appendix A.

6.3 List of Recipients

A notice of availability (NOA) for the EA and FONSI was mailed to Federal and state agencies, Tribal representatives, and members of the general public. A complete mailing list is available upon request. The Supplemental EA and Proposed FONSI was also posted on the internet at the following address under Collier County:

https://www.saj.usace.army.mil/About/Divisions-Offices/Planning/Environmental-Branch/Environmental-Documents/.

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APPENDIX A: PERTINENT CORRESPONDENCE

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APPENDIX A.1: NATIVE AMERICAN TRIBES CORRESPONDENCE

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1 NATIVE AMERICAN TRIBES PERTINENT CORRESPONDENCE

This appendix contains pertinent correspondence related to the Picayune Strand Restoration Project (PSRP) Southwest Protection Feature, Conveyance Features, and Partial Plugging of the Faka Union Canal proposed action. A brief description of pertinent correspondence is provided below.

I'm not sure yet:

- 6 January 2020: SFWMD Real Estate Interest Requirements for PSRP
- 4 November 2019: Miccosukee Tribe of Indians of Florida Interests in Everglades Restoration
- 28 January 2020: USACE Response to the Miccosukee Tribe of Indians of Florida

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

January 6, 2020

Colonel Andrew Kelly
District Commander – Jacksonville District
U.S. Army Corps of Engineers
701 San Marco Blvd.
Jacksonville, FL 32207

Subject: Real Estate Interest Requirements for Picayune Strand Restoration Project

Dear Colonel Kelly:

I am writing to you regarding the real estate interests required for an important Everglades restoration effort; the Picayune Strand Restoration Project (Picayune Strand). As you know, the South Florida Water Management District (District) maintains a positive working relationship with the Miccosukee Tribe of Indians of Florida (the Tribe). On November 4, 2019, the District received a letter of concern from the Tribe describing, among other things, its concerns over the loss of 805 acres of land in the southeastern corner of Picayune Strand (see map and letter, attached).

Under Section 1.10.3 of the July 2007 Final Draft Guidance Memoranda to the Programmatic Regulations for Comprehensive Everglades Restoration Projects (CERP), flowage and conservation easements should be considered if the benefits of the project can still be achieved with less than fee simple. While not a CERP project, the Kissimmee River Restoration Project utilized this guidance such that the United State Army Corps of Engineers (USACE) approved the use of less than fee simple land for appropriate parcels within the project footprint.

Given the nature of the Picayune Strand Restoration Project impacts to the 805 acres, mainly groundwater seepage and hydroperiod changes, project benefits may be achieved with less than fee simple interest over this property. To that end, I respectfully request that the USACE advise the District as to whether easements can be used to attain project purposes.

I appreciate our partnership in Everglades restoration and look forward to continuing to uphold our responsibilities to stakeholders while completing this critical restoration project.

Sincerely,

Drew Bartlett
Executive Director

DB/jgl

3301 Gun Club Road, West Palm Beach, Florida 33416 • (561) 686-8800 • 1-800-432-2045 • www.sfwmd.gov

Miccosukee Tribe of Indians
of Florida

RECEIVED 11·13·19

Business Council Members
Billy Cypress, Chairman

Roy Cypress Jr., Assistant Chairman
Jerry L. Cypress, Treasurer

Talbert Cypress, Secretary
Petties Osceola Jr., Lawmaker

November 4, 2019

Drew Bartlett, Executive Director
South Florida Water Management District
3301 Gun Club Road
West Palm Beach, FL 33406

SUBECT: Systemic Discrimination of Miccosukee Tribe in Everglades Restoration

Dear Mr. Bartlett:

The Miccosukee Tribe of Indians of Florida ("Tribe") has frequently found itself the subject of environmental discrimination by agencies of the United States government; including the Department of the Interior. I am writing today to request your help in resolving several issues, most notably: (1) the DOI Solicitors Opinion which has resulted in the termination of the Western Everglades Restoration Plan (WERP), (2) the condemnation of Miccosukee Tribal land for Picayune Strand Restoration, (3) the decades old Cape Sable Seaside Sparrow (CSSS) fiasco, and (4) the proposed Combined Operations Plan (COP) land access violations.

INTRODUCTION

The Miccosukee Tribe is a federally-recognized and federally-protected Indian Tribe, whose members live and work within the Florida Everglades, whose land interests lie within the Florida Everglades, and whose way of life is dependent upon the natural Everglades. The Tribe exercising powers of self-government under a Tribal constitution approved by the Secretary of Interior, pursuant to the Indian Reorganization Act of 1934, 25 U.S.C.§ 476. The entire way of life of the Tribe and its members, including their cultural, religious, economic, and historical identity, is based upon the Everglades and upon the preservation of the Everglades in its natural state. The Tribe and its members rely upon the Everglades in its natural state to support both subsistence and commercial activities. Subsistence activities include gathering of

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

materials, hunting, and fishing within the Everglades. Commercial activities include frogging, airboat and other guided tours, and recreational and tourism facilities within the Everglades.

TRIBAL RIGHTS

The Tribe has traditional, aboriginal, and statutory rights to use and occupy the Everglades and the Big Cypress Preserve. The Tribe's land interests and its natural resources lie within the Everglades. These interests include: (1) the Tribe's federal Indian Reservation; (2) the Tribe's perpetual lease in WCA-3A (guaranteeing access, occupancy, and use in perpetuity under the terms of the Miccosukee Land Claims Settlement); and (3) the Tribe's permit for use and occupancy of an area along the northern boundary of ENP, known as the Miccosukee Reserved Area. In their natural states and conditions, these areas sustain a unique balance of flora and fauna, dependent upon the natural flow of unpolluted water, which creates and supports the Miccosukee way of life. The alteration of the natural state of the Everglades and its permanent destruction as a unique natural ecosystem, including imbalances in natural aquatic flora and fauna, seriously threatens the Tribe's entire way of life, its traditional bases of subsistence, its commercial activities, and its natural resources including its land, the flora and fauna and the water of the Everglades.

ISSUE NUMBER 1: The DOI Solicitors Opinion.

On April 15, 2019, Ms. Shannon L. Goessling, the Department of Interior's Regional Solicitor – wrote an opinion to Mr. Pedro Ramos, the Everglades National Park Superintendent, entitled "Authority to condemn private lands in Big Cypress National Preserve to further U.S. Army Corps of Engineers-sponsored hydrologic restoration project". The DOI Solicitor wrote, "We concur with NPS's recommendation that the Corps and SFWMD suspend planning to acquire these inholdings until modeling shows that hydrologic restoration will affect them to a degree that acquisition is the only realistic alternative." The DOI Solicitor failed to recognize the right of the Miccosukee Tribe to live inside the Big Cypress National Preserve (BCNP), a right guaranteed by the enabling legislation, Public Law 93-44 (88 Stat. 1257) which states: "Notwithstanding this section or any other provision of this Act, members of the Miccosukee Tribe of Indians of Florida and members of the Seminole Tribe of Florida shall be permitted, subject to reasonable regulations established by the Secretary, to continue their usual and customary use and occupancy of Federal or federally acquired lands and waters within the Preserve, including hunting, fishing, and trapping on a subsistence basis and traditional tribal ceremonials." In fact the DOI Solicitor actually suggested a way to circumvent and violate those legal rights! The DOI Solicitor provided the following blueprint for violation of Tribal rights within the Big Cypress National Preserve: "Assuming that SFWMD has independent authority to acquire private property in BICY, including by condemnation, nothing in BICY's enabling legislation prohibits NPS from then receiving unimproved property from SFWMD by donation.

Because the United States may acquire unimproved property by a variety of means, including condemnation, no concern would arise that the United States would be letting a third party (i.e., SFWMD) acquire property by a method that the United States itself may not use." (See Attachment 1)

After the Miccosukee Tribe expressed concern that their lands were once again (See Item #2 below) being targeted for condemnation, Mr. Michael Stevens, an attorney in the Office of the DOI Solicitor, wrote on October 9, 2019: "Regarding the referenced Solicitors Opinion, this is to clarify that it did not specifically address how the exercise of land acquisition authority under Big Cypress National Preserve's enabling legislation during Western Everglades Restoration Project would affect Tribal interests (including land owned by individual Tribal members). That was not within the scope of the request to our office for a legal opinion." This disingenuous answer seemingly ignores the fact that the DOI Opinion was specifically written to address the properties "... along the western portion of Tamiami Trail." Those properties along the western portion of Tamiami Trail are almost all Indian Camps! (See Attachment 2)

Not surprisingly the camp members, Indian and non-Indian alike, became alarmed by a DOI condemnation of their lands and support for WERP became increasingly scarce. Accordingly, at the October 29, 2019 Everglades Restoration Task Force meeting, COL Andrew Kelly, Commander of the Jacksonville District of the US Army Corps of Engineers announced that he was "TERMINATING" all planning on the Western Everglades Restoration Plan (WERP). The DOI Solicitors Opinion is directly responsible for the lack of support that led to the termination of WERP. (See Attachment 3)

ITEM NUMBER 2: Picayune Strand Restoration.

In a manner identical to that described by the DOI Solicitor, the Miccosukee Tribe has already been discriminated against during the Picayune Strand Restoration Project. The Miccosukee Tribe owned 805 acres which was located on the southeastern corner of the Picayune Strand Restoration Project, outside of the project footprint. Corps of Engineers computer modeling indicated that there might be a tenth of an inch of groundwater increase on Tribal property due to increased surface water in the restoration footprint. The Tribe negotiated an agreement with the Corps of Engineers to accomplish the restoration of the land to its natural state. No surface water increases were expected on Tribal lands and only very minor groundwater increases. Nevertheless, the State of Florida coveted the Tribal property. On June 11, 2003, the Miccosukee Tribe filed an application with Bureau of Indian Affairs (BIA) to place the 805 acres in "Trust Status". BIA delayed and failed to accept the land into Trust Status. The State of Florida filed a condemnation action in Collier County Court and was granted a Petition for Eminent Domain on May 17, 2005. Money for the land was placed IN TRUST with the United States for the Miccosukee Tribe. The Miccosukee Tribe cannot accept this money because the

Miccosukee Constitution and Bylaws, Article V, Section 6 states: "....provided tribal lands shall not be sold". As a result, 805 acres of Tribal lands were forcibly taken from the Tribe and monetary compensation is not possible. This past experience with restoration projects makes DOI's suggestion of land condemnation for WERP even more offensive.

Throwing salt in a fresh wound, the Corps of Engineers announced at the October 29, 2019 Task Force meeting that a non-Indian property, known as "6L Agricultural Area", will receive flood protection as a result of the Picayune Strand Restoration Project. The 6L property is owned by non-Indians located in the southwestern corner of the project area and they are getting a flood protection levee, while the Miccosukee property in the southeastern corner of the project got land condemnation! This is the very definition of environmental racism. (See Attachment 4)

ITEM NUMBER 3: Cape Sable Seaside Sparrow.

As a result of the Biological Opinion for the Cape Sable seaside sparrow, the US Fish and Wildlife Service recommended Reasonable and Prudent Alternatives (RPAs) that are neither reasonable nor prudent. Their discriminatory water management actions have flooded and degraded hundreds of thousands of acres of Tribal Everglades in WCA3-A that are vital to the culture and way of life of the Tribe. The closure of the S-12A and S-12B water control structures for six months each year causes high water levels which pose a threat to the health and safety of the Miccosukee community and has brought the Snail Kite and Wood Stork to the verge of extinction. Sadly, a vast area of the Everglades, which the government promised to preserve in a natural state in perpetuity for the Tribe, has been severely degraded. The closure of these two water control structures has resulted in the flooding of Tribal lands in Water Conservation Area 3-A, and often results in discharges to our coastal estuaries that are currently experiencing Harmful Algal Blooms. South of the S-12s, the RPAs result in over drainage of western Everglades National Park and cause hyper-saline conditions in Florida Bay. Each year the US Fish and Wildlife Service have monitored the steady decline in the numbers of birds in Sub-Population A. The Secretary of the Interior previously determined that Sub-Population A was not to be designated as a "Critical Habitat" under the Endangered Species Act of 1973. The Final Rule, published in the Federal Register, Volume 72, Number 214, November 6, 2007, states in several places: "The exclusion of critical habitat from the area of subpopulation A is expected to reduce or eliminate potential conflicts between hydrologic restoration efforts, including CERP, and the designated critical habitat." However, the FWS RPAs continue to require the yearly closure of the S-12s wreaking havoc on the entire ecosystem from Florida Bay Lake Okeechobee and both estuaries. Spending approximately 1 Million a year on sparrow monitoring efforts has confirmed the steady decline in sparrow numbers despite the FWS destructive RPAs. This year the helicopter survey indicated ZERO sparrows remain in Subpopulation Area A. Desperate to find even a single sparrow, an extensive ground search

was conducted. The researchers claim to have found a single nest with three birds. Try to imagine the vast destruction of hyper saline Florida Bay waters, the loss of tree islands and habitat destruction in western Everglades National Park, the tremendous destruction due to the yearly flooding of the tree islands in WCA-3A (home to the endangered Wood Stork and Snail Kite – both of whom are in their designated critical habitat), the environmental damage to the littoral zone of Lake Okeechobee and ultimately the forced release of polluted lake water out our coastal estuaries where human life is at risk from Harmful Algal Blooms. It is time for this discrimination to end. All of South Florida is suffering from these policies.

ITEM NUMBER 4: Combined Operations Plan (COP).

The most recent example of systemic discrimination is contained within a plan known as the Combined Operations Plan. This plan is supposed to describe the operation of the Central and South Florida Flood Control Project (aka the "Everglades"). The preferred alternative is known as Alternative Q, which routes the southerly flow of water from WCA-3A, avoiding the natural flow path of WCA-3B, into the L-29 canal where the water encounters the closed S-12 structures (supposedly for the benefit of the sparrow). Water is then routed 90 degrees turn eastward and flows approximately 10 miles before it then routed into another 90 degree turn to flow under the new bridges and into the Park. This hydrologic insanity results in a significant loss of water from Tribal Everglades to deliver water to the Park. The problem is that the make-up water for Tribal lands will not be supplied until the Central Everglades Planning Project (CEPP) is complete in 8 to 10 years. The Tribe has requested the Corps of Engineers do computer modeling of the water levels on Tribal lands as a result of COP. The Corps modeling shows that there would be insufficient water for airboats to access Tribal lands in WCA-3A for 11 out of the 41 year period of record. (See Attachment 5).

Let me be crystal clear: In order to provide Everglades National Park with all the water they desire, the Tribe will not be able to visit their lands in WCA 3-A, live in their homes on the tree islands, grow corn or practice their religion, hunt for food, visit and manage their lands or conduct commercial airboat rides. So far, our objections to the COP are falling on deaf ears. The Tribe has been told to be patient and that CEPP is only 8-10 years away from delivering more water. This situation results from the bridges on Tamiami Trail being built before more water is available to hydrate Shark River Slough. The Tribe has warned against taking these projects out of sequence but the temptation to grab the nearest shiny object ("shovel ready" bridges) has just proven too tempting. Damaging one part of the system to benefit a different part is not restoration.

Sir, every time there is some concession to be made it appears that the Miccosukee Tribal lands get the short end of the stick. We are hopeful that under your leadership the Everglades can be saved without sacrificing our Tribes lands or our culture. The Miccosukee Tribe is one of the

strongest supporters of Everglades Restoration but we believe in restoration of the entire ecosystem, not just the two Parks managed by DOI. Thank you for your attention to these matters.

Sincerely yours,

Billy Cypress
Miccosukee Tribe Chairman

5 Attachments

ATTACHMENT # 1

United States Department of the Interior
OFFICE OF THE SOLICITOR
Southeast Regional Office
Richard B. Russell Federal Building
75 Ted Turner Drive, S.W., Room 304
Atlanta, Georgia 30303

NPS/SERO/BICY.SER.6003.MPS

MEMORANDUM

DATE: April 15, 2019

TO: Pedro Ramos, Superintendent, Everglades National Park

FROM: Shannon L. Goessling, Regional Solicitor - Southeast

SHANNON GOESSLING Digitally signed by SHANNON GOESSLING Date: 2019.04.15 14:23:13 -04'00'

SUBJECT: Authority to condemn private lands in Big Cypress National Preserve to further U.S. Army Corps of Engineers-sponsored hydrologic restoration project

On February 11, 2019, the Assistant District Counsel for the U.S. Army Corps of Engineers (Corps) asked the Solicitor's Office to answer three questions related to the potential acquisition of private inholdings within Big Cypress National Preserve and Addition (BICY) as needed to implement the Western Everglades Restoration Project (WERP), an undertaking to restore the natural hydrology of portions of BICY. If modeling indicates that the project may cause water levels to rise so as to make occupancy of the inholdings impracticable, the South Florida Water Management District (SFWMD), as non-federal sponsor for the Corps, would acquire the inholdings and then donate them to the National Park Service (NPS). We conclude that SFWMD may acquire by condemnation, and then donate to NPS, inholdings that are unimproved. However, SFWMD may not condemn and then donate to NPS any inholdings that meet the definition of "improved" contained in BICY's establishing legislation, unless they are being used in a manner detrimental to the purposes of BICY. We concur with NPS's recommendation that the Corps and SFWMD suspend planning to acquire these inholdings until modeling shows that hydrologic restoration will affect them to a degree that acquisition is the only realistic alternative. Moreover, such planning must be carried out in consultation with NPS.

BACKGROUND

Since the establishment of the original Preserve in 1974 and the Addition in 1988, the United States has acquired thousands of properties for inclusion in BICY. Many private owners have chosen not to convey their properties to the United States, and these parcels remain as private inholdings within BICY. The enabling legislation for BICY, which describes the process by

which NPS may acquire land, describes circumstances under which an improved inholding may be exempt from acquisition unless by consent of the owner.

According to the Corps, the footprint of WERP would encompass 248 inholdings, 55 of which appear to be improved. Based on preliminary studies, the Corps believes that the inholdings that would be most affected by WERP are located in two areas: along the boundary of BICY and Water Conservation Area 3A, about 5 miles south of I-75 (called "the Sanctuary"), which is part of the Addition; and along the western portion of Tamiami Trail, which is part of the original Preserve.

NPS is familiar with WERP and knows of the Corps' interest in having its questions answered. However, NPS also believes that it is premature to explore land acquisition, especially through condemnation, too deeply, creating public concern and political complications, until modeling data indicate that acquisition of the inholding is necessary to implement WERP. In contrast, the Corps believes that without knowing whether acquisition is an option, it would not be prudent to undertake modeling, which is expensive. Although NPS believes it already knows the answers to the Corps' questions, it is willing for the Solicitor's Office to respond to the Corps, but in doing so restate the need to be cautious in making the answers public.

QUESTIONS PRESENTED

1. May SFWMD acquire by condemnation[1] unimproved, privately owned inholdings within BICY, and would NPS accept their reconveyance to the United States?

2. May SFWMD acquire by condemnation improved, privately owned inholdings within BICY, and would NPS accept their reconveyance?[2]

3. Is there an existing level of service of flood protection in BICY, especially for improved properties?

ANALYSIS

As a starting point, question 3 is one of fact, not of law. NPS advises that there is no "level of service" for flood protection in BICY. No private inholdings (improved or otherwise) receive any more flood protection than the rest of BICY, i.e., none.

As to questions 1 and 2, the legislation establishing BICY provides, in pertinent part:

---

[1] We do not question either SFWMD's authority to acquire private inholdings from willing sellers or NPS's authority to accept conveyance of such properties from SFWMD.

[2] The Corps also asked whether, if NPS could accept from SFWMD conveyance of these inholdings by donation, NPS must reimburse SFWMD for 80% of the acquisition costs for those inholdings in the Addition under the cost-share provisions of 16 U.S.C. §698f(d). We conclude that this section applies to land acquisition in the aggregate, and not individual tracts. Following a 21,000-acre donation in 2011, NPS and the State of Florida agreed that land acquisition in the Addition was "substantially complete" for the purposes of §698f(d), and cost-share calculations could be concluded. A final cost-share amount was calculated and is being paid to the State. Any individual inholdings subsequently donated by the State would not fall under this cost-share provision.

> In order to ensure the preservation, conservation, and protection of the natural, scenic, hydrologic, floral and faunal, and recreational values of the Big Cypress Watershed . . ., and to provide for the enhancement thereof, [BICY] is hereby established.

Pub. L. 93-440, § 1(a), Oct. 11, 1974, 88 Stat. 1258, codified at 16 U.S.C. § 698f(1)(a)(emphasis added).

> The Secretary [of the Interior] is authorized to acquire by donation, purchase with donated or appropriated funds, transfer from any other federal agency, or exchange, any lands . . . or interests therein which are located within the boundaries of [BICY]. No improved property, as defined [herein], shall be acquired without the consent of the owner unless the Secretary, in his judgment, determines that such property is subject to, or threatened with, uses which are, or would be, detrimental to the purposes of [BICY].

Pub. L. 93-440, § 1(c), Oct. 11, 1974, 88 Stat. 1258, as amended by Pub. L. 100-301, § 4(b), Apr. 29, 1988, 102 Stat. 444, codified at 16 U.S.C. § 698f(c). "Improved property" means:

> (1) a detached, one family dwelling, construction of which was begun before November 23, 1971 with respect to the preserve and January 1, 1986 with respect to the Addition, which is used for noncommercial residential purposes, together with not to exceed three acres of land on which the dwelling is situated and such additional lands as the Secretary deems reasonably necessary for access thereto, such land being in the same ownership as the dwelling, and together with any structures accessory to the dwelling which are situated on such lands and
> (2) any other building, construction of which was begun before November 23, 1971 with respect to the preserve and January 1, 1986 with respect to the Addition, which was constructed and is used in accordance with all applicable State and local laws and ordinances, together with as much of the land on which the building is situated, such land being in the same ownership as the building, as the Secretary shall designate to be reasonably necessary for the continued enjoyment and use of the building in the same manner and to the same extent as existed [on those dates] together with any structures accessory to the dwelling which are situated on the lands so designated. In making such designation the Secretary shall take into account the manner of use in which the building, accessory structures, and lands were customarily enjoyed prior to [those dates].

Pub. L. 93-440, § 3(b), Oct. 11, 1974, 88 Stat. 1259, as amended by Pub. L. 100-301, § 4(f), Apr. 29, 1988, 102 Stat. 445, codified at 16 U.S.C. § 698h(b).

Based on these authorities, we answer questions 1 and 2 as follows:

1. Assuming that SFWMD has independent authority to acquire private property in BICY, including by condemnation,[3] nothing in BICY's enabling legislation prohibits NPS from

[3] We read the proviso in 16 U.S.C. § 698f(c), that lands owned or acquired by the State of Florida in BICY "may be acquired only by donation," as a limit on the United States' authority to acquire land from the State of Florida, and

then receiving unimproved property from SFWMD by donation. Because the United States may acquire unimproved property by a variety of means, including condemnation, no concern would arise that the United States would be letting a third party (i.e., SFWMD) acquire property by a method that the United States itself may not use.

2. Again assuming that SFWMD has independent authority to acquire private property in BICY for its own purposes through condemnation, there is no reason to think that that authority would not include improved property. However, we see a problem with NPS then receiving the improved property by donation from SFWMD. Even if each stage of the transaction is within each agency's legal authority, the transaction as a whole would amount to NPS acquiring improved property in BICY through condemnation, and unless the property had lost its exemption or was subject to a detrimental use (see below), would violate the spirit of the enabling legislation.[4] NPS should not accept such properties.

However, even if an inholding is currently exempted from acquisition as "improved," NPS could still condemn it, or acquire it after SFWMD had condemned it, if it was no longer covered by the exemption. This could arise in two ways:

1. The inholding is no longer considered "improved."
2. The inholding is used, or threatened with use, in a way detrimental to the purposes of BICY.

BICY's 1991 Land Management Plan (LPP) contains guidance for when an inholding meets the definitions of improved under § 698f(c), and when its use is detrimental to the purposes of BICY. It clarifies what constitutes a "detached one family dwelling" under § 698f(c)(i) or "any other building" under § 698f(c)(ii), LPP at 15-16; requires that qualifying buildings must have been constructed and used in accordance with all applicable state and local laws and ordinances, even if the applicable entity has not enforced them, id. at 17; and lists activities on improved inholdings that are considered both inappropriate ("detrimental to the purposes of BICY") and appropriate. Id. at 17-18. Although the LPP places the burden on the landowner to prove that the property meets the definitions of "improved property," id. at 17, it also includes a "good neighbor" policy, meaning that NPS will not revoke an exemption and act to acquire the inholding at the first instance of a violation, but will encourage corrective action. Id. at 19.

CONCLUSION

NPS may acquire by condemnation, directly or indirectly, unimproved inholdings for inclusion in BICY. NPS may not acquire improved inholdings in this way, unless they no longer meet the criteria for exemption. NPS's criteria for determining how such an exemption can be lost are clear, and indicate that significant changes to the current condition of the inholding on the part of the landowner are necessary for the property to no longer qualify for the exemption.[5] Should

---

not on the State of Florida's authority to first acquire the land. Any land acquisition by the State would have to be pursuant to its own statutory authority.

[4] Even if title remained in the State of Florida, because the SFWMD would have acquired it in its capacity as nonfederal sponsor for the Corps (a Federal agency), the transaction could still be perceived as an attempt to evade the restrictions of the enabling legislation. However, that would be a problem for the Corps, and not NPS.

[5] Although enhancement of hydrologic resources is a purpose of BICY, we do not think that a change to the property by someone other than the landowner for the purpose of enhancing hydrologic resources (such as implementing

SFWMD determine, based on its assessment, that WERP might affect improved properties to an extent inconsistent with continued occupation, it should coordinate with NPS to determine whether any of those properties no longer qualify as exempt based on such changes.

cc: Chris Abbett, Associate Regional Director, Southeast Regional Office (SERO)
Thomas Kelly, Chief Realty Operations, Land Resources Program Office, SERO
Karen Cucurullo, Superintendent, BICY
Laura Perdices, Deputy Superintendent, BICY
Robert Johnson, Research Director, Everglades National Park

WERP), which would be inconsistent with the owner's current use of the property, could cause that current use to be "detrimental to the purposes of BICY." We do not think that NPS could declare a use that was historically appropriate to be "detrimental" just because the overall management of BICY changed.

Big Cypress National Preserve
Public Law 93-440; 88 Stat. 1257

Transportation facilities.

Provided, That the Secretary shall consult and cooperate with the Secretary of Transportation to assure that necessary transportation facilities shall be located within existing or reasonably expanded rights-of-way and constructed within the reserve in a manner consistent with the purposes of this Act.

Hunting and fishing.
16 USC 698j.

SEC. 5. The Secretary shall permit hunting, fishing, and trapping on lands and waters under his jurisdiction within the preserve in accordance with the applicable laws of the United States and the State of Florida, except that he may designate zones where and periods when no hunting, fishing, trapping, or entry may be permitted for reasons of public safety, administration, floral and faunal protection and management, or public use and enjoyment. Except in emergencies, any regulations prescribing such restrictions relating to hunting, fishing, or trapping shall be put into effect only after consultation with the appropriate State agency having jurisdiction over hunting, fishing, and trapping activities. Notwithstanding this section or any other provision of this Act, members of the Miccosukee Tribe of Indians of Florida and members of the Seminole Tribe of Florida shall be permitted, subject to reasonable regulations established by the Secretary, to continue their usual and customary use and occupancy of Federal or federally acquired lands and waters within the preserve, including hunting, fishing, and trapping on a subsistence basis and traditional tribal ceremonials.

Miccosukee and Seminole Indian Tribes, land use, retention rights.

Visitor services, contracts.
16 USC 698k.

SEC. 6. Notwithstanding any other provision of law, before entering into any contract for the provision of revenue producing visitor services,

ATTACHMENT # 2

DOI Solicitors Opinion
April 15, 2019

Based on these authorities, we answer questions 1 and 2 as follows:

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"Blue Print" for Condemnation of Private Lands inside BCNP

then receiving unimproved property from SFWMD by donation. Because the United States may acquire unimproved property by a variety of means, including condemnation, no concern would arise that the United States would be letting a third party (i.e., SFWMD) acquire property by a method that the United States itself may not use.

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1. The inholding is no longer considered "improved."
2. The inholding is used, or threatened with use, in a way detrimental to the purposes of BICY.

This is exactly what happened to the Miccosukee Tribe during the Picayune Strand Restoration Project.

805 acres of Tribal land was stolen from the Miccosukee Tribe by condemnation!

United States Department of the Interior
OFFICE OF THE SOLICITOR
Southeast Regional Office
Richard B. Russell Federal Building
75 Ted Turner Drive, S.W., Room 304
Atlanta, Georgia 30303

NPS/SERO/BICY.SER.6003.MPS

MEMORANDUM

DATE: April 15, 2019

TO: Pedro Ramos, Superintendent, Everglades National Park

FROM: Shannon L. Goessling, Regional Solicitor - Southeast SHANNON GOESSLING Digitally signed by SHANNON GOESSLING Date: 2019.04.15 14:23:13 -01'20'

SUBJECT: Authority to condemn private lands in Big Cypress National Preserve to further U.S. Army Corps of Engineers-sponsored hydrologic restoration project

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BACKGROUND

Since the establishment of the original Preserve in 1974 and the Addition in 1988, the United States has acquired thousands of properties for inclusion in BICY. Many private owners have chosen not to convey their properties to the United States, and these parcels remain as private inholdings within BICY. The enabling legislation for BICY, which describes the process by

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The DOI Solicitor's Opinion:

The reason for Western Everglades Restoration Plan (WERP) Termination

DOI Solicitors Opinion
April 15, 2019

According to the Corps, the footprint of WERP would encompass 248 inholdings, 55 of which appear to be improved. Based on preliminary studies, the Corps believes that the inholdings that would be most affected by WERP are located in two areas: along the boundary of BICY and Water Conservation Area 3A, about 5 miles south of I-75 (called "the Sanctuary"), which is part of the Addition; and along the western portion of Tamiami Trail, which is part of the original Preserve.

Mostly Indian Camps

NPS is familiar with WERP and knows of the Corps' interest in having its questions answered. However, NPS also believes that it is premature to explore land acquisition, especially through condemnation, too deeply, creating public concern and political complications, until modeling data indicate that acquisition of the inholding is necessary to implement WERP. In contrast, the Corps believes that without knowing whether acquisition is an option, it would not be prudent to undertake modeling, which is expensive. Although NPS believes it already knows the answers to the Corps' questions, it is willing for the Solicitor's Office to respond to the Corps, but in doing so restate the need to be cautious in making the answers public.

Cats out of the bag!

DOI EXPLINATION: STILL <u>NO</u> <u>ACKNOWLEDGEMENT</u> OF TRIBAL RIGHTS TO "USUAL AND CUSTOMARY USE AND OCCUPANCY" INSIDE BCNP

United States Department of the Interior
OFFICE OF THE SOLICITOR
Regional Solicitor's Office for Interior Regions 2 & 4
Richard B. Russell Federal Building
75 Ted Turner Drive, S.W., Room 304
Atlanta, Georgia 30303

NPS/SERO/BICY,6303,MPS

October 9, 2019

Jeanine Bennett, Esquire
General Counsel, In-House
Miccosukee Tribe of Indians of Florida
Tamiami Station
P.O. Box 440021
Miami, Florida 33144-0021

SUBJECT: April 15, 2019 Memorandum from Shannon L. Goessling to Pedro Ramos: "Authority to condemn private lands in Big Cypress National Preserve to further U.S. Army Corps of Engineers-sponsored hydrologic restoration project"

Dear Ms. Bennett:

Regarding the referenced Solicitor's Opinion, this is to clarify that it did not specifically address how the exercise of land acquisition authority under Big Cypress National Preserve's enabling legislation during the Western Everglades Restoration Project would affect Tribal interests (including land owned by individual Tribal members). That was not within the scope of the request to our office for a legal opinion.

Sincerely,

Michael Stevens
Attorney-Advisor

cc: Pedro Ramos, Superintendent, Everglades National Park
Shannon Goessling, Regional Solicitor, Office of the Solicitor
Annette Tarnawsky, Attorney-Advisor, Office of the Solicitor

INTERIOR REGION 2 • SOUTH ATLANTIC-GULF
ALABAMA, FLORIDA, GEORGIA, NORTH CAROLINA, PUERTO RICO, SOUTH CAROLINA, TENNESSEE, U.S. VIRGIN ISLANDS

INTERIOR REGION 4 • MISSISSIPPI BASIN
ARKANSAS, IOWA, LOUISIANA, MISSISSIPPI, MISSOURI

United States Department of the Interior
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NPS/SERO/BICY.SER.6003.MPS

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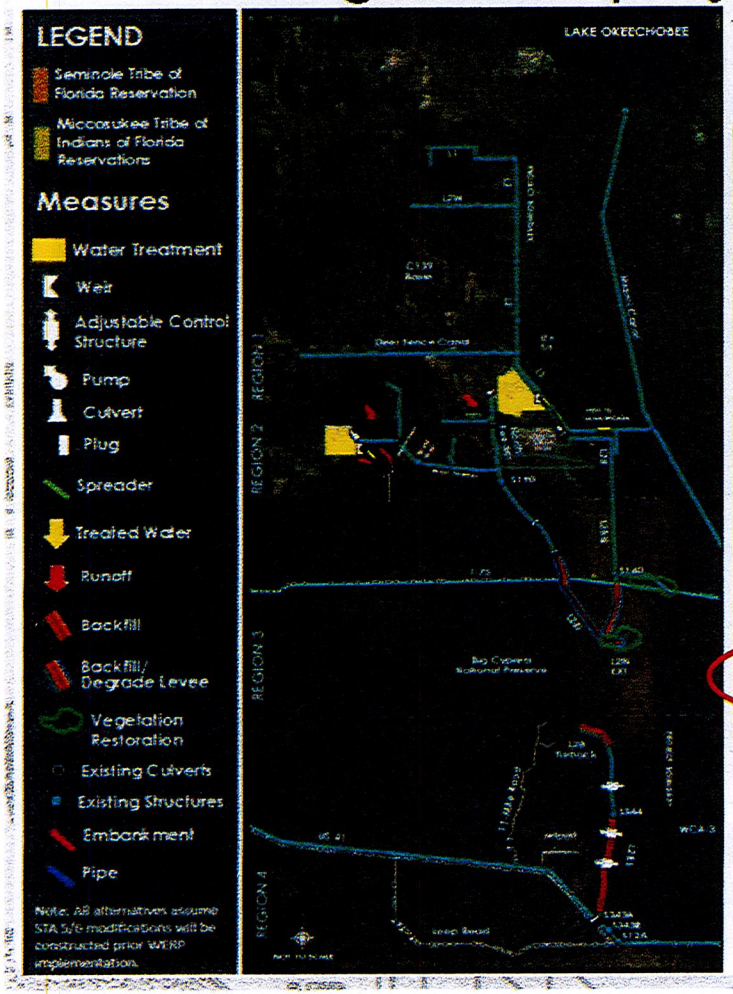
Western Everglades Restoration Project TERMINATED

SOUTH FLORIDA ECOSYSTEM RESTORATION PROGRAM

Planning Studies (Project Implementation Reports)



Challenges

1) Property within Big Cypress National Preserve (BCNP)

- Plan will increase hydroperiods within BCNP directly impacting property

2) Storm Treatment Areas

- Location limitations

3) Water Quality

- Distance (15-20 miles) from areas of most stringent WQ criteria
- Level of treatment

Lack of Consensus = Study Termination

US Army Corps of Engineers

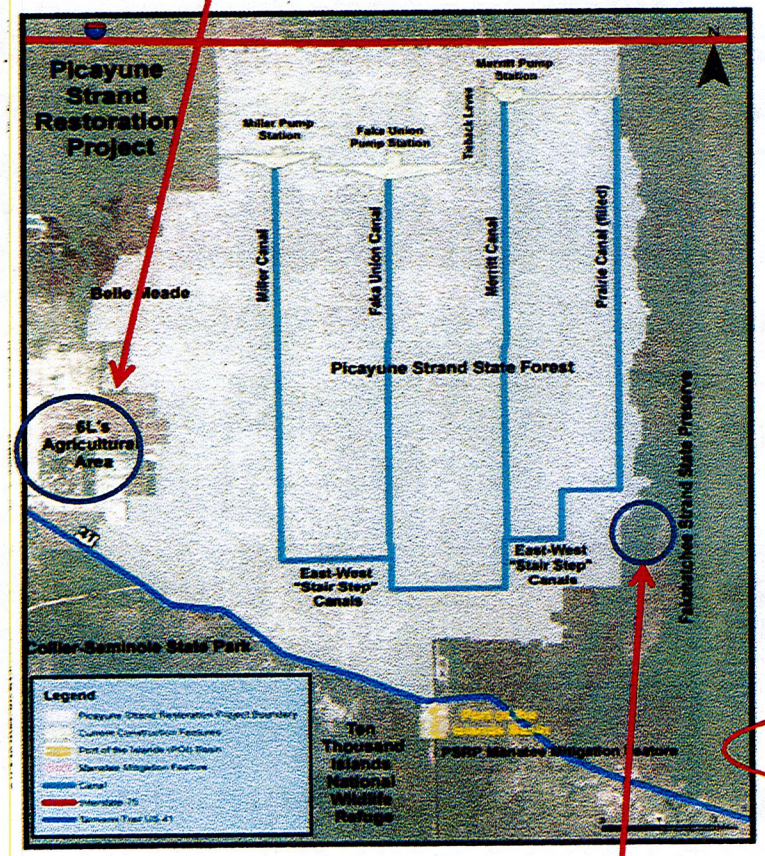
U.S. ARMY

ATTACHMENT # 3

Flood Protection for Non-Indians

SOUTH FLORIDA ECOSYSTEM RESTORATION PROGRAM

CERP: Picayune Strand Restoration Project



The project will restore 55,000 acres of native Florida wetlands and uplands

Total Project Benefits:

- Conveyance of water which will restore natural habitat
- Three pump stations: Merritt, Faka Union, and Miller
- Plugging 48 miles of canals and removing/degrading 260 miles of roads
- Features to mitigate affects on manatees at the Port of the Islands Marina

Status:

- Miller Pump Station construction complete in May 2018; completing operational testing and monitoring period
- Design and construction of SW Protection Features

US Army Corps of Engineers

U.S. ARMY

11

Land Condemnation for Indian Property !

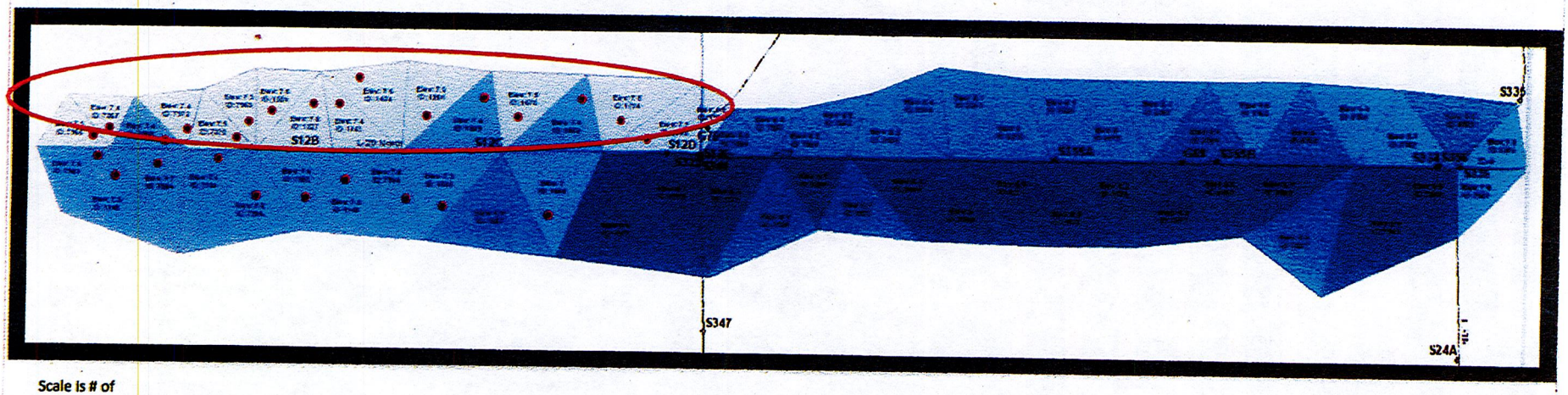
ATTACHMENT # 4

Combined Operations Plan (COP)

IMPACTS TO MICCOSUKEE TRIBE ACCESS TO WCA-3A

Based on US Army Corps of Engineer Modeling

Alt Q v ECB19 – Minimum Elevation – March to July



Scale is # of Days in Period of Record

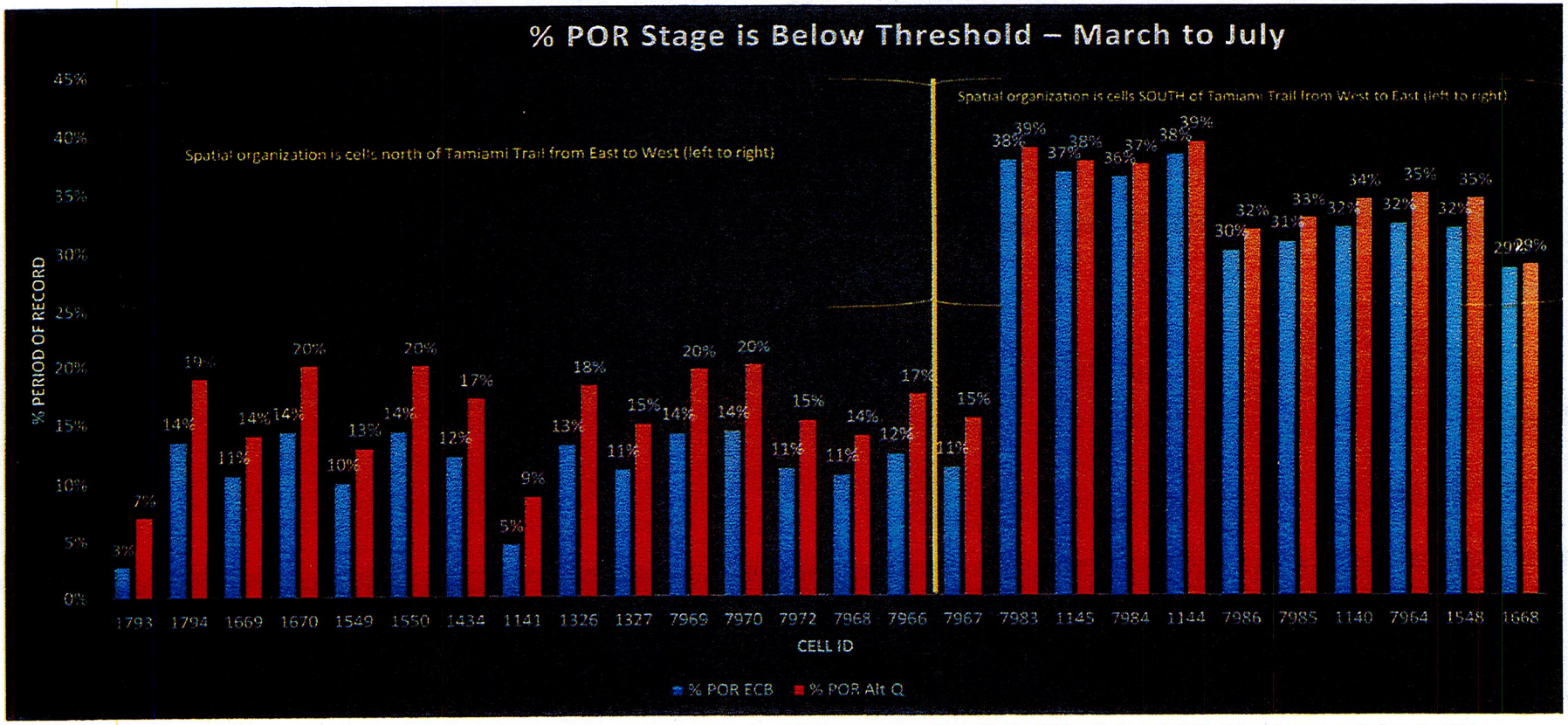
- -563 - -451
- -450 - -245
- 244 - 0
- 1 - 497
- 498 - 862

Difference in impact days over entire POR, seasonally adjusted (Mar-July only), in which water levels are below 12" based on the MINIMUM HAED USGS elevation. An increase (positive number, lighter colored cells) indicates increased risk of airboat closures while a decrease (negative number, darker colored cells) indicates a decreased risk of closures.

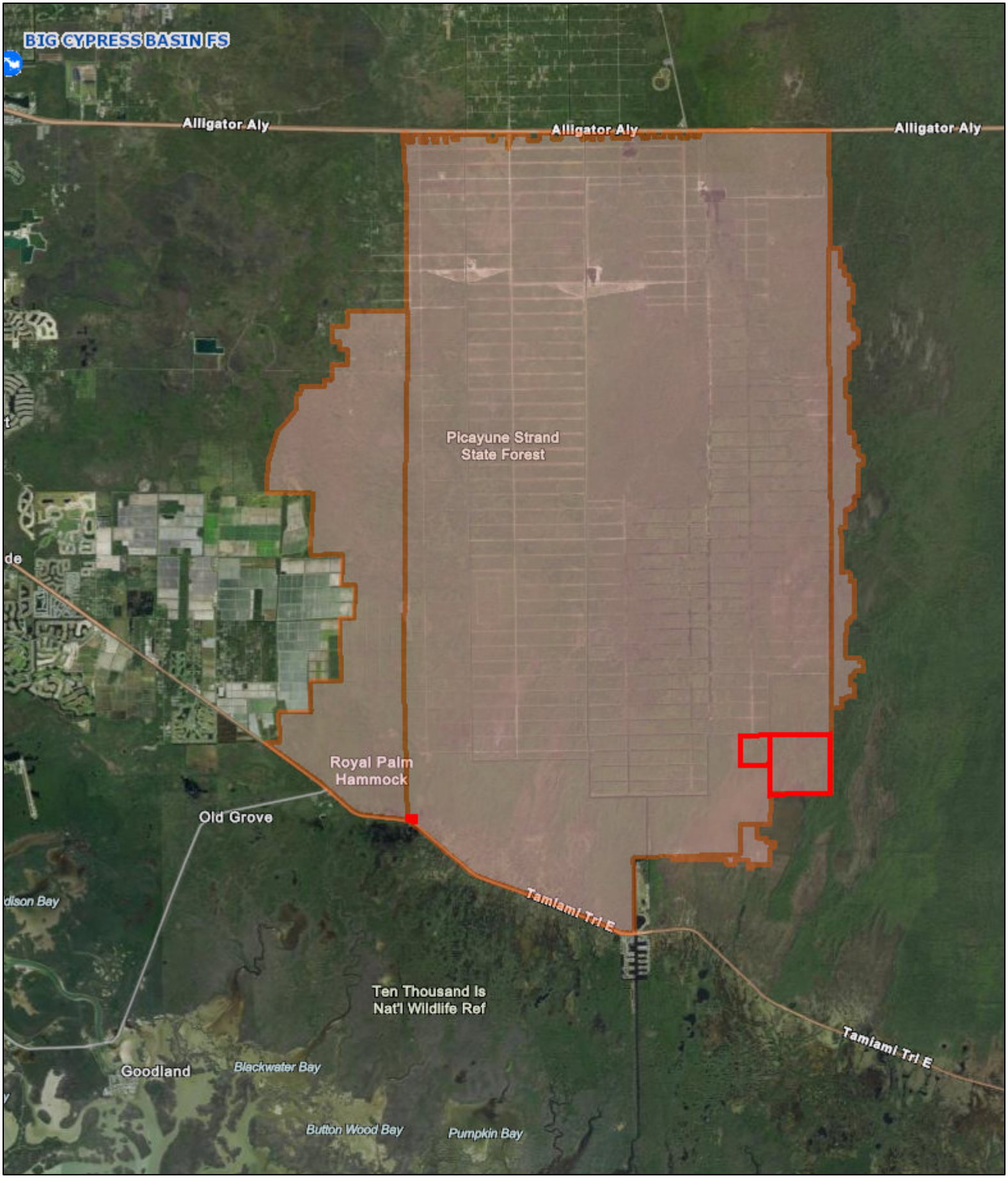
● = Cells that are carried forward in the analysis in the subsequent slides (these are the cells estimated to be at increased risk)

ATTACHMENT # 5

Increased Chance of WCA-3A Access Denial in EVERY Cell
(11 years out of 41 year Period of Record – and NOT counting anything less than 30 days)



When focusing on March – July, the average percent increase in AltQ across all cells is 3% of the POR. Maximum delta is 6% increase (cell 1670).



Real Estate Tract Search Map

South Florida Water Management District
3301 Gun Club Road, West Palm Beach, Florida 33406
561-686-8800; www.sfwmd.gov

N W E S

0 0.8 1.6 2.4 3.2 Miles

0 1.5 3 4.5 Kilometers

DISCLAIMER:
This map is a conceptual or planning tool only. The South Florida Water Management District does not guarantee or make any representation regarding the information contained herein. It is not self-executing or binding, and does not affect the interests of any persons or properties, including any present or future right or use of real property and is exempt from public records disclosure and confidential under Section 119.071(3)(a)(1), Florida Statute.

Map Produced on Date: 12/5/2019 4:56:23 PM

Geospatial Services

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APPENDIX A.2: ENDANGERED SPECIES ACT PERTINENT CORRESPONDENCE

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2 ENDANGERED SPECIES ACT PERTINENT CORRESPONDENCE

This appendix contains pertinent correspondence related to the Picayune Strand Restoration Project (PSRP) Southwest Protection Feature, Conveyance Features, and Partial Plugging of the Faka Union Canal proposed action and the Endangered Species Act (ESA). A brief description of pertinent correspondence is provided below.

I'm not sure yet:

- 17 December 2013: National Marine Fisheries Service (NMFS) Programmatic Biological Opinion for the Comprehensive Everglades Restoration Plan (CERP)
- 30 May 2017: U.S. Army Corps of Engineers (USACE) Species Request for the PSRP
- 7 July 2017: U.S. Fish and Wildlife Service (USFWS) Response to Species Request for the PSRP
- 6 April 2020: USACE transmittal letter for the PSRP Supplemental Biological Assessment for the PSRP SWPF, Conveyance Features, and Partial Plugging of the Faka Union Canal
- 11 May 2020: USFWS Request for Additional Information on the PSRP Supplemental BA

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, JACKSONVILLE DISTRICT
701 SAN MARCO BOULEVARD
JACKSONVILLE, FLORIDA 32207-8175

28 JAN 2020

Programs and Project Management Division
Programs Management Branch

Mr. Drew Bartlett
Executive Director
South Florida Water Management District
3301 Gun Club Road
West Palm Beach, FL 33406

Dear Mr. Bartlett:

This letter is in response to your January 6, 2020, letter and attachments regarding real estate interest requirements for the Picayune Strand Restoration Project (Picayune Strand). I acknowledge the contents of your letter and enclosures, including the concerns of the Miccosukee Tribe of Indians of Florida (Tribe) as outlined in their November 4, 2019 letter to you.

With regards to your request that the U.S. Army Corps of Engineers (Corps) advise the South Florida Water Management District (SFWMD) as to whether easements can be used to attain project purposes for the Picayune Strand Project, I commit to working together with you and your staff to revisit the real estate interest requirements for the Picayune Strand project in accordance with Corps real estate policy. While the lands in question were acquired via fee simple acquisition, we believe a flowage and/or conservation easement can be an appropriate real estate interest if such an easement would allow for the project benefits to be achieved while also being compatible with the uses that the Tribe seeks. My team is available and will participate in further meetings to coordinate and identify the steps required to address Picayune Strand real estate interest requirements.

If you have any questions regarding the information in this letter, please feel free to contact me or Howard Gonzales Jr., Chief, Ecosystem Branch at 904-232-2299, or by email at howard.h.gonzales@usace.army.mil.

Sincerely,

KELLY.ANDREW.DONALD.JR.1025510875

Digitally signed by KELLY.ANDREW.DONALD.JR.1025510875
Date: 2020.01.28 13:26:59 -05'00'

Andrew D. Kelly, Jr.
Colonel, U.S. Army
District Commander

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
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263 13th Avenue South
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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.

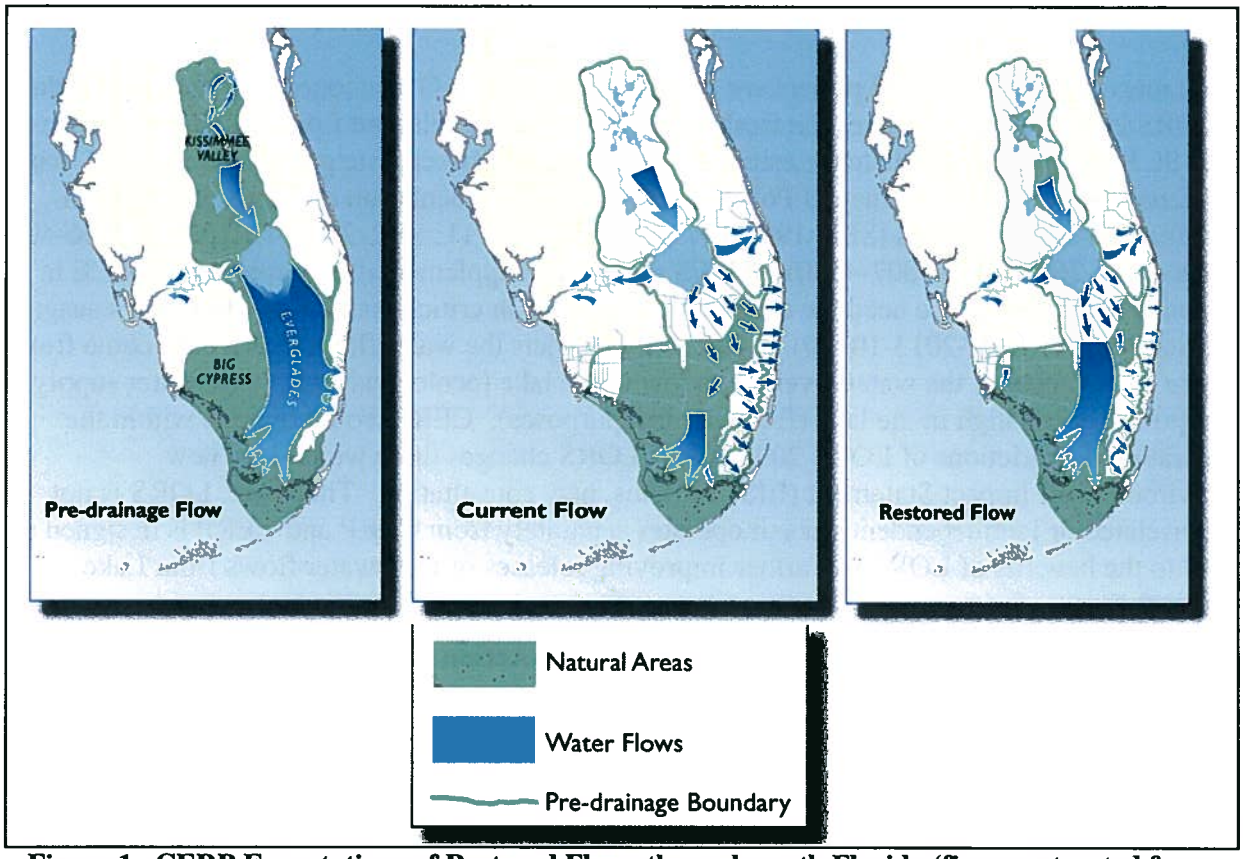


Figure 1. CERP Expectations of Restored Flows through south Florida (figure extracted from CEPP powerpoint presentations)

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.

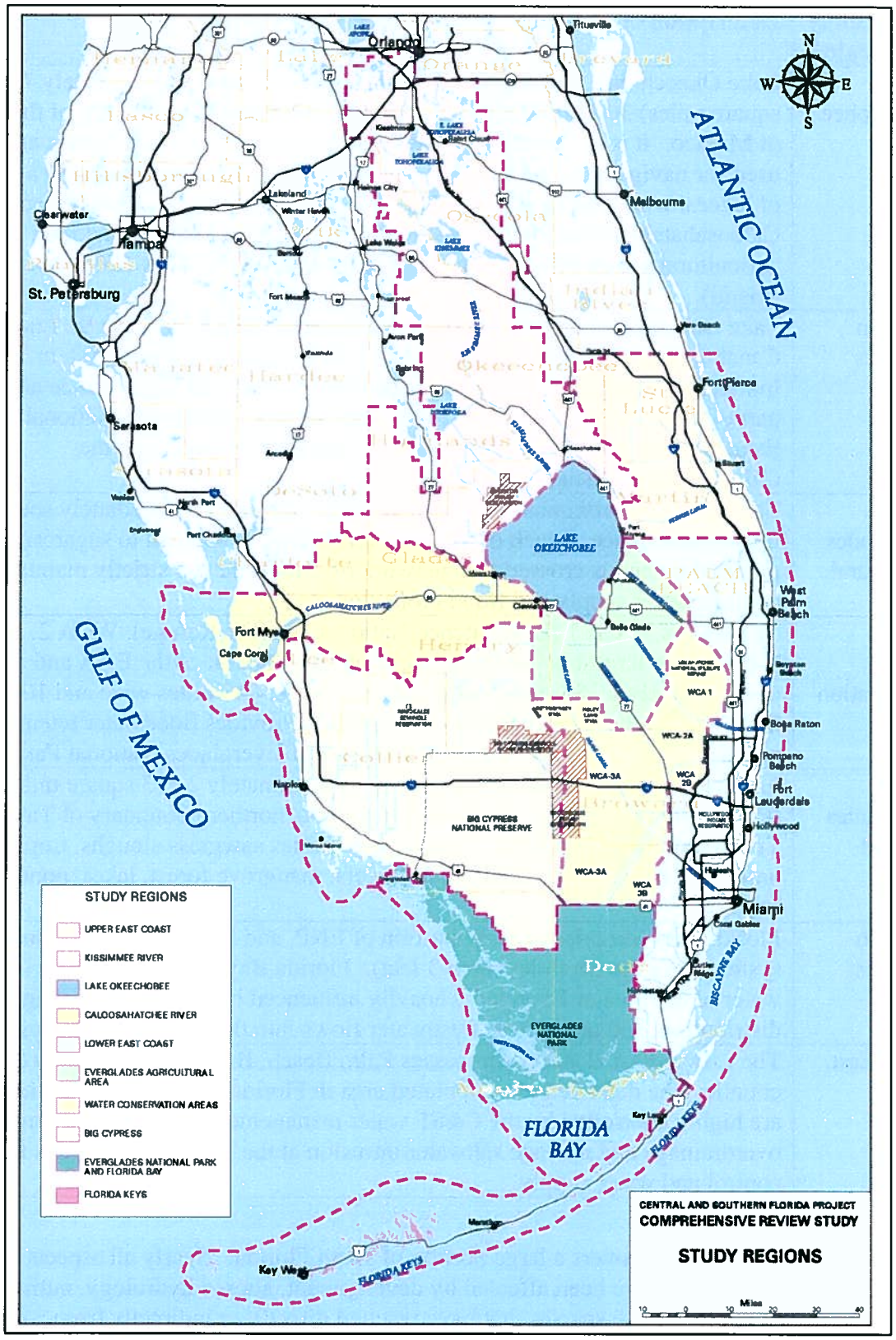


Figure 2. CERP Study Area

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.

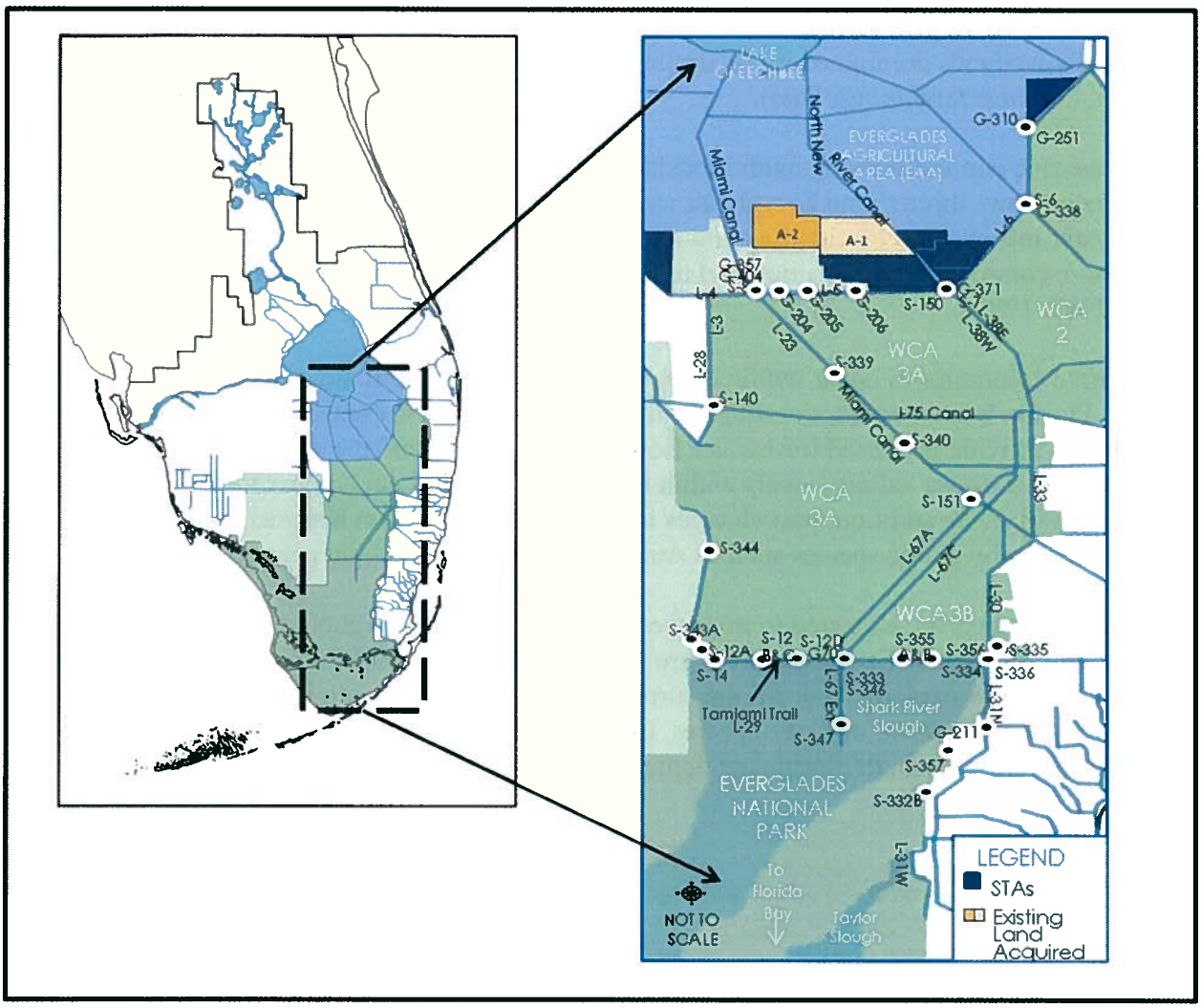


Figure 3. Current Structural Features in South Florida with Locations of EAA, WCAs, and ENP

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.

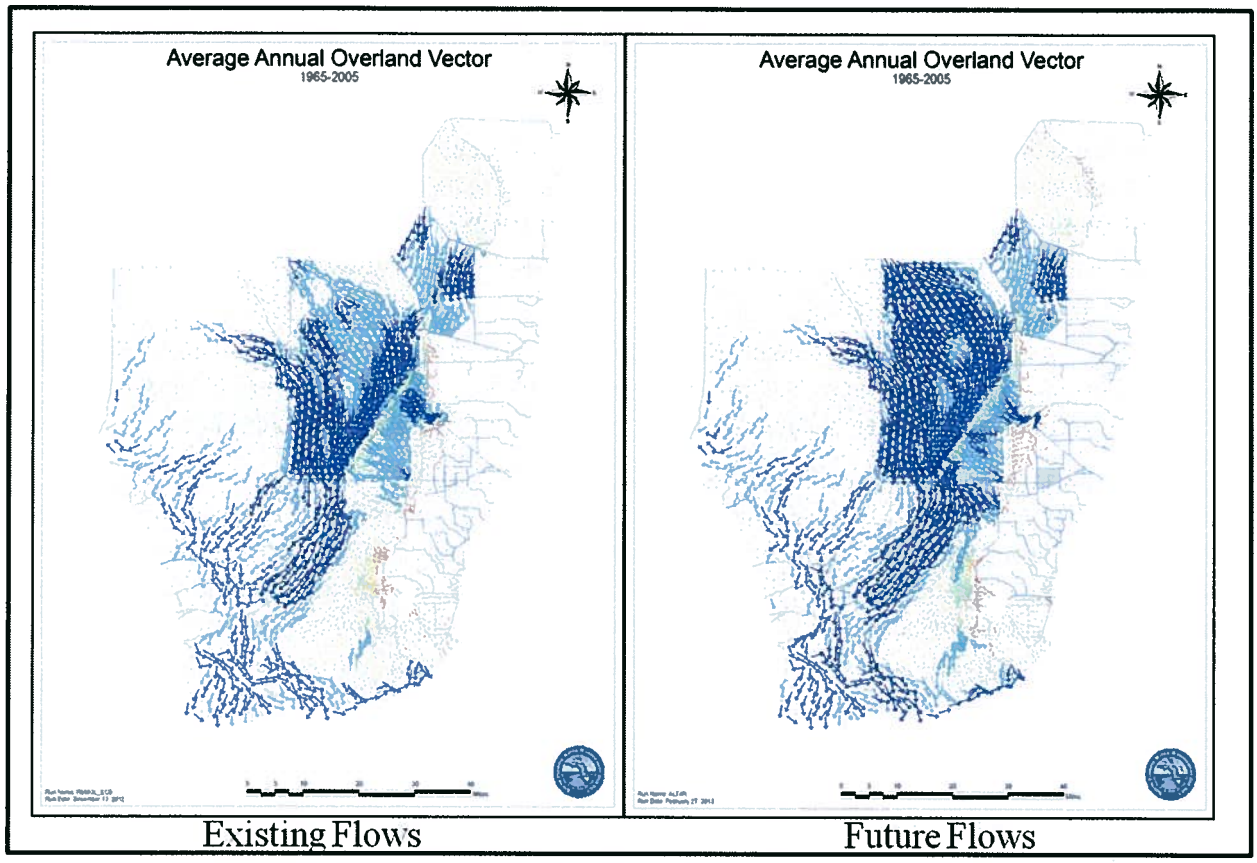


Figure 4. Existing and Future with Project Flows. Blue arrows indicate more water flowing throughout the areas. The box in Figure 2 depicts the same region shown in this figure. (Figure extracted from CEPP PIR/EIS Appendix G – Benefits Analysis)

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).

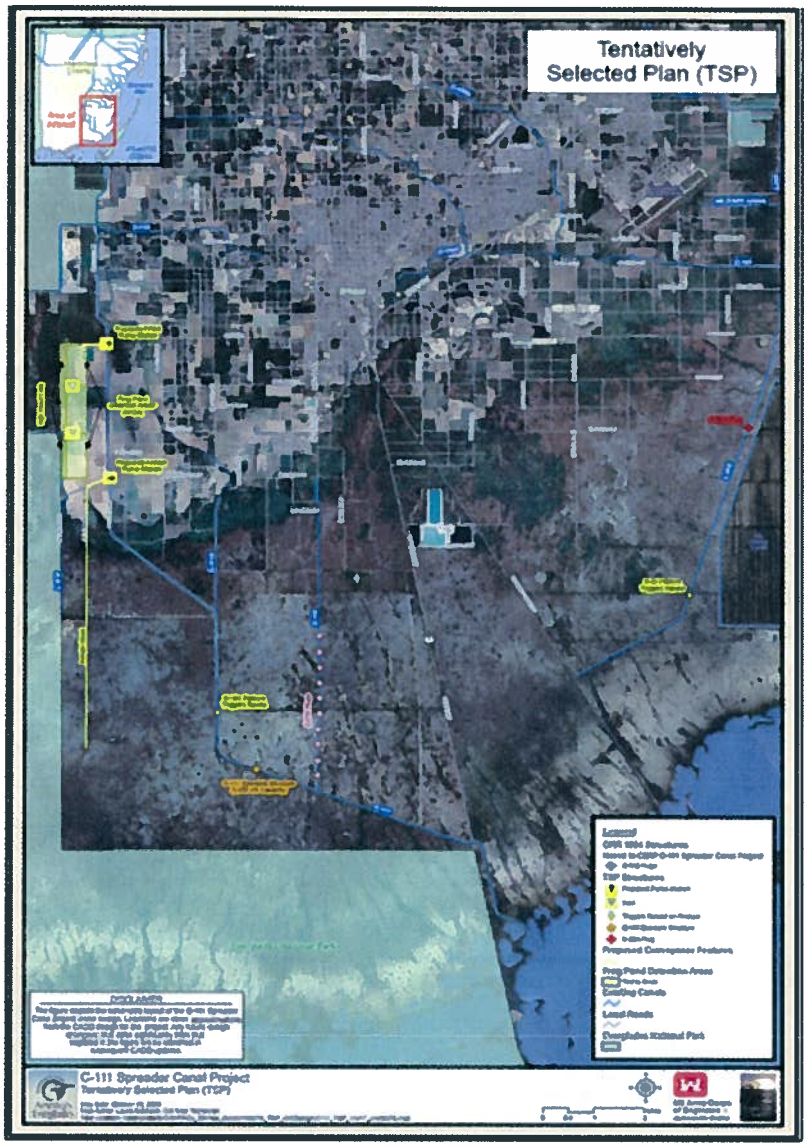


Figure 5. C-111 Spreader Canal Project Area

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.

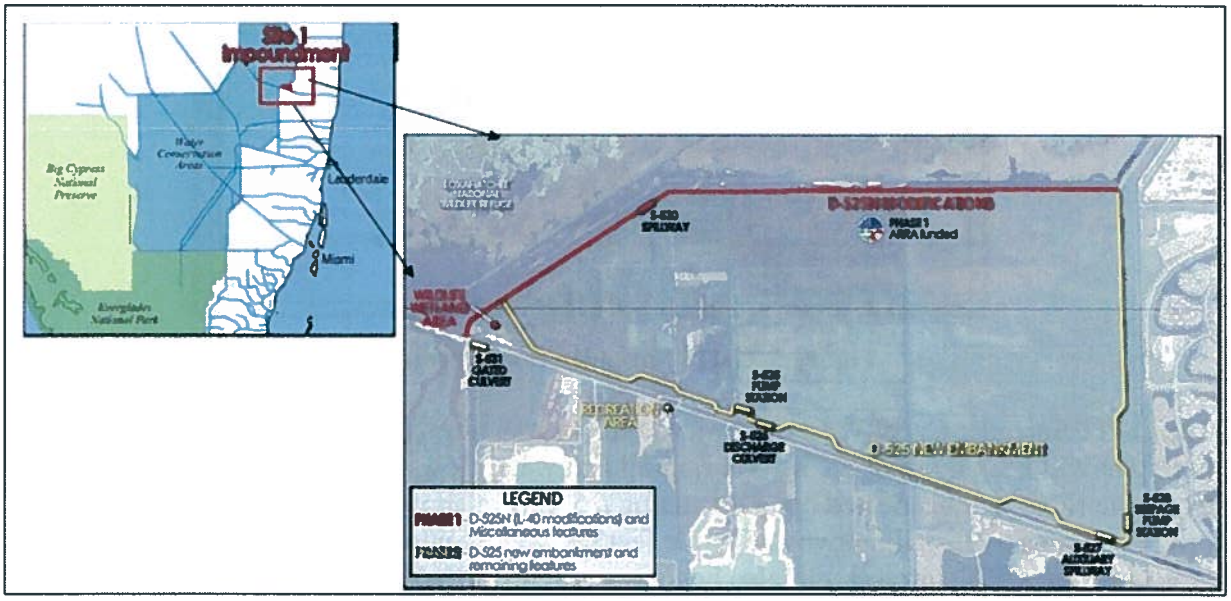


Figure 6. Site 1 Impoundment Project Area and Features

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).

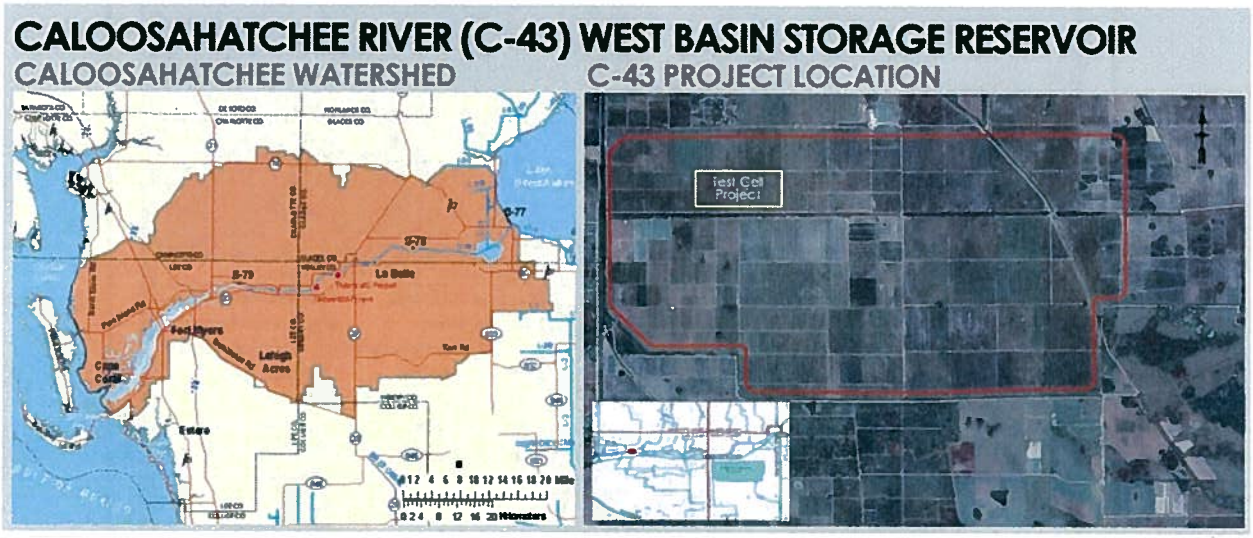


Figure 7. C-43 Project Location and Features

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).

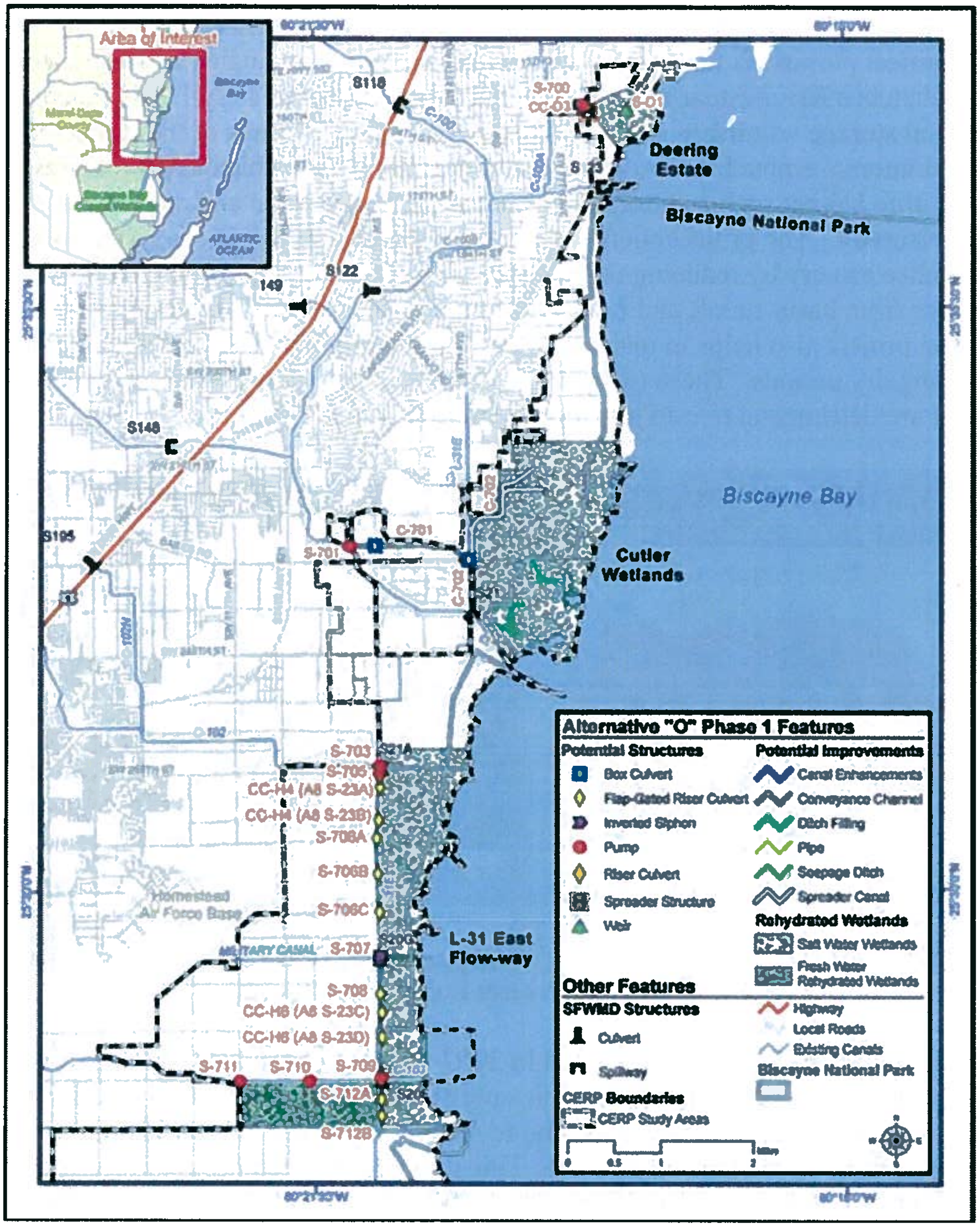


Figure 8. Biscayne Bay Coastal Wetlands Project Location and Features

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).

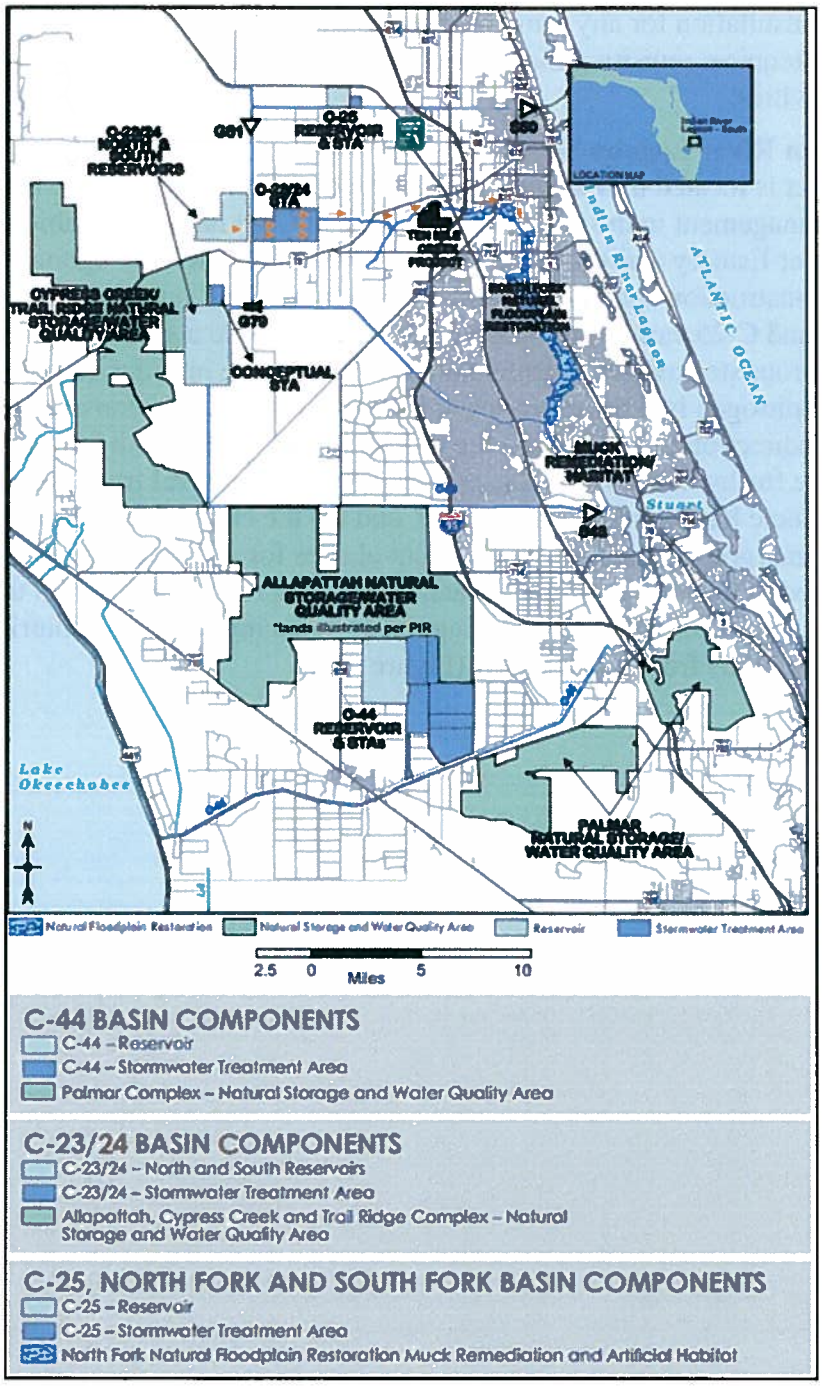


Figure 9. Indian River Lagoon South Project Location and Features

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.

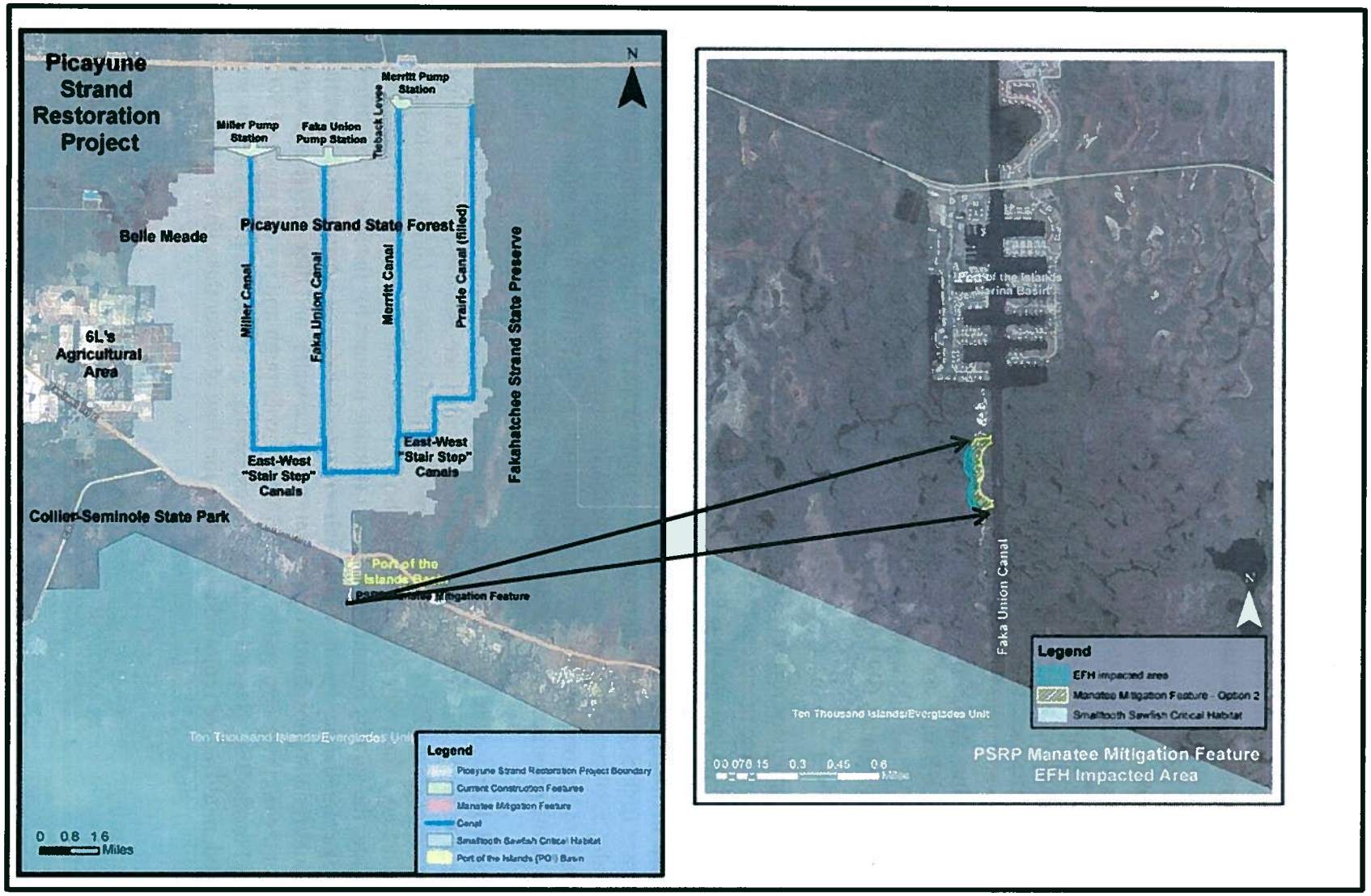


Figure 10. Picayune Strand Project Area and Potential Manatee Mitigation Feature with Smalltooth Sawfish Critical Habitat

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).

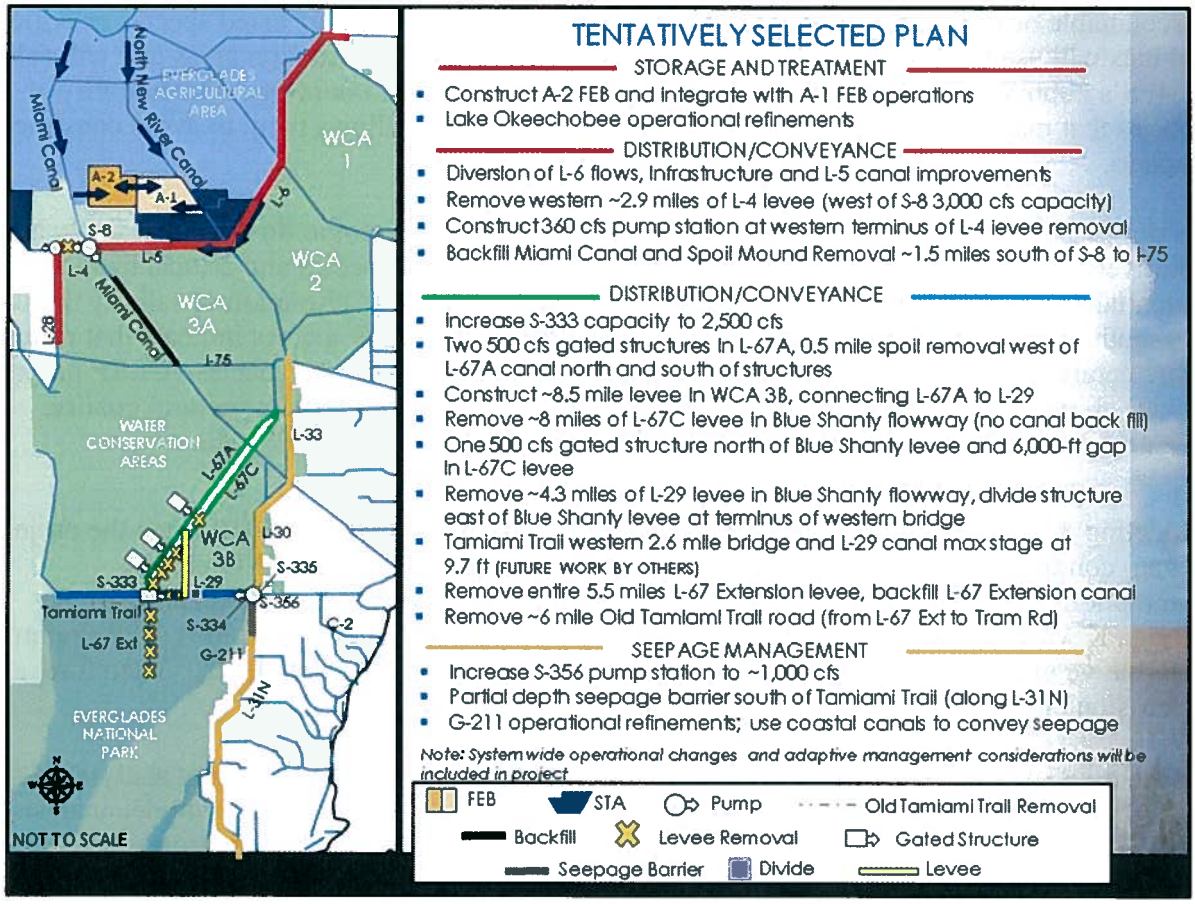


Figure 11. Central Everglades Planning Project Features

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).

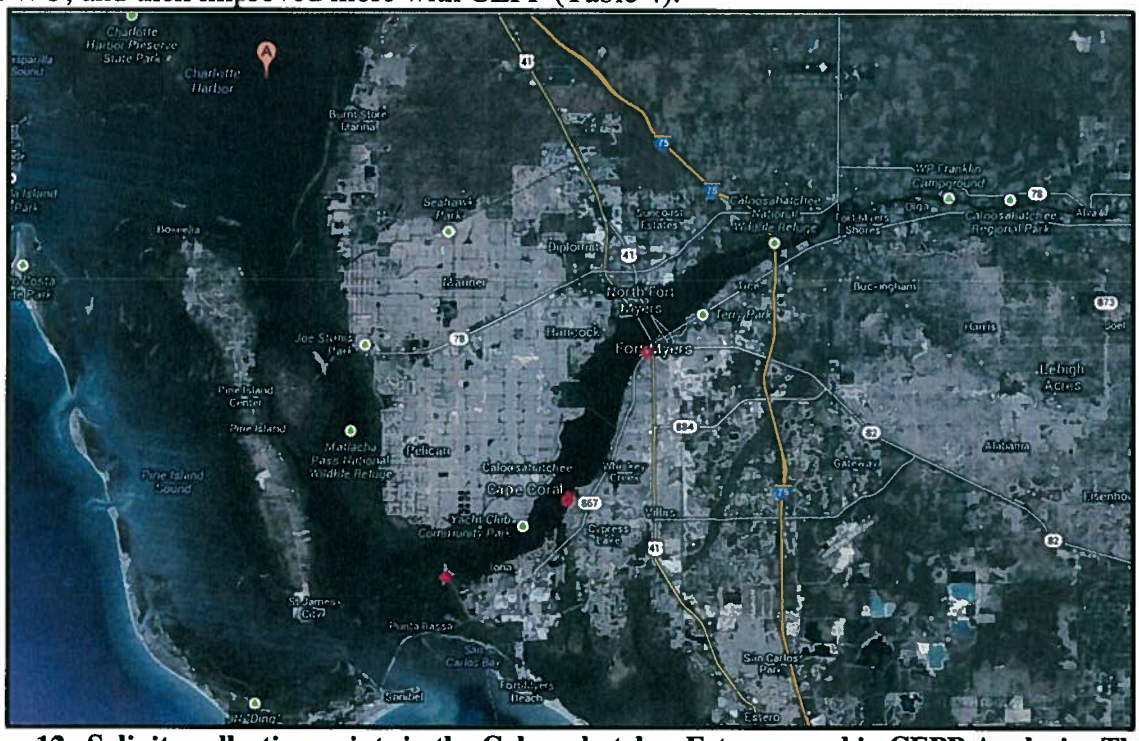


Figure 12. Salinity collection points in the Caloosahatchee Estuary used in CEPP Analysis. The red dots indicate where information was collected.

[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 03 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.

---

[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.

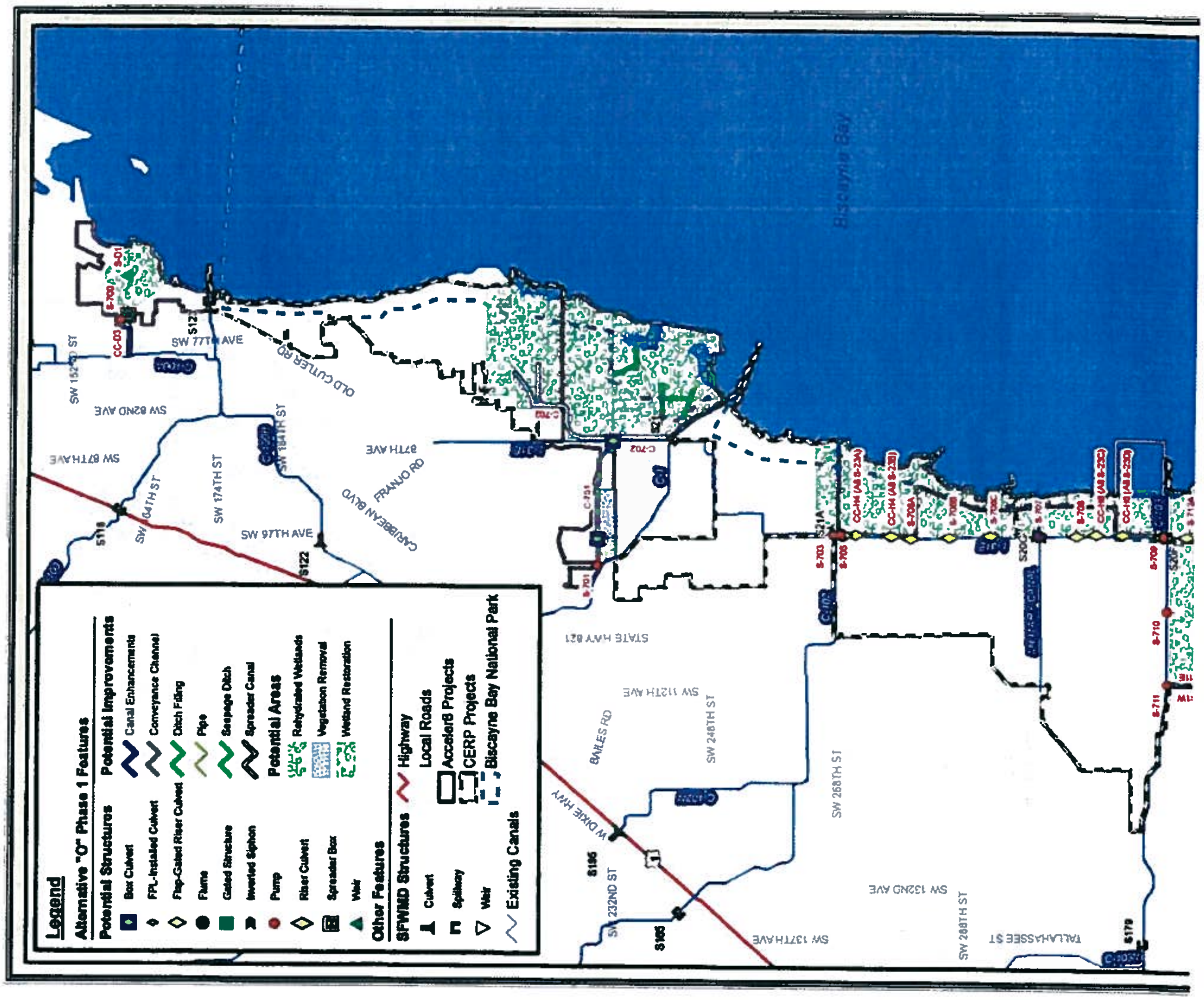
Sincerely,

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
Highway
Local Roads
Acceler8 Projects
CERP Projects
Biscayne Bay National Park
Existing Canals
Biscayne Bay
SW 77TH AVE
OLD CUTLER RD
SW 152ND ST
SW 82ND AVE
SW 87TH AVE
SW 184TH ST
SW 174TH ST
SW 97TH AVE
87TH AVE
FRANJO RD
CARIBBEAN BLVD
STATE HWY 821
SW 112TH AVE
BAILES RD
SW 248TH ST
SW 268TH ST
W DIXIE HWY
SW 232ND ST
SW 132ND AVE
SW 137TH AVE
SW 288TH ST
TALLAHASSEE ST
S118
S122
S123
S195
S165
S179
S21A
C-702
C-701
CC-03
S-700
S-701
S-703
S-705
S-706A
S-706B
S-706C
S-707
S-708
S-709
S-710
S-711
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CC-H4 (All S-23B)
CC-H5 (All S-23C)
CC-H5 (All S-23D)

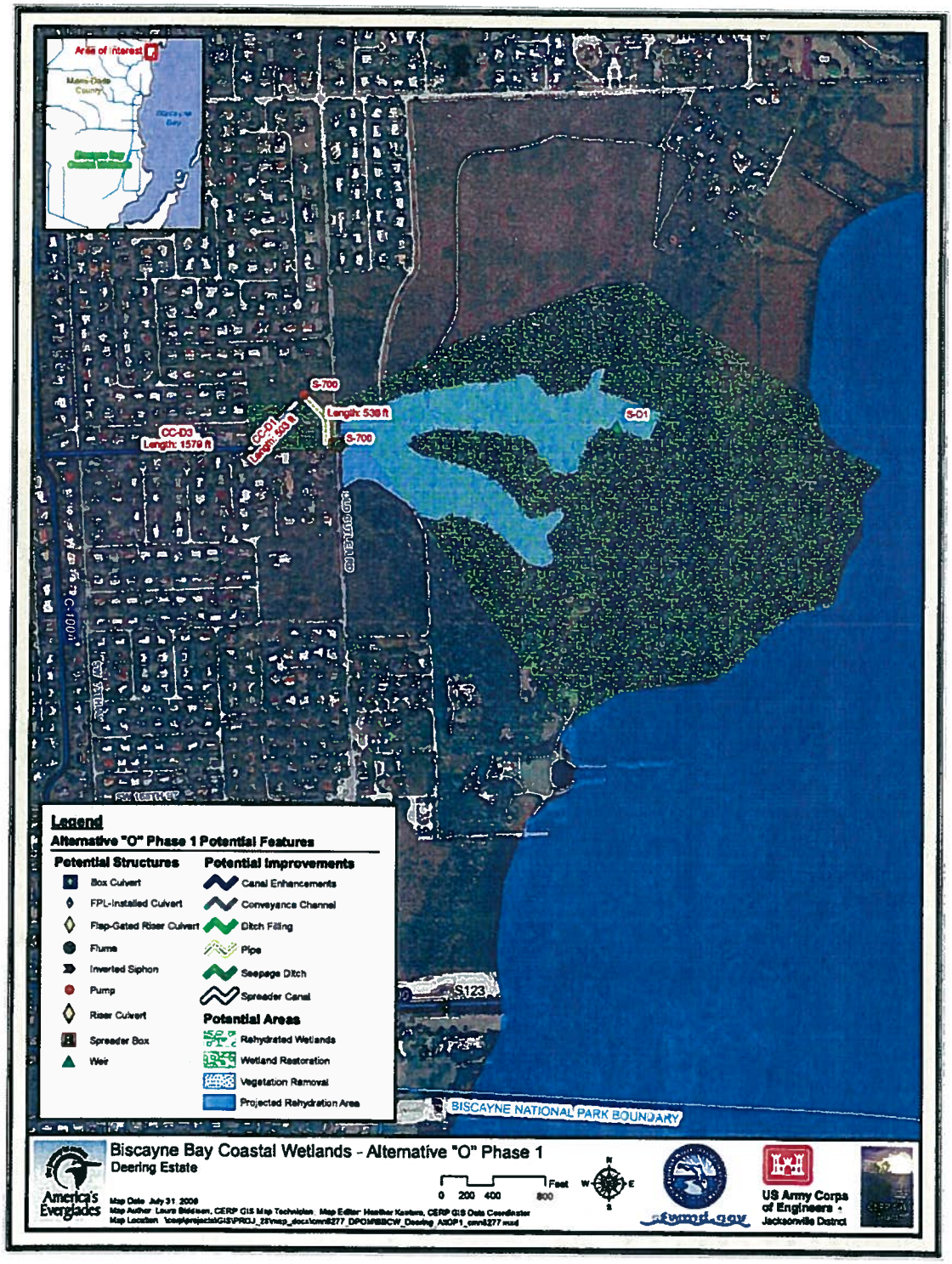

FIGURE A4-2: BISCAYNE BAY COASTAL WETLANDS DEERING ESTATE

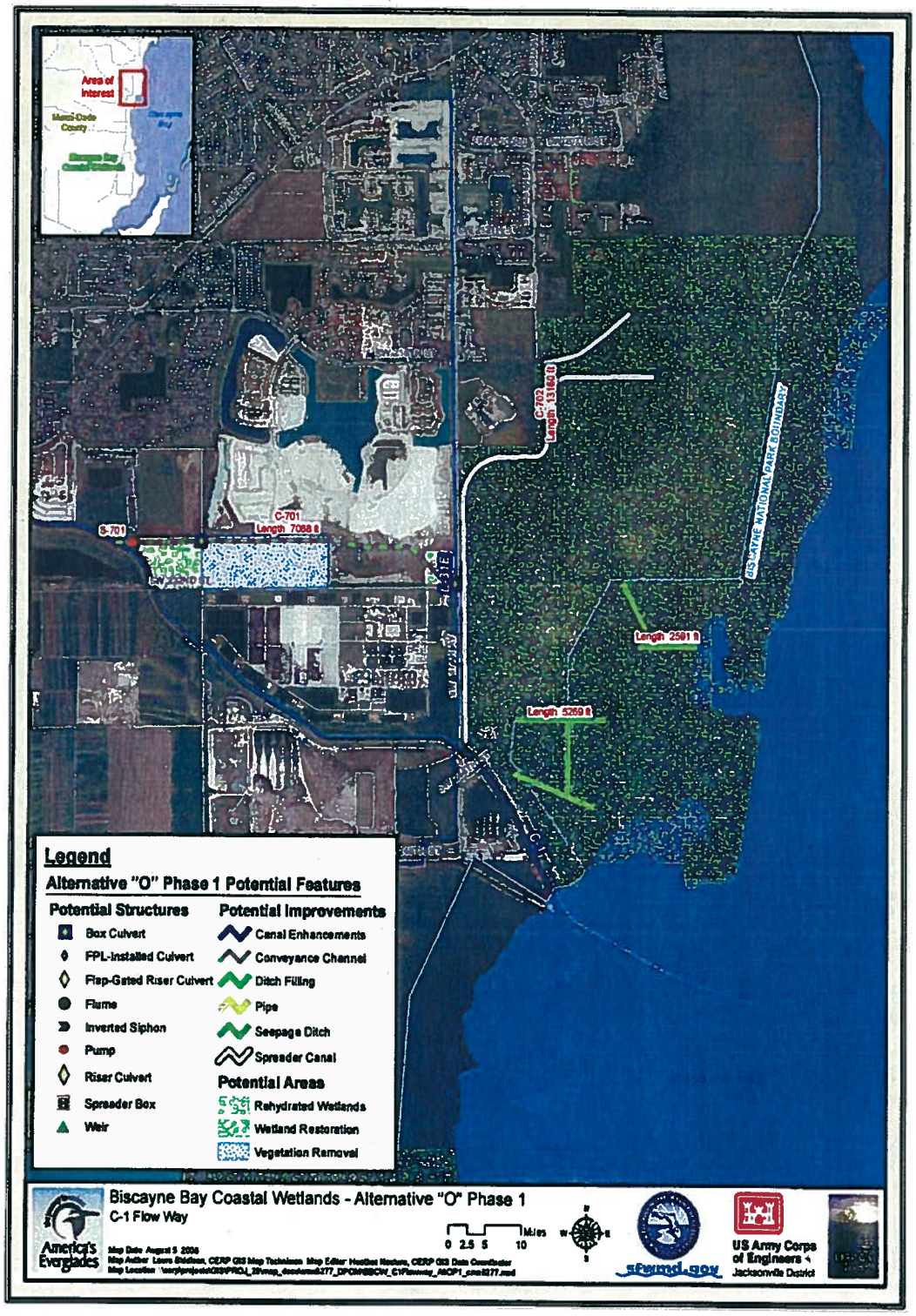

FIGURE A4-3: BISCAYNE BAY COASTAL WETLANDS C-1 FLOW WAY

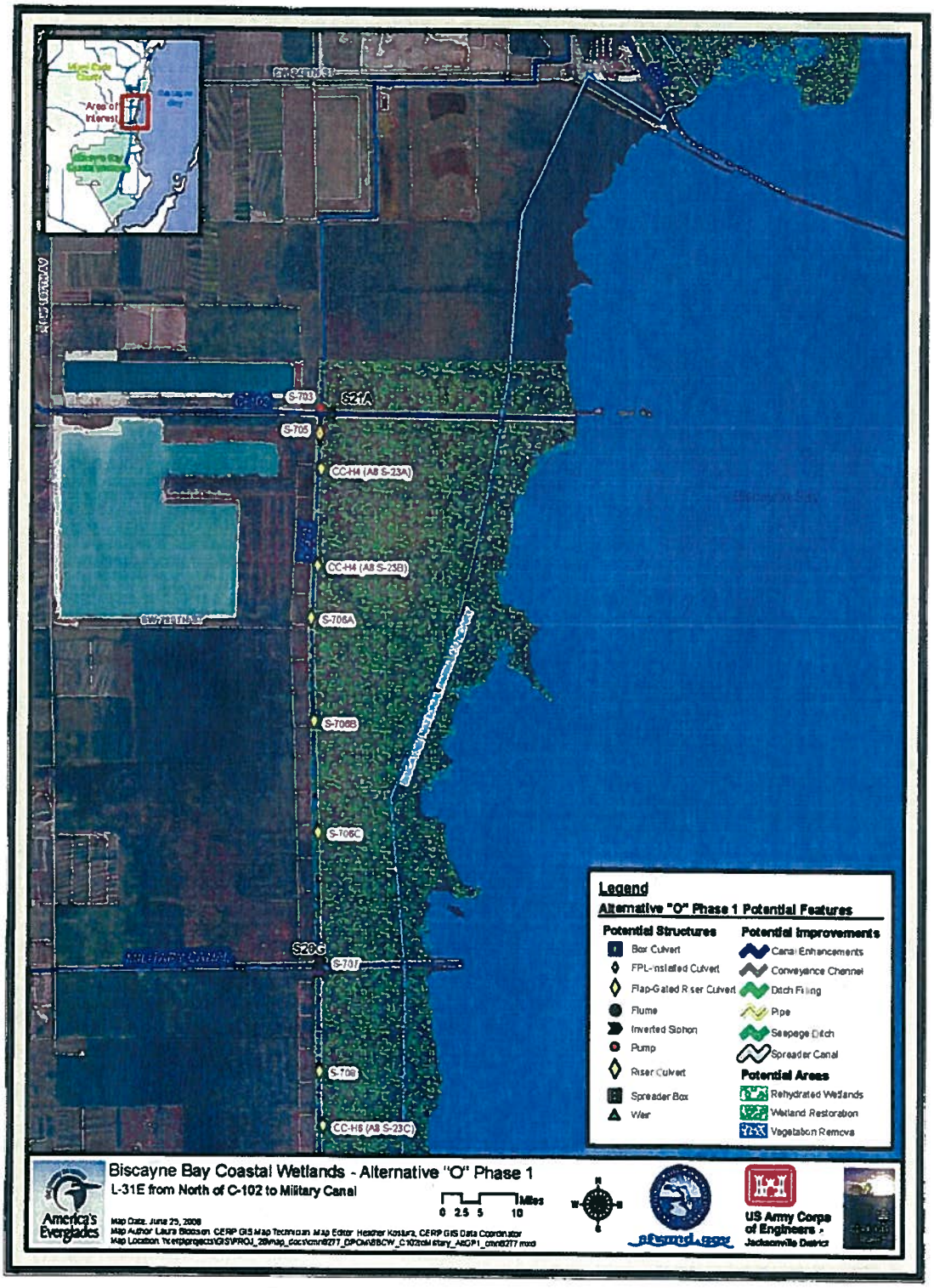

FIGURE A4-4: BISCAYNE BAY COASTAL WETLANDS L-31 FROM NORTH OF C-102 TO MILITARY CANAL

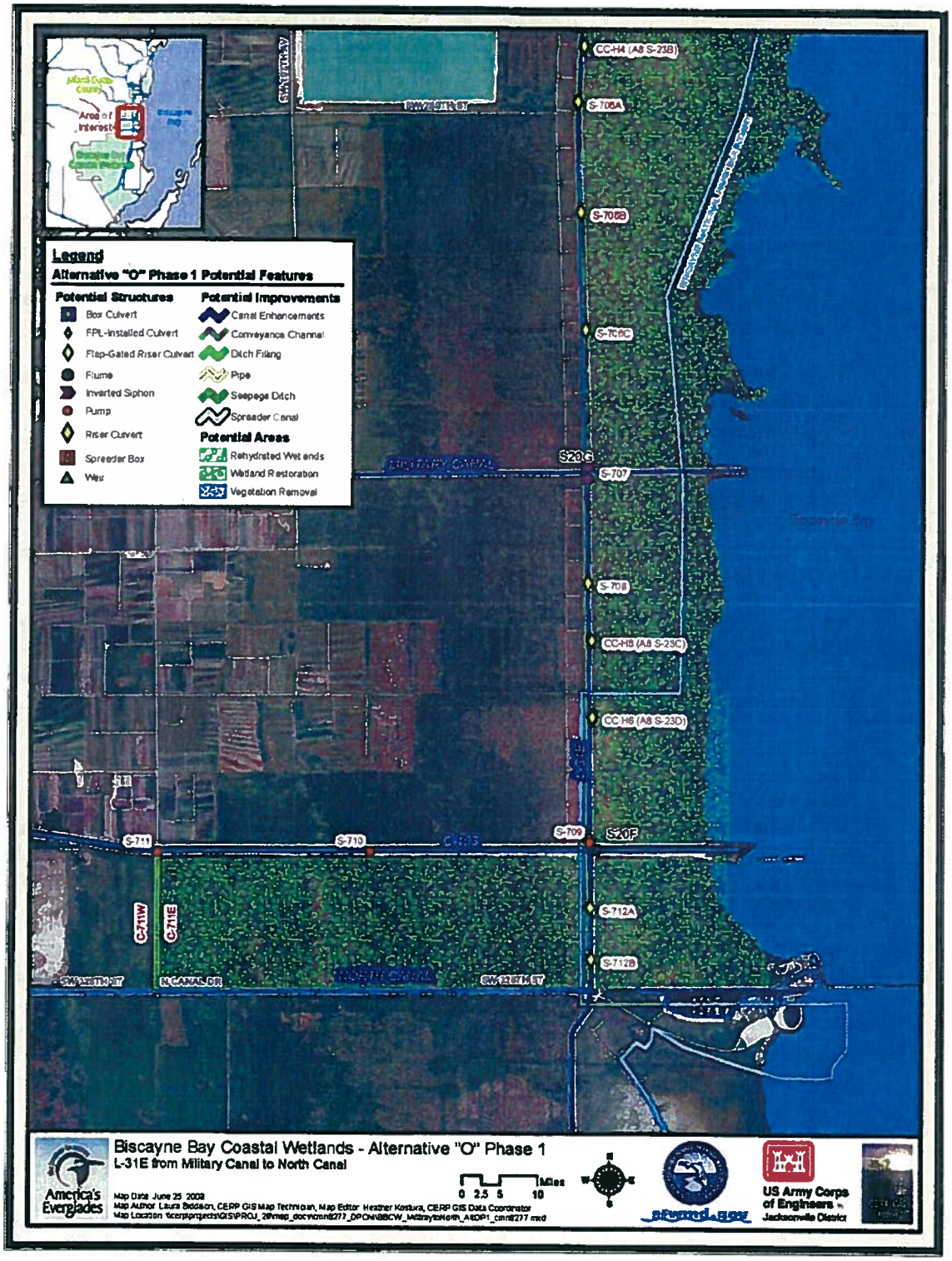

FIGURE A4-5: BISCAYNE BAY COASTAL WETLANDS L-31E FROM MILITARY CANAL TO NORTH CANAL

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.
>
> 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.
>
> 3. Regarding EFH: Even projects that have a net positive effect on EFH still require EFH Consultation if they may adversely impact designated

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
>
>

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.

Email communication:

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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.
>
> 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.
>
> 3. Regarding EFH: Even projects that have a net positive effect on EFH still require EFH Consultation if they may adversely impact designated 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

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

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

FILE #

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,

Gary D. Ritter

for, Joseph E. Powers, Ph.D.
Acting Regional Administrator

2

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

Stacie Auvenshine - NOAA Federal <stacie.auvenshine@noaa.gov>

FW: C-111 Spreader Canal Western Project (UNCLASSIFIED)

1 message

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).

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
701 San Marco Boulevard
JACKSONVILLE, FLORIDA 32207-8175

REPLY TO
ATTENTION OF

Planning and Policy Division
Environmental Branch

MAY 30 2017

Mr. Larry Williams
Field Supervisor
U.S. Fish and Wildlife Service
1339 20th Street
Vero Beach, FL 32960

Dear Mr. Williams:

The U.S. Army Corps of Engineers (Corps), Jacksonville District, is preparing a National Environmental Policy Act (NEPA) assessment for the Southwest Protection Feature (SWPF) of the Picayune Strand Restoration Project (PSRP). The purposes of the SWPF are to provide flood protection for the 6L Agricultural Lands located along the southwestern border of the PSRP project area and north US-41, reduce the potential for stacking water in the vicinity of the SWPF, and to convey freshwater south into the estuaries south of US-41.

The 2004 PSRP Project Implementation Report and Environmental Impact Statement (PIR/EIS) SWPF consisted of a 17.24 mile levee designed to encompass the entire perimeter of the 6L Agricultural Lands (Figure 1). More recent hydrological modeling revealed new information regarding flood stage elevations throughout the PSRP. Based upon the updated modeling, levees are only necessary along the eastern and northeastern perimeter of the 6L Agricultural Lands for flood protection. The length of the new proposed levee extends 8.75 miles, effectively reducing the levee envisioned in the PIR/EIS by 8.49 miles (Figure 2). Three (3) alternatives are currently being evaluated to further address the "stacking" of water in the southwestern portion of the 6L Tier 2 model boundary within the PSRP. The three (3) alternatives under consideration (other than the "No Action" alternative) are:

- Alternative 1 – Restore Duda Fields. Restore the area known as the "Duda fields" including the ditch and berm along 102nd Avenue. This would facilitate overland flow from the north east to the south, southwest and hopefully reduce the depth and duration of surface water in the red cockaded woodpecker habitat. (Figure 3)
- Alternative 2 – Increase conveyance under US-41. This alternative may help to restore flow to the south mitigating for the effect of US-41 on holding restored

surface flows to the north of US-41 that cause greater depth and duration than would have been in the area historically. (Figure 4)

- Alternative 3 – Construct linear pools for seepage management and discharge storage. The linear pools would be constructed between the Lipman (6L) Farms berm and the Picayune levee (known as the SWPF). Linear pools are the description provided in the alternative. (In essence, instead of one continuous canal running between the Lipman Farms berm and the new levee, the canal will contain periodic plugs, thus creating "pools" between the berm and levee.)

Pursuant to the Endangered Species Act, as amended, the Corps is requesting written confirmation of species or their critical habitat either listed or proposed for listing that may be present within the referenced 6L Tier 2 Model Domain area (Figure 1) of the PSRP area within 30 days upon receipt of this letter. The Corps has tentatively determined that the following list of threatened and endangered species may be present within the project area as illustrated in the enclosed Table 1. A tentative schedule for modeling and NEPA for the Southwest Protection Feature portion of the PSRP is included in Table 2 for reference.

If you have any questions, or need further information, please contact Michael Simmons by email michael.t.simmons@usace.army.mil or telephone 904-232-2069. Thank you for your assistance in this matter.

Sincerely,

Gina Paduano Ralph, Ph.D.
Chief, Environmental Branch

Enclosures

L:\GROUP\PDES\Picayune Strand (PSRP)\2017 Environmental\Consultation\USFWS Species request letter PSRP-SWPF

CC:

Ms. Kim Dryden, U.S. Fish and Wildlife Service, 12085 State Road 29S, Immokalee, Florida 32960

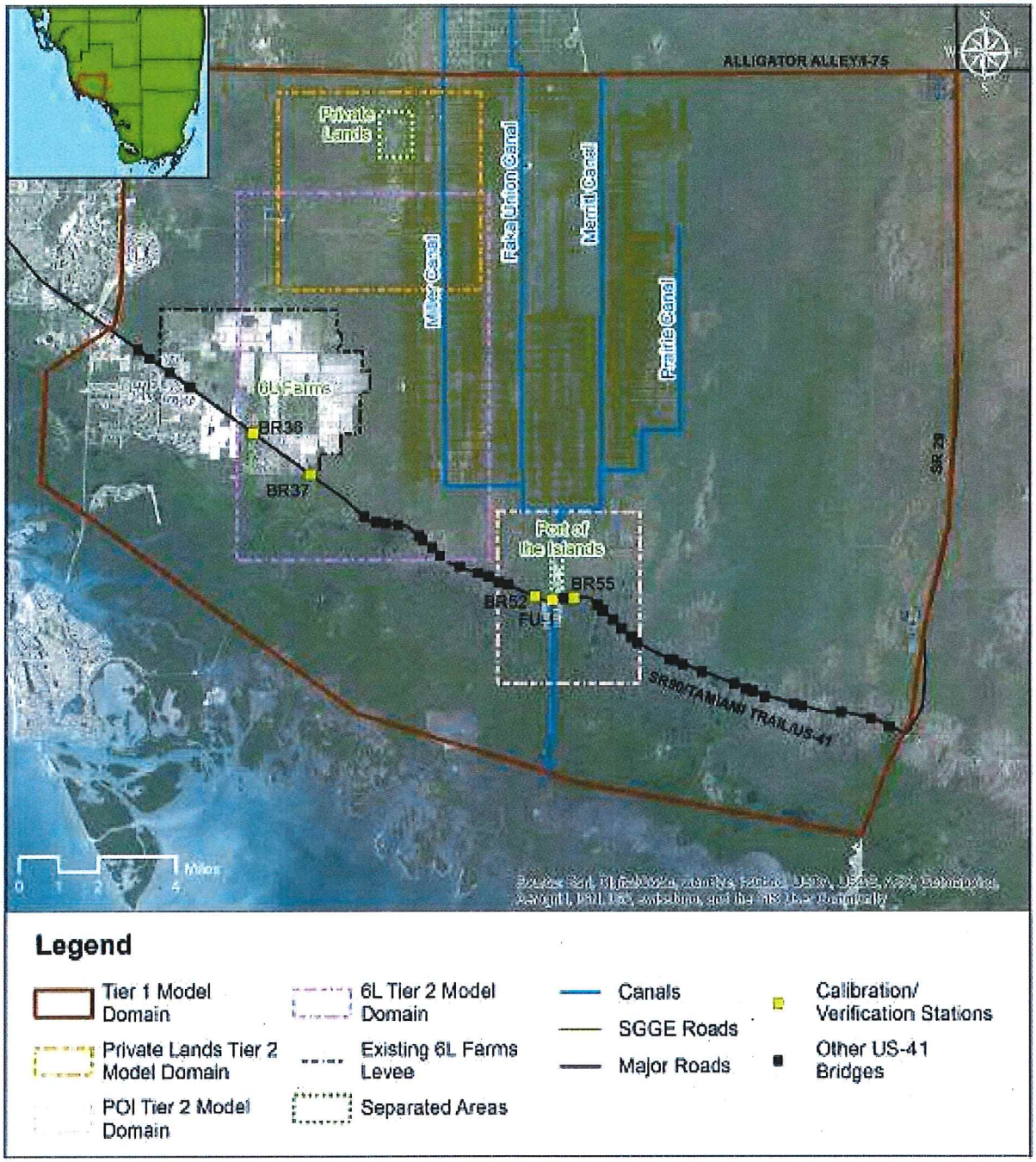

Figure 1. Picayune Strand Restoration Project Area with model domain boundaries

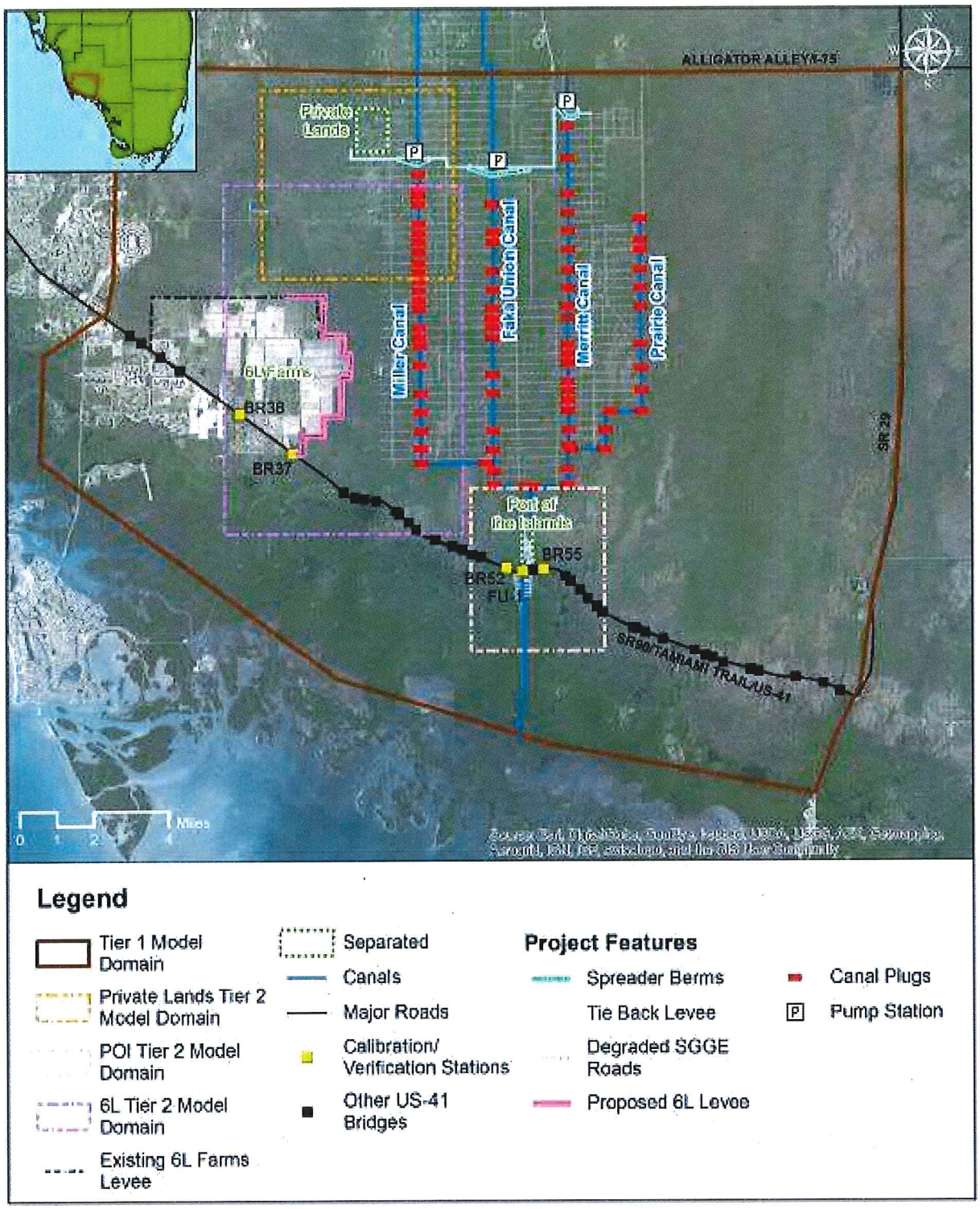

Figure 2. Picayune Strand Restoration Project Area including new proposed 6L levee

Figure 3. Picayune Strand Restoration Project Area: SWPF Alternative 1

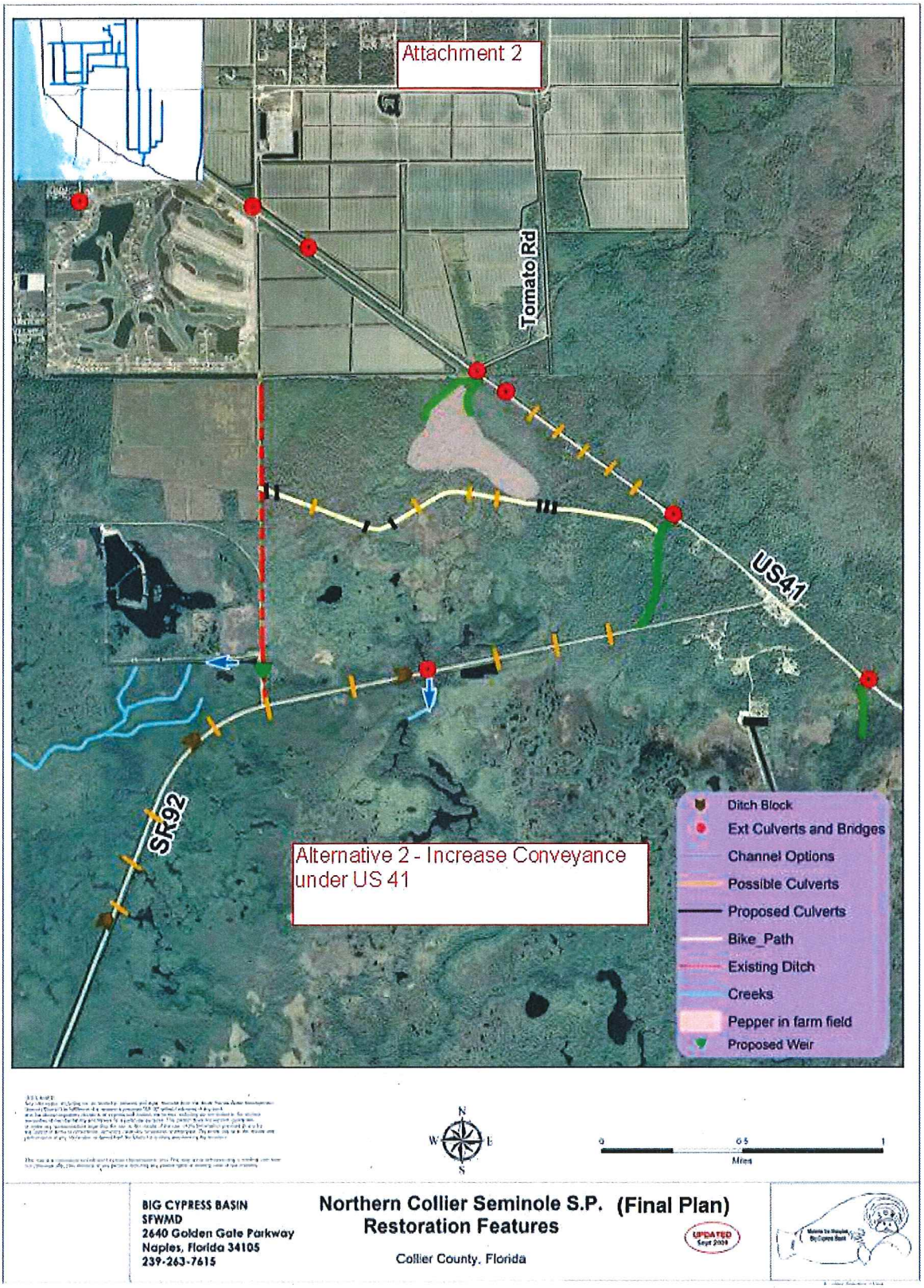

Figure 3. Picayune Strand Restoration Project Area: SWPF Alternative 2

Table 1. Federal and State Listed Land Plant and Animal Species Occurring in Collier County, Florida

Scientific Name	Common Name	Federal Status	State Status
Fishes			
Carcharias taurus	Sand tiger shark	Special Concern	Not Listed
Epinephelus itajara	Goliath grouper	Special Concern	Not Listed
Pristis pectinate	Smalltooth sawfish	Endangered	Endangered
Pristis pristis	Largetooth sawfish	Endangered	Not Listed
Rivulus marmoratus	Mangrove Rivulus	Special Concern	Not Listed
Reptiles			
Alligator mississippiensis	American Alligator	Threatened (Similar Appear)	Threatened (Similar Appear)
Caretta caretta	Loggerhead sea turtle	Threatened	Threatened
Chelonia mydas	Green sea turtle	Endangered	Endangered
Crocodylus acutus	American crocodile	Threatened	Threatened
Dermochelys coriacea	Leatherback sea turtle	Endangered	Endangered
Drymarchon couperi	Eastern indigo snake	Threatened	Threatened
Eretmochelys imbricata	Hawksbill sea turtle	Endangered	Endangered
Gopherus polyphemus	Gopher tortoise	Candidate	Threatened
Lepidochelys kempii	Kemp's ridley sea turtle	Endangered	Endangered
Pituophis melanoleucus mugitus	Florida pine snake	Not listed	Threatened
Birds			
Ammodramus maritimus mirabilis	Cape Sable seaside sparrow	Endangered	Endangered
Antigone canadensis pratensis	Florida Sandhill Crane	Not Listed	Threatened
Aphelocoma coerulescens	Florida scrub jay	Threatened	Threatened
Athene cunicularia floridana	Florida burrowing owl	Not listed	Threatened
Calidris canutus rufus	Red knot	Threatened	Threatened
Campephilus principalis	Ivory-billed woodpecker	Endangered	Endangered
Charadrius melodus	Piping plover	Threatened	Threatened
Charadrius nivosus	Snowy plover	Not Listed	Threatened
Egretta caerulea	Little blue heron	Not Listed	Threatened
Egretta rufescens	Reddish egret	Not Listed	Threatened
Egretta tricolor	Tricolored heron	Not Listed	Threatened
Falco sparverius paulus	Southeastern American kestrel	Not Listed	Threatened
Grus americana (Non-essential)	Whooping crane	Experimental Population	Experimental Population
Haematopus palliates	American oystercatcher	Not Listed	Threatened
Mycteria americana	Wood stork	Threatened	Threatened
Patagioenas leucocephala	White-crowned pigeon	Not Listed	Threatened
Picoides borealis	Red-cockaded woodpecker	Endangered	Endangered
Platalea ajaja	Roseate spoonbill	Not listed	Threatened
Polyborus plancus audubonii	Audubon's crested caracara	Threatened	Threatened
Rostrhamus sociabilis plumbeus	Snail kite	Endangered	Endangered
Rynchops niger	Black skimmer	Not listed	Threatened

Scientific Name	Common Name	Federal Status	State Status
Setophaga kirtlandii	Kirtland's warbler	Endangered	Endangered
Sterna antillarum (non-interior)	Least tern	Not Listed	Threatened
Sterna dougallii dougallii	Roseate tern	Threatened	Threatened
Invertebrates			
Anaea troglodyte floridalis	Florida's leafwing butterfly	Endangered	Endangered
Cyclargus ammon	Nickerbean blue butterfly	Threatened (Similar Appear)	Threatened (Similar Appear)
Cyclargus thomasi bethunebakeri	Miami blue butterfly	Endangered	Endangered
Hemiargus ceraunus antibubastus	Ceraunus blue butterfly	Threatened (Similar Appear)	Threatened (Similar Appear)
Leptotes cassius theonus	Cassius blue butterfly	Threatened (Similar Appear)	Threatened (Similar Appear)
Mammals			
Eumops floridanus	Florida bonneted bat	Endangered	Endangered
Neovison vison evergladensis	Everglades mink	Not Listed	Threatened
Puma concolor coryi	Florida panther	Endangered	Endangered
Sciurus niger avicennia	Big Cypress fox squirrel	Not Listed	Threatened
Trichechus manatus	Manatee	Threatened	Endangered
Gastropods (Snails and Allies)			
Orthalicus reses	Stock Island tree snail	Threatened	Threatened
Plants and Lichens			
Acacia tortuosa	Twisted Acacia	Not Listed	Endangered
Acrostichum aureum	Golden leather fern	Not Listed	Threatened
Andropogon arctatus	Pine-woods bluestem	Not Listed	Threatened
Asplenium erosum	Auricled spleenwort	Not Listed	Endangered
Asplenium serratum	American bird's nest fern	Not Listed	Endangered
Burmannia flava	Fakahatchee Burmannia	Not Listed	Endangered
Calopogon multiflorus	Many-flowered grasspink	Not Listed	Threatened
Campylocentrum pachyrrhizum	Ribbon orchid	Not Listed	Endangered
Campyloneurum angustifolium	Narrow-leaved strap fern	Not Listed	Endangered
Campyloneurum costatum	Tailed strap fern	Not Listed	Endangered
Catopsis berteroniana	Powdery Catopsis	Not Listed	Endangered
Catopsis floribunda	Many-flowered Catopsis	Not Listed	Endangered
Catopsis nutans	Nodding Catopsis	Not Listed	Endangered
Celtis iguanaea	Iguana hackberry	Not Listed	Endangered
Chamaesyce cumulicola	Sand-dune spurge	Not Listed	Endangered
Cheilanthes microphylla	Southern lip fern	Not Listed	Endangered
Ctenitis sloanei	Florida tree fern	Not Listed	Endangered
Cyrtopodium punctatum	Cowhorn orchid	Not Listed	Endangered
Dalea carthagenensis floridana	Florida prairie cover	Endangered (proposed)	Endangered
Encyclia cochleata var. triandra	Clamshell orchid	Not Listed	Endangered
Encyclia pygmaea	Dwarf Encyclia	Not Listed	Endangered
Epidendrum acunae	Acuna's Epidendrum	Not Listed	Endangered
Epidendrum nocturnum	Night-scented orchid	Not Listed	Endangered
Epidendrum strobiliferum	Pendant Epidendrum	Not Listed	Endangered

Scientific Name	Common Name	Federal Status	State Status
Glandularia maritima	Coastal vervain	Not Listed	Endangered
Glandularia tampensis	Tampa vervain	Not Listed	Endangered
Guzmania monostachia	Fakahatchee Guzmania	Not Listed	Endangered
Habenaria distans	Hammock Rein orchid	Not Listed	Endangered
Huperzia dichotoma	Hanging clubmoss	Not Listed	Endangered
Ionopsis utricularioides	Delicate Ionopsis	Not Listed	Endangered
Jacquemontia curtissii	Pineland Jacquemontia	Not Listed	Threatened
Lechea cernua	Nodding pinweed	Not Listed	Threatened
Lechea lakelae	Lakela's pinweed	Not Listed	Endangered
Lepanthopsis melanantha	Tiny orchid	Not Listed	Endangered
Linum carteri var. *smallii*	Carter's large-flowered flax (Small's flax)	Not Listed	Endangered
Maxillaria crassifolia	Hidden orchid	Not Listed	Endangered
Microgramma heterophylla	Climbing vine fern	Not Listed	Endangered
Oncidium undulatum	Mule ear orchid	Not Listed	Endangered
Ophioglossum palmatum	Hand fern	Not Listed	Endangered
Pasiflora pallens	Pineland passionflower	Not Listed	Endangered
Peperomia obtusifolia	Blunt-leaved Peperomia	Not Listed	Endangered
Pleurothallis gelida	Frost-flower orchid	Not Listed	Endangered
Polyrrhiza lindenii	Ghost orchid	Not listed	Endangered
Pteroglassaspis ecristata	Giant orchid	Not Listed	Threatened
Roystonea elata	Florida royal palm	Not Listed	Endangered
Sacoila lanceolata var. *paludicola*	Fahkahatchee ladies' tresses	Not Listed	Threatened
Schizaea pennula	Ray fern	Not Listed	Endangered
Stylisma abdita	Scrub Stylisma	Not Listed	Endangered
Thrinax radiate	Florida thatch palm	Not Listed	Endangered
Tillandsia flexuosa	Banded wild-pine	Not Listed	Threatened
Tillandsia pruinosa	Fuzzy-wuzzy air-plant	Not Listed	Endangered
Trichomanes holopterum	Entangled-winged bristle fern	Not Listed	Endangered
Tripsacum floridanum	Florida gama grass	Not Listed	Endangered
Vanilla phaeantha	Leafy vanilla	Not Listed	Endangered
Critical Habitat			
Caretta caretta (near USFWS not NOAA)	Loggerhead sea turtle	Threatened	Threatened
Pristis pectinate	Smalltooth sawfish	Endangered	Endangered
Trichechus manatus	West Indian manatee	Threatened	Endangered

Table 2. Modeling and NEPA Tentative Schedule for the Southwest Protection Feature within the Picayune Strand Restoration Project in Collier County, FL

TASK	Start Date	Completion Date
Modeling		
Modeling Applications and Calibration	12/20/2016	4/5/2017*
Evaluation of Impacts	4/6/2017*	5/10/17*
PDT Workshop: Integrated Modeling of PSRP Features	5/11/2017*	6/1/2017*
IMC Modeling Documentation Report	6/2/2017*	6/30/2017*
404/NEPA		
Wetland Assessment (GIS, Mapping of Wetlands, Field Work, UMAM, Post-GIS Mapping, Compensatory Mitigation)	5/11/2017*	8/8/2017
Pre-App meeting (404 Permit) w/USACE Regulatory Division	6/3/2017	6/3/2017
Environmental Assessment (EA) Draft Prep. (Front-load) USACE	7/1/2017	11/1/2017
404 Permit Application Prep	7/7/2017	8/5/2017
404 Permit Application (submit at 30% design) Submittal to USACE	8/6/2017	8/19/2017
1st RAI Response (404) SFWMD	9/19/2017	10/18/2017
Initiate Section 7 Consultation USACE	9/24/2017	10/23/2017
404 Permit Application 2nd RAI USACE-Reg	10/19/2017	11/17/2017
Environmental Assessment (EA) Draft – Public Notice USACE	11/4/2017	12/18/2017
2nd RAI Response	11/18/2017	12/17/2017
Compensatory Mitigation and Monitoring Report SFWMD/USACE	12/18/2017	1/16/2018
Environmental Assessment (EA) Final/FONSI USACE	12/19/2017	2/16/2018
404 Permit Issuance USACE-REG	3/8/2018	4/6/2018
National Marine Fisheries Service		
EFH Letter of Concurrence USACE/NMFS	9/24/2017	11/22/2017
HCD Letter of Concurrence USACE/NMFS	9/24/2017	11/22/2017
U.S. Fish and Wildlife Service		
Biological Assessment (BA) USACE	4/3/2017	9/23/2017
Biological Opinion (BO) USFWS	10/24/2017	3/7/2018
State Historic Preservation Office		
Section 106 Consultation- SHPO, THPO, STOF – USACE	7/31/2017	9/28/2017
Hazardous Toxic and Radioactive Waste		
Contamination Evaluation - USFWS	8/6/2017	11/3/2017

*Delayed

United States Department of the Interior

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

July 7, 2017

Service Federal Activity Code: 04EF2000-2017-TA-0639
Service Consultation Code: 2009-F-0469
Original Service Log No: 4-1-04-F-5260
Date Received: April 6, 2016
Applicant: U.S. Army Corps of Engineers/South Florida Water Management District
Project: Picayune Strand Restoration Project-Southwest Protection Feature
County: Collier

Dear Colonel Kirk:

This is in response to your letter dated May 30, 2017, referencing a National Environmental Policy Act (NEPA) assessment for the Southwest Protection Feature (SWPF) of the Picayune Strand Restoration Project (PSRP), in Collier County, Florida. The letter generally defines the project purpose, alternatives, and tentative project schedule, and requests written confirmation of a Species List in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act) (87 Stat. 884; 16 U.S.C. 1531 et. seq.). The request specifically identifies only the 6L Tier 2 Model Domain area as shown in Figure 1 of the referenced letter.

Species List

Table 1 as attached to your letter includes a list of federal and state-listed plant and animal species occurring in Collier County, Florida. This list is correct with the exception of critical habitat for the wintering piping plover (*Charadrius melodus*), which occurs on Marco Island.

Species List Area

The referenced Species List includes all those species that should be assessed for the project area. However, the effects of the project may exceed the specifically defined project area (6L Tier 2 Model Domain area as shown in Figure 1) which is based on a hydrological modeling effort. Based on the project information to date, we believe that it is possible that effects to listed species would likely occur outside this area, including potential effects to the Florida bonneted bat (*Eumops floridanus*), Florida panther (*Puma concolor coryi*), red-cockaded woodpecker (*Picoides borealis,* RCW), West Indian manatee (*Trichechus manatus*) and other species. Therefore, we do not agree that the hydrological modeling area is the project action area. We will assist the Corps and the South Florida Water Management District in determining the project action area when additional information is received.

Project Purpose and Alternative descriptions

species would likely occur outside this area, including potential effects to the Florida bonneted bat (*Eumops floridanus*), Florida panther (*Puma concolor coryi*), red-cockaded woodpecker (*Picoides borealis*), West Indian manatee (*Trichechus manatus*) and other species. Therefore, we do not agree that the hydrological modeling area is the project action area. We will assist the Corps and the South Florida Water Management District in determining the project action area when additional information is received.

Project Purpose and Alternative descriptions

We recommend that the project purpose be restated to include the overall sets of project objectives listed in the 2004 PSRP Project Implementation Report and Environmental Impact Statement which are multi-faceted and based on ecosystem restoration and listed species protection. Additionally the purpose of the SWPF as stated in project review to date is to provide for "existing flood protection maintenance", not "flood protection" per se as referenced in the letter, which might imply additional flood protection objectives.

Alternatives 1 and 2 should reference "listed species habitat" in lieu of RCW habitat, although effects could be primarily to RCW habitat.

Thank you for your cooperation in protecting fish and wildlife resources. If you have any questions on this project, please contact Kim Dryden at (772) 532-5614.

Sincerely Yours,

For

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

cc: electronic only
Corps, Jacksonville, Florida (Gina Ralph, Michael Simmons, Stacie Auvenshire)
District, Ft. Myers, Florida (Janet Starnes)
District, Naples, Florida (Mike Duever)
District, West Palm Beach, Florida (Rod Braun, Nirmala Jeyakumar)
Service, Vero Beach, Florida (Timothy Breen)
Service, Naples, Florida (Kim Dryden, Kevin Godsea)
FDEP, Tallahassee, Florida (Natalie Barfield, Jordan Pugh)
FDEP, West Palm Beach, Florida (Tracy Robb)
FDEP, Collier-Seminole State Park, Naples, Florida (Kirby Green, Maulik Patel)
Rookery Bay NERR, Naples, Florida (Keith Laakkonen)
NMFS, St. Petersburg, Florida (Mark Sramek)

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, JACKSONVILLE DISTRICT
701 SAN MARCO BLVD
JACKSONVILLE, FL 32207-8175

Planning and Policy Division
Environmental Branch

6 April 2020

Mr. Larry Williams, Field Supervisor
U.S. Fish and Wildlife Service
1339 20th Street
Vero Beach, FL 32960

Dear Mr. Williams:

In accordance with provisions of Section 7 of the Endangered Species Act of 1973, as amended, the Jacksonville District, U.S. Army Corps of Engineers, (Corps), is hereby initiating consultation with the U.S. Fish and Wildlife Service (USFWS) concerning the Southwest Protection Feature with additional conveyance features, as well as, the plugging of the northern 3.3 miles of the Faka Union Canal associated with the Picayune Strand Restoration Project (PSRP). The purpose of the PSRP is to restore and enhance the wetlands within Picayune Strand (formerly Southern Golden Gate Estates) and in adjacent public lands by reducing over-drainage, improve water quality of coastal estuaries by moderating the large salinity fluctuations caused by freshwater discharge of the Faka Union Canal, improve groundwater recharge, and restore/enhance habitat for fish and wildlife resources including threatened and endangered species.

The SWPF and additional conveyance features will provide flood risk management to the agricultural properties adjacent to the southwest corner of the PSRP in accordance with the Savings Clause (Section 601(h)(5) of the Water Resources Development Act (WRDA) 2000. Implementation of these features will alleviate anticipated hydrological impacts due to potential ponding of water in the southwest corner of the PSRP boundary where US-41 serves as a buffer for downstream conveyance of freshwater flow into downstream estuaries. The SWPF and additional conveyance features are vital components of the PSRP as full implementation of the PSRP, specifically the plugging of Miller Canal, full plugging of the Faka Union Canal, and plugging of the West Stair Step Canal cannot proceed without them in place. To date it is estimated that approximately 80% of the project funds have been spent while only achieving 20% to 30% of the project benefits.

This supplemental biological assessment (BA) incorporates analysis of the partial plugging of the northern 3.3 miles of the Faka Union Canal in order to boost the percentage of project benefits achieved. An interim step, this partial plugging will begin the hydrologic restoration for a large portion of the northern interior of the PSRP without impacting lands west or south of the project.

A reduction of flow south through the Faka Union Canal is anticipated and Miller Canal will continue to provide drainage to the west.

The Corps has included an update to the Florida Panther Compensation Worksheet for CERP Panther Habitat Units. Since the authorization of the PSRP, the project boundary has expanded to the east and west from its original boundary outlined in the integrated 2004 PSRP Project Implementation Report and Environmental Impact Statement. The original boundary encompassed approximately 55,149 acres. The current boundary now encompasses approximately 66,726 acres. This update includes the addition of this extra acreage, as well as, direct and indirect habitat changes associated with the implementation of the SWPF and additional conveyance features.

The Corps acknowledges the potential usage and occurrence of threatened and endangered species and/or critical habitat within the PSRP action area, specifically as it relates to the implementation of the SWPF, additional conveyance features, and partial plugging of the Faka Union Canal. The Corps is requesting formal consultation under ESA for the following species: Florida bonneted bat (*Eumops floridanus*), red-cockaded woodpecker (*Picoides borealis*), and gopher tortoise (*Gopherus polyphemus*). We request that the USFWS provide concurrence on the USACE species effect determinations as described in the enclosed supplemental BA, provide a Draft Biological Opinion (BO) within 65 days of receipt of this letter for Corps review and a Final BO within 90 days from receipt of this letter. The BO is required for the Biddability, Constructability, Operability and Environmental Review (BCOE) certification which is scheduled for 11 June 2020.

Due to the unique circumstances regarding COVID-19, Corps staff are following guidelines aimed to reduce or eliminate potential promulgation. Thus, all copies of this BA will be provided electronically. Hard copies of this BA will not be mailed.

If you have any questions or concerns please contact Mr. Michael Simmons by email Michael.T.Simmons@usace.army.mil or telephone 904-232-2069 regarding this consultation request.

Sincerely,

Angela E. Dunn
Chief, Environmental Branch

Enclosure

cc:
Mr. Donald Progulske, U.S. Fish and Wildlife Service, 1339 20th Street,
Vero Beach, FL 32960
Mr. Timothy Breen, U.S. Fish and Wildlife Service, 1339 20th Street,
Vero Beach, FL 32960
Ms. Kimberly Dryden, U.S. Fish and Wildlife Service, 1339 20th Street,
Vero Beach, FL 32960

Table 1: Status of Federally Threatened and Endangered Species with the Potential to Occur within the PSRP Action Area for the Implementation of the SWPF, Conveyance Features, and Partial Plugging of the Faka Union Canal and USACE Affect Determinations (E: Endangered; T: Threatened; SA: Similarity of Appearance; CH: Critical Habitat; C: Candidate Species)

Common Name	Scientific Name	Status	May Affect Not Likely to Adversely Affect	May Affect	No Effect
REPTILES	-	-	-	-	-
American alligator	*Alligator mississippiensis*	T (SA)	X	-	-
American crocodile	*Crocodylus acutus*	T	X	-	-
Loggerhead sea turtle	*Caretta caretta*	T, CH	-	-	X
Green sea turtle	*Chelonia mydas*	E	-	-	X
Leatherback sea turtle	*Dermochelys coriacea*	E	-	-	X
Hawksbill sea turtle	*Eretmochelys imbricata*	E	-	-	X
Kemp's ridley sea turtle	*Lepidochelys kempii*	E	-	-	X
Gopher tortoise	*Gopherus polyphemus*	C	-	X	-
Eastern indigo snake	*Drymarchon couperi*	T	X	-	-
BIRDS	-	-	-	-	-
Cape Sable seaside Sparrow	*Ammodramus maritimus mirabilis*	E	-	-	X
Florida scrub jay	*Aphelocoma coerulescens*	T	-	-	X
Ivory-billed woodpecker	*Campephilus principalis*	E	-	-	X
Piping plover	*Charadrius melodus*	T, CH	-	-	X
Red knot	*Calidris canutus rufus*	T	-	-	X

Common Name	Scientific Name	Status	May Affect Not Likely to Adversely Affect	May Affect	No Effect
Audubon's crested caracara	*Polyborus plancus audubonii*	T	-	-	X
Everglade snail kite	*Rostrhamus sociabilis plumbeus*	E	X	-	-
Kirtland's Warbler	*Setophaga kirtlandii*	* (Delisted – Oct 2019)	-	-	X
Roseate tern	*Sterna dougallii dougallii*	T	-	-	X
Wood stork	*Mycteria americana*	T	X	-	-
Red-cockaded woodpecker	*Picoides borealis*	E	-	X	-
MAMMALS	-	-	-	-	-
Florida bonneted bat	*Eumops floridanus*	E	-	X	-
Florida panther	*Puma concolor coryi*	E	X	-	-
West Indian manatee	*Trichechus manatus*	T, CH	X	-	-
INSECTS	-	-	-	-	-
Florida leafwing butterfly	*Anaea troglodyte floridalis*	E	-	-	X
Bartram's hairstreak butterfly	*Strymon acis bartrami*	E	-	-	X
Cassius blue butterfly	*Leptotes cassius theonus*	T (SA)	-	-	X
Ceraunus blue butterfly	*Hemiargus ceraunus antibubastus*	T (SA)	-	-	X
Miami blue butterfly	*Cyclargus thomasi bethunebakeri*	E	-	-	X

Common Name	Scientific Name	Status	May Affect Not Likely to Adversely Affect	May Affect	No Effect
Nickerbean blue butterfly	*Cyclargus ammon*	T (SA)	-	-	X
Stock Island tree snail	*Orthalicus reses*	T	-	-	X
PLANTS	-	-	-	-	-
Florida prairie clover	*Dalea carthagenensis floridana*	E	-	-	X

Compensation Worksheet		Habitat types of land being offered as compensation (acres)					Habitat types of compensation land after enhancement (acres)			
Habitat Type	*Assigned Value*	Primary/d Zone	Secondary Zone	Other Zone	Habitat Units		Primary/d Zone	Secondary Zone	Other Zone	Habitat Units
Pine Forest	9.5	15247.3			144849		13501.3			128262
Hardwood-Pine	9.3	105.4			980		599.2			5573
Cypress Swamp	9.2	28741.7			264424		41231.5			379330
Hardwood Swamp	9.2	1988.8			18297		-4.3			-40
Hardwood Forest	9	9800.2			88202		10.3			93
Dry Prairie	6.3	168.4			1061					0
Unimproved Pasture	5.7	13.4			76					0
Shrub Swamp/Brush	5.5	34.6			190					0
Improved Pasture	5.2				0					0
Cropland	4.8	59.6			286		-13.2			-63
Orchards/Groves	4.7				0					0
Marsh/Wet Prarie	4.7	8083.4			37992		10270.2			48270
Xeric Scrub	4.5				0					0
Exotic/Nuisance Plants	3	368.8			1106		0			0
Coastal Wetlands	3	849.7			2549		850.3			2551
Water	0	534.7			0		33.7			0
Urban	0	729.5			0		247.1			0
STA* or FEBs	4.5				0					0
Subtotal		66726	0	0	560013	0	66726	0	0	563975

Pre - Project Panther Habitat Units	560013
Post - Project Panther Habitat Units	563975
Panther Habitat Unit Change (Post - Pre)	3962
Panther Habitat Units needed (negative) or credit (positive)*	**561994**

*Numbers from March 12 2009 Biological opinion for Picayune Strand Restoration Table 17. Use this version, which was adjusted from the original C-43 derived version in Spreadsheet Picayune 2.
*This update includes the addition of acreage along both the eastern and western boundary due to boundary change over time. This also includes a reduction in acreage no longer within the project boundary west of the tieback levee along the northwestern boundary.
*This update includes the conversion of habitat acreage within the SWPF footprint and fragmented habitat between the PSRP western boundary and the western boundary or the SWPF footprint. Also included is the small conversion of habitat on the northern side of US-41 at the ALT PC2 new opening.

Figure 1: Updated PSRP Panther Habitat Compensation Worksheet for Panther Habitat Unit Credits.

Dinkens/CESAJ-PD-E/1867
Simmons/CESAJ-PD-ES
Nasuti/CESAJ-PD-ES
LoSchiavo/CESAJ-PD-ES
Dunn/CESAJ-PD-E

ENDANGERED SPECIES ACT BIOLOGICAL ASSESSMENT

PICAYUNE STRAND RESTORATION PROJECT

PREPARED BY

DEPARTMENT OF THE ARMY

U.S. ARMY CORPS OF ENGINEERS

JACKSONVILLE DISTRICT

APRIL 2020

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DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, JACKSONVILLE DISTRICT
701 SAN MARCO BLVD
JACKSONVILLE, FL 32207-8175

Planning and Policy Division
Environmental Branch

6 April 2020

Mr. Larry Williams, Field Supervisor
U.S. Fish and Wildlife Service
1339 20th Street
Vero Beach, FL 32960

Dear Mr. Williams:

In accordance with provisions of Section 7 of the Endangered Species Act of 1973, as amended, the Jacksonville District, U.S. Army Corps of Engineers, (Corps), is hereby initiating consultation with the U.S. Fish and Wildlife Service (USFWS) concerning the Southwest Protection Feature with additional conveyance features, as well as, the plugging of the northern 3.3 miles of the Faka Union Canal associated with the Picayune Strand Restoration Project (PSRP). The purpose of the PSRP is to restore and enhance the wetlands within Picayune Strand (formerly Southern Golden Gate Estates) and in adjacent public lands by reducing over-drainage, improve water quality of coastal estuaries by moderating the large salinity fluctuations caused by freshwater discharge of the Faka Union Canal, improve groundwater recharge, and restore/enhance habitat for fish and wildlife resources including threatened and endangered species.

The SWPF and additional conveyance features will provide flood risk management to the agricultural properties adjacent to the southwest corner of the PSRP in accordance with the Savings Clause (Section 601(h)(5) of the Water Resources Development Act (WRDA) 2000. Implementation of these features will alleviate anticipated hydrological impacts due to potential ponding of water in the southwest corner of the PSRP boundary where US-41 serves as a buffer for downstream conveyance of freshwater flow into downstream estuaries. The SWPF and additional conveyance features are vital components of the PSRP as full implementation of the PSRP, specifically the plugging of Miller Canal, full plugging of the Faka Union Canal, and plugging of the West Stair Step Canal cannot proceed without them in place. To date it is estimated that approximately 80% of the project funds have been spent while only achieving 20% to 30% of the project benefits.

This supplemental biological assessment (BA) incorporates analysis of the partial plugging of the northern 3.3 miles of the Faka Union Canal in order to boost the percentage of project benefits achieved. An interim step, this partial plugging will begin the hydrologic restoration for a large portion of the northern interior of the PSRP without impacting lands west or south of the project.

A reduction of flow south through the Faka Union Canal is anticipated and Miller Canal will continue to provide drainage to the west.

The Corps has included an update to the Florida Panther Compensation Worksheet for CERP Panther Habitat Units. Since the authorization of the PSRP, the project boundary has expanded to the east and west from its original boundary outlined in the integrated 2004 PSRP Project Implementation Report and Environmental Impact Statement. The original boundary encompassed approximately 55,149 acres. The current boundary now encompasses approximately 66,726 acres. This update includes the addition of this extra acreage, as well as, direct and indirect habitat changes associated with the implementation of the SWPF and additional conveyance features.

The Corps acknowledges the potential usage and occurrence of threatened and endangered species and/or critical habitat within the PSRP action area, specifically as it relates to the implementation of the SWPF, additional conveyance features, and partial plugging of the Faka Union Canal. The Corps is requesting formal consultation under ESA for the following species: Florida bonneted bat (*Eumops floridanus*), red-cockaded woodpecker (*Picoides borealis*), and gopher tortoise (*Gopherus polyphemus*). We request that the USFWS provide concurrence on the USACE species effect determinations as described in the enclosed supplemental BA, provide a Draft Biological Opinion (BO) within 65 days of receipt of this letter for Corps review and a Final BO within 90 days from receipt of this letter. The BO is required for the Biddability, Constructability, Operability and Environmental Review (BCOE) certification which is scheduled for 11 June 2020.

Due to the unique circumstances regarding COVID-19, Corps staff are following guidelines aimed to reduce or eliminate potential promulgation. Thus, all copies of this BA will be provided electronically. Hard copies of this BA will not be mailed.

If you have any questions or concerns please contact Mr. Michael Simmons by email Michael.T.Simmons@usace.army.mil or telephone 904-232-2069 regarding this consultation request.

Sincerely,

Angela E. Dunn
Chief, Environmental Branch

Enclosure

cc:
Mr. Donald Progulske, U.S. Fish and Wildlife Service, 1339 20th Street,
Vero Beach, FL 32960
Mr. Timothy Breen, U.S. Fish and Wildlife Service, 1339 20th Street,
Vero Beach, FL 32960
Ms. Kimberly Dryden, U.S. Fish and Wildlife Service, 1339 20th Street,
Vero Beach, FL 32960

Table 1: Status of Federally Threatened and Endangered Species with the Potential to Occur within the PSRP Action Area for the Implementation of the SWPF, Conveyance Features, and Partial Plugging of the Faka Union Canal and USACE Affect Determinations (E: Endangered; T: Threatened; SA: Similarity of Appearance; CH: Critical Habitat; C: Candidate Species)

Common Name	Scientific Name	Status	May Affect Not Likely to Adversely Affect	May Affect	No Effect
REPTILES	-	-	-	-	-
American alligator	*Alligator mississippiensis*	T (SA)	X	-	-
American crocodile	*Crocodylus acutus*	T	X	-	-
Loggerhead sea turtle	*Caretta caretta*	T, CH	-	-	X
Green sea turtle	*Chelonia mydas*	E	-	-	X
Leatherback sea turtle	*Dermochelys coriacea*	E	-	-	X
Hawksbill sea turtle	*Eretmochelys imbricata*	E	-	-	X
Kemp's ridley sea turtle	*Lepidochelys kempii*	E	-	-	X
Gopher tortoise	*Gopherus polyphemus*	C	-	X	-
Eastern indigo snake	*Drymarchon couperi*	T	X	-	-
BIRDS	-	-	-	-	-
Cape Sable seaside Sparrow	*Ammodramus maritimus mirabilis*	E	-	-	X
Florida scrub jay	*Aphelocoma coerulescens*	T	-	-	X
Ivory-billed woodpecker	*Campephilus principalis*	E	-	-	X
Piping plover	*Charadrius melodus*	T, CH	-	-	X
Red knot	*Calidris canutus rufus*	T	-	-	X

Common Name	Scientific Name	Status	May Affect Not Likely to Adversely Affect	May Affect	No Effect
Audubon's crested caracara	*Polyborus plancus audubonii*	T	-	-	X
Everglade snail kite	*Rostrhamus sociabilis plumbeus*	E	X	-	-
Kirtland's Warbler	*Setophaga kirtlandii*	* (Delisted – Oct 2019)	-	-	X
Roseate tern	*Sterna dougallii dougallii*	T	-	-	X
Wood stork	*Mycteria americana*	T	X	-	-
Red-cockaded woodpecker	*Picoides borealis*	E	-	X	-
MAMMALS	-	-	-	-	-
Florida bonneted bat	*Eumops floridanus*	E	-	X	-
Florida panther	*Puma concolor coryi*	E	X	-	-
West Indian manatee	*Trichechus manatus*	T, CH	X	-	-
INSECTS	-	-	-	-	-
Florida leafwing butterfly	*Anaea troglodyte floridalis*	E	-	-	X
Bartram's hairstreak butterfly	*Strymon acis bartrami*	E	-	-	X
Cassius blue butterfly	*Leptotes cassius theonus*	T (SA)	-	-	X
Ceraunus blue butterfly	*Hemiargus ceraunus antibubastus*	T (SA)	-	-	X
Miami blue butterfly	*Cyclargus thomasi bethunebakeri*	E	-	-	X

Common Name	Scientific Name	Status	May Affect Not Likely to Adversely Affect	May Affect	No Effect
Nickerbean blue butterfly	*Cyclargus ammon*	T (SA)	-	-	X
Stock Island tree snail	*Orthalicus reses*	T	-	-	X
PLANTS	-	-	-	-	-
Florida prairie clover	*Dalea carthagenensis floridana*	E	-	-	X

Compensation Worksheet		Habitat types of land being offered as compensation (acres)					Habitat types of compensation land after enhancement (acres)			
Habitat Type	*Assigned Value*	Primary/d Zone	Secondary Zone	Other Zone	Habitat Units		Primary/d Zone	Secondary Zone	Other Zone	Habitat Units
Pine Forest	9.5	15247.3			144849		13501.3			128262
Hardwood-Pine	9.3	105.4			980		599.2			5573
Cypress Swamp	9.2	28741.7			264424		41231.5			379330
Hardwood Swamp	9.2	1988.8			18297		-4.3			-40
Hardwood Forest	9	9800.2			88202		10.3			93
Dry Prairie	6.3	168.4			1061					0
Unimproved Pasture	5.7	13.4			76					0
Shrub Swamp/Brush	5.5	34.6			190					0
Improved Pasture	5.2				0					0
Cropland	4.8	59.6			286		-13.2			-63
Orchards/Groves	4.7				0					0
Marsh/Wet Prarie	4.7	8083.4			37992		10270.2			48270
Xeric Scrub	4.5				0					0
Exotic/Nuisance Plants	3	368.8			1106		0			0
Coastal Wetlands	3	849.7			2549		850.3			2551
Water	0	534.7			0		33.7			0
Urban	0	729.5			0		247.1			0
STA* or FEBs	4.5				0					0
Subtotal		66726	0	0	560013	0	66726	0	0	563975

Pre - Project Panther Habitat Units	560013
Post - Project Panther Habitat Units	563975
Panther Habitat Unit Change (Post - Pre)	3962
Panther Habitat Units needed (negative) or credit (positive)*	**561994**

*Numbers from March 12 2009 Biological opinion for Picayune Strand Restoration Table 17. Use this version, which was adjusted from the original C-43 derived version in Spreadsheet Picayune 2.
*This update includes the addition of acreage along both the eastern and western boundary due to boundary change over time. This also includes a reduction in acreage no longer within the project boundary west of the tieback levee along the northwestern boundary.
*This update includes the conversion of habitat acreage within the SWPF footprint and fragmented habitat between the PSRP western boundary and the western boundary or the SWPF footprint. Also included is the small conversion of habitat on the northern side of US-41 at the ALT PC2 new opening.

Figure 1: Updated PSRP Panther Habitat Compensation Worksheet for Panther Habitat Unit Credits.

Dinkens/CESAJ-PD-E/1867
Simmons/CESAJ-PD-ES
Nasuti/CESAJ-PD-ES
LoSchiavo/CESAJ-PD-ES
Dunn/CESAJ-PD-E

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1 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 Federal action analyzed in this BA is focused on the design refinements associated with the Picayune Strand Restoration Project (PSRP), specifically design refinements associated with the Southwest Protection Feature (SWPF) and Conveyance Features as described in Section 3.1. These features have been modified since the 2016 PSRP Limited Reevaluation Report and associated Environmental Assessment (EA) and Finding of No Significant Impact (FONSI). The BA is also used to determine whether formal consultation or a conference is necessary (50 CFR Section 402.12(a)). This is achieved by:

- Reviewing the results of an on-site inspection of the area affected by the Federal action to determine if listed of 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 (50 CFR Section 402.12(f)).

2 CONSULTATION SUMMARY FOR PICAYUNE STRAND RESTORATION PROJECT

USACE and USFWS have formally consulted on the PSRP several times since the 2004 PSRP study was authorized (Table 1). This document is a supplement to the BA of the Central and Southern Florida Comprehensive Plan, PSRP, Final Project Implementation Report (PIR) and Environmental Impact Statement (EIS) dated September 2004. That BA, dated 15 October 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*), red-cockaded woodpecker (*Picoides borealis*), Everglade snail kite (*Rostrhamus sociabilis plumbeus*) and its critical habitat, smalltooth sawfish (*Pristis pectinata*), eastern indigo snake (*Drymarchon corais couper*i), 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 (*Odantaspis taurus*). The 2004 BA also identified and made a determination of effect for West Indian manatee critical habitat.

Table 1: List of USACE-USFWS Consultation Dates for the PSRP.

DOCUMENT	CONSULTATION DATE
2004 BA	OCTOBER 2004
2008 BA	NOVEMBER 2008
2009 BO	MARCH 2009
2014 BA	SEPTEMBER 2014
2016 BA	APRIL 2016
2016 BO	APRIL 2016

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 the 2004 PSRP Final PIR/EIS. Consultation with NMFS was reinitiated under a July 2, 2013 Comprehensive Everglades Restoration Program (CERP) Programmatic BA that addressed potential impacts to smalltooth sawfish critical habitat. In their 2013 Programmatic Biological Opinion (BO), NMFS concluded that the PSRP was among the CERP projects that "may affect, but are not likely to adversely affect listed species and their critical habitats under NMFS's purview" (NMFS 2013).

In October 2004, the U.S. Fish and Wildlife Service (USFWS) concurred with the effects determinations provided by the U.S. Army Corps of Engineers (USACE). Based on project commitments and conservation measures described in the 2004 USACE BA, USFWS concurred that the PSRP "may affect, but is not likely to adversely affect:" the red-cockaded woodpecker, bald eagle, Everglade snail kite, eastern indigo snake, American crocodile, West Indian manatee, and West Indian manatee critical habitat (USFWS 2009). USFWS also concurred with the 2004 USACE determination that PSRP would have no effect on American crocodile critical habitat and Everglade snail kite critical habitat

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, USACE 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 USACE's 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 USACE 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 USACE "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 to 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, USACE, 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 implemented for the PSRP achieves the objectives of preventing adverse effects to manatees in the POI Basin and maintains the benefits of hydrologic restoration.

In September 2014, a fourth supplemental BA reviewed potential effects associated with the addition of two additional features to the PSRP: the manatee mitigation feature and tieback levee. For the manatee mitigation feature, USACE determined "no effect" for: the American crocodile, wood stork, Everglade snail kite, red-cockaded woodpecker, and West Indian manatee critical habitat. A "may affect, not likely to adversely affect" determination was made for the West Indian manatee, Florida bonneted bat, eastern indigo snake, gopher tortoise, and Florida Panther. Regarding the Tieback levee, USACE concluded a "no effect" determination for the American crocodile, gopher tortoise, Everglade snail kite, West Indian manatee, and Florida bonneted bat. A "may affect, not likely to adversely affect" determination was made for the eastern indigo snake, red-cockaded woodpecker, wood stork, and Florida panther. USFWS concurred with these determinations as stated in their 2014 BO dated October 2014.

In April 2016, another supplemental BA was submitted to USFWS for consultation on the Florida bonneted bat in reference to the restoration of the Eastern Stair Steps. USACE made the determination that the plugging, vegetation and road removal/grading "may affect and is likely to adversely affect" the Florida Bonneted Bat. In their BO, dated April 2016, USFWS concluded the restoration of the Eastern Stair Steps is "not likely to jeopardize the continued existence of the Florida bonneted bat and included an incidental take statement. In 2019, USACE, USFWS, and the SFWMD informally consulted on the proper approach for the project to take regarding the Florida bonneted bat. To avoid long delays and higher costs, all three agencies agreed to a monitoring program to monitor activity associated with the Florida bonneted bat and how that relates to habitat use, habitat characteristics, and stages of project restoration for the full implementation of the PSRP. The Florida bonneted bat monitoring program started in late summer 2019.

USACE-USFWS consultation regarding the SWPF and additional conveyance features has been ongoing between October 2015 and February 2020. Discussion on potential solutions to water ponding in the southwest corner of the PSRP was started in federal fiscal year 2016 (October 2015 – September 2016). On 30 May 2017, USACE provided a species request list for the PSRP – SWPF to the USFWS Vero Beach Office. USFWS confirmed the species list to be addressed for the National Environmental Policy Act (NEPA) on the PSRP SWPF phase in a response letter dated 7 July 2017. USACE, USFWS, along with other partner agencies have continued discussions regarding potential effects and concerns associated with the SWPF phase during monthly environmental coordination calls since the fall of 2016 (Table 2).

Table 2: Summary of PSRP Environmental Team meetings for the SWPF phase (2017 and 2020).

Meeting Date(s)	Meeting Group	Purpose
4/4/2017	PSRP Environmental Team	1. Update SWPF Environmental Coordination Team on the status of the project and the need for the formation of this team. 2. Introduce SWPF Environmental Coordination Team to the current project schedule. 3. Discuss and coordinate upcoming tasks based on the project schedule
5/16/2017	PSRP Environmental Team	1. Update SWPF Environmental Coordination Team on the status of the project. 2. Discuss and coordinate upcoming tasks based on the project schedule

Meeting Date(s)	Meeting Group	Purpose
9/26/2017	PSRP Environmental Team	1. Review of Modeling and Habitat Evaluation from PIR 2. Additional information needed from modeling for habitat evaluation.
11/3/2017	PSRP Environmental Team	1. Revisit the purpose of the SWPF. 2. Review the SWPF MFR document. 3. Discuss and finalize the evaluation products to be requested from IMC 4. Review the purpose/need for the evaluation products
11/30/2017	PSRP Environmental Team	1. Review flow transect meeting results. 2. Provide clarification and understanding of the 6L Farms' drainage issue 3. Finalize products needed for environmental evaluation and IMCs needs for moving forward with final model run. 4. Discuss natural community indices.
12/14/2017	PSRP Environmental Team	1. Review PSRP-SWPF updated modeling schedule. 2. Transect evaluation meeting scheduling. 3. Update on PSRP-SWPF MFR. 4. Update on FLUCCS mapping. 5. Update on USFWS format for species analysis for BA.
1/11/2018	PSRP Environmental Team	1. Update on Flow Transect Evaluation Meeting 2. Clarify Drainage/Discharge Issue 3. Model & Env. Evaluation Schedule/Planning 4. Update on USFWS format for species analysis for BA.
1/25/2018	PSRP Environmental Team	1. Update on Flow Transect Evaluation Meeting 2. Modeling Schedule
2/22/2018	PSRP Environmental Team	Housekeeping: 1. Modeling Status 2. Engineering/Design 3. Meeting Schedule 4. Modeling Data
3/22/2018	PSRP Environmental Team	Housekeeping: 1. Modeling Updates 2. Modeling Schedule/Results Timetable 3. PSRP Engineering/Design Schedule
4/26/2018	PSRP Environmental Team	1. Lipman Farms Tour Follow-up 2. Modeling Results Status
5/10/2018	PSRP Environmental Team	1. Modeling of Lipman Farm discharges 2. Concerns with PSRP-SWPF levee design 3. Effects concerning project alternatives
6/20/2018	PSRP Environmental Team	1. Review of Lipman farm discharge layout 2. Review of Lipman & Deseret Farms permits

Meeting Date(s)	Meeting Group	Purpose
9/13/2018	PSRP Environmental Team	1. Modeling status/update 2. Detention Pond discussion 3. Discussion on modeling with farm discharge and detention ponds
11/8/2018	PSRP Environmental Team	1. Modeling Results Release Update 2. December 3, 2018 Estuarine Meeting 3. Planning of Initial Meeting to discuss upstream effects
12/3/2018	PSRP Environmental US-41 South Team	1. Concur on list of environmental effects 2. Evaluation of IMC Modeling Results Products 3. IMC Modeling vs USACE ENG HEC-RAS Modeling effort 4. Preliminary evaluation of modeling results 5. Establishment of path forward
12/4/2018	PSRP Environmental US-41 North Team	1. Concur on list of environmental effects 2. Evaluation of IMC Modeling Results Products 3. IMC Modeling vs USACE ENG HEC-RAS Modeling effort 4. Preliminary evaluation of modeling results 5. Establishment of path forward
6/12/2019	PSRP Environmental Team	1. Review of Evaluation Methods/Tools 2. Review of New Alternative Modeling 3. Evaluation of Env. Effects for each Alternative
7/11/2019	PSRP Environmental Team	1. Review of 12 June 2019 Meeting 2. Review of Assigned Tasks
8/27 – 8/28/2019	PSRP Environmental Team	Workshop 1. Review of Evaluation Methods/Tools 2. Review of New Alternative Modeling 3. Evaluation of Env. Effects for each Alternative
11/14/2019	PSRP Environmental Team	1. Modeling accuracy 2. Water quality assessment 3. RCW
12/10/2019	PSRP Environmental RCW Sub-Team	1. Discuss methods to avoid and minimize impacts to RCWs for PSRP
12/12/2019	PSRP Environmental Team	1. Status check on outstanding issues: access road, water quality, flows, canal maintenance, land certification, USFWS Conservation Lands, RCW, and Panther
1/9/2020	PSRP Environmental Team	1. Update on December 2019 meeting discussions: RCW, Panther, Collier-Seminole State Park, Water Quality, flows, communication
1/29/2020	USACE and Collier Seminole State Park (and Florida Park Service – Tallahassee)	1. Collaborate with Collier-Seminole State Park regarding concerns with PSRP-SWPF and Conveyance Features

Meeting Date(s)	Meeting Group	Purpose
2/13/2020	PSRP Environmental Team	1. Status update on outstanding issues and discussions: water quality, RCW, Modeling Documentation Report, SWPF Levee Design, Collier-Seminole State Park, UMAM, NEPA/ESA
2/27/2020	PSRP Environmental Team	UMAM Planning 1. Planning discussion and coordination for the UMAM effort associated with the PSRP SWPF and Conveyance Features
3/17 – 3/18/2020	PSRP Environmental & Engineering Teams	Workshop 1. Review Project Status and Path Forward 2. Review of Water Quality Analyses – SFWMD & FDEP 3. Review Levee Design 4. Flows through Structures and Across Marco Trail

3 PROJECT AUTHORITY

This project was authorized by Section 1001(15) of the Water Resources Development Act (WRDA) of 2007, Public Law 110-114 and was later modified to add the manatee mitigation feature (also referred to as the manatee refugium feature) by Section 1401 (9)5 of the WRDA of 2016, Public Law 114-322.

4 PROJECT GOALS, OBJECTIVES, CONSTRAINTS

The goals and objectives have not changed from the 2004 PSRP Final PIR/EIS and are described below.

4.1 Project Goals

The goal of the PSRP is to restore the predevelopment ecosystem of the area formerly known as the Southern Golden Gate Estates (now Picayune Strand State Forest) and to adjacent publicly owned and managed lands. Restoring the hydrology will restore natural communities, wildlife populations including listed species, and downstream estuary conditions to a more natural, less degraded state. The goal of the PSRP corresponds with the first CERP goal of enhancing ecological values.

4.2 Project Objectives

The project objectives (Figure 1) for the PSRP are:

- Reestablish natural freshwater flows to the estuary
- Restore natural hydropatterns, including sheetflow and flow ways
- 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 protection to adjacent public lands

- Provide resource-based recreational opportunities compatible with the protection of the natural systems
- Restore natural fire regime

4.2.1 Consistency with CERP objectives

	CERP Objectives / SGGE PIR Objectives	Increase habitat and functional quality	Increase availability of fresh water	Increase species abundance and diversity	Increase spatial extent	Provide recreational and navigation opportunities
1	Reestablish natural freshwater flows to estuary	✓				
2	Restore natural hydropatterns, including sheet flow and flow ways	✓				
3	Reestablish natural plant distribution and composition	✓				
4	Increase surface aquifer recharge		✓			
5	Restore habitat for listed species	✓		✓		
6	Increase fish and wildlife resources	✓		✓		
7	Restore ecological connectivity and provide contiguous habitat protection to adjacent public lands			✓	✓	
8	Provide resource based recreational opportunities compatible with the protection of the natural systems					✓
9	Restore natural fire regime	✓				

Figure 1: Crosswalk of PSRP (formerly SGGE) objectives and CERP objectives.

4.3 Constraints

Three constraints are written into the law authorizing the CERP, of which the PSRP is a component. Section 601 of the WRDA 2000 (PL 106-541), subparagraph (h)(5), includes a Savings Clause. Section 601(h)(5)(A) of this clause refers to existing sources of water:

> *(A) NO ELIMINATION OR TRANSFER- Until a new source of water supply of comparable quantity and quality as that available on the date of enactment of this Act is available to replace the water to be lost as a result of implementation of the Plan, the Secretary and the non-Federal sponsor shall not eliminate or transfer existing legal sources of water, including those for:*

(i) an agricultural or urban water supply;
(ii) allocation or entitlement to the Seminole Indian Tribe of Florida under section 7 of the Seminole Indian Land Claims Settlement Act of 1987 (25 U.S.C. 1772e);
(iii) the Miccosukee Tribe of Indians of Florida;
(iv) water supply for Everglades National Park; or
(v) water supply for fish and wildlife.

Section 601 (h)(5)(B) of the Savings Clause states:

(B) MAINTENANCE OF FLOOD PROTECTION- Implementation of the Plan shall not reduce levels of service for flood protection that are:

(i) in existence on the date of enactment of this Act; and
(ii) in accordance with applicable law.

Section 601(h)(5)(C) on tribal rights states:

(C) NO EFFECT ON TRIBAL COMPACT- Nothing in this section amends, alters, prevents, or otherwise abrogates rights of the Seminole Indian Tribe of Florida under the compact between the Seminole Tribe of Florida, the State, and the South Florida Water Management District, defining the scope and use of water rights of the Seminole Tribe of Florida, as codified by section 7 of the Seminole Indian Land Claims Settlement Act of 1987 (25 U.S.C. 1772e).

5 PROJECT DESCRIPTION

5.1 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 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). The project features include three pump stations, tieback levee, canal plugs, road removal, manatee mitigation feature, and southwest protection feature.

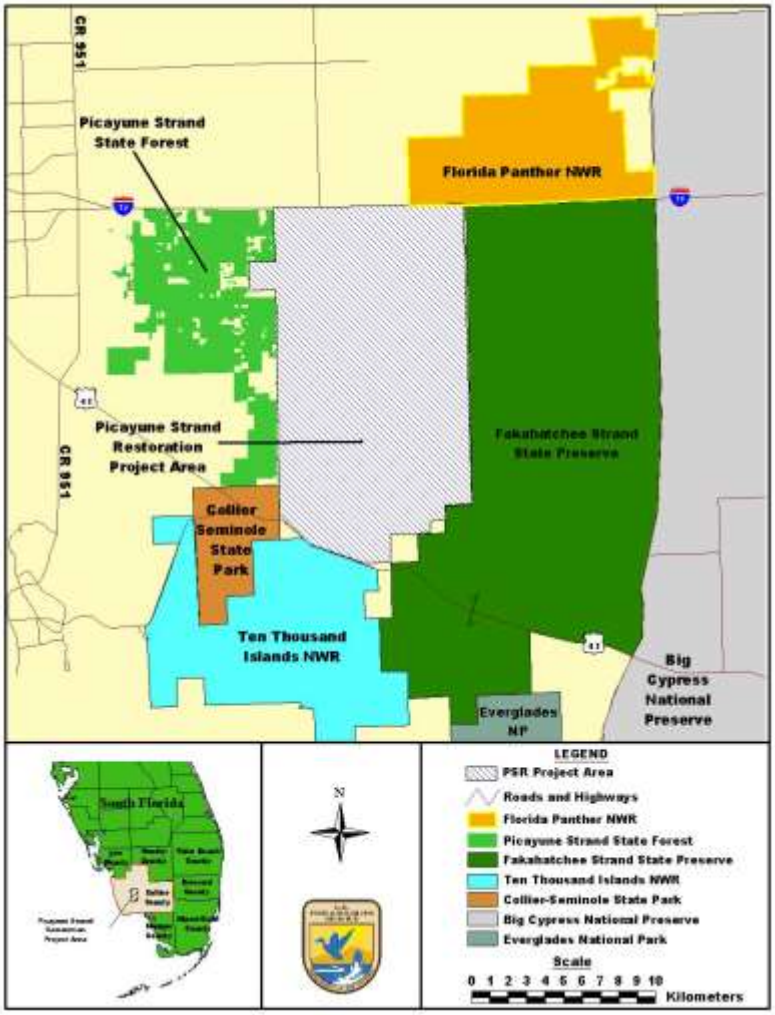

Figure 2: Connectivity of the PSRP in relation to nearby Federal and State protected lands.

5.2 PSRP Project Description

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 PSRP (Figure 3) involves the 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. This subsequent development dramatically altered the natural landscape, changing a healthy wetland ecosystem into a distressed environment. The PSRP will restore wetlands in Picayune Strand and in adjacent public lands by reducing over-drainage, while restoring a natural and beneficial sheetflow of water to downstream estuaries associated with Collier-Seminole State Park, TTINWR, and portions of Rookery Bay NERR. Project features include 83 miles of canal plugs, 227 miles of road removal, the addition of three pump stations with spreader basins to aid in rehydration of the wetlands, tieback levee, manatee mitigation feature to provide additional habitat for West Indian manatees, and a southwest protection feature to provide flood risk management for privately-owned farms adjacent to the project and to provide additional conveyance of water flow south. Restoration benefits include wetland restoration and subsequent reemergence of foraging and nesting wading birds and native flora and, restore quality Florida panther habitat, and increase ecological connectivity throughout the region. In addition to restoring freshwater wetlands, the

project will improve estuarine water quality by increasing groundwater recharge and reducing large and unnatural freshwater flows.

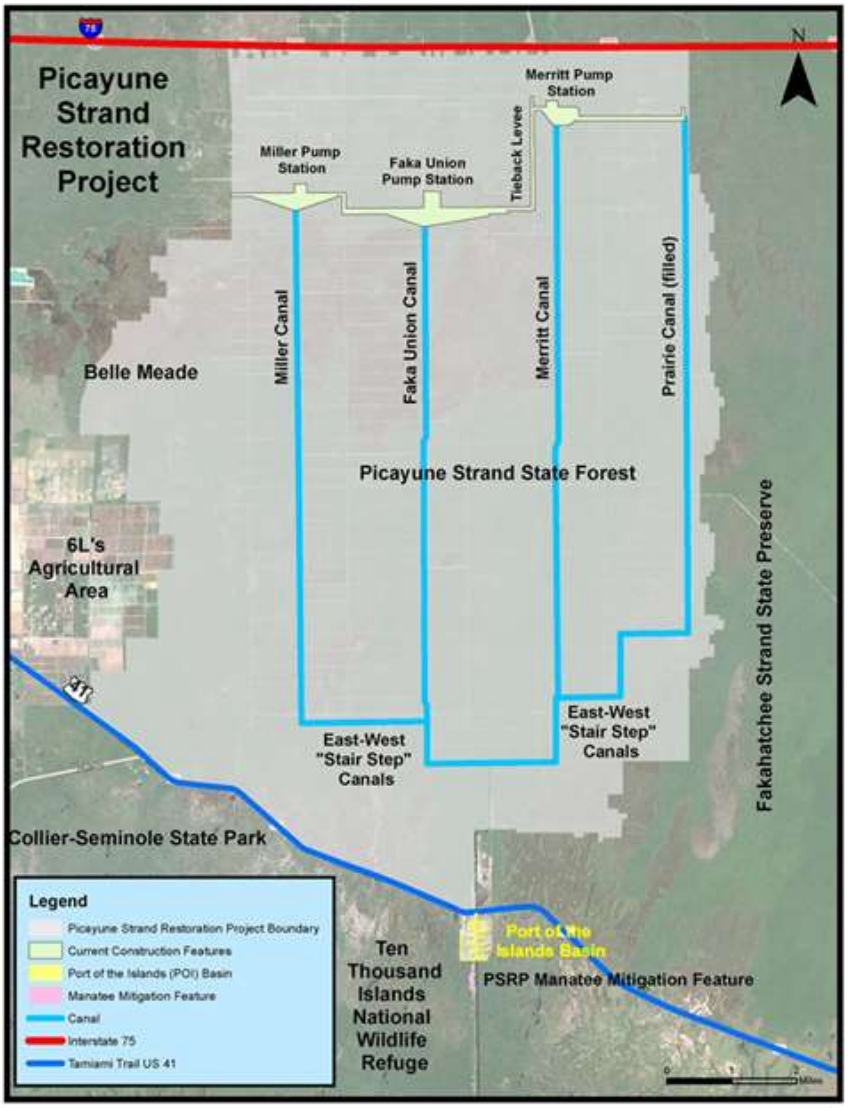

Figure 3: Map of the layout of the PSRP.

5.2.1 Current Action Area

This supplemental BA focuses on design refinements associated with the SWPF and additional conveyance features, which are a component of the PSRP. In order to complete the full restoration of the PSRP, the SWPF, a flood risk management feature, is required to reduce flood risk to the adjacent farms in the southwest corner of the project. Additional conveyance features are design refinements of the this feature to increase the opportunity for project flow to move south of US-41 to prevent water from ponding north of US-41 and to achieve project benefits by improving saline conditions in downstream estuaries. The refinements considered in this BA are in line with the intent of the features described in the 2004 PSRP PIR/EIS. The design refinements associated with the SWPF and additional conveyance features do not propose any operational changes to the overall PSRP.

Additionally, this supplemental BA analyzes the partial plugging of the northern 3.1 miles of the Faka Union Canal. The plugging of the Faka Union Canal has already been authorized and evaluated for NEPA and ESA impacts. The analysis provided in this document is evaluates the timing change of partially plugging the Faka Union Canal to increase hydrologic restoration and improve upon the percentage of project benefits received.

5.3 Plan Features

The components of the selected restoration plan for PSRP, Alternative 3D (Figure 4), are described in the 2004 PSRP. The plan features from the 2004 PSRP Final PIR/EIS discussed in this BA are those that were either conceptual in nature (SWPF), design refinements associated with approved components (conveyance features), or adjustments in the timing sequence from the 2004 PSRP Final PIR/EIS (partial plugging of the Faka Union Canal).

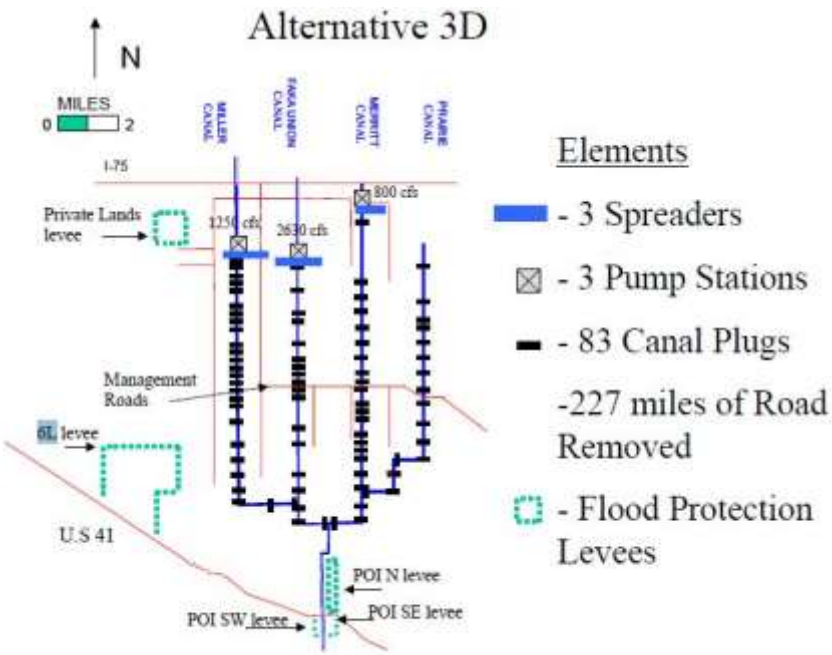

Figure 4: Alternative 3D - the selected plan for the PSRP (USACE 2004).

The 2013 PSRP Limited Reevaluation Report (LRR) eliminated the private lands levee, POI levees, and adjusted the length of the 6L levee (now referred to as the SWPF). The 2013 PSRP LRR, also, added the tieback levee and manatee mitigation feature (Figure 5). The SWPF and conveyance features are required to move forward with the full implementation of the PSRP. Plugging of the remaining canals (Miller, southern portion of Faka Union, and the Western Stair Steps) cannot proceed without the completion of the SWPF and conveyance features. USACE project management estimates that only 20% to 30% of the project benefits are being realized coming from roughly 80% of the expended budget, making the implementation of the SWPF and conveyance features of utmost importance. In order to increase restoration acreage and improve realized benefits, USACE has analyzed the partial plugging of the northern 3.3 miles of the Faka Union canal.

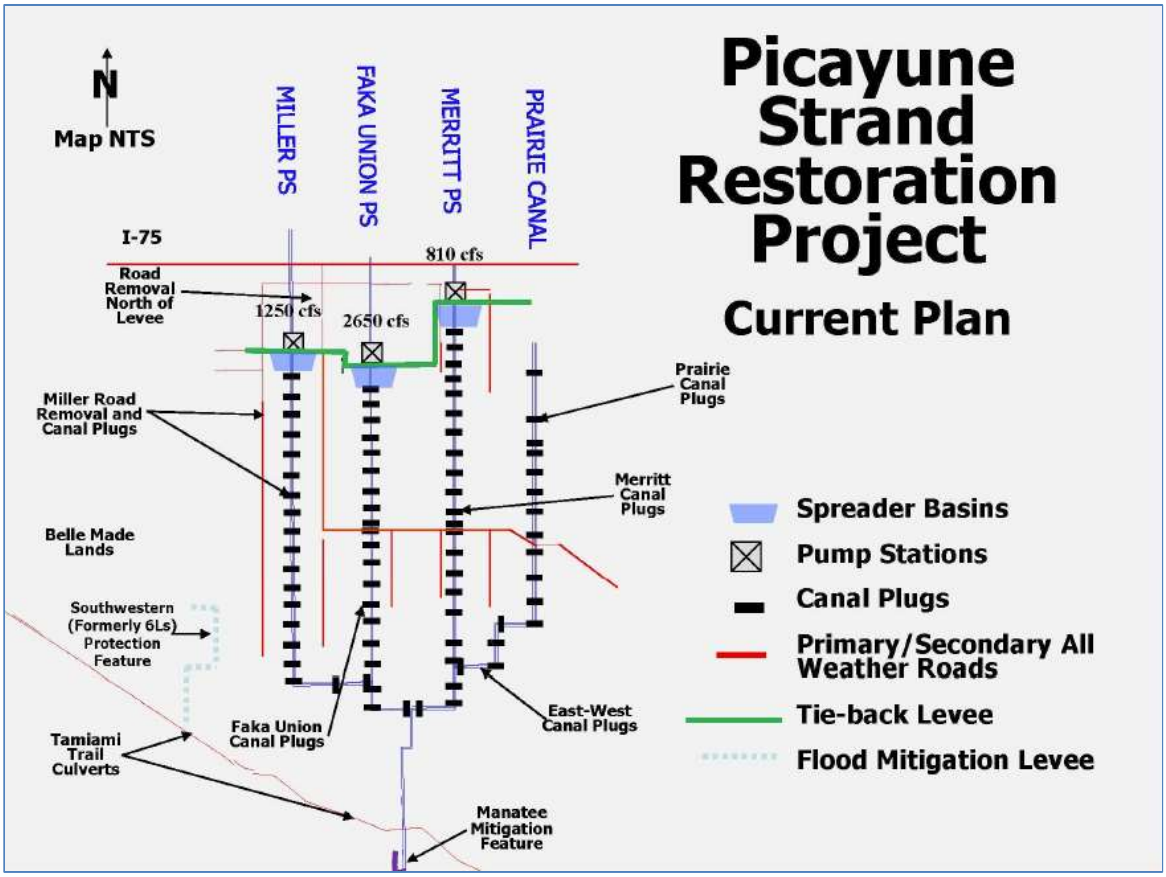

Figure 5: Updated Recommended Plan for the PSRP (USACE 2014)

5.3.1 Southwest Protection Feature

On 11 December 2000, the WRDA of 2000 was signed into law by the President of the United States (PL No. 106-541, of the 106th Congress). Section 601(h)(5) contains a Savings Clause that provides protection for existing legal sources of water that will be eliminated or transferred due to project implementation and no significant and adverse reduction in the level of service for flood protection that was in existence on the date of enactment and in accordance with applicable law. The SWPF is a flood risk management feature that was included in the 2004 PSRP Final PIR/EIS as a conceptualized levee surrounding agricultural lands located on the southwest corner of the PSRP boundary (Figure 3) in accordance with the "Savings Clause" in Section 601(h)(5) of WRDA 2000. The SWPF, formerly called the 6L levee, was conceptualized as a 17.25 mile long feature in the original PSRP PIR/EIS designed to prevent an increase in surface water levels due to operating the project. More detailed hydraulic and hydrologic modeling associated with the PSRP (LRR) using updated LIDAR and the Gridded Surface Subsurface Hydrologic Analysis (GSSHA) model platform determined that the SWPF could be reduced to only 8.75 miles (Figure 6). The SWPF levee included in the alternative described below is a modification of the 8.75 mile levee included in the 2014 PSRP Final LRR/EA which reduces the footprint and direct impact to wetland communities in the southwest corner of the larger PSRP footprint (USACE 2014). The implementation of the SWPF is critical to the completion of the PSRP. Full implementation of the PSRP includes the plugging of the entire Miller Canal, Faka Union Canal, and Western Stair Steps Canal. These canals cannot be plugged in their entirety until the SWPF is constructed managing flood risk for those agricultural lands southwest of the project. In order for the project to receive the full benefits described in the PIR (and updated by the LRR), the SWPF

is the critical feature for completing the PSRP and achieving the 70% to 80% of restoration benefits remaining.

Figure 6: Map of the SWPF levee footprint including access road and temporary fill storage. The SWPF levee footprint including access and temporary fill storage are outlined in white.

Due to the natural topography of the community mosaic found within the PSRP, restored hydrology flows from the northeast to the southwest as sheetflow and surface hydrology throughout the project. As, water rises in the southwest corner, due to a "damming" effect of US-41, flood risk to the agricultural areas increases as a combination of water height and duration increases as a result of project implementation. The height of the existing levee around these farms, as well as potential increases in groundwater seepage, can be detrimental to the crops grown in the agricultural area southwest of the project.

The selected plan, ALT PC2 (Figure 8), for the SWPF meets the flood risk management needs for the agricultural lands located southwest of the PSRP footprint proper. The SWPF levee in this alternative is 7.5 miles in length and includes a seepage/borrow canal between the existing levee and the new SWPF levee. The reduction of the SWPF levee footprint is a result of using the existing Tomato Rd as an access point to the levee which provides for a larger gap between the south end of the SWPF levee and US-41 (Figure 7). The reduction of 1.25 miles of constructed levee and canal lessens the amount of wetland community habitat directly affected by construction while providing more time and distance for intermixing of levee discharge water with restoration sheetflow prior to flows making it to US-41.

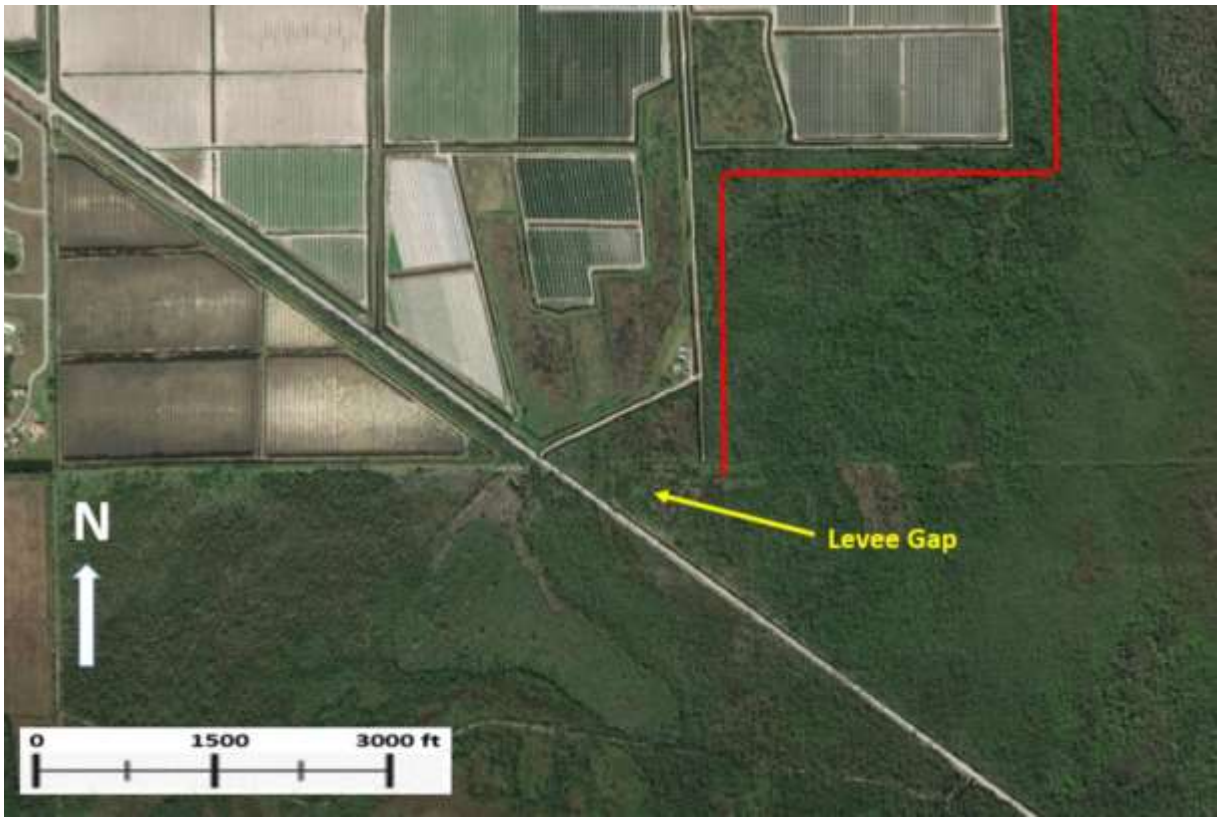

Figure 7: Map showing the gap between US-41 and the SWPF levee.

There is approximately 950 foot gap between the southern terminus of the levee and US-41 (Figure 7). Additionally, the elevation of the levee was set to be 2.5 feet above the 100 year (yr) maximum computed water surface profile (Table 3). The levee steps down (in elevation) from 11.5 feet North American Vertical Datum of 1988 (NAVD88) in the north to 7.5 feet NAVD88 in the south (6 inches at a time), generally maintaining a minimum 2.5 feet of superiority. The average width of the SWPF levee embankment is 41 feet.

Table 3: Summary table for SWPF levee height

STATION	WATER ELEVATION (FT NAVD88)	LEVEE ELEVATION (FT NAVD88)	SUPERIORITY (FT)
1000.6	8.8	11.5	2.7
12940.4	8.4	11.0	2.6
17263.2	7.9	10.5	2.6
25279.6	6.8	9.5	2.7
31181.8	5.3	8.0	2.7
38737.7	4.7	7.5	2.7

5.3.1.1 Southwest Protection Feature Levee Model Assumptions

ALT PC2 (Figure 8) incorporates the following conditions: all four canals (Miller, Faka Union, Merritt, and Prairie) are plugged, the Stair Steps are plugged, most of the roads and side ditches are removed, the tieback levee and manatee mitigation feature are complete, the SWPF levee is constructed and all three

pump stations are built and operational. ALT PC2 described below includes the conditions just mentioned plus additional features aimed at improving conveyance of water south to the estuarine systems and to reduce water ponding against the north side of US-41.

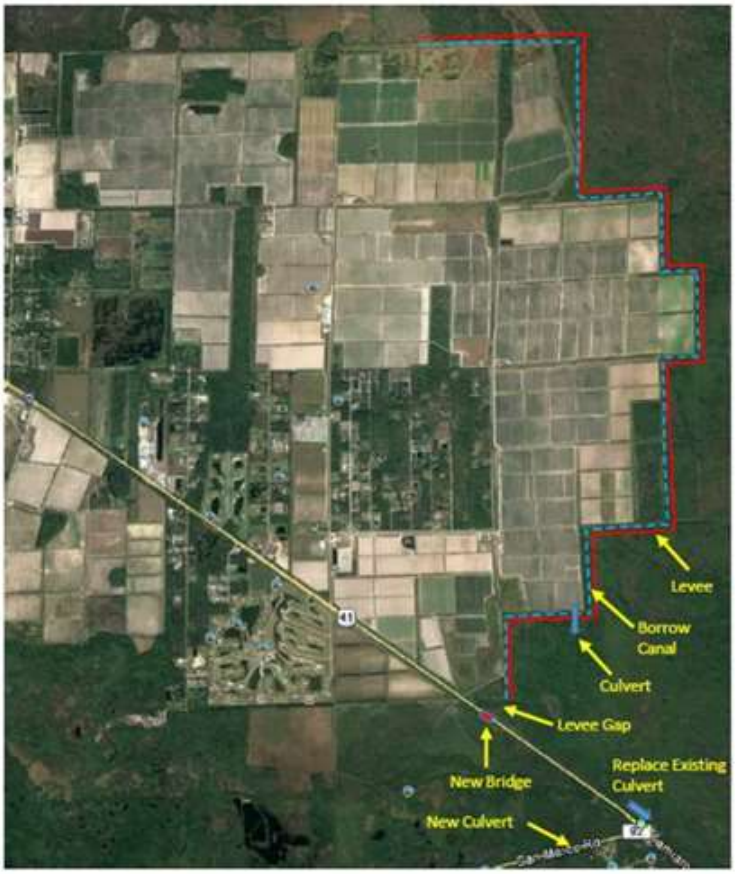

Figure 8: Map of ALT PC2.

5.3.2 Conveyance Features

Updated analysis associated with the LRR revealed accumulation of water in the southwest corner of the PSRP proper. US-41, running west-northwest to east-southeast, serves as a barrier to hydrologic flow to the estuaries downstream of the PSRP trapping water north of the highway. Compounding the issue, natural topography within the Picayune Strand State Forest is highest in the northeast corner and lowest in the southwest corner of the forest. With the addition of the SWPF levee, the LRR identified the need for additional conveyance of water from the PSRP proper to the downstream estuaries.

US-41 has 20 bridges and/or culverts along the project's southern boundary between Lipman Farms and Faka Union Canal (Figure 9). Although a number of openings are present, US-41 functions as a dam across the southern extent of the PSRP limiting the amount of freshwater flow to the downstream estuaries resulting in salinity wedge reaching further inland due to less freshwater-saltwater mixing. This restriction of freshwater flow due to lack of necessary conveyance under US-41 results in saltwater intrusion further upstream which results in peat loss in coastal wetlands that should be maintained at a more brackish to freshwater gradient reducing ecosystem health and community structure/soil stability. Additionally,

modeling has shown a water ponding effect north of US-41 which would result in additional habitat changes as well as potential to damage US-41 itself. The addition of another opening as a conveyance feature is needed to accomplish the objectives of moving water south into the estuaries and reducing ponding depth north of US-41.

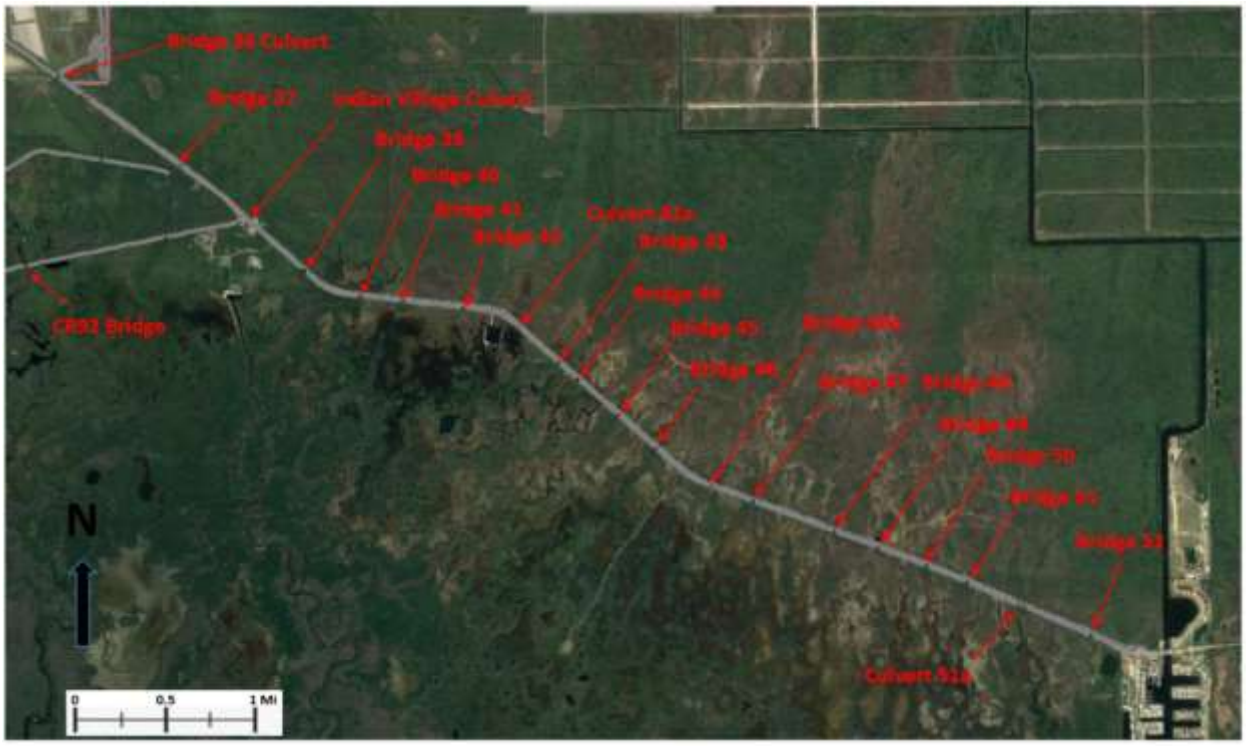

Figure 9: Location of openings under US-41 along the southern boundary of the PSRP between Lipman Farms and the Faka Union Canal

Conveyance Canal

At 20 feet wide and 4 feet deep, the conveyance canal was designed to capture overflow from the east farm ditch and efficiently convey the water to the south and out into the Picayune Strand State Forest (approximately 1,000 feet from US-41). This canal will also collect seepage from the increased water levels from the Picayune Strand State Forest. Maximum flow rates in the conveyance canal range from approximately 95 cubic feet per second (cfs) to 120 cfs for the 5 year through 100 year storm events, with an average velocity of less than 1 foot per second (fps) during peak discharge (Figure 10).

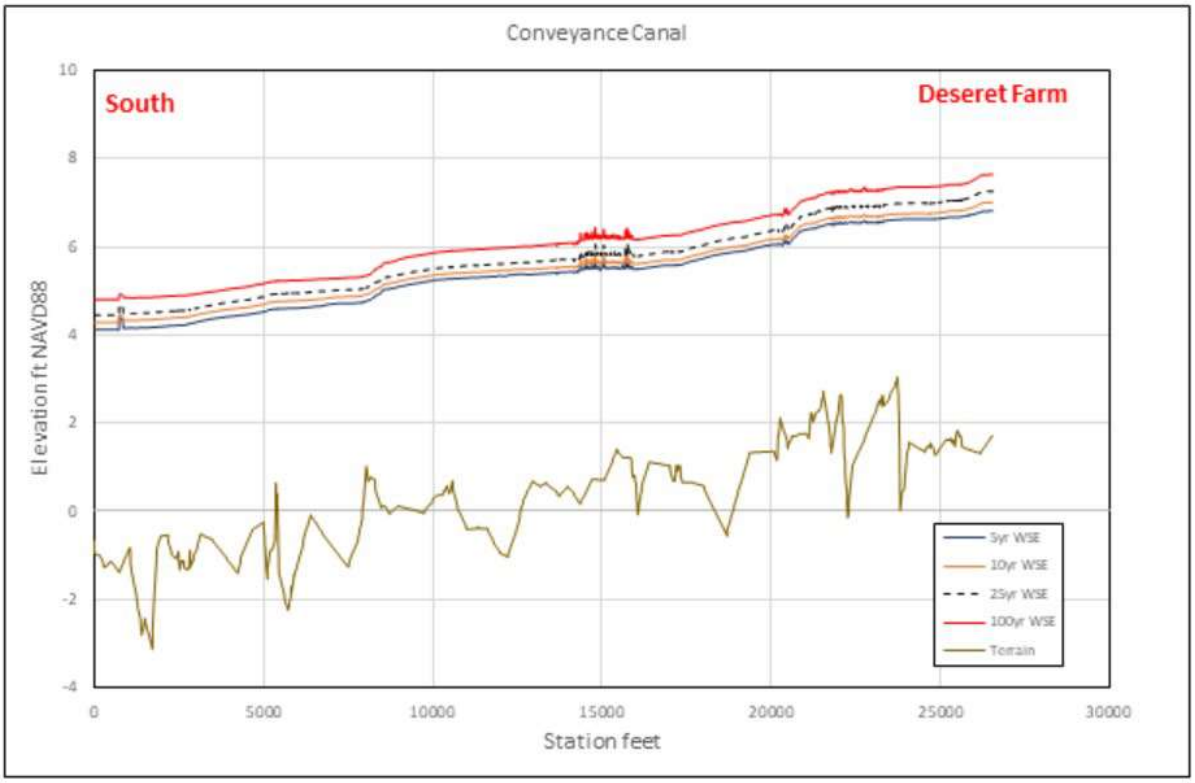

Figure 10: Conveyance canal maximum computed water profile for 5, 10, 25, and 100 year storms

SWPF Levee Conveyance Culvert

The levee culvert is a flap gated culvert structure that discharges into the Picayune Strand State Forest approximately 1 mile north of US-41 (Figure 11). This structure consists of two 5 foot diameter barrel culverts with a 110 cfs total capacity with 0.3 ft of head.

SWPF Levee Access Road Culverts

The levee access road will have culverts at the crossings over the existing east farm drainage ditch and the new conveyance canal. Each crossing will have three 5 ft diameter culvert pipes. Positioned underneath the levee access road, this feature is required for conveyance of water south in both the east farm ditch and the conveyance canal to flow out of the southern terminus (Figure 11). Each structure pipehas a capacity of 110 ft cfs with 0.1 ft of head.

New US-41 Culverts

The new opening under US-41 is a series of box culverts (Figure 11). The feature consists of three 12 ft by 4 ft concrete box culverts spaced 120 ft apart. The designed flow rate of this structure is 200 cfs with 0.1 ft of head.

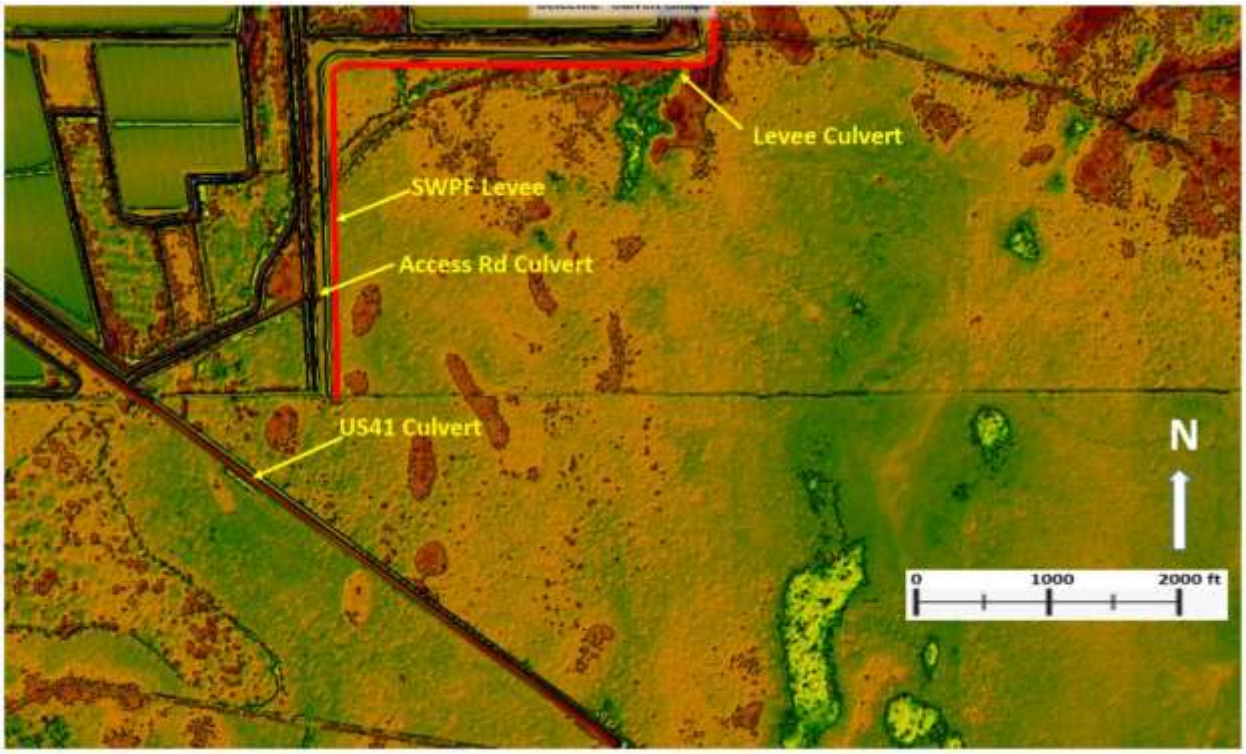

Figure 11: Conveyance features near the southern terminus of the planned SWPF overlaid on a digital elevation map (DEM). Red colors are higher in elevation. Green colors are lower in elevation.

Modification of Indian Village Entrance Culvert

The conveyance feature at the entrance to Indian Village is a modification of an existing structure opposed to implementation of a new structure (Figure 12). The existing Indian Village entrance culvert consists of three 3 ft diameter corrugated HDPE pipes. With implementation of ALT PC2, one additional culvert pipe will be added. The design flow rate for this structure is 95 cfs with 0.3 ft of head.

Modification of CR-92 Culvert

The CR-92 culvert is located downstream of Bridge 37 (Figure 12). This structure will reconnect a historic drainage channel that was cut off with the construction of CR-92. The design flow rate for this structure is 100 cfs with 0.4 ft of head.

Figure 12: Proposed culvert locations near the intersection of US-41 and CR-92. Red colors are higher in elevation. Green colors are lower in elevation.

5.3.2.1 Conveyance Features Model Assumptions

ALT PC2 (Figure 8) incorporates some of the features described in previously discussed alternatives with supplementary features to provide additional conveyance to the downstream estuaries, further reducing the "stacking" of water north of US-41. This alternative includes an enlarged gap at the south end of the SWPF levee further reducing the levee length to 7.5 miles, a levee culvert consisting of two 5 ft diameter pipes with flap gates, a new opening under US-41 consisting of three sets of single 12 x 4 ft box culverts, a borrow/conveyance canal with a bottom width of 20 ft and average depth of 4 ft, addition of one 3 ft culvert to the existing structure at the entrance to the Indian village on the north side of US-41 just east of the intersection of US-41 and CR-92 (San Marco Rd), and a new 10 x 3 ft box culvert under CR-92, west of the Collier Seminole State Park campground.

5.3.3 Partial Faka Union Canal Plugging

For protection of the agricultural lands southwest of the PSRP footprint, complete plugging of the Faka Union Canal, as described in the PIR, cannot be completed prior to the construction of the SWPF. Decision makers with USACE and the SFWMD challenged project managers to investigate a strategy to achieve a greater percentage of project benefits without increasing risk to adjacent property owners and current land managers. USACE project management estimated that only 20% to 30% of project benefits are being realized coming from roughly 80% of the budget expended making the implementation of the SWPF and conveyance features of utmost importance. Of the remaining features outside of the SWPF and conveyance features, the only plausible feature remaining that could increase project benefits attained without potentially increasing flood risk was partially plugging the Faka Union Canal (Figure 13).

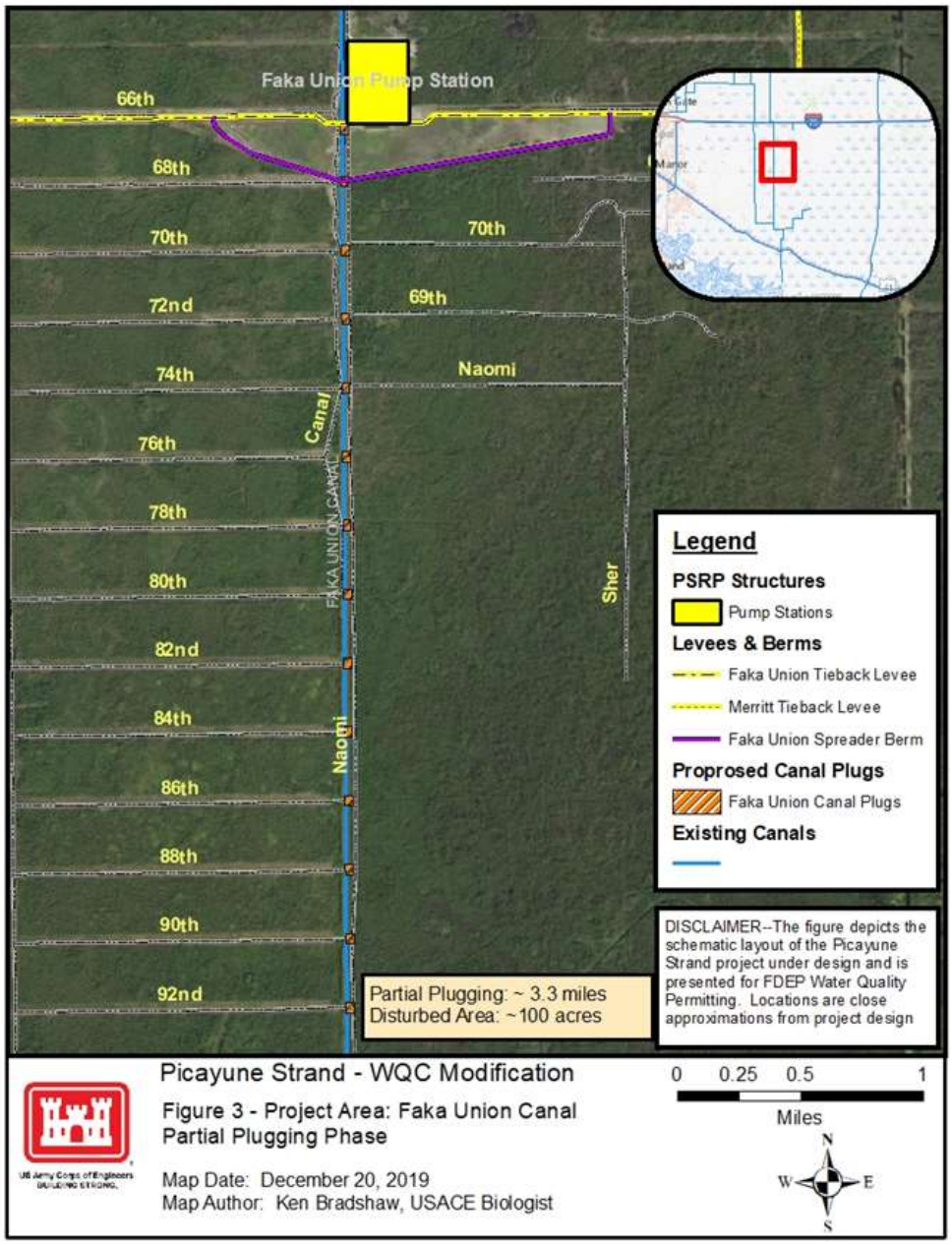

Figure 13: Map of the northern 3.3 miles of the Faka Union Canal planned for plugging.

Plugging of the Faka Union Canal was modeled using "mile-long" increments to assess if any of the Faka Union could be plugged without creating any temporary flood risk to property owners and listed species. The plugging of the northern 3.3 miles is the scenario that provides the most benefits without creating flood risk is to partially plug the northern 3 miles of the Faka Union Canal (Figure 13).

The project components of partial plugging of the northern 3.3 miles of the Faka Union Canal incorporate the already constructed tie back levee and the Faka Union spreader berm. Approximately 3.3 miles of the Faka Union Canal will be plugged from the tieback levee and spreader weir extending southward. The Faka Union Canal will be plugged with adjacent existing fill from along the Faka Union Canal and fill from

spoil piles located north of the tieback levee. For this phase of the project, canal plugs will be constructed beginning at approximately 66th Avenue and ending at approximately 92nd Avenue. The canal plugs at the avenues will be approximately 100 feet long at the top and slope at 6H:1V on either end to the existing canal bottom. The plug fill will be end dumped into the canal without dewatering. The fill will be placed until the plug surface is at the required elevation and provides a surface which can be proof-rolled without pumping. A turbidity barrier will be placed downstream of the southernmost plug in each work area. Excess fill that is available north of the tie-back levee will be hauled in and will be used to create additional plugs in order to fill as much of the canal as possible.

Special canal plugs will also be constructed at the tieback levee and spreader weir. The special canal plugs at the tieback levee and spreader weir will be approximately 400 feet long at the top and slope at 6H:1V on either end to the existing canal bottom. The canal will be demucked, filled, and compacted to construct the plugs. The tie-back levee and spreader weir special canal plugs were previously authorized.

Initial modeling associated with PIR and LRR for the Miller and Faka Plugging Phases of the Picayune Strand Restoration Project indicated that the Miller Canal and the Faka Union Canal would need to remain unplugged to capture project flows to protect the 6Ls agricultural community, southwest of the project area, from flooding until the 6Ls community had adequate protection from full project flows (i.e. the Southwest Protection Features (SWPF)). Recent modeling conducted in an effort to increase project restoration benefits without sacrificing flood risk management for the PSRP indicates that the Faka Union Canal can be partially plugged without requiring additional flood protection for the 6Ls. Modeling indicates that leaving the Miller Canal and the southern 4.5 miles of the Faka Union Canal in place is a practical solution to provide flood protection to the 6Ls until the SWPF is constructed. Therefore, the purpose of this modification is to change the construction sequence for the Faka Union phase to include the partial plugging of the upper 3.3 miles of Faka Union Canal prior to the completion of construction of the SWPF. The partial plugging of the Faka Union Canal is considered a “temporary” state and will not remain partially plugged as a long term feature. Therefore, the GSSHA storm event model was chosen as the appropriate tool for evaluating temporary/short term effects of partially plugging the northern 3.3 miles of the Faka Union Canal.

5.3.3.1 Partial Faka Union Canal Plugging Model Assumptions

Modeling for the partial plugging of the Faka Union Canal was done using the GSSHA Flood Event Model. The GSSHA Flood Event Model simulated a 5-day 5-year storm event, 5-day 10-year storm event, 5-day 25-year storm event, and 5-day 100-year storm event. Model assumptions (Figure 14) used in these scenarios include:

- Merritt Canal and Prairie Canal are fully plugged
- Merritt Pump Station is operational
- Merritt Spreader Berm constructed
- Eastern Stair Step Canal is plugged
- Faka Union Pump station is operational
- Only northern 3.3 miles of Faka Union Canal are plugged
- Miller Pump Station is not operational
- Miller Canal is open (not plugged)

- Roads east of Miller Canal are removed/degraded
- Western Stair Step Canal are open
- Tieback levee is constructed
- Manatee Mitigation feature is constructed

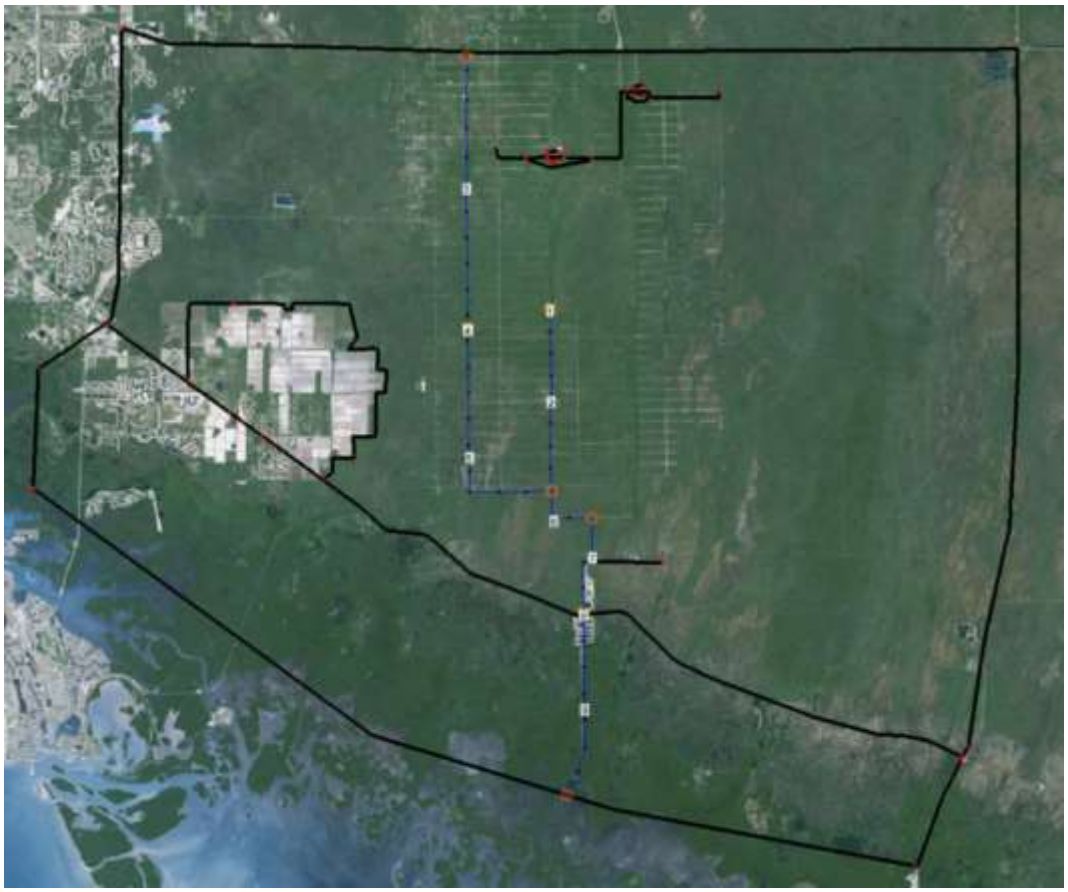

Figure 14: Conceptual model of the Faka Union Canal Plugging (IMC 2019). Blue lines represent canals remaining after current phase of planned plugging (Partial Faka Union Plugging). More information is available in the IMC Model Documentation Report for Partial Faka Union Canal Plugging (2019).

5.3.3.2 Partial Faka Union Plugging Analysis

Drainage from the Northern Golden Gates Estates (NGGE) will continue to flow by gravity to the PSRP area through the canal system. For the overall PSRP project, the pump stations on the Miller, Faka Union and Merritt Canals will be used to maintain optimum canal stages upstream of the pump stations to maintain the existing levels of flood protection in NGGE residential areas. For the partial plugging phase of Faka Union Canal, only the Faka Union and Merritt Pump Stations would be used. The Merritt Canal Pump Station has been operating since completion of the Merritt Canal Plugging in 2014 and the Faka Union Pump Station has been operated for maintenance since it was completed.

Surface water stages would increase during the wet season (1 May to 15 October) in the areas adjacent to where the Faka Union Canal is partially plugged. Increased water stages are considered beneficial

because sheetflows (i.e., slower moving water that can infiltrate) and groundwater recharge/storage would increase. Some the sheetflows would be captured by Miller Canal to the west and the open portion of Faka Union Canal to the south; these flows would be routed through the canal system to Faka Union Bay.

Three locations (Figure 15) were selected in the model domain to show simulated water depths for the 5-, 10-, 25-, and 100-yr storm events at those locations (Figures 16, 17, 18). Depth hydrographs indicated the highest stages would occur at Location 2 (Figure 17), just north of the southernmost Faka Union Canal plug in the central portion of the SGGE area, with maximum depths of approximately 0.33, 0.36, 0.41, and 0.49 meters for the 5-, 10-, 25-, and 100-yr storm events, respectively. The inundation maps show the extent of inundation does not extend southwest to the 6Ls farms for the simulated storm events, and flooding impacts are not expected at those locations due to partially plugging the Faka Union Canal. The Miller Canal and remaining section of Faka Union Canal would still capture and route water to Faka Union Bay until the SWPF are built and these canals are plugged.

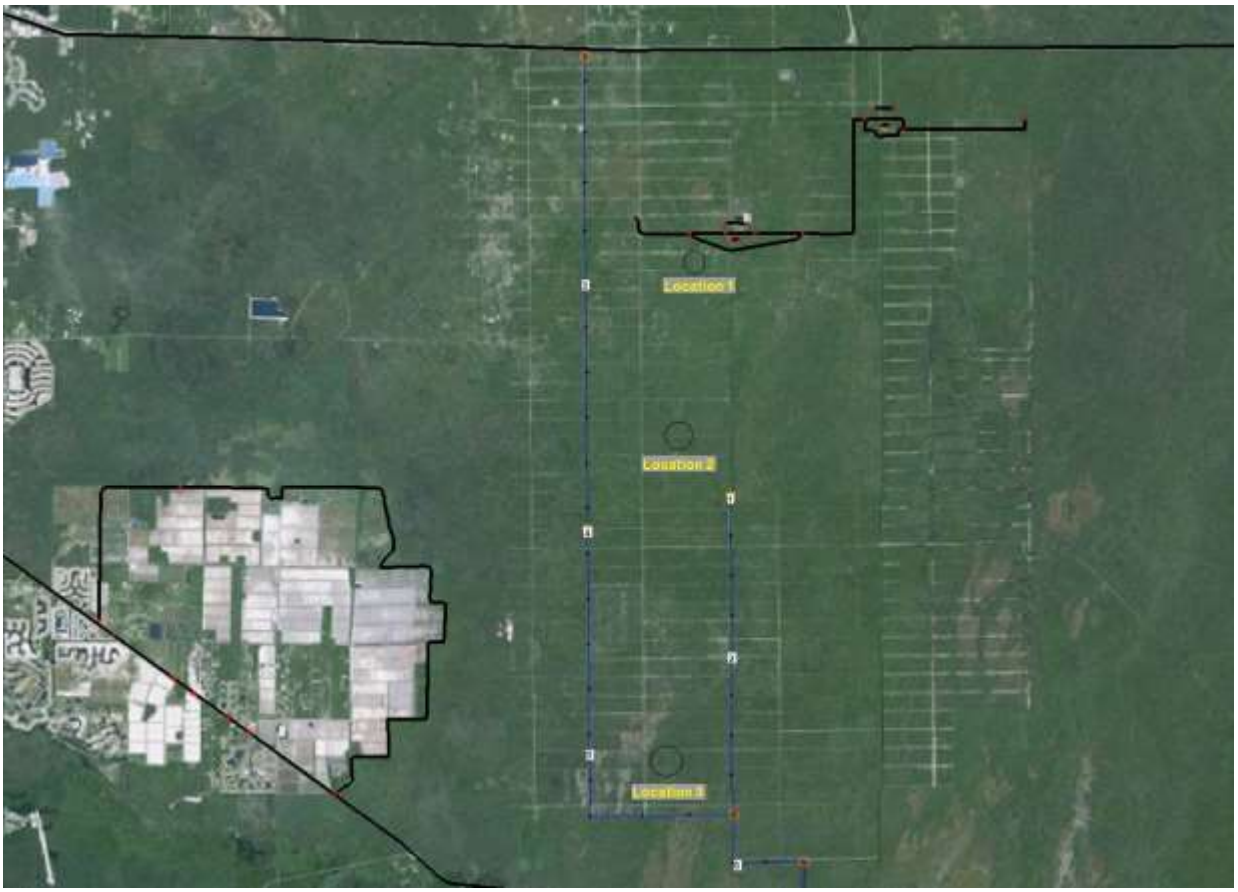

Figure 15: Selected locations for extraction of depth time series model data.

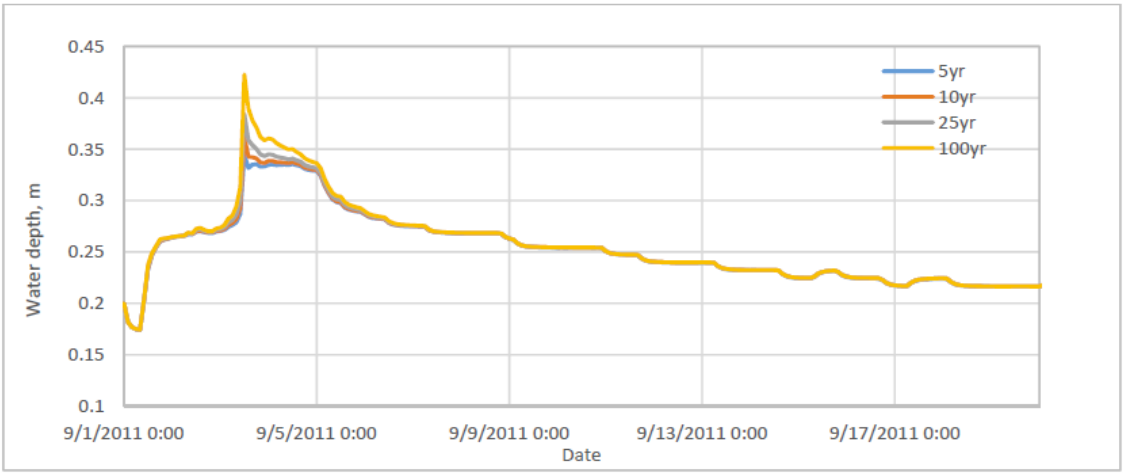

Figure 16: Depth hydrographs for the four storm events at Location 1.

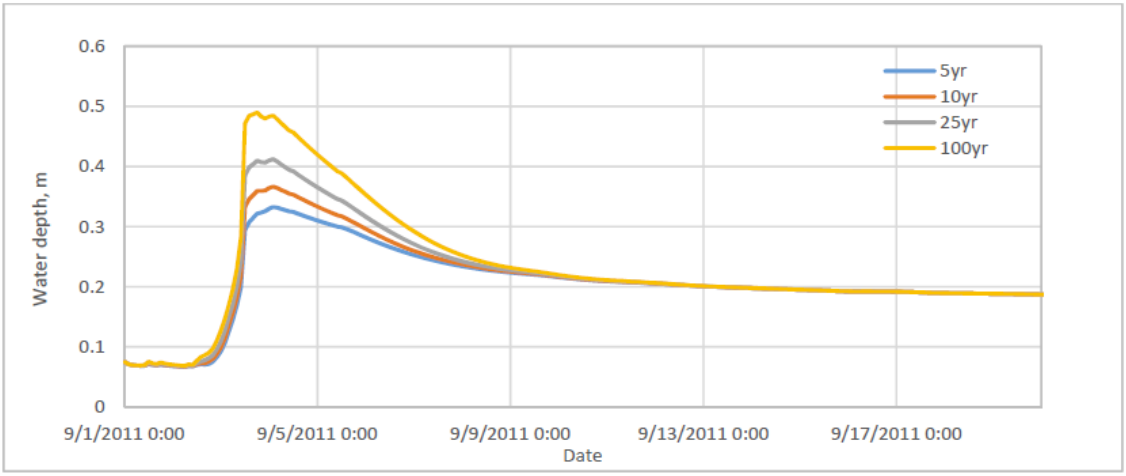

Figure 17: Depth hydrographs for the four storm events at Location 2.

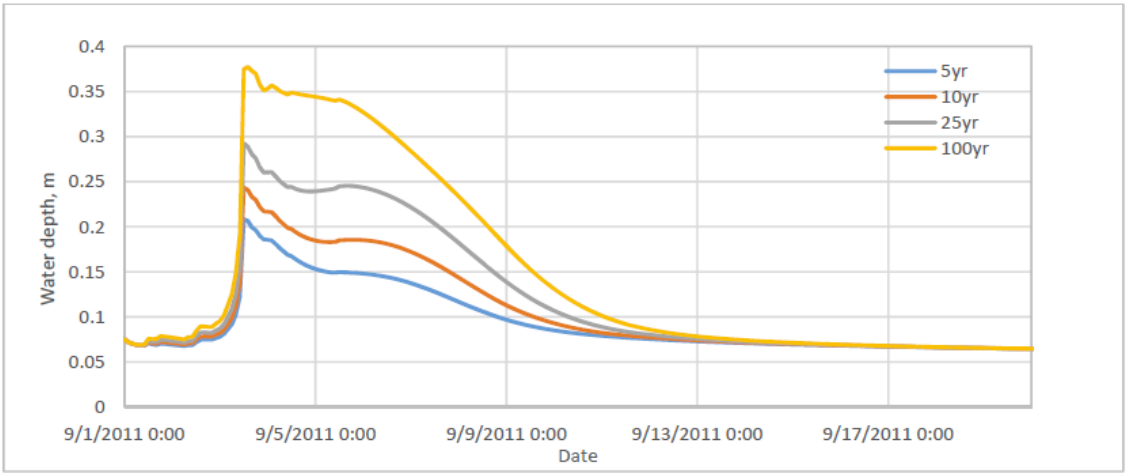

Figure 18: Depth hydrographs for the four storm events at Location 3.

Partial plugging of Faka Union canal is an incremental step to restoring the historic flow patterns and hydroperiods in PSRP. Plugging the upper 3.3 miles of Faka Union canal will increase water depths and hydroperiods within the extents described in the model QC report and shown in the simulated storm depth difference maps (Figures 20, 21, 22, 23), but is not expected to increase depths or hydroperiods any more than what has been documented with long-term modeling of the full with-project condition. The partial plugging of Faka Union canal is expected to slightly decrease flow at the Faka POI stream gage (Figure 19) because less water will preferentially flow down the canal, and will instead be dispersed as sheetflow downstream of the Faka Union pump station, and away from the plugged canal, following topographical features in the region. This incremental decrease in freshwater discharge to Faka Union Bay is beneficial to the estuary, and is not expected to reduce flows any more than the full with-project condition. Changes to flow distribution at culverts and bridges along Hwy 41, between Tomato RD and Faka POI, are not expected to occur during this phase of the project because Miller Canal and the lower section of Faka Union canal will capture sheetflows that reach the canals and route the water through the remaining canal system, therefore, additional water from partially plugging Faka Union canal is not expected to sheetflow as far south as Tamiami Trail.

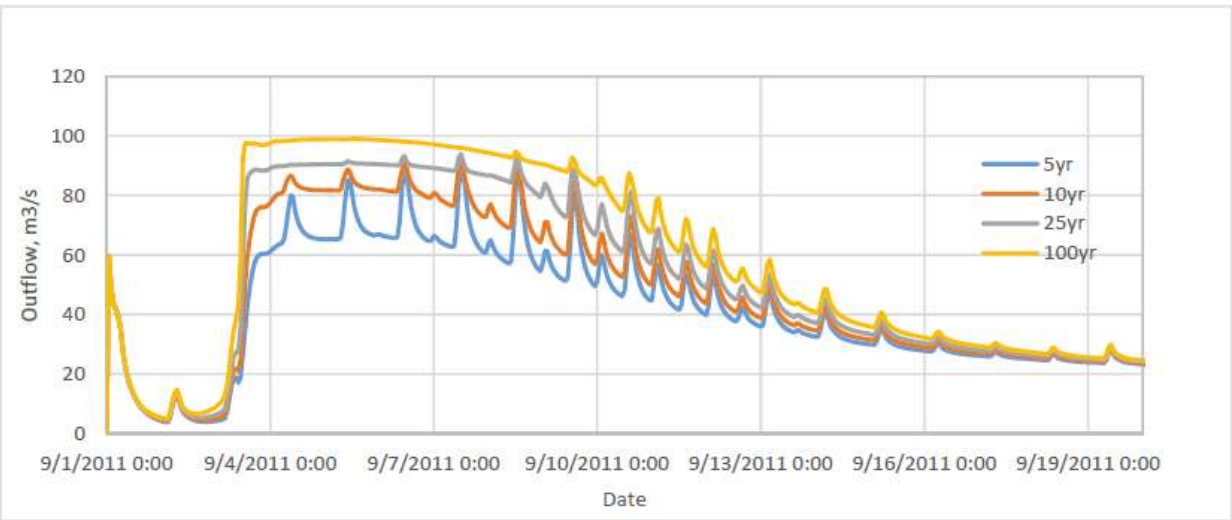

Figure 19: Outlet flow hydrograph for the GSSHA Storm Event Model scenarios. The outlet is located at the junction of the Faka Union Canal and the Gulf of Mexico. The peaks and valleys in these storm hydrographs are representative of the influence of the tidal conditions.

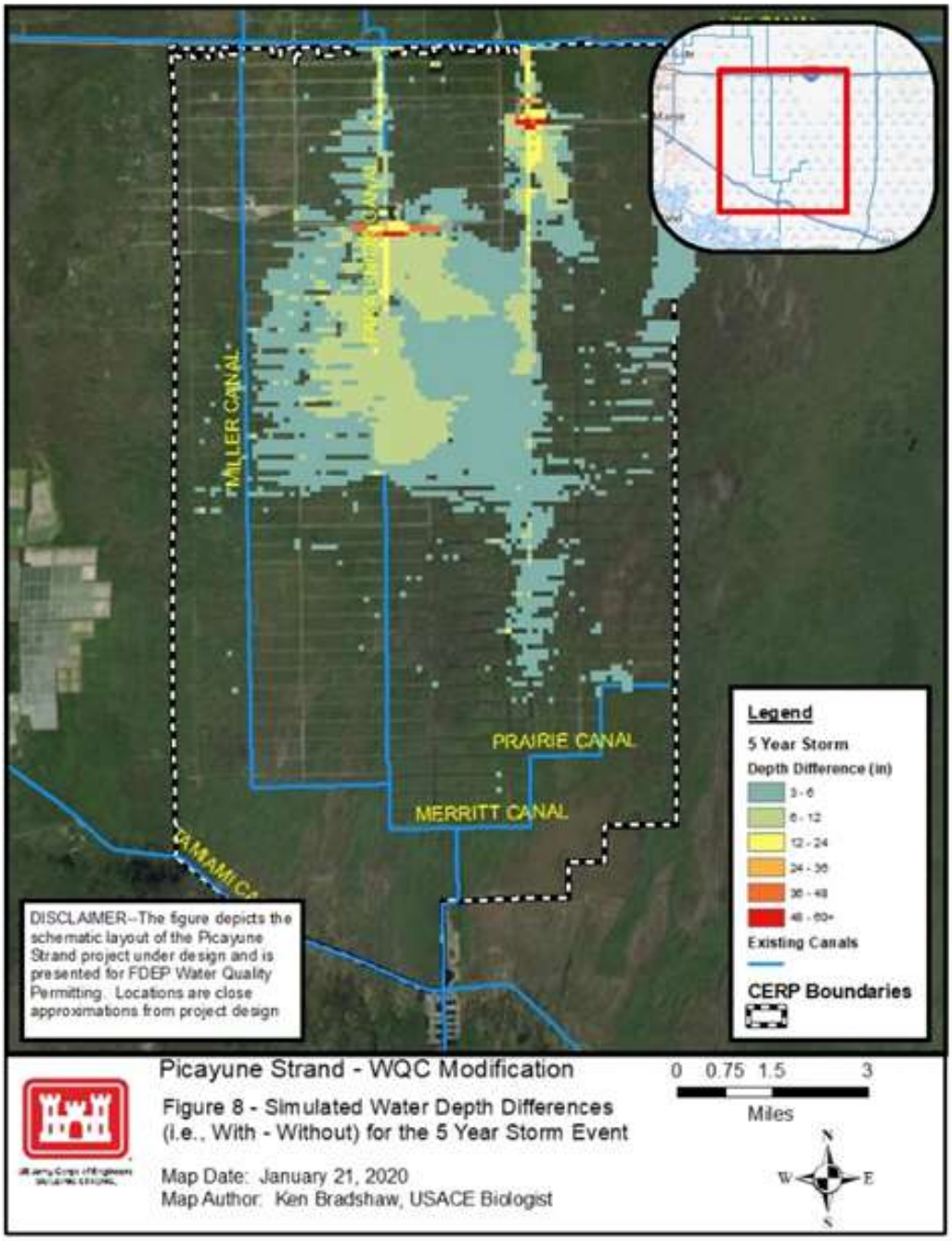

Figure 20: Simulated water depth differences (with project minus without project) for a 5 year storm for the partial plugging of the Faka Union Canal.

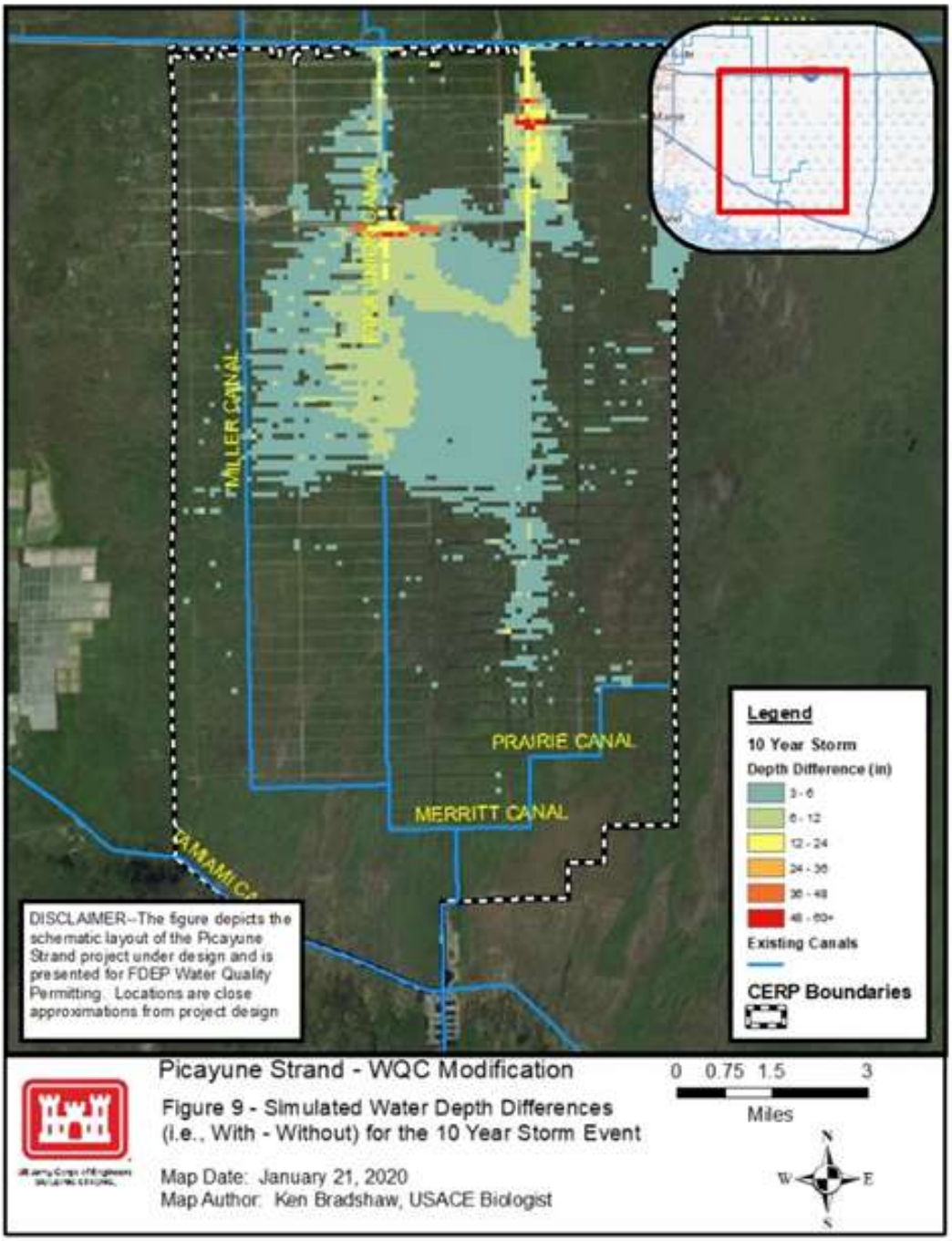

Figure 21: Simulated water depth differences (with project minus without project) for a 10 year storm for the partial plugging of the Faka Union Canal

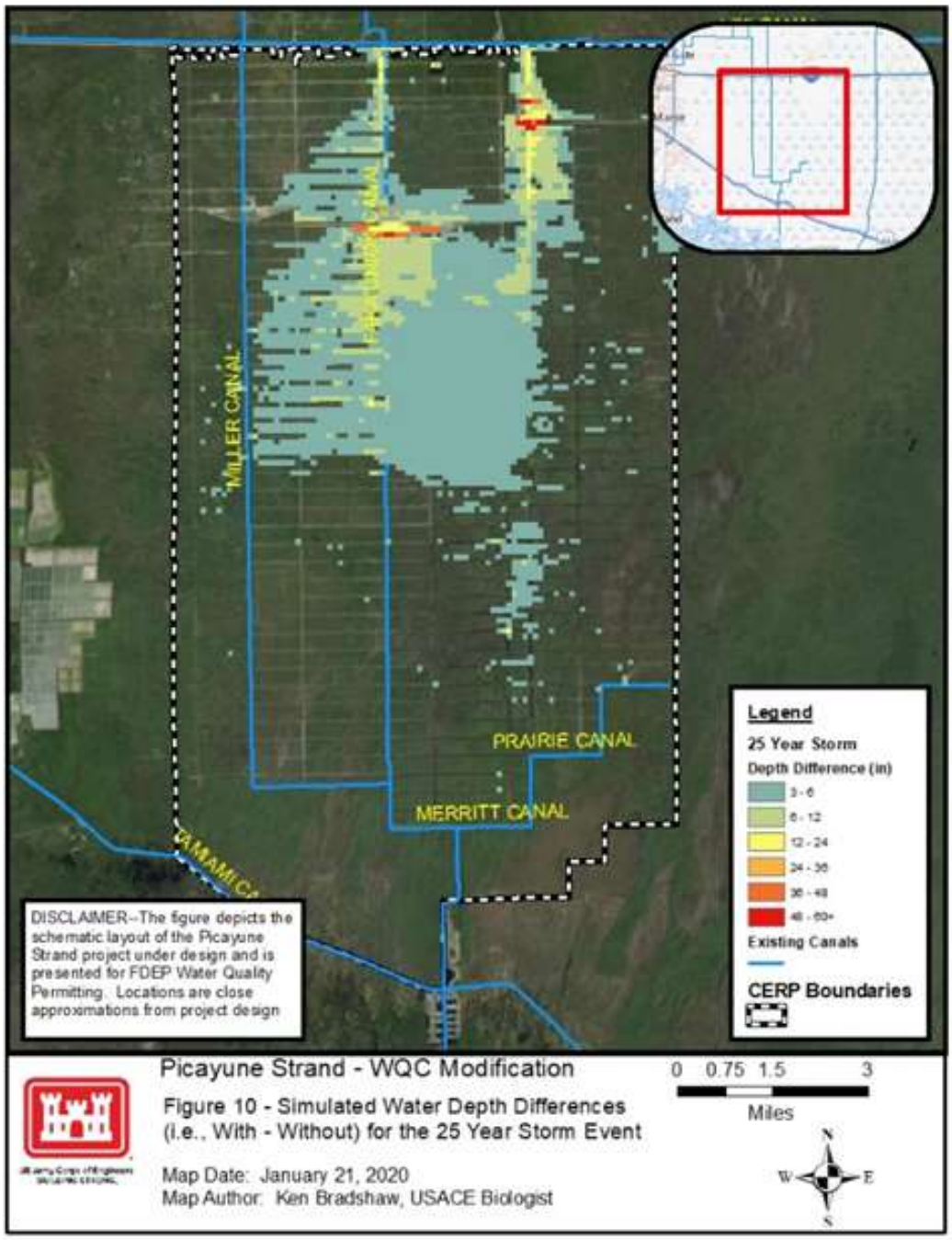

Figure 22: Simulated water depth differences (with project minus without project) for a 25 year storm for the partial plugging of the Faka Union Canal

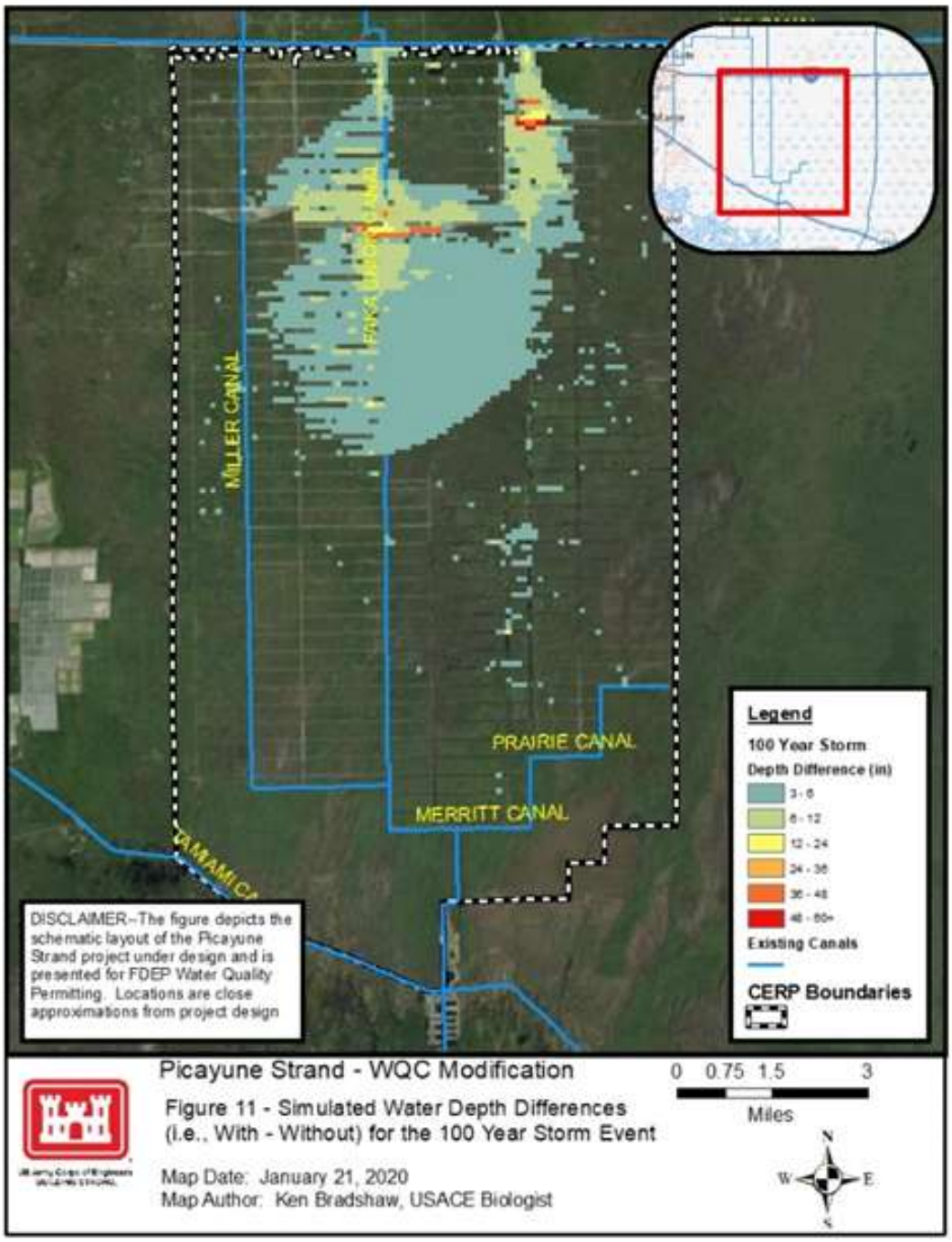

Figure 23: Simulated water depth differences (with project minus without project) for a 100 year storm for the partial plugging of the Faka Union Canal

Parital plugging of the Faka Union Canal will increase the total area, approximately 8,352 acres, receiving restoration benefits. Improvements to groundwater hydrology will increase aquifer recharge. The partial plugging will also restore pre-development hydrology within the vicinity of 66th Ave to 92nd Ave between Miller Canal and Merritt Canal improving habit for fish and wildlife. There are no additional impacts to flood risk management. Additionally, there will be no effect to water flow to the downstream Faka Union Canal and River.

6 DESCRIPTION OF EXISTING CONDITIONS, LISTED SPECIES, AND DESIGNATED CRITICAL HABITAT

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 Final PIR/EIS is hereby incorporated by reference into this supplemental BA for the SWPF and Conveyance Features. Updated information on existing conditions within the Picayune Strand State Forest and Collier Seminole State Park are included in the descriptions below.

6.1 Existing Conditions

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).

The preliminary hydraulic and hydrologic (H&H) analysis used for the 2004 PSRP Final PIR/EIS showed an increase in water levels that could impact the agricultural farms to the southwest of the project. The SWPF was designed to prevent an increase in surface water levels due to operating the project. The original concept entailed construction of levee on the west, north, and east sides of these farms totaling an estimate 12.2 miles (actually 17.25 miles [USACE 2016-LRR]) in length (USACE 2004). More detailed H&H analysis was performed during the 2016 PSRP Final Limited Reevaluation Report (LRR). The analysis

was completed to verify the land acquisition and protection features prescribed in the 2004 PSRP Final PIR/EIS to mitigate a reduction in the level of service for flood protection as required in Section 601(h)(5) or "Savings Clause" of the WRDA 2000. The results of the more detailed H&H analysis determined that the levee could be reduced to only 8.75 miles instead of the original PIR length of 17.25 miles as conceptualized in the original PIR/EIS. The 2016 PSRP Final LRR found less flood risk to the southwestern farm lands and reduced the footprint of the SWPF down to 8.75 miles in length. The current design of the SWPF for this analysis was further reduced to 7.1 miles, a 10.15 mile reduction from the original PIR/EIS concept and a 1.55 mile reduction from the more detailed analysis included in the 2016 PSRP Final LRR.

Of note, general topography of the PSRP slopes downward from the northeast corner to the southwest corner of the project (Figure 8, Figure 24). Naturally, under project conditions water will sheetflow towards the agricultural farms.

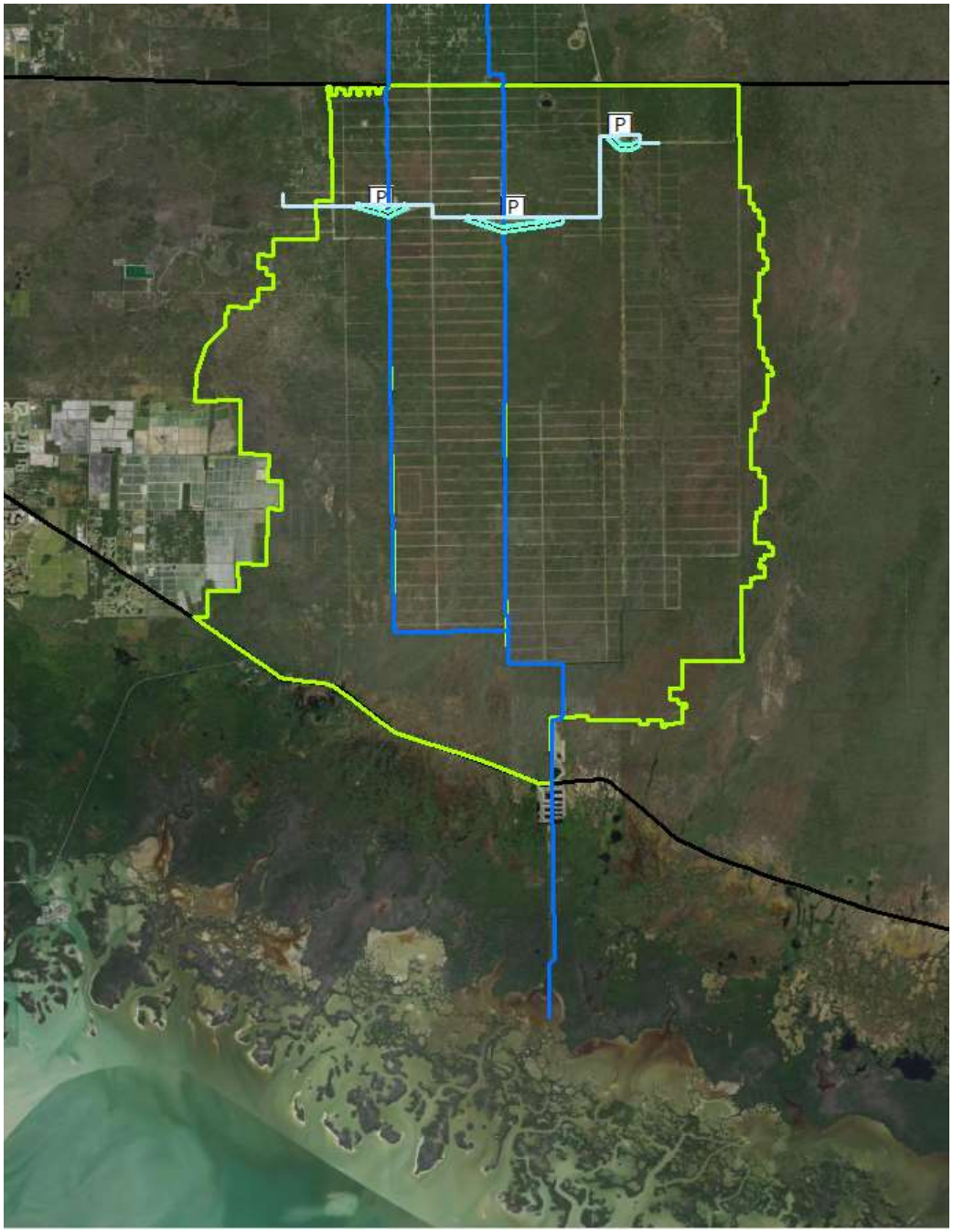

Figure 24: Map of existing system within the PSRP boundary (yellow). The two blue lines represent the existing canals (Miller, Faka Union and the Western Stair Step Canals). White and teal lines represent current infrastructure: tieback levee, three pump stations and associated spreader features.

6.1.1 Hydrology

Land drainage activities began in southwest Florida with the diversion and channelization of the Caloosahatchee River. Significant anthropogenic alterations of the hydrologic regime and vegetative communities have occurred within the SGGE Project Area since the cypress logging operations in the 1940s and 1950s. The greatest changes to the SGGE area began with the 1960s development. The area was subdivided into rectangular plots. A network of 279 miles of roads was laid out on a quarter mile grid. Roads were built above surrounding ground by excavation of borrow ditches on each side. The roads and ditches, oriented north-south and east-west, intercepted historic shallow flow paths, which were generally oriented in a NNE-SSW direction. To maintain a lower groundwater table and provide flood drainage, 48 miles of large artificial channels were built. The Merritt, Faka Union, Miller, and Prairie canals ultimately delivered all drainage to the lower end of the Faka Union (central) canal. These canals additionally provided conveyance for water drained from Northern Golden Gate Estates, located outside the main study area, north of Interstate 75. The operation of these large canals lowered groundwater throughout the SGGE Project Area landscape. Pre-drainage sheet flow was virtually eliminated; aquifer storage was reduced due to the generally lowered water table. Channeling all of the flow caused "shock load" discharges to the estuaries, releases of very large quantities of freshwater over a relatively small cross-sectional area of Faka Union Bay, during a relatively short time. Subdivision and road construction, as well as some land clearing on purchased lots inside the SGGE Project Area further changed the landscape by promoting invasion of upland and exotic vegetation, changes in species dominance in native communities, and increased wildfire. Beginning in 1985, the State of Florida started purchasing the SGGE Project Area lands with the purpose of restoring the hydrology and ecology of the area and combining the surrounding natural preserve units.

It is estimated that the Golden Gate and Faka Union Canal systems have increased drainage 16 times faster than historic conditions, lowered water tables by 2 to 4 feet, and reduced hydroperiods by 2 to 4 months, resulting in a dramatic increase in forest fires and annual runoff (Gore 1988).

6.1.2 Natural Communities

The PSRP Project Area, located in Collier County, Florida, has a mosaic of natural communities present (Figure 25). The project lies east of the city of Naples, between Interstate 75 (I-75) and U.S. Highway 41 (US-41). Combined with the Belle Meade State Conservation and Recreation Lands (CARL) area to the west, the PSRP Project Area constitutes the heart of what is now called Picayune Strand State Forest. This forest is located south of Northern Golden Gate Estates (NGGE) and I-75, southwest of the Florida Panther National Wildlife Refuge, north of the marine preserves and refuges that constitute the Ten Thousand Islands Region and Collier-Seminole State Park, and west of the Fakahatchee Strand Preserve State Park. The project area contains some of the most diverse natural communities in North America and could provide habitat for several Federally listed species, including the critically endangered Florida panther. However, 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.

Currently, the canal system associated with SGGE has hydrologic influence over all the surrounding private, state, and federal lands. The estuarine area of influence of the SGGE canal drainage within the coastal natural communities covers four major embayments, which are, from west to east: Blackwater

River, Pumpkin Bay, Faka Union Bay, and Fakahatchee Bay. Expansion of the project boundary to include lands for the SWPF, also creates an estuarine area of influence to Palm Bay, and possibly Goodland Bay as well.

The descriptions of existing conditions for each natural community listed below are from the Picayune Strand State Forest (PSSF) Unit Management Plan (FDACS 2008) and the Collier Seminole State Park (CSSP) Unit Management Plan (FDEP 2004).

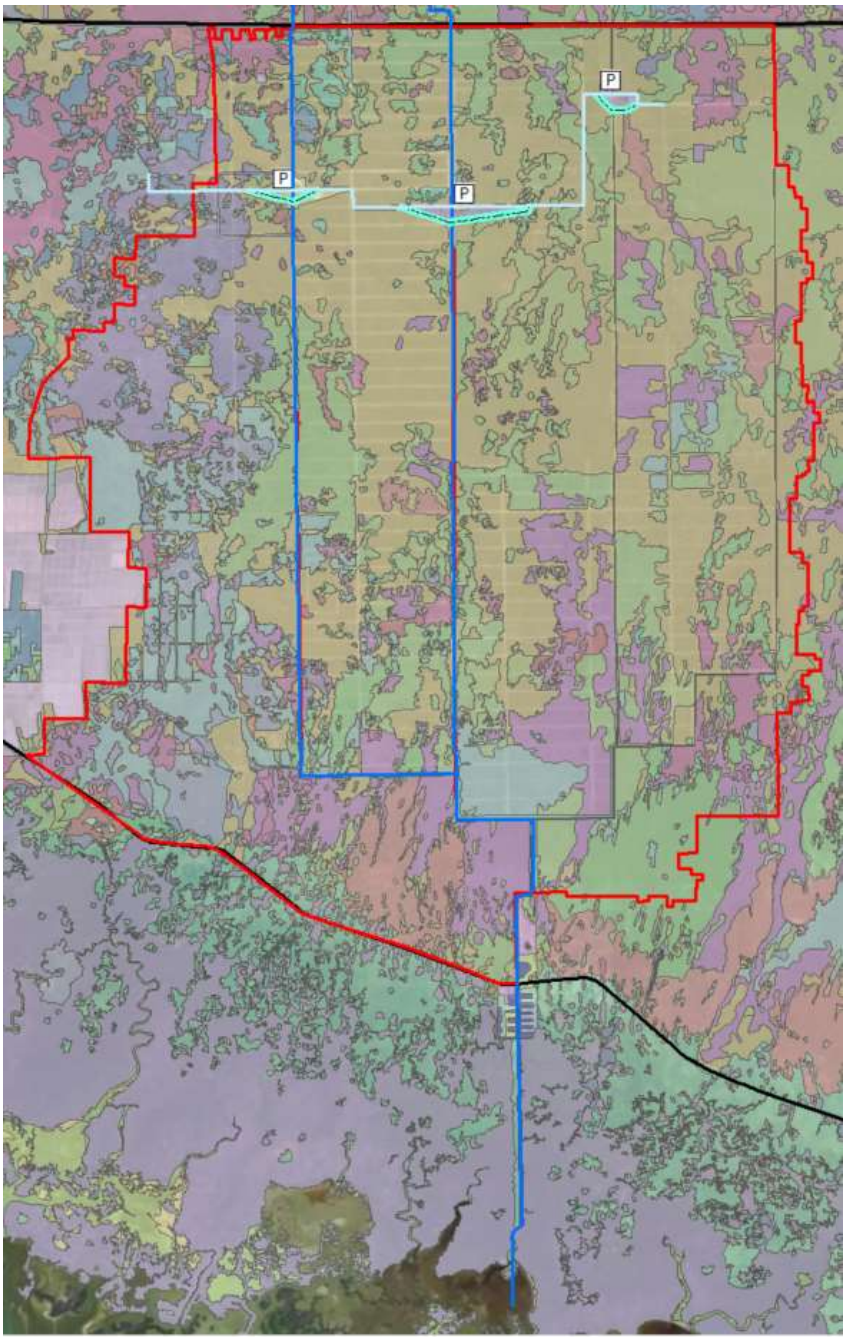

Figure 25: Map of the natural community mosaic within and downstream of the PSRP (boundary in red)

6.1.2.1 Mesic Hammock

PSSF

This community has expanded substantially in distribution. Most mesic hammocks are small and have changed little except where drainage has encouraged severe wildfires. Currently, the sabal palm component of this community may be more prevalent than the oak in the canopy layer. Although non-native invasive plants are not as severe an obstacle in this community, native ground and shrub species are reduced due to shading and/or non-native plants. Ground and shrub covers in these areas range from quite diverse to just a few species. More specific information may be attained after a thorough inventory (including ground truthing, in progress) is conducted within these stands.

6.1.2.2 Rockland Hammock

CSSP

Rockland hammock is the reason the park was created. The proponents of Lincoln-Lee National Park saw this appealing tropical forest as its principal feature. They were especially eager to safeguard the large royal palms. Even aside from the royal palms, it remains an excellent example of a surviving tropical hardwood forest in southern Florida. About 35 species of trees have been identified including the most northerly records for such species as gulf graytwig (*Schoepfia chrysophylloides*) inkberry (*Exothea paniculata*), and guiana plum (*Drypetes lateriflora*). From a nature trail, fine examples of satinleaf (*Chrysophyllum oliviforme*), Jamaica dogwood or Florida fishpoison tree (*Piscidia piscipula*), and Simpson's stopper (*Myrcianthes fragrans*) can be seen. A specimen of devil's claw (*Pisonia aculeata*) growing along this trail may be the largest in Florida. A strangler fig (*Ficus aurea*) of impressive size grows in the hammock near the service area. Unfortunately, when the park was developed, some of the trees were cleared to make way for park facilities, although there may have been some clearing prior to that time by settlers or perhaps Native Americans. The memorial field, service area, picnic areas and part of the campground were originally rockland hammock. Part of the old memorial field is being restored by planting tropical hardwood trees grown in the park nursery.

In 1960, the hammock was flattened by Hurricane Donna. Trunks of many of the old hardwoods can still be seen prostrate on the ground. In 1992, another strong hurricane, Hurricane Andrew passed south of the park; although it flattened hammocks near the east coast, the observable impact to large trees at Collier-Seminole State Park was principally to laurel oaks that frequently are afflicted by heart rot in this environment and are easily toppled by strong winds.

There are two smaller rockland hammocks in the park, one is in the eastern portion, north of US-41. The other is in the western part of the park, south of Old Marco Road. These intergrade with, and are undoubtedly successional products of, prairie hammocks. Those examples south of Old Marco Road superficially appear to be prairie hammocks because of the signature given by oaks and cabbage palms, but an examination of the understory shows species indicative of an emerging rockland hammock. Whether these prairie hammocks eventually completely succeed to rockland hammock depends on whether or not fire enters them which is itself largely dependent on how much moisture is retained in the emerging humus layer during dry years.

6.1.2.3 Prairie Hammock

PSSF

The lower elevation and wetter prairie hammock was not present in SGGE in 1940 to the scale that is currently observed. In 1995, it occupied over 2,500 acres. Prairie hammock and wet pine flatwoods communities have primarily replaced cypress communities in SGGE. The replacement by prairie hammock of a large area of cypress along the eastern boundary of SGGE to the south of Prairie Canal, which is probably less affected by drainage, suggests that lack of fire is probably also playing a role in this conversion. Prairie hammock areas in the Belle Meade have likely changed significantly and are restricted to small areas between flatwoods and cypress sloughs.

CSSP

This community is found in the western part of the park, immediately south of the Old Marco Road. Prairie hammocks in the park are characterized as clumps of cabbage palms and live oaks in the midst of marl prairie or marsh communities. This community is itself likely the product of an advanced successional stage of marl prairie. Prairie hammocks have a relatively open understory. Typical understory plants include wax myrtle, white stopper, Spanish stopper, marlberry, pigeon plum, poison ivy, orchids and an occasional gumbo-limbo tree. If this community escapes fires long enough, it will eventually succeed into rockland hammock as the above-mentioned understory plants may suggest. That will require the buildup of large amounts of humus.

6.1.2.4 Tropical Hardwood Hammock

PSSF

The lower elevation and wetter tropical hammock was not present in SGGE in 1940 (i.e., 299 acres) to the scale currently observed (i.e., 740 acres in 1995). Most tropical hardwood hammocks are small and have changed little except where drainage and past isolated disturbance, including plow lines from wildfires has altered them. They are found scattered as isolated pockets usually completely surrounded by cypress. The most significant tropical hardwood hammocks are found in the Belle Meade or the southern portion of SGGE. They are dominated by hardwoods such as sabal palm and live oak, and pond cypress occurs but is not common. Although non-native invasive plants are not as severe an obstacle in this community, native ground and shrub species are reduced due to shading and/or non-native plants. Shrub density is sparse to moderate, and usually made up of small hardwoods including myrsine, wild coffee, indigo berry, stoppers, wild lime, and poison ivy. Groundcover is variable, often dominated by ferns. Epiphytic bromeliads are common in trees and ferns are common on palm trunks.

6.1.2.5 Hydric Hammock

PSSF

This community is probably more extensive now than historically (pre-drainage). Most hydric hammocks are small and have changed little except where drainage has encouraged severe wildfires. They are dominated by hardwoods such as red maple, sabal palm, and laurel oak on wetter sites. Bald cypress occurs, but is not common. Although non-native invasive plants are not as severe an obstacle in this community, native ground and shrub species are reduced due to shading and/or non-native invasive plants. Shrub density is sparse to moderate, and usually made up of small hardwoods including myrsine, wild coffee or dahoon holly. Ground cover is variable, often dominated by ferns. Epiphytic bromeliads are common in trees and ferns are common on palm trunks.

6.1.2.6 Mesic Flatwoods

PSSF

Currently there is a moderate reduction in the acreage of mesic and wet pine flatwoods, although they generally have a very different distribution from where they occurred in 1940. Wet pine flatwoods have tended to expand into what were cypress communities in 1940. There has been a substantial increase in the acreage of pine flatwoods that have been heavily invaded by sabal palms, which provide 30% or more understory cover. Mesic pine flatwoods in the Belle Meade have changed little in terms of extent and location since the 1940's, except for infestation by non-native invasive species, especially melaleuca. However, drainage in the northern portion has facilitated an increase in cabbage palm abundance. Areas of fire exclusion threaten much of the flatwoods in the northern half of the Belle Meade which still contain numerous old (>150 years) slash pines. Other areas, especially the central portion of the Belle Meade have had canopy removed by wildfires. In contrast, the southern Belle Meade, which has had the least amount of hydrological alteration, the mesic flatwoods has been maintained by a relatively natural fire regime and still supports RCWs.

CSSP

The mesic flatwoods community is present in the northern portion of the park interspersed as scattered islands among wet flatwoods and strand swamps. This community is a relatively small portion. In the park, mesic flatwoods is distinguished from wet flatwoods by the presence of large, contiguous patches of saw palmetto. Some large, predisturbance slash pines can be seen here. Both communities have slash pines in the overstory although they are generally more stunted in wet flatwoods. As for ground cover, the mesic flatwoods has enough continuous coverage of saw palmetto to give a characteristic slick signature on aerial photographs. Although small in proportion, the community is noteworthy because of the slash pine trees that are quite old and of an impressive size even, though some trees were removed during the 1960s through selective cutting.

Mesic flatwoods are closely associated with and often grade into wet flatwoods or scrubby flatwoods. The differences between these communities are generally related to minor topographic changes. Wet flatwoods occupy the lower, wetter areas while scrubby flatwoods occupy the higher, drier areas.

6.1.2.7 Scrubby Flatwoods

CSSP

This community is a relatively small proportion of the park acreage. It is the driest of natural communities in the park, being on elevated sands. It is characterized by a dense growth of sand live oaks and myrtle oaks. However, other scrub oak species commonly found in scrubby flatwoods are conspicuously absent or present in much reduced quantity at this southerly latitude. For example, running oak (Quercus minima) is present but is not abundant. Gopher tortoises, although few in number, are often seen here. Scrubby flatwoods occurs--just north of U.S. Highway 41, next to the borrow pit. This site was partially destroyed by the digging of a borrow pit in the 1970s. The other principal locations for this community in the park are near the borrow pit along the south side of Hwy 92 and near West Palm Run as it approaches Highway 92.

6.1.2.8 Wet Flatwoods

PSSF

Wet flatwoods systems on PSSF have had hydroperiod and substrate disturbance coupled with fire exclusion and so accumulate litter loads quickly, resulting in plant diversity degradation with invasion by opportunistic species such as cabbage palm and grape vine (*Vitis spp*.), accelerated non-native invasive plant invasions, declines in pine tree recruitment, and increases in wildfire.

Currently in SGGE there is a moderate reduction in the acreage of wet pine flatwoods, although they generally have tended to expand into what were cypress communities in 1940 and the distribution has changed. Drainage has altered the wet flatwoods in the northern portions of Belle Meade, otherwise acreage and distribution has not likely changed significantly, although pine has established in formerly cypress dominated areas. Areas of fire exclusion threaten much of the flatwoods in the northern half of the Belle Meade which still contain numerous old (>150 years) slash pines. Other areas, especially the central portion of the Belle Meade have had canopy removed by wildfires. There has been a substantial increase in the acreage of pine flatwoods that have been heavily invaded by sabal palms, which provide 30% or more shrub cover. These palms are usually of similar size and appear to be even-aged. Dense palm stands occur on calcareous substrates in both natural uplands and uplands created by drainage. Disturbed pine flatwoods are very limited in extent, but can be identified by the presence of physically altered soils; large areas of charred, dead trees; and dominance or partial dominance by ruderal species such as saltbush (*Atriplex spp*.), wax myrtle, muscadine grape (Vitis rotundifolia), poison ivy (*Toxicodendron radicans*), or Brazilian pepper (*Schinus terebinthifolius*).

CSSP

The wet flatwoods community is more common than mesic flatwoods and scrubby flatwoods. With respect to ground cover, except for the abundance of the parasitic *Cassythia filiformis* (love vine), this community closely resembles the standard description given for it by FNAI. In the park and surrounding region, the demarcation between wet flatwoods and adjoining strand swamps is often indistinct. This blending effect is in part due to disruptions in the hydrological regime followed by the spread of slash pine into adjoining strand swamps. In spite of these perturbations, this community remains a remarkably fine example of south Florida flatwoods.

6.1.2.9 Marl Prairie

CSSP

Examples of this community occur in the western part of the park, south of Old Marco Road and in the eastern part of the park, just north of US-41. Generally, vegetation in the more northerly parts of the prairie reflect the influence of freshwater sheet flow coming in from the north, whereas the southerly ones, by contrast, show the brackish influence of infrequent tidal surges. To the north, under freshwater influence, sawgrass is more abundant, while in the tidal-influenced marl prairies, *Eleocharis cellulosa*, a salt tolerant spikerush, shows up. In the latter case, FNAI's synonym for marl prairie of spikerush marsh is more appropriate. However, the widely scattered, stunted cypress or mangrove trees that FNAI describes as being present are not seen in this park. That community-type is more indicative of the Everglades regions of Everglades National Park and Big Cypress National Preserve.

6.1.2.10 Wet Prairie

PSSF

Prior to drainage on PSSF in 1940, wet prairies were most extensive (approximately 7,600 acres) just upstream of the brackish marshes along the coast, with smaller scattered areas in the northern and eastern portions of the SGGE Tract. The lack of change between 1940 and 1995 in the larger, more downstream wet prairies is most likely due to their low elevation and proximity to the coast, which could reduce the ability of the canals to drain these sites. There is currently substantial acreage of wet prairie with palms on sites that were cypress forests prior to drainage. These probably represent sites where sabal palm invaded following drainage, and subsequent fires eliminated the cypress. There are some small areas of disturbed wet prairie that were cypress forest and are now at least partially dominated by ruderal species such as saltbush, wax myrtle, muscadine grape, poison ivy, or Brazilian pepper. Fires have probably eliminated the cypress, and with the drier conditions following drainage, early succession upland species are now invading these sites. The acreage and distribution of wet prairies in the Belle Meade may also have changed little, except for the abundance of cabbage palms in the northern portion and melaleuca throughout. The wet prairies are smaller in the Belle Meade than in SGGE and represent more of a narrow ecotone between wet flatwoods and cypress communities.

Wet prairies are found throughout the forest, primarily in the mesic flatwoods, embedded within cypress domes, and occur as remnants in the abandoned pastures. Several of these prairies have been altered by drainage and the invasion of shrub species including wax myrtle and groundsel tree. The vegetation is similar to the typical description, with several areas containing higher densities of cabbage palm and other upland species in this habitat. Also, damage from OHV use is extensive. Over 50% of the prairies have been rutted, soils compacted and the vegetation destroyed. Torpedo grass, a non-native invasive species, most often dominates areas that were damaged by OHV use during the wet season.

6.1.2.11 Strand Swamp

PSSF

This community type has been the habitat most heavily impacted on PSSF by logging operations and canal-induced drainage. Based on the 1940 NRCS vegetation map, almost 40,000 acres of the lands within SGGE were classed as cypress or cypress with palm forest. As historic cypress strands within the SGGE became drier due to the canal-induced draw down, there was a shift in vegetative succession toward a mixed cypress-hardwood-sabal palm system (USACE and SFWMD 2004). Cypress forest was reduced by about 20,000 acres, and cypress with palm forest changed in location [to formerly all-cypress areas], but not acreage. As a result of these abnormally dry conditions, hotter fire now frequently burns farther from prairies and flatwoods communities into adjacent cypress strands or other hydric forested systems. Pines, sabal palms and saw palmettos that are adapted to drier conditions and more intensive fire regimes have replaced most of the cypress forest communities. Often non-native invasive species like Brazilian pepper and melaleuca have become dominant or co-dominant in many of these formerly hydric communities, especially areas that have burned in wildfires.

A small portion of the cypress forest has been converted to cypress-with-hardwoods, probably due to a lack of fire compounded with drier conditions, which has allowed succession to proceed. These forests are dominated by bald cypress and a variety of hardwoods that provide more than 30% canopy cover,

such as red maple, pop ash, and pond apple. Epiphytic bromeliads are common in trees in this community, and ferns are common on palm trunks.

Currently there are about 1,200 acres of the original cypress that are classified as disturbed. Disturbed cypress forests have been significantly changed as evidenced by physically altered soils; large areas of charred, dead trees; and/or dominance or partial dominance by ruderal species such as saltbush (Atriplex cristata), wax myrtle, muscadine grape, poison ivy, and/or Brazilian pepper.

Cypress areas in the Belle Meade are less affected by drainage except in the northern portions. In the drained northern areas, ponds which were logged did not regenerate. In other areas, pine has become established. Most of the cypress in the Belle Meade area has changed [comparatively] little except through past logging operations, roads and wildfire control lines, and non-native invasive species invasions.

CSSP

This community, where the cypress strands appear discontinuous, may resemble cypress domes. They have suffered from fire exclusion and altered hydroperiods. Regarding the latter, numerous man-made canals in the region have contributed to drainage of the strand swamps. The drainage canals have reduced the residence time for standing water with the most obvious effect being an abnormally large scattering of slash pines among cypress. As pointed out under wet flatwoods, the effects of these changes are more noticeable in those places where strand swamps border on wet flatwoods. Brazilian peppers have also invaded strand swamps to some extent. Nevertheless the park's strand swamps, represent some of the finest examples of this community in southwestern Florida. Although large cypress trees were logged earlier in this century, some trees in the park escaped. A good example is seen near the headwaters of the Blackwater River, just north of US-41 near the Indian Village. This strand swamp is comprised of huge cypress trees that may be 100-feet tall. It is small in geographical extent, but in character, it resembles the finest examples seen in the Fakahatchee Strand or at Corkscrew Swamp. Generally, the biggest trees reflect where water is deepest and remains longest.

Canopy plants are mainly temperate; for example, cypress and red maple, while understory and epiphytic plants are mainly tropical. While this community is not usually considered as fire adapted, infrequent fire is essential for its maintenance; without fire (FNAI estimates between 30 and 200 years), hardwood invasion, and peat accumulation will shift the community to more mesic conditions in a few hundred years. Cypress is tolerant of light surface fires, but muck fires burning into the peat can kill the trees, lower the ground surface and transform a strand into a slough. The largest trees on the deepest and wettest peat usually withstand fires. This is often where sloughs are found.

6.1.2.12 Basin Swamp

PSSF

As historic cypress strands within the SGGE became drier due to the canal-induced draw down, there was a shift in vegetative succession toward a mixed cypress-hardwood-sabal palm system. As a result of these abnormally dry conditions, hotter fire now frequently burns farther from prairies and flatwoods communities into adjacent cypress strands or other hydric forested systems. Pines, sabal palms and saw palmettos that are adapted to drier conditions and more intensive fire regimes have replaced most of the cypress forest communities. Often non-native invasive species like Brazilian pepper and melaleuca have

become dominant or co-dominant in many of these formerly hydric communities, especially areas that have burned in wildfires. Unlike most basin swamps, the swamp in Belle Meade is located on deep sands, and peat accumulation is not expected.

Dwarf or scrub pond cypress savannas generally have a relatively low density of stunted pond cypress with sparse understories, much exposed sandy soil during the dry season, and a mixture of wetland herbaceous plants. In some of these pond cypress savannas there are small isolated prairie hammocks with a dense shrub layer of saw palmetto. Within the dome swamps in the Belle Meade, pop ash (*Fraxinus caroliniana*) and pond apple present along with pond cypress in the interior, with bald cypress is present at the exterior of the dome. The vegetation is similar to the typical description, with several areas containing higher densities of cabbage palm and other upland species in this habitat. There are few shrubs present, which include St. John's wort and corkwood (*Stillingia aquatica*). Groundcover plants include beakrushes (*Rhynchospora spp*.), yellow hatpin (*Syngonanthus flavidulus*), swamp sawgrass (*Cladium jamaicense*), and grasses such as gulfdune paspalum (*Paspalum monostachyum*), blue maidencane, and bluejoint panicum (*Panicum tenerum*). Epiphytes include air plants and the butterfly orchid (*Encyclia tampensis*)

6.1.2.13 Depression Marsh

PSSF

Prior to drainage on PSSF, there were only a few small marshes present, with most of them located in the northern portion of the salt marshes near the coast. The conversion of sheetflow conditions would be expected to have converted all the freshwater marshes along the coast to salt marshes. However, the data cannot show if this has actually happened because the 1995 plant community classification combined salt and fresh marsh into a single class along the coast. Sea level rise may impede freshwater marsh reestablishment (USACE and SFWMD 2004).

Depression marshes are found throughout the forest, primarily in the mesic flatwoods, and occur as remnants in the abandoned pastures. They are also found embedded within cypress domes. Several of these marshes have been altered by drainage and the invasion of shrub species including wax myrtle and baccharis (*Baccharis halimifolia*). Previous fire history is unknown. Although non-native invasive plants are not as severe an obstacle in this community, native ground and shrub species are reduced due to shading and/or non-native invasive plants. There is one very large freshwater marsh located in the north end of SGGE. The vegetation of this particular marsh is primarily alligator flag, pickerel weed, and scattered pond cypress. While relatively intact, this area may not receive sufficient water from the restoration to restore the hydrology of the area. There is some damage from OHV use, and from dumping.

6.1.2.14 Slough

CSSP

This community occupies the deeper drainage ways of cypress strand interiors and is distinguishable by water which is present at least two-thirds of the year (ca. 250 days), and by the abundance of pond apple, pop ash trees, and cutgrass or southern wild rice in deeper sloughs (*Zizaniopsis miliacea*). Sloughs are usually in the lowest part of linear depressions in the underlying limestone bedrock. With the almost constant water presence, the relative humidity is higher than in the surrounding or associated strand swamps as indicated by greater numbers of epiphytic bromeliads, ferns and orchids. The nearly constant

presence of water also moderates temperature and provides some degree of frost protection for the delicate epiphytic plants during the colder winter months. Sloughs are vulnerable to hydrologic disturbance and must have a permanent, reliable, water source of good quality to persist. Currently only two well-defined sloughs are recognized and mapped in the park.

6.1.2.15 Estuarine Tidal Marsh

CSSP

This graminoid-dominated community of the park is best developed near tidal streams and along the inland boundary of the tidal swamps. Spike rush (*Eleocharis cellulosa*) and cordgrasses dominate tidal marshes at Collier-Seminole. The most accessible example is near the boat dock. It remains in an apparently pristine condition, but mangrove trees have gradually encroached at the margins over the past 30 years (personal communication, Ken Alvarez).

6.1.2.16 Estuarine Tidal Swamp

CSSP

This community occupies most of the park. It is a segment of the great mangrove swamp of southern Florida, one of the largest in the world. The dominant plants are red, black and white mangroves and buttonwood. The community appears to be in an original condition, except for the infestation of Brazilian pepper in some locales where the ground is elevated above the reach of high tide. In this bioenergetically rich community, plant diversity is low compared to animal diversity that is especially high because of the abundant fish and invertebrate species.

6.1.3 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.

6.1.4 Infrastructure

As of February 2020, there have been a number of incremental infrastructure changes due to implementation of the PSRP. These changes include removal of some of the roadway and drainage swale network constructed by the GAC in the 1960s and 1970s and plugging of the Prairie Canal, Merritt Canal, and most of the Eastern Stair Steps. Additionally, three pump stations (Merritt, Faka Union, and Miller) have been built along with a spreader feature with each to facilitate the spreading of water to sheet flow through the project area to the downstream estuaries. A tieback levee protecting the northern portion of Picayune Strand State Forest, I-75, and the southern portion of the Northern Golden Gate Estates has been implemented. The manatee mitigation feature is complete and observations have confirmed use by West Indian manatees as a refugia.

In order for the full PSRP to be completed, the SWPF, including conveyance features, must be constructed prior to the restoration of Miller Canal and the southern portion of the Faka Union Canal. Miller Canal and the southern portion of the Faka Union Canal continue to drain the western and southern portions of the PSRP footprint providing additional flood risk management to adjoining properties.

6.2 Listed Species

There are 100 state and federal listed threatened and endangered species either known to exist or potentially exist within the project area and, subsequently, may be affected by the proposed project (Table 3). Many of these species have been previously affected by habitat impacts resulting from wetland drainage, alteration of hydroperiod, wildfire, and water quality degradation. USACE has coordinated the existence of federally listed species with USFWS and with NMFS, as appropriate. Specifically, coordination with NMFS includes listed fish, whales, and sea turtles at sea. Separate coordination with the NMFS has been initiated to assess potential affects to marine species. Coordination with FWS includes other listed plants and animals.

6.2.1 Federally Listed Species

On 30 May2017, USACE provided a species request letter to USFWS in order to determine what species should be evaluated for impacts in association with the PSRP SWPF and additional conveyance features. On 7 July 2017, USFWS agreed that the list provided by USACE was appropriate. Of the 100 species included, 32 species (31 fauna and 1 flora) are federally listed species and further evaluated in this BA (Table 4). In addition there are three critical habitats that are discussed as well.

Table 4: List of Federal listed species potentially occurring in the vicinity of the PSRP.

Scientific Name	Common Name	Federal Status
REPTILES		
Alligator mississippiensis	American Alligator	Threatened (Similar Appear)
Caretta caretta	Loggerhead sea turtle	Threatened
Chelonia mydas	Green sea turtle	Endangered
Crocodylus acutus	American crocodile	Threatened
Dermochelys coriacea	Leatherback sea turtle	Endangered
Drymarchon couperi	Eastern indigo snake	Threatened
Eretmochelys imbricata	Hawksbill sea turtle	Endangered
Gopherus polyphemus	Gopher tortoise	Candidate
Lepidochelys kempii	Kemp's ridley sea turtle	Endangered
BIRDS		
Ammodramus maritimus mirabilis	Cape Sable seaside sparrow	Endangered
Aphelocoma coerulescens	Florida scrub jay	Threatened
Calidris canutus rufus	Red knot	Threatened
Campephilus principalis	Ivory-billed woodpecker	Endangered
Charadrius melodus	Piping plover	Threatened
Mycteria americana	Wood stork	Threatened
Picoides borealis	Red-cockaded woodpecker	Endangered
Polyborus plancus audubonii = *Caracara cheriway*	Audubon's crested caracara = Northern crested caracara	Threatened
Rostrhamus sociabilis plumbeus	Everglade snail kite	Endangered
Setophaga kirtlandii	Kirtland's warbler	Endangered

Scientific Name	Common Name	Federal Status
Sterna dougallii dougallii	Roseate tern	Threatened
INVERTEBRATES		
Anaea troglodyte floridalis	Florida's leafwing butterfly	Endangered
Cyclargus ammon	Nickerbean blue butterfly	Threatened (Similar Appear)
Cyclargus thomasi bethunebakeri	Miami blue butterfly	Endangered
Orthalicus reses	Stock Island tree snail	Threatened
Hemiargus ceraunus antibubastus	Ceraunus blue butterfly	Threatened (Similar Appear)
Leptotes cassius theonus	Cassius blue butterfly	Threatened (Similar Appear)
Strymon acis bartrami	Bartram's hairstreak butterfly	Endangered
MAMMALS		
Eumops floridanus	Florida bonneted bat	Endangered
Puma concolor coryi	Florida panther	Endangered
Trichechus manatus	West Indian manatee	Threatened
PLANTS AND LICHENS		
Dalea carthagenensis floridana	Florida prairie clover	Endangered (proposed)
CRITICAL HABITAT		
Caretta caretta (near USFWS not NOAA)	Loggerhead sea turtle	Threatened
Charadrius melodus	Piping plover	Threatened
Trichechus manatus	West Indian manatee	Threatened

6.2.2 Designated Critical Habitat

The PSRP is in close proximity to several designated critical habitats including those for loggerhead sea turtle, piping plover, and West Indian manatee (Table 4). Discussion of these critical habitats are included in each species account for which the critical habitat is designated for. For example, loggerhead sea turtle critical habitat is discussed in the loggerhead subsection below.

7 EFFECTS DETERMINATIONS

The physical and chemical conditions of surface waters in the Class III freshwater bodies of the PSRP area generally meeting the state water quality standards. The Faka Union Canal and the estuaries receiving flow from the Faka Union Basin meet standards for fecal coliform, turbidity and chlorophyll. The FDEP Water Quality Assessment Report lists the Faka Union Canal as potentially impaired (category 3c) for dissolved oxygen. However, the receiving estuaries from the Faka Union Basin are listed as impaired water bodies because of high concentrations of bacteria found in shellfish.

The PSRP would improve the water quality of coastal estuaries by increasing freshwater distribution to estuaries east and west of Faka Union Bay and reducing the existing, very large, wet-season, point

discharges from the Faka Union Canal into Faka Union Bay. Additionally, sheet flow of water originating upstream of the project would improve the quality of the water as it passed through restored wetland communities.

Water quality analysis indicated that the project would not degrade the existing ambient water quality for total phosphorus and total nitrogen, as defined by F.A.C. 62-4.242(2), in the OFW. Flows and nutrient loads will be introduced to new locations with the construction of new conveyance features under Hwy-41 and CR-92. These areas will be monitored to asses impacts of an altered hydrologic and nutrient load and an adaptive management framework would be developed and implemented if construction and/or operation of the project causes adverse effects. The SWPF and conveyance features are required in order to realize the full benefits of the PSRP because these features provide the required flood risk management needed for the completion of the remaining phases of the PSRP.

With water quality analysis by SFWMD and FDEP still in process, USACE has addressed water quality concerns as it pertains to individual species accounts listed below.

7.1 "No Effect" Determination

7.1.1 Loggerhead Sea Turtle and "No Effect" Determination

7.1.1.1 Species Description

Federally listed as threatened in Southeast Region of the United States, the loggerhead sea turtle is the most common sea turtle found in Florida. With approximately 90% of nests related to the nesting aggregation of the Northwest Atlantic Ocean's loggerhead sea turtle subpopulation (Ceriani & Meylan 2017). Named for its large head, the loggerhead sea turtle weighs between 155 and 375 pounds while reaching lengths of approximately 3 feet. Loggerhead sea turtles inhabit continental shelves and estuarine environments along the margins of the Atlantic, Pacific and Indian Oceans. With large, heavy, strong jaws, they have primarily carnivorous diet feeding on benthic invertebrates including horseshoe crabs, clams, mussels, and other invertebrates. Adults of both sexes return offshore near nesting beaches in early spring in order to mate. However, the return interval for females is generally every two to three years; sometimes up to four years due to the energy investment associated with each nesting season.

In Florida, female loggerheads typically nest between April and September. Nesting females will lay between 3 and 6 nests per nesting season (4.1 clutches/season in Florida), which are laid 12-14 days apart (Witherington et al., 2006). The average clutch size for loggerheads is 114 eggs (Brost et al. 2015). Once a nest is made, females return to the ocean, providing no parental care. Eggs incubate in the nest for approximately 60 days. Upon hatching, hatchlings frenzy to the ocean water where the swim offshore to hide and feed in floating mats of sargassum (algae).

7.1.1.2 Determination of Effect

Both NMFS and USFWS share federal jurisdiction for sea turtles with NMFS having the lead responsibility for the marine environment and USFWS having lead responsibility on nesting beaches. The location of nesting beaches are well downstream in terms of proximity to the SWPF and conveyance features associated with ALT PC2. Loggerhead sea turtle nesting has been observed on the Gulf-side of the Ten Thousand Islands (Figure 27). These nesting beaches are tidally influenced along the Gulf of Mexico proper. While loggerhead nesting effort is in the median range for Florida (Figure 26), the nesting beaches

will receive little to no impact from the implementation of ALT PC2. USACE has determined that ALT PC2 and will have no effect on the loggerhead sea turtle in association with nesting beaches.

Figure 26: Loggerhead Sea Turtle Nesting Density (2014-2018) based on FWC's Statewide Nesting Beach Survey Data. Density classifications: red defines high-density nesting in top 25% of state density values for species; orange defines medium-density nesting between 25% and 75% of state density values for species; yellow defines low-density nesting in lowest 25% of state density values for species; gray defines nesting not present.

Figure 27: Loggerhead Sea Turtle Nesting Occurrence (1979-2018) based on FWC's Statewide Nesting Beach Survey Data. Yellow represents nesting activity observed. Gray represents no nesting activity observed.

7.1.1.3 Loggerhead Sea Turtle Critical Habitat

Figure 28: Loggerhead sea turtle designated critical habitat (LOGG-T-FL28, LOGG-T-FL29, and LOGG-T-FL30) within the vicinity of the PSRP.

In 2014, the USFWS designated 685 miles of terrestrial coastal habitat, divided into 88 units across 6 states for critical habitat for the Northwest Atlantic population of loggerhead sea turtles (Federal Register 2011; Federal Register 2014). Florida Recovery Unit Critical Habitats LOGG-T-FL28, LOGG-T-FL29, and LOGG-T-FL30 were included in this designation (Figure 28). USFWS, in the ESA, defines critical habitat as, "the identification of geographic areas containing features essential to the conservation of a listed species and which may require special management considerations or protections" (USFWS 2018). Neither the implementation of the SWPF and conveyance features nor the full implementation of the PSRP will affect the terrestrial habitat designated as critical habitat for the loggerhead sea turtle nor the surrounding coastlines in which loggerhead sea turtles may select alternatively for nesting. USACE had determined this project will have no effect on the loggerhead sea turtle

7.1.2 Green Sea Turtle and "No Effect" Determination

7.1.2.1 Species Description

Federally listed as threatened in the Southeast Region of the United States, the green sea turtle is the second most common sea turtle found in Florida. Named for the color of its body fat, the green sea turtle is the only sea turtle that is solely an herbivore. The turtle weighs approximately 300 to 350 pounds with a shell that is approximately 3 feet long. Living in tropical and sub-tropical waters, the important feeding areas for green sea turtles include the Indian River Lagoon, the Florida Keys, Florida Bay, Homosassa, Crystal River, and Cedar Key. Green sea turtles occupy three habitat types: high energy oceanic beaches,

convergence zones in the pelagic habitat, and benthic feeding grounds in relatively shallow, protected waters. Females deposit eggs, 128 per clutch on average, on high energy beaches where a deep nest cavity can be dug above the high water line Brost et al., 2015). On average, 3.6 clutches per year are laid by each female green. Hatchlings leave the beach and move in the open ocean. However, juveniles can often be seen in inlets and estuaries where food and shelter are readily available. Green sea turtles forage in pastures of seagrasses and/or algae. Smaller green sea turtles can also be found over coral reefs, worm reefs, and rocky bottoms.

In Florida, female greens typically nest between June and late September. Nesting females will lay approximately 3.6 clutches per nesting season (Witherington et al., 2006). The average clutch size for greens is 128 eggs (Brost et al., 2015). Once a nest is made, females return to the ocean, providing no parental care. Eggs incubate in the nest for approximately 60 days. Upon hatching, hatchlings frenzy to the ocean water where the swim offshore to hide and feed in floating mats of sargassum (algae).

7.1.2.2 Determination of Effect

Both NMFS and USFWS share federal jurisdiction for sea turtles with NMFS having the lead responsibility for the marine environment and USFWS having lead responsibility on nesting beaches. The location of nesting beaches are well downstream in terms of proximity to the SWPF and conveyance features associated with ALT PC2. Green sea turtle nesting has not been observed on the Gulf-side of the Ten Thousand Islands (Figure 30). These potential nesting beaches are tidally influenced along the Gulf of Mexico proper. While green nesting effort is in the lowest range for Florida (Figure 29), the nesting beaches will receive little to no impact from the implementation of ALT PC2. USACE has determined that ALT PC2 and will have no effect on the green sea turtle in association with nesting beaches.

Figure 29: Green Sea Turtle Nesting Density (2014-2018) based on FWC's Statewide Nesting Beach Survey Data. Density classifications: red defines high-density nesting in top 25% of state density values for species; orange defines medium-density nesting between 25% and 75% of state density values for species; yellow defines low-density nesting in lowest 25% of state density values for species; gray defines nesting not present.

Figure 30: Green Sea Turtle Nesting Occurrence (1979-2018) based on FWC's Statewide Nesting Beach Survey Data. Yellow represents nesting activity observed. Gray represents no nesting activity observed.

7.1.3 Leatherback Sea Turtle and "No Effect" Determination

7.1.3.1 Species Description

Federally listed as endangered for the Southeast Region of the United States, the leatherback sea turtle is third most common sea turtle nesting in Florida. The leatherback is the largest living turtle and weighs up to between 700 and 2,000 pounds, with a length between 4 and 8 feet (Stewart and Johnson, 2006). The leatherback sea turtle lives in tropical and sub-tropical waters. Habitat requirements for juvenile and post-hatchling leatherbacks are virtually unknown. Nesting females prefer high-energy beaches with deep unobstructed access. Leatherback sea turtles primarily feed on jellyfish.

In Florida, female leatherbacks typically nest between March and July. Nesting females will lay multiple nests per season with nest seasons taking place in intervals of two to three years (Stewart and Johnson, 2006). The average clutch size for leatherbacks is approximately 73 eggs (fertilized) with around 25 yolkless eggs (spacers) per clutch (Stewart and Johnson, 2006). In Florida, almost all leatherback nesting takes place on the Atlantic Coast.

7.1.3.2 Determination of Effect

Both NMFS and USFWS share federal jurisdiction for sea turtles with NMFS having the lead responsibility for the marine environment and USFWS having lead responsibility on nesting beaches. The location of nesting beaches are well downstream in terms of proximity to the SWPF and conveyance features associated with ALT PC2. Leatherback sea turtle nesting has not been observed on the Gulf-side of the Ten Thousand Islands (Figure 32). These nesting beaches are tidally influenced along the Gulf of Mexico proper. While leatherback nesting effort is in the lowest range for Florida (Figure 31), the nesting beaches will receive little to no impact from the implementation of ALT PC2. USACE has determined that ALT PC2 and will have no effect on the leatherback sea turtle in association with nesting beaches.

Figure 31: Leatherback Sea Turtle Nesting Density (2014-2018) based on FWC's Statewide Nesting Beach Survey Data. Density classifications: red defines high-density nesting in top 25% of state density values for species; orange defines medium-density nesting between 25% and 75% of state density values for species; yellow defines low-density nesting in lowest 25% of state density values for species; gray defines nesting not present.

Figure 32: Leatherback Sea Turtle Nesting Occurrence (1979-2018) based on FWC's Statewide Nesting Beach Survey Data. Yellow represents nesting activity observed. Gray represents no nesting activity observed.

7.1.4 Hawksbill Sea Turtle and "No Effect" Determination

7.1.4.1 Species Description

Federally listed as endangered for the Southeast Region of the United States , the hawksbill sea turtle is a small to medium-sized marine turtle weighing between 100 to 200 pounds with a shell that is approximately 2 ½ feet in length. The hawksbill sea turtle lives in tropical and sub-tropical waters of the Atlantic, Pacific, and Indian oceans. Areas that are known as important feeding areas for hawksbill turtles in Florida include the waters near the Florida Keys and on the reefs off Palm Beach County. Hawksbill turtles use different habitat types at different stages of their life cycle. Post hatchlings take shelter in weed lines that accumulate at convergence zones. Coral reefs are the foraging habitat of juveniles, sub-adults, and adults. They are known to inhabit mangrove-fringed bays and estuaries, particularly along the eastern shore where coral reefs are absent. Hawksbill sea turtles feed predominantly on sponges using their "hawk-like" beak to crush and break. In Florida, hawksbills lay few nests each year, with the majority of those few occurring between the Florida Keys and Canaveral National Seashore.

7.1.4.2 Determination of Effect

Both NMFS and USFWS share federal jurisdiction for sea turtles with NMFS having the lead responsibility for the marine environment and USFWS having lead responsibility on nesting beaches. The location of nesting beaches are well downstream in terms of proximity to the SWPF and conveyance features associated with ALT PC2. Hawksbill sea turtle nesting has not been observed on the Gulf-side of the Ten Thousand Islands (Figure 34). These nesting beaches are tidally influenced along the Gulf of Mexico proper. While hawksbill nesting effort is in the lowest range for Florida (Figure 33), the nesting beaches will receive little to no impact from the implementation of ALT PC2. USACE has determined that ALT PC2 and will have no effect on the hawksbill sea turtle in association with nesting beaches.

Figure 33: Hawksbill Sea Turtle Nesting Density (2014-2018) based on FWC's Statewide Nesting Beach Survey Data. Density classifications: red defines high-density nesting in top 25% of state density values for species; orange defines medium-density nesting between 25% and 75% of state density values for species; yellow defines low-density nesting in lowest 25% of state density values for species; gray defines nesting not present.

Figure 34: Hawksbill Sea Turtle Nesting Occurrence (1979-2018) based on FWC's Statewide Nesting Beach Survey Data. Yellow represents nesting activity observed. Gray represents no nesting activity observed.

7.1.5 Kemp's Ridley Sea Turtle and "No Effect" Determination

7.1.5.1 Species Description

Federally listed as endangered for the Southeast Region of the United States, the Kemp's ridley sea turtle is the rarest and smallest of all sea turtles weighing only 85 to 100 pounds with a shell measuring 2 to 2.5 feet long. This species is a shallow water benthic feeder consuming mainly algae and crabs. Juveniles grow rapidly. Juveniles and sub-adults have been found along the eastern seaboard of the United States and in the Gulf of Mexico. However, the major nesting beach for the Kemp's ridley sea turtle is on the northeastern coast of Mexico. This species occurs mainly in coastal areas of the Gulf of Mexico and in the northwestern Atlantic Ocean. The post-pelagic stages are commonly found dwelling over crab-rich sandy or muddy bottoms. Juveniles frequent bays, coastal lagoons and river mouths. Similar to the hawksbill, there are few Kemp's ridley nests laid each year in Florida. This is mainly due to the unique nesting behavior known as an "arribada" where most of the known Kemp's ridley population nests over the short period of time at along one nesting beach in northeast Mexico, just south of the Mexico-Texas border.

7.1.5.2 Determination of Effect

Both NMFS and USFWS share federal jurisdiction for sea turtles with NMFS having the lead responsibility for the marine environment and USFWS having lead responsibility on nesting beaches. The location of nesting beaches are well downstream in terms of proximity to the SWPF and conveyance features associated with ALT PC2. Kemp's ridley sea turtle nesting has not been observed on the Gulf-side of the Ten Thousand Islands (Figure 36). These nesting beaches are tidally influenced along the Gulf of Mexico proper. While loggerhead nesting effort is in the lowest range for Florida (Figure 35), the nesting beaches will receive little to no impact from the implementation of ALT PC2. USACE has determined that ALT PC2 and will have no effect on the loggerhead sea turtle in association with nesting beaches.

Figure 35: Kemp's Ridley Sea Turtle Nesting Density (2014-2018) based on FWC's Statewide Nesting Beach Survey Data. Density classifications: red defines high-density nesting in top 25% of state density values for species; orange defines medium-density nesting between 25% and 75% of state density values for species; yellow defines low-density nesting in lowest 25% of state density values for species; gray defines nesting not present.

Figure 36: Kemp's Ridley Sea Turtle Nesting Occurrence (1979-2018) based on FWC's Statewide Nesting Beach Survey Data. Yellow represents nesting activity observed. Gray represents no nesting activity observed.

7.1.6 Cape Sable Seaside Sparrow and "No Effect" Determination

7.1.6.1 Species Description

Measuring 13-14 centimeters in length, the Cape Sable seaside sparrow is one of nine subspecies of seaside sparrows (Werner 1975). Cape Sable seaside sparrows are non-migratory residents of freshwater to brackish marshes and their range is restricted to the lower Florida peninsula. They were originally listed as endangered in 1969 due to their restricted range (USFWS 1999). Subsequent changes in their habitat have further reduced their range and continue to threaten this subspecies with extinction.

Cape Sable seaside sparrows prefer mixed marl prairie communities that include muhly grass (*Muhlenbergia filipes*) for nesting (Stevenson and Anderson 1994). Marl prairie communities have short-hydroperiods (the period of time during which a wetland is covered by water) and contain a mosaic of moderately dense, clumped grasses, interspersed with open space that permit ground movements by the sparrows (USFWS 1999). Cape Sable seaside sparrows are generally not found in communities dominated by dense sawgrass, cattail (*Typha spp.*) monocultures, long-hydroperiod wetlands with tall, dense vegetative cover, spike rush marshes, and sites supporting woody vegetation (Werner 1975, Kushlan and Bass 1983). CSSS also avoid sites with permanent water cover (Curnutt and Pimm 1993). The combination of hydroperiod and periodic fire events are critical in the maintenance of suitable mixed marl prairie communities for the Cape Sable seaside sparrow (Kushlan and Bass 1983).

Cape Sable seaside sparrows nest in the spring when the marl prairies are dry. While the majority of nesting activities have been observed between March 1 and July 15 when Everglades marl prairies are dry, (Lockwood et al. 1997, 2001), nesting has been reported as early as late February (Werner 1975), and as late as early August (Dean and Morrison 2001). Males will establish breeding territories in early February and defend these territories throughout the breeding season (USFWS 1999). Male sparrows vocalize to attract females and this particular breeding activity has been shown to decrease with increased surface water conditions (Nott et al. 1998, Curnutt and Pimm 1993).

The Cape Sable seaside sparrow will lay three to four eggs per clutch (Werner 1975, Pimm et al. 2002) with a hatching rate ranging between 0.66 and 1.00 (Boulton et al. 2009b). The nest cycle lasts between 34 and 44 days in length and includes a 12-13 day incubation period, 9-11 day nestling period and 10-20 days of post-fledgling care by both parents (Sprunt 1968, Trost 1968, Woolfenden 1968, Lockwood et al. 1997, Pimm et al. 2002). Nest success rate varies between 21 and 60 percent, depending upon timing of nest initiation within the breeding season (Baiser et al. 2008, Boulton et al. 2009a). Substantially higher nest success rates occur within the early portion of the breeding season (approximately 60 percent prior to June 1) followed by a decline in success as the breeding season progresses to a low of approximately 21% after June 1 (Baiser et al. 2008, Boulton et al. 2009a). In most years, June 1 is a good division between the early high success period and the later, lower success period (Dr. Julie Lockwood email correspondence to USFWS, October 15, 2009). Nearly all nests that fail appear to fail due to predation, and predation rates appear to increase as water level increases (Lockwood et al. 1997, 2001, Baiser et al. 2008). A complete array of nest predators has not been determined. However, raccoons (*Procyon lotor*), rice rats (*Oryzomys palustris*), and snakes may be the chief predators (Lockwood et al. 1997, Dean and Morrison 1998, Post 2007).

A dietary generalist, the Cape Sable seaside sparrow feed by gleaning food items from low-lying vegetation (Ehrlich et al. 1992, Pimm et al. 2002). Common components of their diet include soft-bodied insects such as grasshoppers, spiders, moths, caterpillars, beetles, dragonflies, wasps, marine worms,

shrimp, grass, and sedge seeds (Stevenson and Anderson 1994). The importance of individual food items appear to shift in response to their availability (Pimm et al. 2002).

Cape Sable seaside sparrows are non-migratory with males displaying high site fidelity, defending the same territory for two to three years (Werner 1975). CSSS are capable of both short-distance and longer-range movements, but appear to be restricted to short hydroperiod prairie habitat (Dean and Morrison 1998). Large expanses of deep water or wooded habitat act as barriers to long-range movements (Dean and Morrison 1998). Recent research by Julie Lockwood, Ph.D. of Rutgers University and her students have revealed substantial movements between subpopulations east of Shark River Slough (Lockwood et al. 2008), suggesting that the Cape Sable seaside sparrow has considerable capacity to colonize unoccupied suitable habitat (Sustainable Ecosystems Institute 2007).

7.1.6.2 Determination of Effect

Presently, the known distribution of the Cape Sable seaside sparrow is restricted to two areas of marl prairies east and west of Shark River Slough in the Everglades region (within ENP and BCNP) and the edge of Taylor Slough in the Southern Glades Wildlife and Environmental Area in Miami-Dade County. In the 1930s, Cape Sable was the only known breeding range for the Cape Sable seaside sparrow (Nicholson 1928). Areas on Cape Sable that were occupied by the Cape Sable seaside sparrow in the 1930s have experienced a shift in vegetative communities from freshwater vegetation to mangroves, bare mud flats, and salt-tolerant plants, such as turtleweed (*Batis maritima*) and bushy seaside tansy (*Borrichia frutescens*) (Kushlan and Bass 1983). As a result, Cape Sable seaside sparrow no longer use this area. More recently, continued alterations of Cape Sable seaside sparrow habitat have occurred as a result of changes in the distribution, timing, and quantity of water flows in south Florida. Water flow changes and associated shifts in vegetation appear to be the leading contributor to the decline in Cape Sable seaside sparrow population, which subsequently threaten the subspecies with extinction. Competition and predation also threatens the Cape Sable seaside sparrow.

Marl prairie is only found in small patches along the southern boundary of the PSRP footprint and just south of the PSRP southern footprint, all within Collier Seminole State Park (FDEP 2004). Collier Seminole State Park has approximately 214.15 acres of interspersed marl prairie habitat (Figure 39). The patches of marl prairie found here are susceptible to salt water intrusion, especially during high tide events and storms. Given the current hydrologic patterns, ALT PC2 is expected to increase ponding depth during the wet season (July through October) by up to four inches maximum in the western portions of marl prairie between US-41 and CR-92 and up to six inches maximum in the eastern portions along the north side of US-41 (Figures 37 and 38). However, given the nesting season of March 1 to July 15 on average, wet season water depths would not have an impact on the any potential nesting of the sparrow if present.

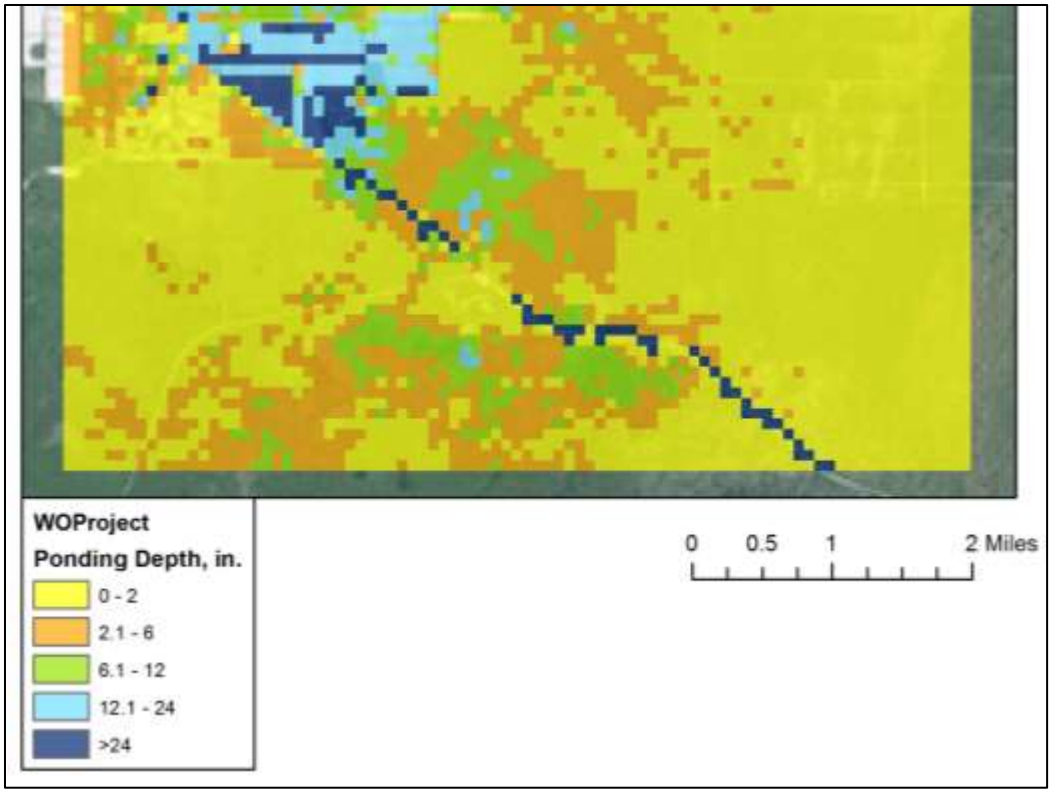

Figure 37: "Without Project" ponding depth for marl prairie.

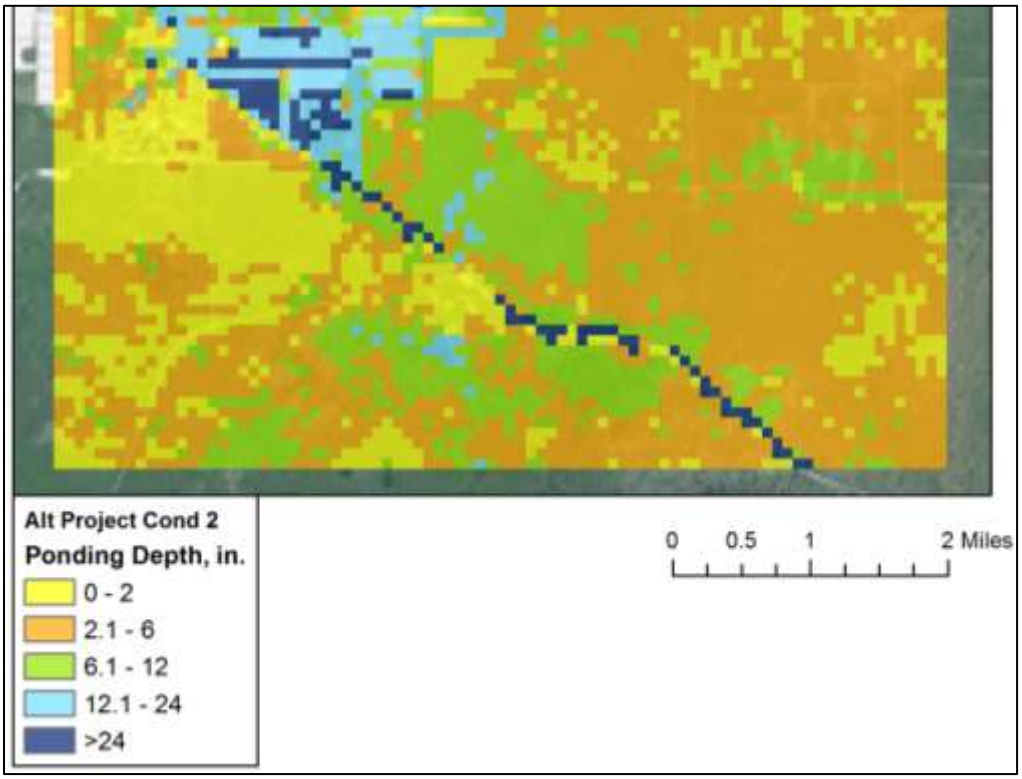

Figure 38: ""ALT PC2" ponding depth for marl prairie.

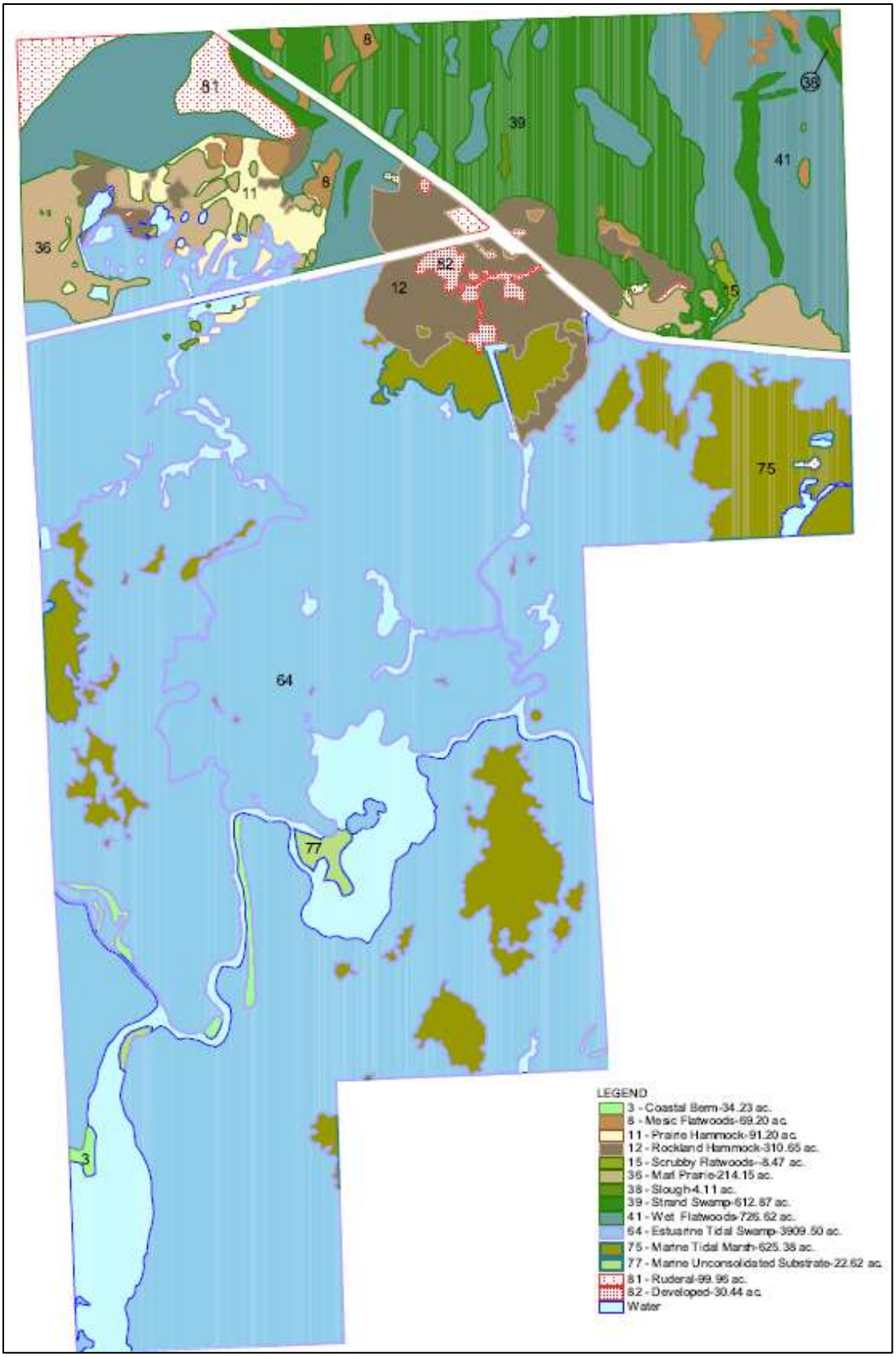

Figure 39: Natural communities map for Collier Seminole State Park (FEDP 2004).

Hydroperiod in the western patches of marl prairie range from less than 1 month to 2 months (Figures 40 and 41). ALT PC2 increases that range for some marl prairie habitat to a range of 2 months to 6 months (Figures 40 and 41). The eastern patches of marl prairie located on the northern side of US-41 range from 2 months to 6 months without project (Figures 40 and 41). Hydroperiod increases for this area with ALT PC2 (Figures 40 and 41).

Given the non-migratory behavior of Cape Sable seaside sparrows and their avoidance of long range movements over open water and forested habitat, it is highly unlikely the Cape Sable seaside sparrow will ever take up residence in the PSRP or downstream estuaries. The mosaic of wetland habitats influenced by historic and current hydrology have not been conducive to supporting Cape Sable seaside sparrow populations. Furthermore, the proximity and potential for periodic brackish conditions from salt water intrusion and tides in the vicinity and potentially within the marl prairie mosaic further reduces the quality of habitat as preferred by the sparrow. With improper site conditions combined with the small patch size mosaic of marl prairie habitat near high speed roadways, there likely is no population currently present with in the PSRP or downstream nor will there be with pre-drainage hydrology restored. The nearest and observation to the PSRP was in Ochopee in July 1971 (Cornell Lab of Ornithology 2019c). Therefore, USACE has determined that ALT PC2 will have no effect on the Cape Sable seaside sparrow.

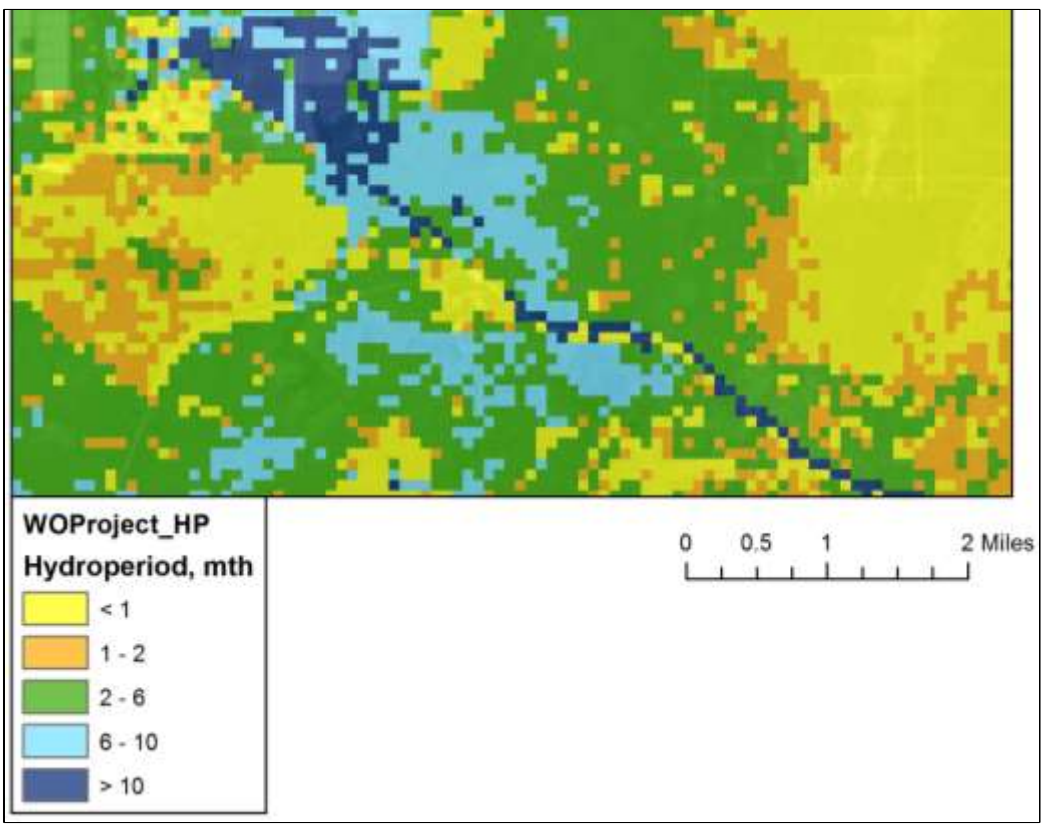

Figure 40: "Without Project" hydroperiod for marl prairie.

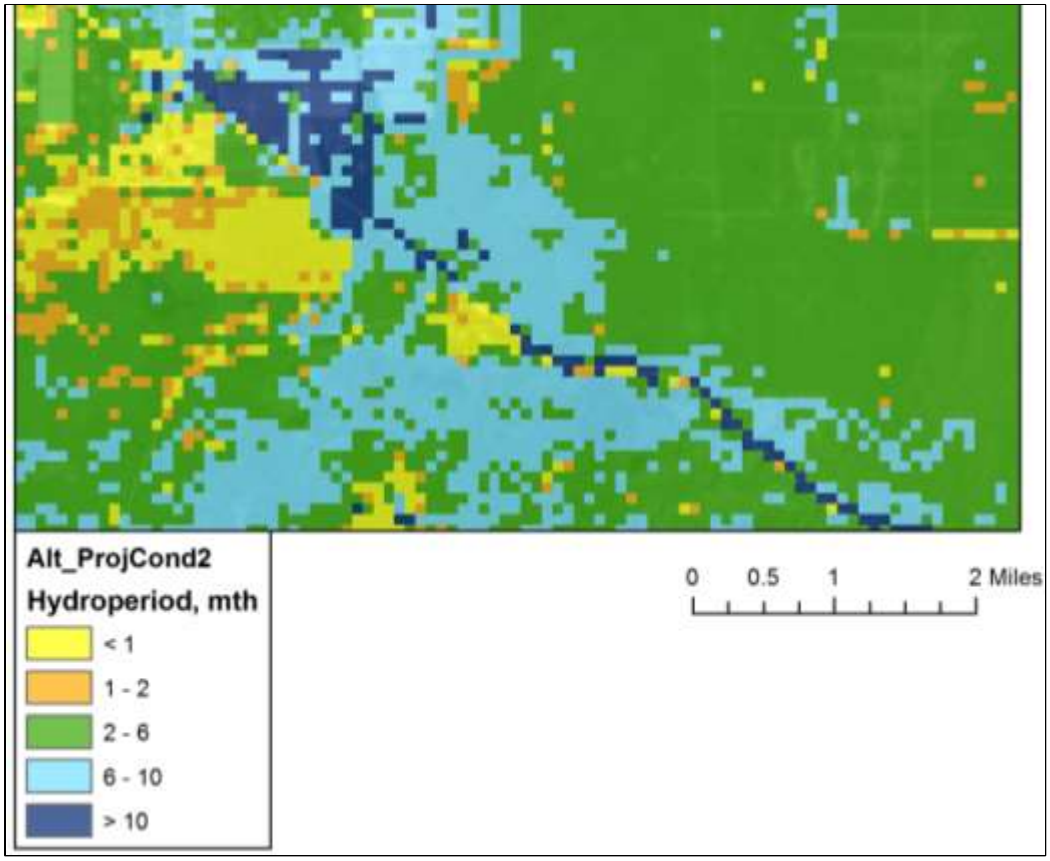

Figure 41: "ALT PC2" hydroperiod for marl prairie.

7.1.7 Florida Scrub Jay and "No Effect" Determination

7.1.7.1 Species Description

The Florida scrub-jay (*Aphelocoma caerulescens*) is federally listed as threatened. It is a small to medium sized blue and gray bird reaching lengths of 30.5 centimeters (cm) with wingspans up to 34.3 cm. It is endemic to Florida and ranges throughout much of the central part of the state, preferring areas of sand pine and xeric oak scrub (FFWCC 2017d). The Florida scrub-jay has extremely specific habitat requirements (USFWS 1999). Historically, the scrub-jay has inhabitated dune ecosystems and coastal scrub habitats containing well-drained sandy soils to oak-dominated scrub (xeric) that are adapted to nutrient poor soils, high seasonal rainfall, periodic drought, and frequent fires (USFWS 1999). Optimal habitat are generally comprised of stunted, low-growing oaks such as sand live oak (*Quercus geminata*), Chapman oak (Quercus chapmanii), myrtle oak (Quercus myrtifolia), and scrub oak (Quercus inopina) (USFWS 1999). Preferred habitats contain 1 to 3 meters high oaks with 10% to 50% unvegetated open sandy openings (USFWS 1999).

Florida scrub jays live in social units, typically made of family members, which engage in cooperative breeding. Groups range from a single mated pair up 12 extended family members (8 adults and up to 4 juveniles) (USFWS 1999). The species is non-migratory, extremely sedentary, and permanently territorial (USFWS 1999). Fewer than 5% of scrub-jays disperese more than 8 kilometers where habitat is suitable. Dispersal distances are dependent upon habitat type and range from 2 kilometers over open water and

urban areas, to 8–24 kilometers over broken pasture, fence rows, and roads sites and patch overgrown shrub areas.

Invertebrates comprise the majority of the Florida scrub jay diet, with acorns being their most important plant food. Foraging is done on open ground, via natural or man-made clearings and acorn stashing is an important behavior. The species are cooperative breeders and occupy year-round multipurpose territories, nesting in shrubby oaks, between 1 and 2 meters high.

7.1.7.2 Determination of Effect

Habitat requirements preferred by the Florida scrub jay are non-existent within the PSRP footprint and downstream estuaries. Xeric, scrub, and sandhill type communities consisting of open sandy soils for food caching is unavailable in pre-restoration, as well as, post-development conditions in PSRP. Additionally, there have been no Florida scrub jay observations reported on eBird in the vicinity of the PSRP (Figure 42). Therefore, USACE has determined that PSRP overall and the implementation of ALT PC2 will have no effect on the Florida scrub jay.

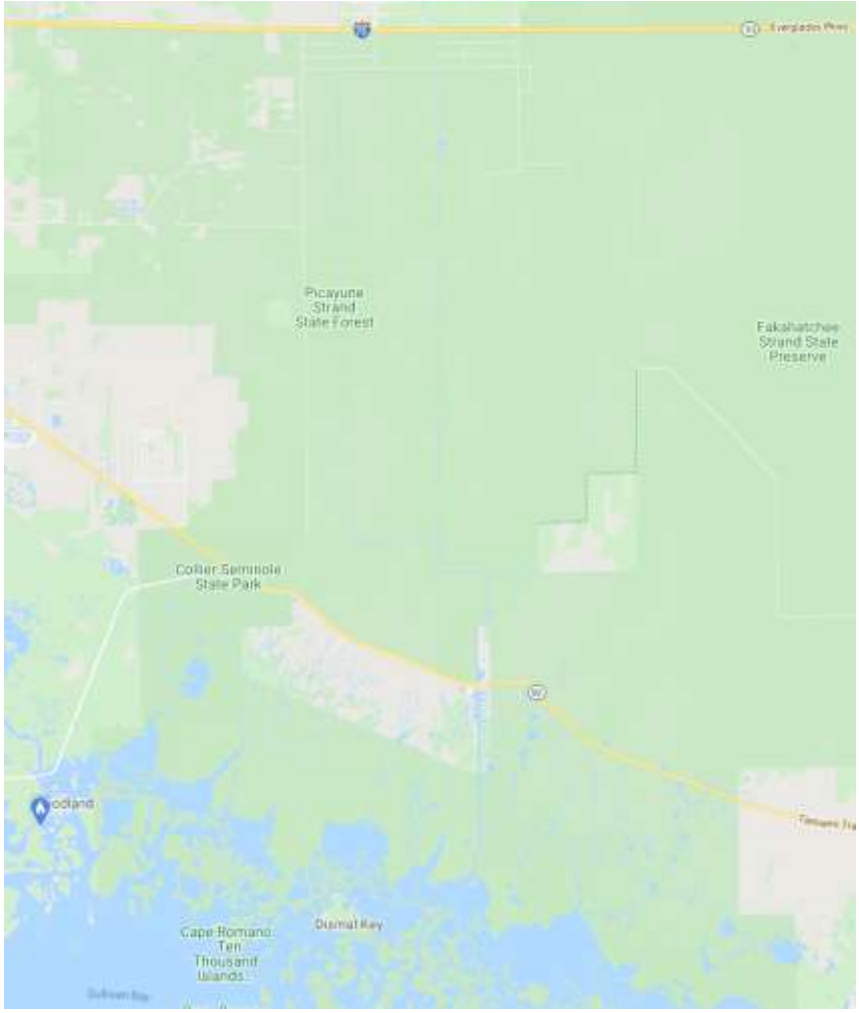

Figure 42: Map of historic Florida Scrub Jay sightings in the vicinity of the PSRP from the eBird database (Cornell Lab of Ornithology 2019c). Observations are in Goodland dated 1993 and 2001.

7.1.8 Ivory-Billed Woodpecker and "No Effect" Determination

7.1.8.1 Species Description

Ivory-billed woodpeckers are among the largest known woodpeckers, with lengths of 48–51 cm, typical wingspans of 76 to 80 cm, and weight of 454 to 567 g (USFWS ECOS 2020). Historically occupying vast contiguous forests consisting of many large trees, preferred habitat is thick hardwood forests with substantial amounts of snags or portions in some stage of decay. In Florida, documentation suggests bald cypress is an important tree species found in forests used by Ivory-billed woodpeckers as are drier ecotones between swamps and upland pine forests (Cornell Lab of Ornithology 2019a; USFWS ECOS 2020). These large woodpeckers feed on larval longhorn, jewel, and click beetles, and to a lesser extent back beetles such as the southern pine beetle (Cornell Lab of Ornithology 2019a). Typically feeding behavior consists of peeling or stripping large pieces of bark from dead trees using their large bills (Cornell Lab of Ornithology 2019a). Other sources of food include fruit and nuts.

Ivory-billed woodpeckers excavate nests in dead trees or dead areas of living trees (Cornell Lab of Ornithology 2019). Nest locations are generally below a broken branch. Placement under a broken branch is speculated to be for protection from weather including rain and for the condition of wood softened by fungi and rot (Cornell Lab of Ornithology 2019a). Nests are located within trees between 15 and 70 feet above ground surface. Audubon reports state that both sexes assist in creating, or excavating, the nest hole that is 4 to 5 in wide, 5 to 6 in tall, and up to 2 ft deep (Cornell Lab of Ornithology 2019a). Bark is stripped from the area below the nest entrance and a different hole is built and used each year (Cornell Lab of Ornithology 2019a). The female lays a clutch of 1 to 5 white eggs. Upon hatching, ivory-billed woodpecker chicks are naked and completely dependent on their parents (Cornell Lab of Ornithology 2019a).

Heavy logging and hunting led to the presumed extinction of the ivory-billed woodpecker. Due to the lack of suitable habitat to support ivory-billed woodpeckers, the lack of confirmed sightings of this species in Florida, and documentation suggesting this species is extinct, ivory-billed woodpecker is unlikely to occur in the project area.

7.1.8.2 Determination of Effect

The ivory-billed woodpecker (*Campephilus principalis*) is federally listed as endangered. There are no confirmed sightings of the species within the PSRP footprint (Figure 43) and only audio observations have been claimed since 1944. The species was listed as endangered in 1967 and the last reported observation of the Cuban subspecies was made in 1987. In recent years, audio recordings and indistinct photographs have suggested that the species may not be extinct; however conclusive evidence has not been found. Conditions favored by the ivory-billed woodpecker, including large continuous forests, including cypress and dead/rotting trees and wood, will be improved by the overall PSRP. USACE has determined the implementation of ALT PC2 will have no effect on the ivory-billed woodpecker.

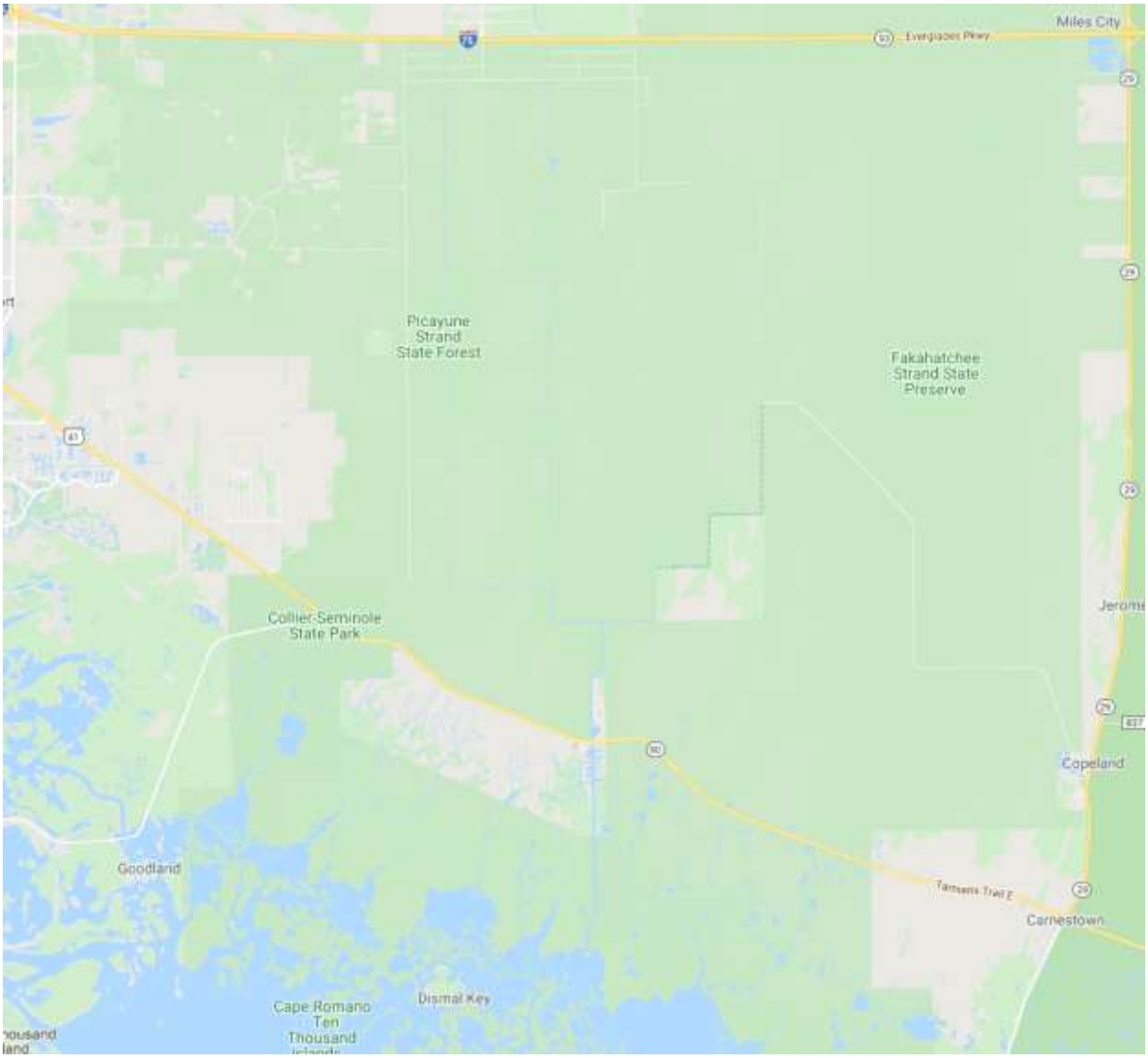

Figure 43: Map of historic ivory-billed woodpecker observations in the vicinity of the PSRP from the eBird database (Cornell Lab of Ornithology 2019b)

7.1.9 Piping Plover and "No Effect" Determination

7.1.9.1 Species Description

Federally listed as threatened, the piping plover is a smaller shorebird weighing 43-63 grams and is 17-18 cm in length. The piping plover has a sandy gray to pale gray dorsal side with a white underside with bright yellow-orange legs. Characteristic of plovers, the piping plover has a short stout bill that is black during winter. These small plovers breed in coastal habitats along the northeastern United States and along lakeshores of the Great Lakes, and in wetlands throughout the northern Great Plains (Cornell Lab of Ornithology 2019a,b). The piping plover winters along open sandy beaches, sandflats, and mudflats along the southeast U.S. coast from the Carolinas to Central Florida and from southwest Florida along the Gulf

of Mexico to just south of the Texas-Mexico border, with limited occurrences throughout the Caribbean (Kaufman 2001; USFWS 2001). In Florida, wintering piping plovers are more common on the Gulf Coast.

Piping plovers generally migrate from their breeding grounds to their wintering grounds from late July through September (fall migration) (Haig 1992). Spring migration back to their breeding grounds generally occurs from late February through early April (Haig 1992). While not well known, piping plovers forage on the benthic community associated with beaches including the intertidal zone, sandflats, and mudflats (Kaufman 2001). Along the coast, diet includes marine worms, small crustaceans, insects, and other marine invertebrates. Inland, diet includes mostly insects such as small beetles, water boatmen, shore flies, and midges (Kaufman 2001).

The chief threat to the piping plover is habitat loss associated with both loss of breeding habitat and overwintering habitat. In Florida, continued development of beaches including coastal armoring have reduced the amount and quality of sheltering and foraging winter habitat. Piping plovers are susceptible to disturbance which reduce survival rates due to stress, higher energy consumption, and predation.

7.1.9.2 Determination of Effect

Limited observations of piping plover have been recorded by dedicated bird observers in the eBird data base (Figure 44). The earliest recorded observation in the downstream estuaries of the PSRP is from 2 March 2001 where at least one individual was observed (exact number(s) were not entered) in the Ten Thousand Islands National Wildlife Refuge on Panther Key. Two piping plovers were observed at Neal Key on 6 January 2013. Two other piping plover observations were recorded at Welk Island on 19 February 2015. In fall 2015, 3 piping plovers were observed on two different occasions on Second Chance Island near the Cape Romano Shoals. Four other observations are documented in eBird between November 2017 and December 2018 at Second Chance Island. One piping plover was documented on the east side of the Goodland Bay Bridge on 29 September 2019 and on shoals near the middle of the bridge span on 27 October 2019.

Piping plovers will move around exposed mud flats and shoals between the time tides begin to recede till near high tide. Even with the low number of observations, most likely due to the remote locations of these foraging habitats, it is anticipated that piping plovers do frequent this mud flats and shoals in the downstream estuaries outside of high tide. Although, the majority of piping plover activity will be concentrated along the coastlines of Marco Island (Figure 45) and Florida Unit 27 (Figure 46) critical wildlife habitat established for winter piping plover population, piping plovers may utilize estuaries downstream of the PSRP. Foraging timing and availability of foraging habitat due to the diurnal tidal cycle in the area will not be impacted by the implementation of ALT PC2. Therefore, USACE has determined the implementation of ALT PC2 will have no effect on the piping plover.

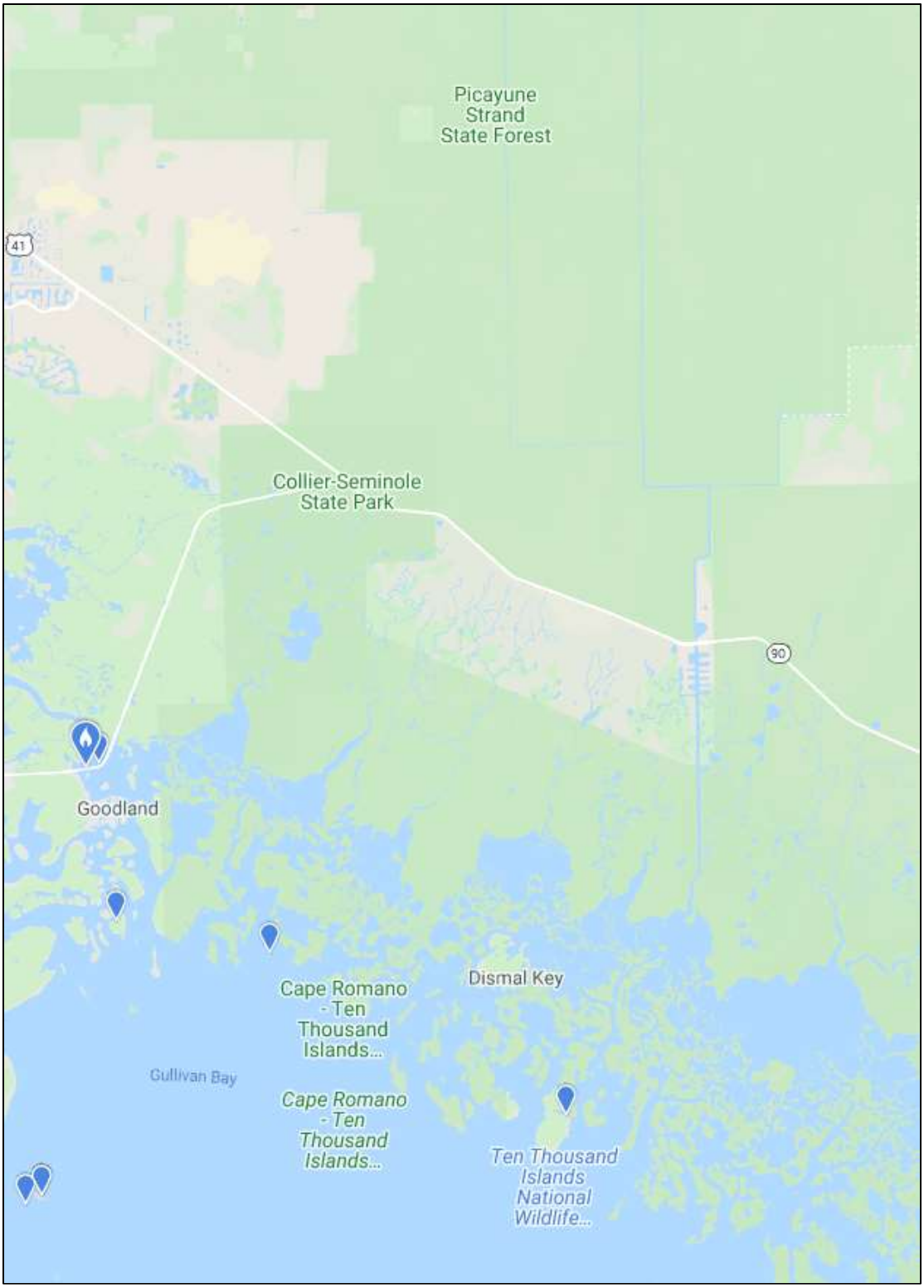

Figure 44: Map of historic piping plover observations in the vicinity of the PSRP from the eBird database (Cornell Lab of Ornithology 2019b)

7.1.9.3 Piping Plover Critical Habitat

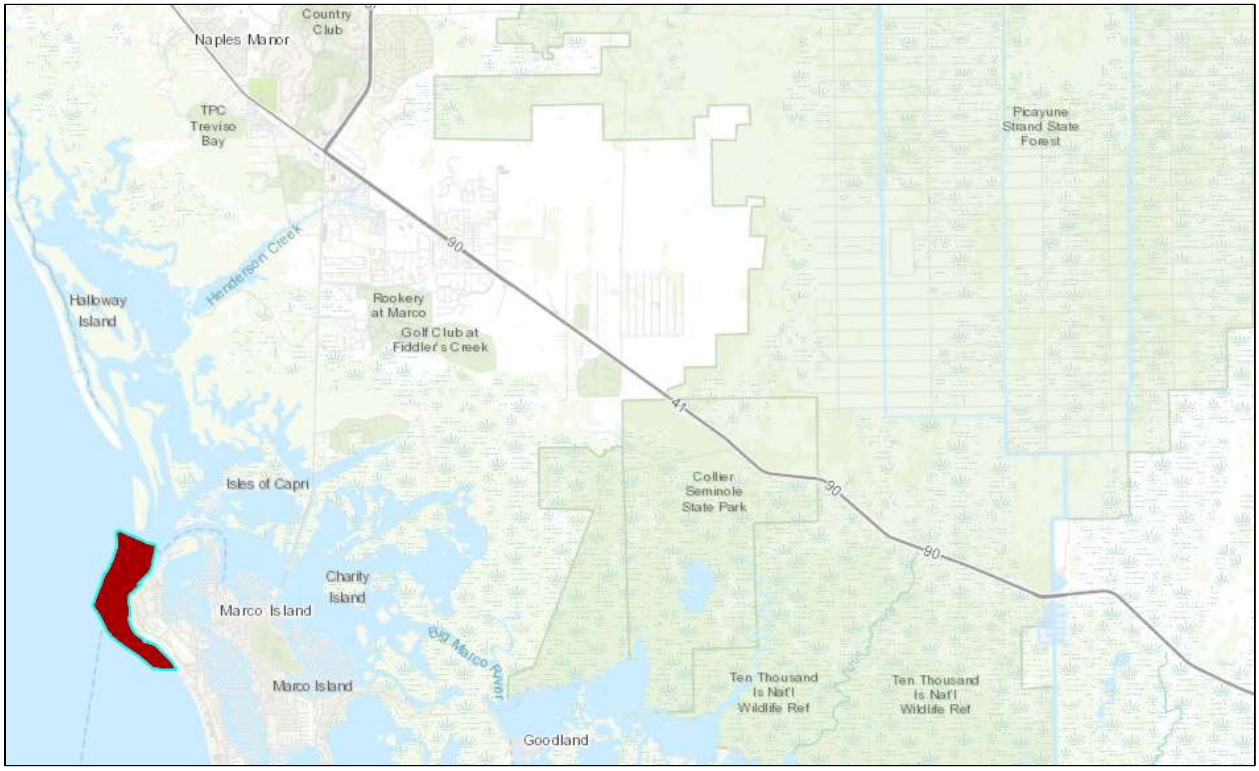

Figure 45: Piping Plover designated critical habitat (Unit FL-27) within the vicinity of the PSRP.

On 10 July 2001, the USFWS published their final rule for designated piping plover critical habitat (Federal Register 2001). FL-27 was one unit designated as critical habitat for the piping plover (Figure 48). Unit FL-27 is 606 acres (245 ha). Most of FL-27 is at the Tigertail Beach County Park in Marco Island, Collier County, FL (Figures 47 and 48). The unit's northern border is on the north side of Big Marco Pass, including Coconut Island and all emerging sand bars. On the south side of Big Marco Pass, the boundary starts at the north boundary of Tigertail Beach County Park and extends to just south of the fourth condominium tower south of the County Park. The placement of the southern boundary assures that the unit includes all of Sand Dollar Island, the changeable sandbar off Tigertail Beach. The western boundary includes all the sand bars in Big Marco Pass but excludes Hideaway Beach. It includes land from MLLW to where densely vegetated habitat (including grass or lawns) or developed structures, not used by the piping plover, begin and where the constituent elements no longer occur. The location of this designated critical habitat (FL-27) for the piping plover is well west (along the Gulf of Mexico) of the PSRP, and more significantly, the SWPF and conveyance features footprint (and area of potential effect). This phase of the PSRP and the full implementation of PSRP will have no effect on the piping plover or the designated critical habitat, FL-27.

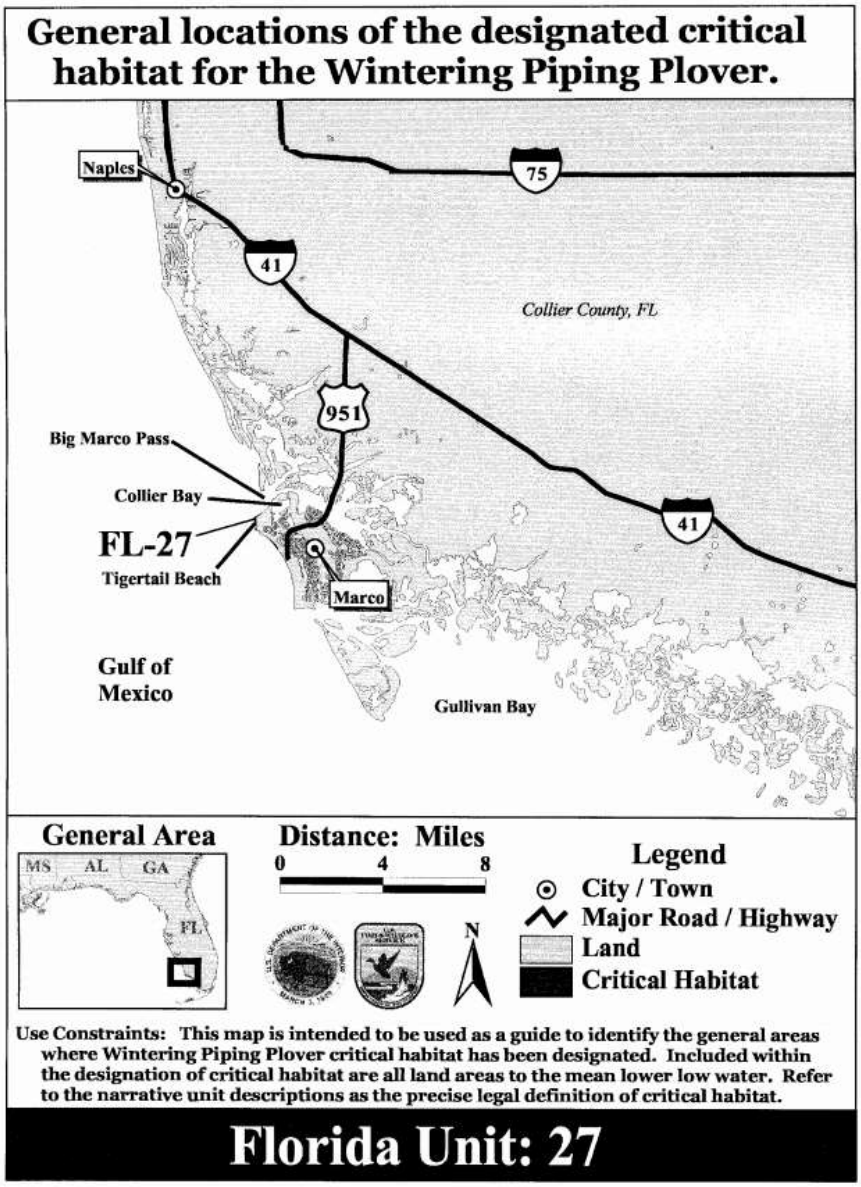

Figure 46: Federal designated piping plover critical habitat, unit FL-27, as defined by the USFWS (Federal Register 2001).

7.1.10 Red Knot and "No Effect" Determination

7.1.10.1 Species Description

Federally listed as threatened, the red knot is a medium-sized shorebird (sandpiper) weighing 4.8 ounces and is 23 – 28 cm in length (20 – 22 inch wingspan) (USFWS 2015b). In breeding season, the red knot is distinguished by its red (rufous) plumage. The face, breast, and upper belly of the red knot have a rich rufous-red to a brick or salmon red with a few scattered light feathers mixed in (USFWS 2015b). The lower belly and underside of the tail are generally white with dark flecks (USFWS 2015b). Females may be slightly lighter in color than males (Niles et al. 2008). Nonbreeding plumage is dusky gray above and whitish below (USFWS 2015b).

These larger sandpipers nest in the Canadian Arctic during the summer. One clutch of 3 to 4 eggs is laid in June. Parental care is provided by both parents during the 22 day incubation period (USFWS 2015b). If a nest fails, evidence suggests that red knots do not attempt a second clutch (USFWS 2015b). If a nest successfully hatches, the young begin foraging themselves within 24 hours of hatching (Niles et al. 2008). Females begin their migration south after the chicks hatch in mid-July, leaving the males to provide parental care. Males will leave after about 25 days (early August) to begin their migration south while the juveniles follow shortly thereafter (Niles et al. 2008).

The red knot participates in one of the longest and most arduous migrations of any species, traveling up to 19,000 miles annually from the Canadian Arctic to Terra del Fuego at the southern tip of South America and back (USFWS 2015b). These migrating knots stop only to forage and rest. Due to the time-sensitive nature of their migration, stopovers for forage and rest are limited in duration, and any disturbance resulting in flushing can be extremely detrimental or mortal to individuals of this species due to their body condition upon landing at each stopover.

7.1.10.2 Determination of Effect

Limited observations of the red knot have been recorded by dedicated bird observers in the eBird data base (Figure 47). The earliest recorded observation in the downstream estuaries of the PSRP is from 4 January 2005 where 8 individuals were spotted in a location just east of Collier Seminole State Park in the Ten Thousand Islands NWR. On 6 January 2013, one individual was observed near Cape Romano. Additional observations of red knots have occurred downstream of the PSRP between 2013 and 2020.

Red knots will move around exposed mud flats and shoals between the time tides begin to recede till near high tide. Even with the low number of observations, most likely due to the remote locations of these foraging habitats, it is anticipated that red knots do frequent these mud flats and shoals in the downstream estuaries outside of high tide. Although some observations have been made near US-41 between Collier Seminole State Park and the Faka Union Canal, the majority of red knot activity will be concentrated along the coastlines of Marco Island and the Ten Thousand Islands NWR. However, foraging timing and availability of foraging habitat due to the diurnal tidal cycle in the area will not be impacted by the implementation of ALT PC2. Therefore, USACE has determined the implementation of ALT PC2 will have no effect on the red knot.

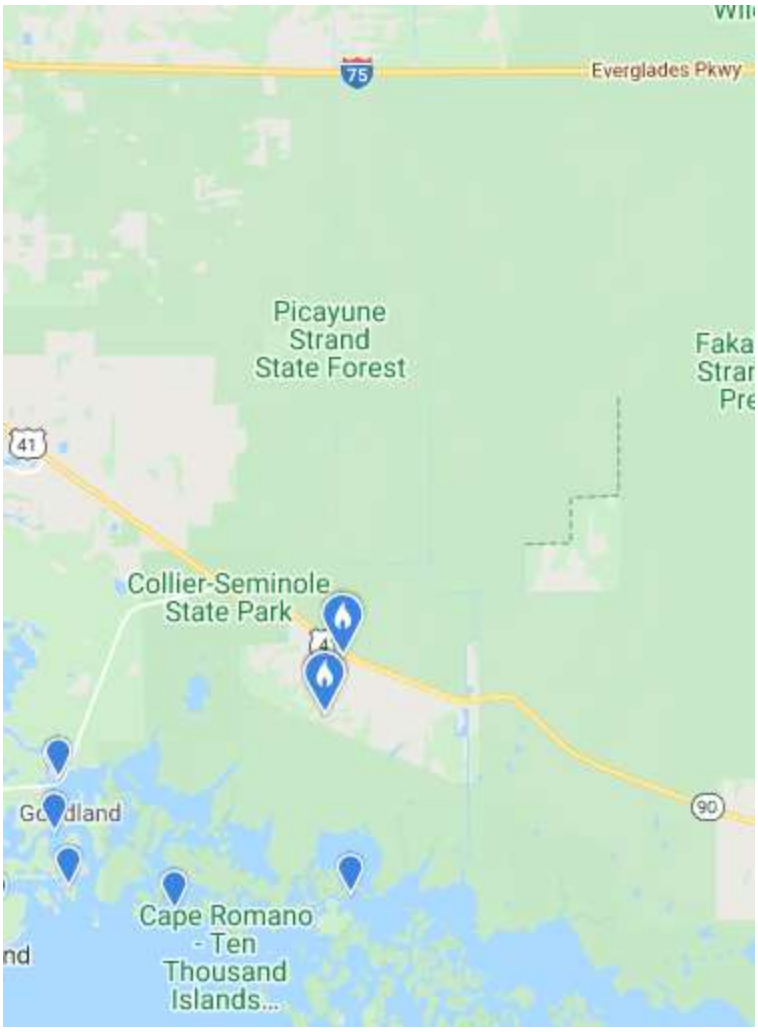

Figure 47: Map of historic red knot observations in the vicinity of the PSRP from the eBird database (Cornell Lab of Ornithology 2019b)

7.1.11 Audubon's Crested Caracara (Northern Crested Caracara) and "No Effect" Determination

7.1.11.1 Species Description

The Northern crested caracara, also known as Audubon's crested caracara, is listed as threatened by both USFWS and FWC. This large falcon has a total length of 19.7 in to 25.2 in with a wingspan of 47.2 in (USFWS 1999; USFWS 2017b). In Florida, the caracara historically occupied native prairies, but fire suppression has caused widespread conversion of prairies to open brushland. Currently, the bulk of Florida's caracara population has been found on large cattle ranches with improved pastures and scattered cabbage palms. The caracara prefers habitats with short vegetation and a low density of trees (USFWS 2017). Dry prairies with wetter areas and scattered cabbage palm comprise typical habitat. Caracaras also occur in some improved pasturelands and even in lightly wooded areas with more limited stretches of open grassland. Within these habitats, caracaras exhibit a propensity for nesting in cabbage palms, followed by live oaks, cypress, Australian pine, saw palmetto, and black gum (Morrison and Humphrey 2001).

Caracaras forage within a variety of habitats including improved pastures, adjacent to dwellings and farm buildings, newly plowed or burned fields, agricultural lands, including sod and cane fields, citrus groves, dairies, and wetland habitats (Morrison 1996). Caracaras are non-migratory and may be found in their home range year round. Home ranges average approximately 1,200 ha (approximately 3,000 acres) corresponding to a radius of two to three kilometers (1.2 to 1.9 miles) surrounding the nest site (Morrison and Humphrey 2001).

Foraging typically occurs throughout the home range during nesting and non-nesting seasons. Caracaras are extremely opportunistic regarding foraging, taking advantage of both live prey and carrion (USFWS 1999; USFWS 2017b). Forage of live prey consists of insects, invertebrates, fish, snakes, turtles, birds, and mammals (USFWS 2017b). The search for food is completed during flight, from perches, or via walking or running on the ground (USFWS 1999, USFWS 2017b). Caracaras have flatter talons than other raptors, an adaptation allowing them to walk or run on the ground to catch prey (USFWS 1999).

Caracaras, once paired, are monogamous. They prefer to nest in the tops of cabbage palms located in more sparsely vegetated habitats (USFWS 2017b). Each pair will build a new nest, generally, in the same tree each year beginning in December, although breeding season generally starts in November and ends in April (USFWS 2017b). Clutch size is usually two to three eggs which are incubated between 31 and 33 days (Morrison 1999). Young fledge in 7 to 8 weeks after hatching (USFWS 2017b).

7.1.11.2 Determination of Effect

Overall, there is a vast area of more open and drier habitat along the tieback levee and north of the tieback levee that may be preferential to the caracara. These open areas are in close proximity to ample food sources including those associated with the farming industry. However, much of the PSRP and downstream areas do not contain habitat preferred by the caracara. Additionally, land associated with the agricultural areas outside of the PSRP are frequented by the caracara, an activity that will not be affected by this project.

Many observations listed in eBird appear to be from US-41 and associated with farming activities (Figure 48). Crested caracara are known to amass in larger numbers near agriculture farms, especially tomato farms, to feed on insects and small animals living and foraging in cull piles of unwanted/damaged fruit (Betsy Evans personal communication 2020). Approximately 50 caracara have been observed feeding at tomato cull piles at one time near Immokalee between January and August in 2011 and 2012 (Betsy Evans personal communication 2020). The Lipman farms have a series of small canals on property that provide habitat for fish, another prey species of the caracara.

Given the continued operations of tomato farming and availability of easier prey in shallower canals associated with Lipman Farms and major roadway runoff canals, the presence of the caracara will continue to persist. Ancillary to potential forage base associated with the farms, ALT PC2 will not have directly impact or result in the significant loss of the vast numbers of cabbage palm present throughout the PSRP footprint. The PSRP does have an exotic management plan that has already been approved and is not changing under this phase of the project.

Historically, predevelopment hydrologic conditions combined with the natural communities present would have precluded the caracara from nesting and significantly reduced the potential for any substantial population in the Picayune Strand. In post-development Picayune Strand, there is a lot more open space due to the infrastructure put down in the 1960s and 1970s. The draining of the land combined with the

increase in the cabbage palm population has provided more favorable conditions for the caracara. Although the density at which cabbage palm occurs throughout the Picayune Strand State Forest is too great to be favorable for nesting habitat (USFWS 2017). However, observational data suggests caracara are using agricultural areas and open land areas such as the tieback levee for foraging. No nesting has been documented in the Picayune Strand. Therefore, USACE has determined that ALT PC2 will have no effect on the Audubon's crested caracara.

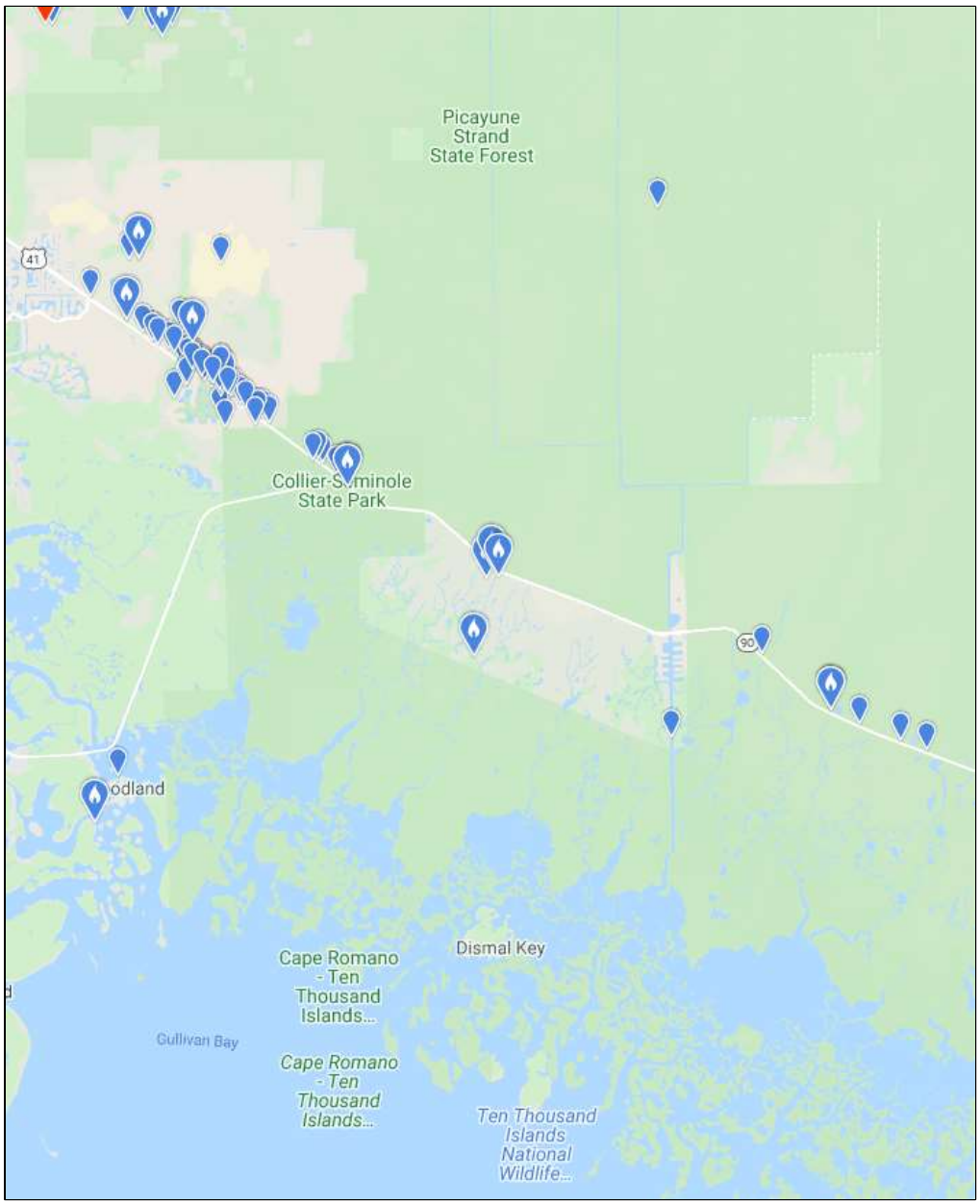

Figure 48: Map of historic crested caracara observations in the vicinity of the PSRP from the eBird database (Cornell Lab of Ornithology 2019b).

7.1.12 Kirtland's Warbler and "No Effect" Determination

7.1.12.1 Species Description

The Kirtland's warbler (*Setophaga kirtlandii*) was delisted due to recovery from the Federal list of threatened and endangered species on 9 October 2019. This species breeds in Michigan, Wisconsin and Ontario, Canada (USFWS 2020). The species does not breed or overwinter in Florida, but is sometimes observed during migration periods. Kirtland's warbler is a large insectivorous warbler, around 15 cm in length. The species breeds in upper and lower Michigan and migrates to the Bahamas for the winter. It is thought that birds observed in Florida are likely individuals that have been blown offcourse during migration. Unconfirmed sightings have been made during spring migration, from mid-April to early May, in Palm Beach, Alachua, and Duval counties. Observations during fall migration have been made in Miami-Dade, Escambia, Collier, Martin, Palm Beach, St. Lucie, St. John's, and Wakulla counties.

7.1.12.2 Determination of Effect

Due to the successful recovery of this species, reaching over 2,000 breeding pairs, and subsequent delisting (Federal Register 84 CFR 55436, 9 October 2019), the Kirtland's warbler no longer falls under the jurisdiction of the Endangered Species Act. No observations of this warbler have been made in the vicinity of the PSRP (Figure 49). The closest observations were south of St. Petersburg, FL in Fort De Soto Park in 2005, Richardson Historic Park and Nature Preserve in Fort Lauderdale, FL in 2011, and Bill Baggs Cape Florida State Park in Miami, FL in 2017 (Cornell Lab of Ornithology 2019c). Due to the location of the PSRP and the footprints associated with ALT PC2, USACE has determined the project will have no effect on t the Kirtland's warbler.

Figure 49: Map of historic Kirtland's warbler observations in the vicinity of the PSRP from the eBird database (Cornell Lab of Ornithology 2019c).

7.1.13 Roseate Tern and "No Effect" Determination

7.1.13.1 Species Description

The roseate tern, *Sterna dougallii dougalli*, is a medium-size coastal, or marine, tern with a white body, black cap, black bill, orange legs and feet and a deep forked tail with white streamers up to 25 cm long (USFWS 1999; Cornell Lab of Ornithology 2019). This tern is slender with a body that is 35 to 40 cm long with a wingspan of 60 cm (USFWS 1999). Listed as "threatened" in the State of Florida, the roseate tern has two breeding populations with one being in the southeastern United States and Caribbean (USFWS 1999). The roseate tern is migratory, mostly wintering along the north and northeastern coasts of South America (USFWS 1999).

The roseate tern is strictly a coastal and pelagic species nesting on sandy barrier islands, rocky islands, and occasionally on islands or hummocks in saltmarshes while foraging over open water or along coastal shallows (Cornell Lab of Ornithology 2019). Roseate terns forage on small fish, insects, squid, and crustaceans (USFWS 1999; Cornell Lab of Ornithology 2019). They find food by flying into the wind and hovering over potential prey before plunge-diving and capturing prey with their bill (USFWS 1999; Cornell Lab of Ornithology 2019). While spending time along the coast for resting or nesting, these terns will forage in shallow waters associated with the coastal littoral zone, estuarine waters, and inlets. While offshore, they will prey upon schools of smaller fish near the surface. On occasion, roseates will steal fish from other birds such as common terns and Atlantic puffins (Cornell Lab of Ornithology 2019).

Roseate terns are colonial nesters preferring to nest in larger numbers for protection from predators. Nest placement is usually on a site near vegetation or a prominence in the landscape (Cornell Lab of Ornithology 2019). Roseate terns will also nest with other terns including least terns, common terns, and sooty terns. In natural areas, nests are scrapes, or depressions, in the ground (sand) that are 2.4 in to 4.8 in wide. After initial scraping of the nest site, the nest scrape is lined with bits of shell, rock, small sticks or twigs, in order to provide camouflage from potential predators. Clutch sizes range from 1 to 5 brown and dark speckled eggs (Cornell Lab of Ornithology 2019). However, clutch size of 3 eggs or larger are rare (USFWS 1999). In the Caribbean, eggs are generally laid in May with incubation lasting 23 to 25 days based on observations (USFWS 1999).

Threats to the roseate tern include climate change and sea level rise which could affect nesting success. Temperatures of the sand in and near nest scrapes could become too hot rendering eggs non-viable. Sea level rise and higher tidal cycles can potentially overwash colonial nesting sites. Habitat loss from beach development and increasing anthropogenic beach activities such as sunbathing, beach sports, swimming, boating, biking, and pets are also threats to the roseate tern and their ability to successfully reproduce.

7.1.13.2 Determination of Effect

Based on historic observations documented in the eBird database (Figure 50), the PSRP footprint and specifically those associated with this action, ALT PC2, are not used directly by the roseate tern. If in the area, roseate terns could potentially forage in the downstream estuaries and coastal waters off of the Ten Thousand Islands NWR. The impacts to the estuarine environment and the estuarine species of fish and crustaceans may be beneficial with the restored freshwater flow downstream as confirmed by NMFS (NMFS 2013). Even though the project may be beneficial to food sources for shorebird and seabirds, they are not likely to be present in downstream areas of PSRP. USACE has determined ALT PC2 will have no effect on the roseate tern.

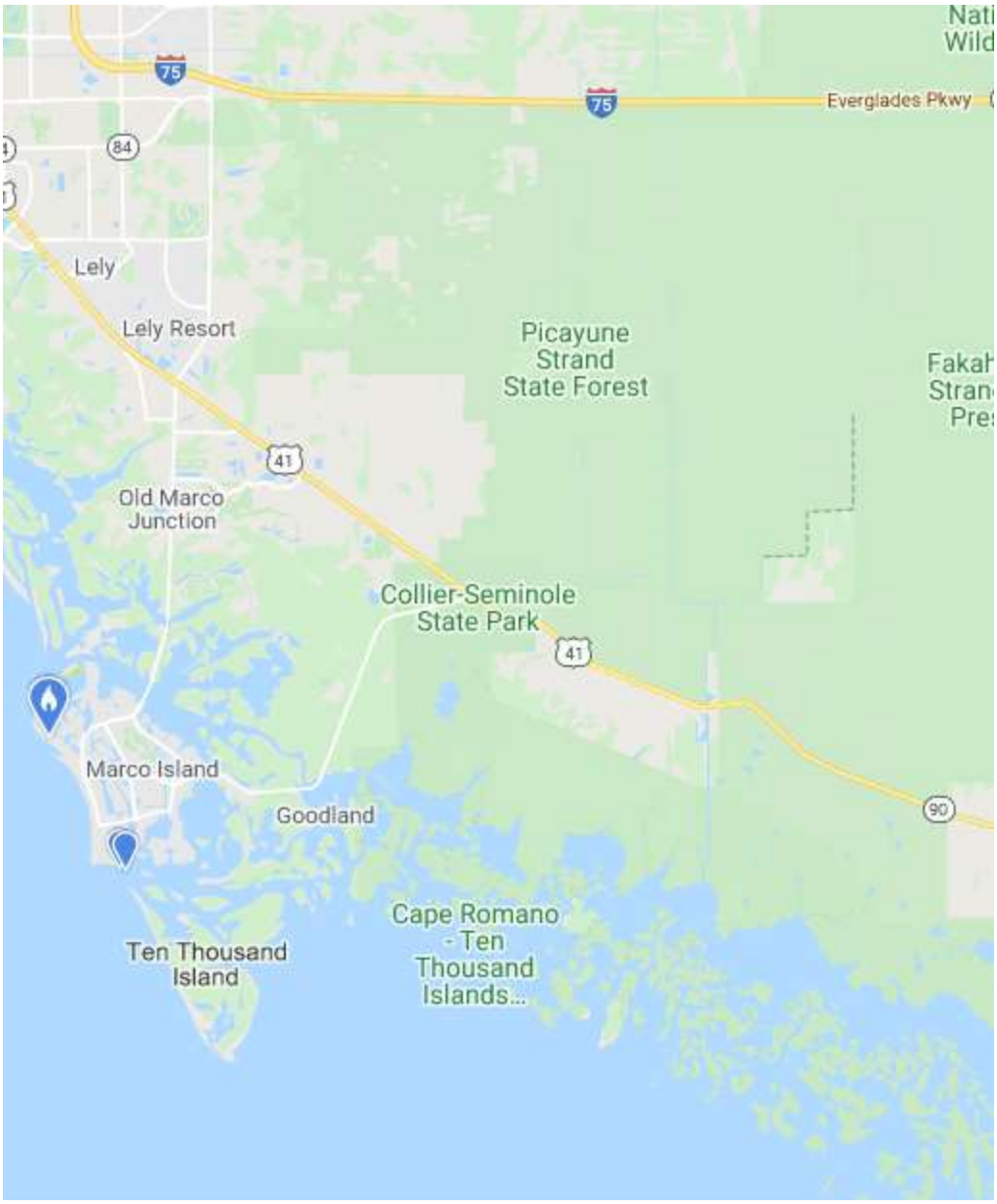

Figure 50: Map of historic roseate tern observations in the vicinity of the PSRP from the eBird database (Cornell Lab of Ornithology 2019c).

7.1.14 Florida Leafwing Butterfly and "No Effect" Determination

7.1.14.1 Species Description

The Florida leafwing butterfly (*Anaea troglodyte floridalis*) is a federally endangered species. Endemic to south Florida, this medium sized butterfly is approximately 2.75 to 3 inches long. The dorsal side of the wings are red, with the ventral sides a gray to tan color (USFWS ECOS 2020). This butterfly, through cryptic adaptation, resembles a dead leaf when at rest with its wings folded. Sexual dimorphism is prevalent. Females are slightly larger and darker than males. The species feeds on only one known host plant, pineland croton (*Croton cascarilla*) (USFWS ECOS 2020).

The range for the Florida leafwing butterfly includes Martin, Palm Beach, Broward, Miami-Dade, Monroe, and Collier Counties where pine rocklands containing pineland croton is present. Critical habitat for this butterfly consists of 10,561 acres in four separate units in Miami-Dade and Monroe Counties (USFWS ECO 2020).

7.1.14.2 Determination of Effect

The natural community where the only known host plant, pineland croton, grows is in pine rockland. Based on the community maps (Figure 39) and those listed in the unit management plans for both Picayune Strand State Forest and Collier Seminole State Park, pine rockland does not occur in the vicinity of the PSRP (FDEP 2004). Pineland croton has not been documented in Collier Seminole State Park (FDEP 2004). Therefore, there will be no direct impacts of ALT PC2 on any potential host plants for the Florida leafwing butterfly. Without host plants, the Florida leafwing butterfly is unlikely to occur in the project area.

Within Collier Seminole State Park, there is approximately 311 acres of rockland hammock which is an advanced successional stage of pine rockland (FNAI 2010). Pine rockland succeeds to rockland hammock in the absence of fire (15-25 years) due to being extinguished near the ecotones of the hammock due to the moist microclimate maintened within (FNAI 2010). With restoration of hydrology into the area, the likelihood that rockland hammock will become drier and more susceptible to fire, returning the habitat to pine rockland is slim. Historically, this butterfly was less common and sporadic in Collier County (Federal Register 2013).USACE has determined there will be no effect on the Florida leafwing butterfly.

7.1.15 Bartram's Hairstreak Butterfly

7.1.15.1 Species Description

Bartram's hairstreak butterfly (*Strymon acis bartrami*) is a federally endangered species. Endemic to south Florida, this small butterfly is approximately 1 inch in length with a forewing length near 0.5 inches ((Pyle 1981; Opler and Krizek 1984; Minno and Emmel 1993; USFWS 2015a). The dorsal side of the wings are dark gray in color, with the ventral side of the wings being a lighter gray with white barring and dots (Pyle 1981; Opler and Krizek 1984; Minno and Emmel 1993; USFWS 2015a). Limited to extreme south Florida, this butterfly has only been observed in Palm Beach, Broward, Miami-Dade, Monroe, and Collier Counties. Limited observations are a result of where the only known host plant, the pineland croton (*Croton cascarilla*), grows (Minno and Emmel 1993; Smith et al. 1994).

Pineland croton grows in pine rockland communities found in south Florida. Observations of the Bartram's hairstreak butterfly are rarely more than 5 meters from a host plant (Schwartz 1987; Worth et al. 1996; Salvato and Salvato 2008; USFWS 2015a). Critical habitat for this butterfly consists of 11,539 acres in seven units in Miami-Dade and Monroe Counties (USFWS 2015a).

7.1.15.2 Determination of Effect

The Bartram's hairstreak butterfly occupies a very similar niche as the Florida leafwing butterfly. The natural community where the only known host plant, pineland croton, grows is in pine rockland. Based on the community maps (Figure 39) and those listed in the unit management plans for both Picayune Strand State Forest and Collier Seminole State Park, pine rockland does not occur in the vicinity of the PSRP (FDEP 2004). Pineland croton has not been documented in Collier Seminole State Park (FDEP 2004). Therefore, there will be no direct impacts of ALT PC2 on any potential host plants for the Bartram's

hairstreak butterfly. Without host plants, the Bartram's hairstreak butterfly is unlikely to occur in the project area.

Within Collier Seminole State Park, there is approximately 311 acres of rockland hammock which is an advanced successional stage of pine rockland (FNAI 2010). Pine rockland succeeds to rockland hammock in the absence of fire (15-25 years) due to being extinguished near the ecotones of the hammock due to the moist microclimate maintained within (FNAI 2010). With restoration of hydrology into the area, the likelihood that rockland hammock will not become drier and more susceptible to fire, and the habitat is not likely to return to pine rockland. Historically, this butterfly was less common and sporadic in Collier County (Federal Register 2013). USACE has determined there will be no effect on the Bartram's hairstreak butterfly.

7.1.16 Cassius Blue Butterfly and "No Effect" Determination

7.1.16.1 Species Description

The cassius blue is a small butterfly with two subspecies, one occurring in Florida and the other in Texas. The cassius blue is common throughout the Florida peninsula, especially near coastlines. The cassius blue is officially listed as "threatened" due to its similar size and appearance to the federally endangered Miami blue butterfly. The cassius blue is larger than the Miami blue, with an average wing spread of 20 to 33 millimeters (Opler and Milaikul 1992). Both sexes have wings where the undersides (ventral side) are striped with two eyespots on the margin of each hind wing. However, there is some sexual dimorphism in dorsal coloration and pattern. Males are pale to bright blue dorsally while females are bluish-white to white above on basal areas of wings with brad dark borders on the front wings and a dark spot on the rear margin of the hindwing (Cech and Tudor 2005, Minno and Minno 1999).

The cassius blue is a cold sensitive species, having trouble surviving even the winter temperatures associated with coastal northern Florida (Hall and Butler 2009). Host plants for the Cassius blue include a variety of plants in the pea family such as downy milkpea (*Galactia volubilis*), Florida hammock milkpea (*Galactia striata*), Florida Keys blackbead (*Pithecellobium keyense*), and catclaw blackbead (*Pithecellobium unguis-cati*), hairy cowpea (*Vigna luteola*), false tamarind (*Lysiloma latisiliquum*), Florida fishpoison tree/Jamaican dogwood (*Piscidia piscipula*), rosarypea (*Abrus precatorius*), cape leadwort (*Plumbago auriculata*), and doctorbush (*Plumbago zeylanica*) (Minno and Emmel 1993, Minno and Minno 1999, Minno et al. 2005, Hall and Butler 2009).

7.1.16.2 Determination of Effect

The PSRP and downstream estuaries are coastal in location (Figures 2 and 3). The unit management plans for Collier Seminole State Park and Picayune Strand State Forest list a variety of potential host plants in the pea family (Legumes) including: Elliott's milk pea (*Galactia elliotti*), Eastern milkpea/Florida milkpea (*Galactia regularis*), downy milkpea (*Galactia volubilis*), catclaw blackbead (*Pithecellobium unguis-cati*), hairy cowpea/Piedmont cowpea (*Vigna luteola*), false tamarind/wild tamarind (*Lysiloma latisiliquum*), Florida fishpoison tree/Jamaican dogwood (*Piscidia piscipula*), milk pea (*Galactia regularis*) (FDEP 2004, FDACS 2008). Plants in the legume family are versatile in form and abundant throughout the project area. Given that the Cassius blue is only listed due to its similarity to an endangered species (Miami blue) combined with the prevalence of host plants available within the PSRP, USACE has determined that the PSRP and ALT PC2 will have no effect on the Cassius blue butterfly.

7.1.17 Ceraunus Blue Butterfly and "No Effect" Determination

7.1.17.1 Species Description

The Ceraunus blue butterfly, *Hemiargus ceraunus*, is listed as threatened due to similarity in appearance to the Miami blue butterfly. Less restricted than the butterflies with similar appearance, the Ceraunus blue butterfly occurs across the southern United States south through Mexico, Central American into South America (Daniels 2009). The Ceraunus blue occurs within all counties in Florida and is common year round in south Florida (Daniels 2009). This butterfly is small with a wingspan of 22 to 30 mm. The species is sexually dimorphic with males having a lavender-blue dorsal wing surface with a narrow black margin and single black hindwing spot (Daniels 2009). Females appear to be darker than males with blue scaling limited to the wing bases. The ventral sides of their wings are gray with dark bars, white bands and white-rimmed black spots (Daniels 2009). The hindwing has a prominent orange-rimmed black marginal spot (Daniels 2009).

Typical of small butterflies, the Ceraunus blue butterfly stays low to the ground. Host plants include a variety of legumes, including pea plants. Examples of host plants include the rosary pea (*Abrus precatorius*), partridge pea (*Chamaecrista fasciculata*), sensitive pea (*Chamaecrista nictitans*), and indigo (*Indegofera spp*.).

7.1.17.2 Determination of Effect

The unit management plans for Collier Seminole State Park and Picayune Strand State Forest list a variety of potential host plants in the pea family (Legumes) including: Elliott's milk pea (*Galactia elliotti*), Eastern milkpea/Florida milkpea (*Galactia regularis*), downy milkpea (*Galactia volubilis*), catclaw blackbead (*Pithecellobium unguis-cati*), hairy cowpea/Piedmont cowpea (*Vigna luteola*), false tamarind/wild tamarind (*Lysiloma latisiliquum*), Florida fishpoison tree/Jamaican dogwood (*Piscidia piscipula*), milk pea (*Galactia regularis*) (FDEP 2004, FDACS 2008). Legumes are versatile in form and abundant throughout the project area. Given that the Ceraunus blue is only listed due to its similarity to an endangered species (Miami blue butterfly) combined with the prevalence of host plants available within the PSRP, USACE has determined that the PSRP and ALT PC2 will have no effect on the Ceraunus blue butterfly.

7.1.18 Miami Blue Butterfly and "No Effect" Determination

7.1.18.1 Species Description

The Miami blue is a small butterfly endemic to Florida and is officially listed as endangered under the ESA in April 2012. The Miami blue has a forewing length of 10 to 13 millimeters. Males and females are both bright blue dorsally, but females have an orange eyespot near their hind wing. Both sexes have a gray underside with four black spots. The Miami blue occurs at the edges of tropical hardwood hammocks, beachside scrub, and occasionally in rockland pine forests. Larval host plants include the seed pods of nickerbeans (*Caesalpinia spp*.), blackbeards (*Pithecellobium spp*.), and balloon vine (*Cardiospermum halicababum*), a non-native species. Adults feed on the nectar of Spanish needles (*Bidens pilosa*), cat tongue (*Melanthera aspera*), and other weedy flowers near disturbed hammocks.

Primarily a south Florida coastal species, the Miami blue's historic distribution ranged as far north as Hillsborough County on the Gulf Coast and Volusia County on the Atlantic Coast and extended south to the Florida Keys and the Dry Tortugas (Daniels 2006). The butterfly was thought to be extinct following Hurricane Andrew in 1992, but was observed in November 1999 at Bahia Honda State Park in the Florida

Keys. More than 329 surveys conducted at locations in mainland Florida and the Keys have failed to detect other colonies of this species.

Population declines are primarily a result of loss and degradation of suitable habitat due to residential, recreational, and commercial development. In coastal areas where undeveloped lands remain, the introduction of exotics has led to the direct loss of larval host plants and nectar sources. Other perceived threats include human-caused mortality from pesticide and herbicide use.

7.1.18.2 Determination of Effect

The Miami blue historically ranged from a line from Tampa Bay to Merritt Island (with some historic collections from Volusia County) southward through the Florida Keys and the Dry Tortugas, including both coastlines (Comstock and Huntington 1943, Opler and Krizek 1984). Few populations of the Miami blue persisted in the 1990s throughout its range. The butterfly disappeared from the southwest coast, not having been observed since 1990 (Calhoun et al. 2002). A major impact to the Miami blue is thought to have been Hurricane Andrew in 1992. With the development of southeast Florida reducing available habitat that was historically used, impacts from one of the most powerful hurricanes in history (at the time) were more amplified further reducing the population in the years following the Hurricane Andrew's landfall (Glassberg and Salvato 2000, Calhoun et al. 2002). The unit management plans for both Collier Seminole State Park and the Picayune Strand State Forest do not include the Miami blue butterfly in their accounts of species present on their managed lands. Most literature states the Miami blue is limited to Miami-Dade and Monroe Counties where the butterfly is thought to only persist in the Florida Keys (Daniels 2006). In the 1980s, the Miami blue was documented on Marco Island and in Fakahatchee Strand Preserve State Park (Federal Register 2012). However, in subsequent surveys, including 2002, the Miami blue has not been observed in these areas (Federal Register 2012). The lack of documentation and preferred habitat within the project and associated with ALT PC2, USACE has determined the project will have no effect on the Miami blue butterfly.

7.1.19 Nickerbean Blue Butterfly and "No Effect" Determination

7.1.19.1 Species Description

The nickerbean blue butterfly, *Cyglargus ammon*, is listed as threatened due to similarity in appearance to the Miami blue butterfly. The nickerbean blue is considerably smaller than the Miami blue with a full wing span of 2.2 cm to 3 cm. Historically, this butterfly ranged across the northwestern islands of the Carribbean including the Bahamas and Cuba (Glassberg 1999). It wasn't until the late 1990's that the nickerbean blue was documented in the United States (Florida) (Glassberg 1999). The nickerbean blue was discovered to be established in the Florida Keys, specifically Big Pine Key, by 1997 (Salvato 1998, Calhoun et al. 2002). Unverified reports in 1999, suggest the nickerbean blue has made its way to Homestead, FL suggesting colonization of the Florida mainland is underway (Calhoun et al. 2002).

Characteristics of the nickerbean blue butterfly are similar to the other blue butterflies occupying the same area. The nickerbean blue is sexually dimorphic. Both sexes have wings that are dorsally bright blue. The ventral side of the wings are gray with lines of white bars with only 3 basal black spots. One of two eyespots at the corner of the outer margin is always capped with red. Females have a hindwing with an orange spot at the lower edge (Glassberg 1999). Adults lay eggs on their host plants which include pineland croton, pineland acacia (*Vachellia farnesiana* var. *pinetorium*), sweet acacia (*Vachellia farnesiana* var. *farnesiana*), and fewflower holdback (*Denisophytum pauciflorum*) (Calhoun et al. 2002).

The nickerbean blue typically occupies pine rockland communities, as well as opening and edges of rockland hammocks (Calhoun et al. 2002). The pine rocklands in the keys, especially Big Pine Key receive less rainfall than its counterparts found on the mainland in south Florida, resulting in more xeric conditions (Calhoun et al. 2002).

7.1.19.2 Determination of Effect

The unit management plan for Collier Seminole State Park lists *Vachellia farnesiana* as present within the park while no host plants for the nickerbean blue butterfly is listed as present within the Picayune Strand State Forest (FDEP 2004, FDACS 2008). Literature suggests the nickerbean blue inhabits clearings and edges, perhaps ecotones of rockland hammock which is present in Collier Seminole State Park on both sides of US-41 (Calhoun et al. 2002, FDEP 2004). However, the rockland hammock community in the PSRP and Collier Seminole State Park are generally considered to lack fire frequency due to the communities ability to maintain humidity and moisture, reducing its xeric characteristics (FNAI 2001, FDEP 2004).

The nickerbean blue arrived in the lower keys in the mid-to-late 1990s, approximately 20 to 25 years ago, most likely as a displacement associated with weather such as a tropical storm or hurricane (Calhoun et al. 2002). In 1998/1999, unverified accounts suggest this butterfly has reached the mainland, near Homestead, FL (Calhoun et al. 2002). It is possible, the nickerbean blue could have expanded its range to southwest Florida either from the Homestead area, or perhaps through storm related displacement from Big Pine Key across Florida Bay to the southwest coast. However, there are no documented observations of the nickerbean blue butterfly along the southwest coast of Florida near the Ten Thousand Islands NWR or in the vicinity of the PSRP. The lack of presence combined with the restoration of wetlands across 55,000 acres and improvements to freshwater delivery to the downstream estuaries suggest, the fringes and ecotones associated with the rockland hammock community present within the PSRP do not and will not possess the xeric-biased conditions that the nickerbean blue butterfly prefers. Therefore, USACE has determined the PSRP and specifically the implementation of ALT PC2 will have no effect on the nickerbean blue butterfly.

7.1.20 Stock Island Tree Snail and "No Effect" Determination

7.1.20.1 Species Description

Measuring approximately 45-55 millimeters in length, the arboreal Stock Island tree snail, *Orthalicus reses*, inhabits hardwood hammocks consisting of tropical trees and shrubs such as gumbo limbo, mahogany, ironwood, poisonwood, marlberry and wild coffee, among others (Deisler 1987. Population declines, habitat destruction and modification, pesticide use, and over-collecting led to the listing of this species as threatened in 1978 (USFWS 1999).

The historic distribution of the Stock Island tree snail was thought to be limited to hardwood hammocks on Stock Island and Key West and possibly other lower Keys hammocks (Voss 1976). Recently, the range of this species has been artificially extended through the actions of collectors who have introduced it to Key Largo and the southernmost reaches of the mainland. At present, this snail occupies six sites outside of its historic range including ENP and Big Cypress National Preserve.

7.1.20.2 Determination of Effect

The Stock Island tree snail has been extirpated from its native range on Stock Island and Key West in 1992 (Forys et al. 2001). However, several smaller populations exist outside of its historic range (USFWS 1999,

Forys et al. 2001). Utilizing the "Information for Planning and Consultation" tool provided online by the USFWS, the stock island tree snail is not a listed species present in the vicinity of the PSRP. This tree snail is only believed to occur in Miami-Dade and Monroe Counties.

A number of trees known to host the Stock Island tree snail are present within the PSRP including: gumbo limbo (Bursera simaruba, Jamaican dogwood (Piscidia picipula) and strangler fig (Figus aurea) to name a few (USFWS 1999, FDEP 2004, FDACS 2008). However, this species is unlikely to occur within the PSRP. Therefore, USACE has determined that the implementation of ALT PC2 will have no effect on the Stock Island tree snail.

7.1.21 Florida Prairie Clover and "No Effect" Determination

7.1.21.1 Species Description

The Florida prairie clover (*Dalea carthagenensis* var. *floridana*) is federally listed as endangered. It is a short-lived perennial shrub that averages 2.6 feet to 9.8 feet in height (Long and Lakela 1971, Bradley and Gann 1999, Machinski et al. 2014). The plant itself has a light brown wood stem with non-woody, light brown to reddish branches (Long and Lakela 1971, Bradley and Gann 1999, Machinski et al. 2014). Leaves are composed of 9 to 15 oval, glad-tipped leaflets, and are glad-dotted on the underside. Flowers, white and maroon, are in small loose heads at ends of hairy, glandular stalks, less than 0.4 in long (Long and Lakela 1971, Bradley and Gann 1999, Machinski et al. 2014). Each flower petal is of different length and shape.

The species is found in pine rockland, rockland hammock, marl prairie, and coastal berm, as well as connecting habitats (Bradley and Gann 1999). The species was historically present in Miami-Dade, Monroe, Collier, and Palm Beach counties (Bradley and Gann 1999). Current distribution includes Big Cypress National Park, three Miami-Dade County conservation areas, and three unprotected areas in the Cutler Bay area of Miami-Dade County (Maschinski et al. 2014).

7.1.21.2 Determination of Effect

In Collier County, the Florida prairie clover has only been documented in the Big Cypress National Preserve (Federal Register 2012). A number of natural communities where this plant could persist is present within the vicinity of the PSRP including rockland hammock, marl prairie, and the ecotones associated with those communities (FDEP 2004). An indicator region within Collier Seminole State Park representing rockland hammock within the PSRP along with the associated elevation and stage is shown in Figure 51. The stage duration curve is averaged over the entire indicator region which is 240 m by 240 m, or just under 14.25 acres in total. The elevation within box 12 (Figure 51) is of higher elevation, thus, above the average elevation of the entire indicator region. The average ponding depth (distance above surface elevation shown by the red line in Figure 51 bottom box) for the entire indicator region 12 peaks at approximately 0.25 m, or 9.8 in (0.82 ft) with ALT PC2 and full implementation of the PSRP. The average hydroperiod of indicator region 12 increases by approximately 11.88 days with the implementation of ALT PC2 compared to without project. With the higher elevation of associated with the rockland hammock community (Figure 39), the ponding depth and hydroperiod differences between the implementation of ALT PC2 and the without project condition will be less than those shown for the averages across 14.24 acres.

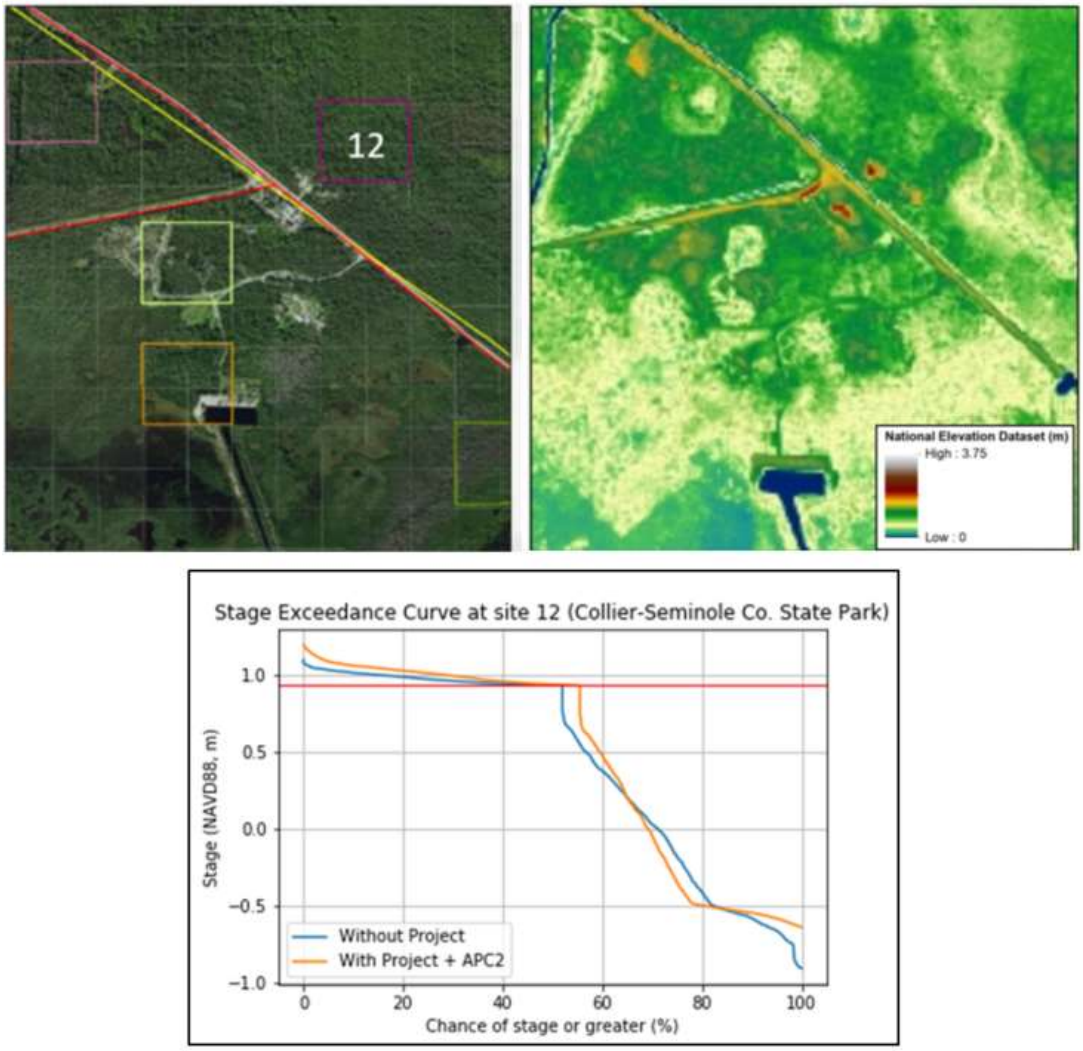

Figure 51: Collier Seminole State Park Indicator Region 12 within the PSRP where rockland hammock is present (upper left). Surface elevation above sea level is shown in the upper right. The stage duration curve showing hydroperiod and ponding depth for without project and with ALT PC2 are shown (bottom).

Florida prairie clover has not been documented in either Collier Seminole State Park or Picayune Strand State Forest (FDEP 2004, FDEP 2008). In fact, this plant is only known to occur in Big Cypress National Preserve and six locations within Miami-Dade County (Federal Register 2012). Anticipated hydrological impacts of restoration associated with the implementation of ALT PC2 based on modeling suggest minimal or negligible effects to the rockland hammock habitats both north and south of US-41 within the PSRP. The lack of anticipated impact from restoration implementation combined with the absence of observation of this plant within the PSRP, USACE has determined that the PSRP overall and implementation of ALT PC2 will have no effect on the Florida prairie clover.

7.2 "May Affect" Determination

7.2.1 American Alligator and "May Affect Not Likely to Adversely Affect" Determination

7.2.1.1 Species Description

The American alligator (*Alligator mississippiensis*) is listed as threatened by the USFWS due to similarity of appearance to American crocodile, an endangered species. The American alligator is distinguished from the American crocodile by the head shape and color. Alligators are black or dark green in color with a more broad shape snout without teeth showing when closed. Alligators live up to 30 years or more, reaching up to 14 feet in length, with their tale approximating half of their body length, and weighing up to 1,000 pounds (USFWS 2008).

The alligator is dependent on spatial and temporal patterns of water fluctuations that affect courtship and mating, nesting, and habitat use (Brandt and Mazzotti 2000). As a top predator, alligators control populations of prey species including species such as rodents that would negatively impact wetland communities if not kept in check through predation (USFWS 2008). Alligators will eat almost anything that crosses their path. However, adults primarily consume fish, turtles, snails, and small mammals and birds that frequent water edges to forage or drink (USFWS 2008). Juvenile alligators feed on insects, crustaceans, snails, and fish (USFWS 2008).

A keystone species within the Everglades ecosystem, the American alligator serves in several vital roles in the ecosystems it inhabits. Referenced in the previous paragraph, the alligator aides in population control of prey species, preventing or limiting potential destructive behavior that could damage or alter these ecosystems. The most significant influences the alligator has is the creation of the "gator hole." Alligators create wallowed out depressions that fill with water in the wet season but remain filled during the dry season when water is scarce (USFWS 2008). These gator holes provide essential water and habitat for a plethora of species in need of both for survival. In turn, the alligator is also provided with vital water for survival as well as food to survive the leaner dry season months.

While dependent on water for survival, American alligators are reliant on land for nesting. Females build nests made of sticks, vegetation, leaves, and mud in a sheltered location near water (USFWS 2008). Each nest typically has 20 to 50 oblong white eggs which are covered by more vegetation. Eggs incubate for approximately 65 days with the mother staying close in order to protect the nest (USFWS 2008). Once hatched, the hatchlings will either make their own way to the water if close or make high-pitched croaking sounds to call their mother, who then carries them to the water via her mouth.

Historically, American alligators were most abundant in the peripheral Everglades marshes and freshwater mangrove habitats, but are now most abundant in canals and the deeper slough habitats of the central Everglades. Water management practices including drainage of peripheral wetlands and increasing salinity in mangrove wetlands as a result of decreased freshwater flows has limited occurrence of American alligators in these habitats (Craighead 1968, Mazzotti and Brandt 1994).

7.2.1.2 Determination of Effect

The PSRP intends to restore hydrology to approximately 55,000 acres of mixed wetland types while increasing freshwater flow, improving "brackish" conditions in downstream estuaries. These improvements to the ecosystem in the vicinity of Picayune Strand will increase the opportunity for

alligators to forage, shelter, and reproduce. USACE has determined that ALT PC2 may affect but is not likely to adversely affect the American alligator.

7.2.2 American Crocodile and "May Affect Not Likely to Adversely Affect" Determination

7.2.2.1 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 the project 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.

7.2.2.2 Determination of Effect

American crocodiles are heavily reliant on salinity regimes throughout their life cycle (Mazzotti 1999; Mazzotti et al. 2007; Cherkiss et al. 2011; RECOVER 2015). Adult crocodiles tolerate a wide range of salinities due to their ability to manage salt concentrations through osmoregulation (RECOVER 2015). However, juvenile crocodiles lack the ability to osmoregulate (Mazzotti 1989; Mazzotti and Dunson 1989). In Florida Bay, historic nesting and recruitment centered around habitat along the northeast shoreline. Since the mid-1990s, American crocodile nesting and population density has shifted from northeast Florida Bay to the Flamingo/Cape Sable area on the western edge of Florida Bay into the lower southwest coast near White Water Bay (RECOVER 2019).

Subsequently, individual crocodiles are in better health (Fulton's K body condition) in the Flamingo/Cape Sable area than counterparts in northeast Florida Bay and Biscayne Bay (RECOVER 2019). Salinity regimes in these areas are observed to be the reason. In southern coastal areas of Florida, areas with reduced or improving salinity regimes (generally less than 30 ppt) result in increases in crocodile health and survival by reducing physiological stress resulting from osmotic regulation and as a result of increased productivity in improving estuaries of prey species. Previous prey studies in Florida Bay have shown that euryhaline fish biomass is influenced by salinity regime at monitoring sites with longer freshwater periods resulting in higher fish biomass than sites with shorter freshwater periods or influence (Lorenz 1999).

Previous observations show a small population of adult American crocodiles are present along the Southwest Coast of Florida, including the Ten Thousand Islands, Cape Romano, and Rookery Bay NERR regions. However, documented success of nesting has been elusive. Growth and survival of juvenile American crocodiles increase when salinity fluctuates below 20 ppt in shoreline, pond and creek habitats of Everglades coastal wetlands (RECOVER 2009). Flow data (Figure 53) assessed for the selected plan (ALT PC2) shows an increase in freshwater restoration flows south of US-41 into the downstream estuaries which will produce more favorable salinities for all life stages of the American crocodile. Similarly, in eastern Florida Bay, the relationship of freshwater flow and salinity (Figure 52) showed flows as little as 20-25 cfs can reduce salinity from near 40 psu (approximately 38 psu) down to 20 PSU (NPS 2012).

ALT PC2 will result in increased conveyance south of US-41, providing additional freshwater flow, which will reduce estuarine salinities in favor of the American crocodile. Therefore, USACE has determined that ALT PC2 may affect but is not likely to adversely affect the American crocodile.

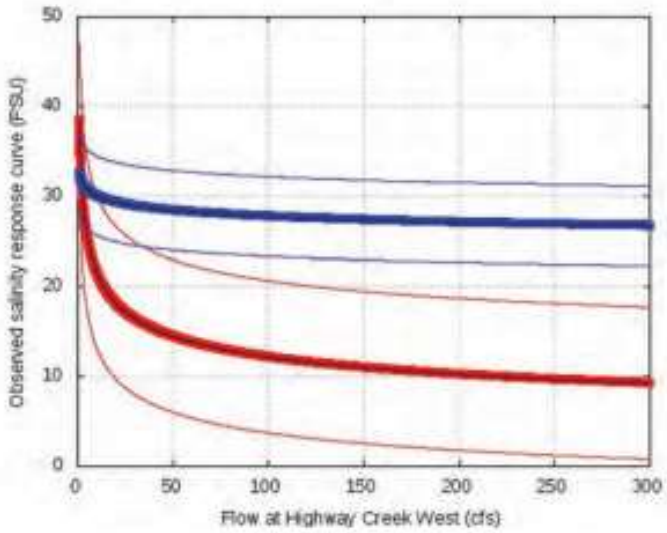

Figure 52: Relation of salinity to freshwater flow in Blackwater Sound (blue) and Long Sound (red) in eastern Florida Bay, 1995-2009 (NPS 2012).

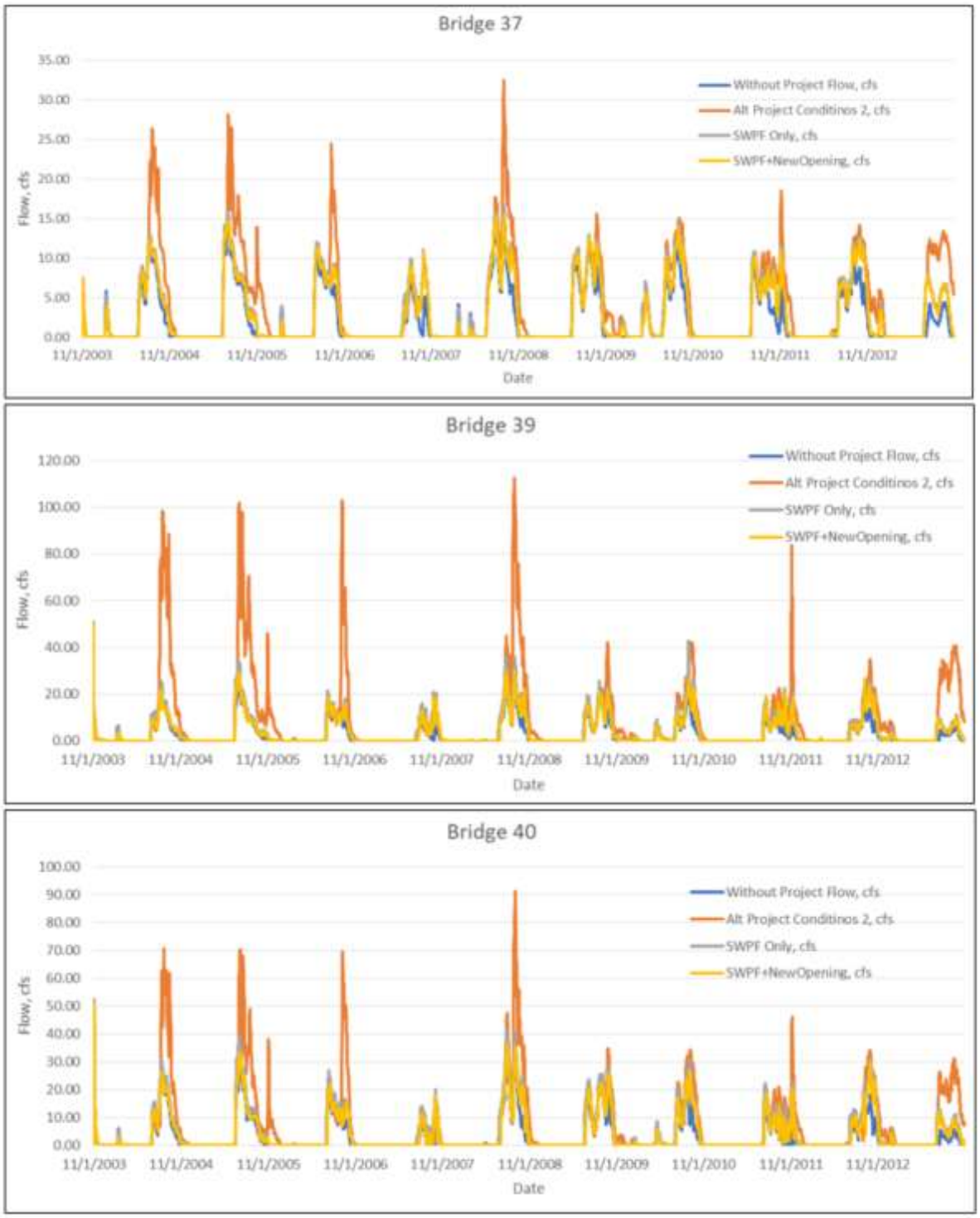

Figure 53: Modeled flow rates for three bridges (27, 39, and 40) for four different scenarios: Without project, ALT PC2, SWPF only, and SWPF plus new US-41 opening.

7.2.3 Everglade Snail Kite and "May Affect Not Likely to Adversely Affect" Determination

7.2.3.1 Species Description

A wide-ranging, New World raptor, the snail kite is found primarily in lowland freshwater marshes in tropical and subtropical America from Florida, Cuba, and Mexico, and south to Argentina and Peru (USFWS 1999). The Florida and Cuban subspecies of the Everglade snail kite, *R. sociabilis plumbeus*, was initially listed as endangered in 1967 due to its restricted range and highly specific diet (USFWS 1999). Its survival is directly tied to the hydrology, water quality, vegetation composition and structure within the freshwater marshes that it inhabits (Martin et al. 2008, Cattau et al. 2008).

Everglade snail kite habitat consists of freshwater marshes and the shallow vegetated edges of lakes where the apple snail (*Pomacea paludosa*), the Everglade snail kite's main food source, can be found. Snail kite populations in Florida are highly nomadic and mobile; tracking favorable hydrologic conditions and food supplies, and thus avoiding local droughts. Snail kites move widely throughout the primary wetlands of the central and southern portions of the State of Florida. Snail kite is threatened primarily by habitat loss and destruction. Widespread drainage has permanently lowered the water table in some areas. This drainage permitted development in areas that were once Everglade snail kite habitat. In addition to loss of habitat through drainage, large areas of marsh are heavily infested with water hyacinth, which inhibits the Everglade snail kite's ability to see its prey.

The Everglade snail kite has a highly specialized diet typically composed of apple snails, which are found in palustrine, emergent, long-hydroperiod wetlands. As a result, the Everglade snail kite's survival is directly dependent on the hydrology and water quality of its habitat (USFWS 1999). Snail kites require foraging areas that are relatively clear and open in order to visually search for apple snails. Suitable foraging habitat for the Everglade snail kite is typically a combination of low profile marsh and a mix of shallow open water. Shallow wetlands with emergent vegetation such as spike rush (*Eleocharis spp*.), maidencane, sawgrass, and other native emergent wetland plant species provide good Everglade snail kite foraging habitat as long as the vegetation is not too dense to locate apple snails. Dense growth of plants reduces the ability of the Everglade snail kite to locate apple snails and their use of these areas is limited even when snails are in relatively high abundance (Bennetts et al. 2006). Areas of sparse emergent vegetation enable apple snails to climb near the surface to feed, breathe, and lay eggs and thus they are easily seen from the air by foraging Everglade snail kites. Suitable foraging habitats are often interspersed with tree islands or small groups of scattered shrubs and trees which serve as perching and nesting sites.

Snail kite nesting primarily occurs from December to July, with a peak in February-June, but can occur year-round. Nesting substrates include small trees such as willow, cypress (*Taxodium spp*.), and pond apple, and herbaceous vegetation such as sawgrass, cattail, bulrush (*Scirpus validus*), and reed (*Phragmites australis*). Snail kites appear to prefer woody vegetation for nesting when water levels are adequate to inundate the site (USFWS 1999). Nests are more frequently placed in herbaceous vegetation during periods of low water when dry conditions beneath willow stands (which tend to grow to grow to the landward side of the cattails, bulrushes and reeds) prevent Everglade snail kites from nesting in woody vegetation (USFWS 1999). Nest collapse is rare in woody vegetation but common in non-woody vegetation, especially on lake margins (USFWS 1999). In order to deter predators, nesting almost always occurs over water (Sykes et al. 1995).

Snail kites will lay between one and five eggs with an average of about three eggs per nest (Sykes 1995, Beissinger 1988). Each egg is laid at about a two-day interval with incubation generally commencing after

the second egg is laid (Sykes 1987). Both parents incubate the eggs for a period of 24 to 30 days (Beissenger 1983). Hatching success is variable between years and between watersheds, but averages 2.3 chicks/nest (USFWS 1999, Cattau et al. 2008). February, March, and April have been identified as the most successful months for hatching (Sykes 1987a,b). Snail kites may nest more than once within a breeding season and have been documented to renest after both failed and successful nesting attempts (Sykes 1987, Beissinger 1988). Chicks are fed by both parents through the nestling period although ambisexual mate desertion has been documented (USFWS 1999). Young fledge at approximately 9 to 11 weeks of age (Beissenger 1988). Adults forage no more than 6 kilometers from the nest, and generally less than a few hundred meters (Beissenger 1988, USFWS 1999). When food is scarce or ecological and hydrologic conditions are unfavorable, adults may abandon the nest altogether (Sykes et al. 1995).

7.2.3.2 Determination of Effect

Overall, the PSRP will benefit the snail kite based on the restoration to their preferred habitat of freshwater marshes and wetlands, as well as shallow vegetated edges of lakes (natural and man-made) (USFWS 1999). PSRP intends to ultimately restore approximately 55,000 acres of wetlands in what will be a mosaic of wetland habitats. The restoration strategy of plugging the canals will result in numerous small ponds with vegetated edges which will support prey. Most observations recorded in eBird are along roadside canals, canals associated with agricultural lands, and current and former canals within the PSRP (Figure 54).

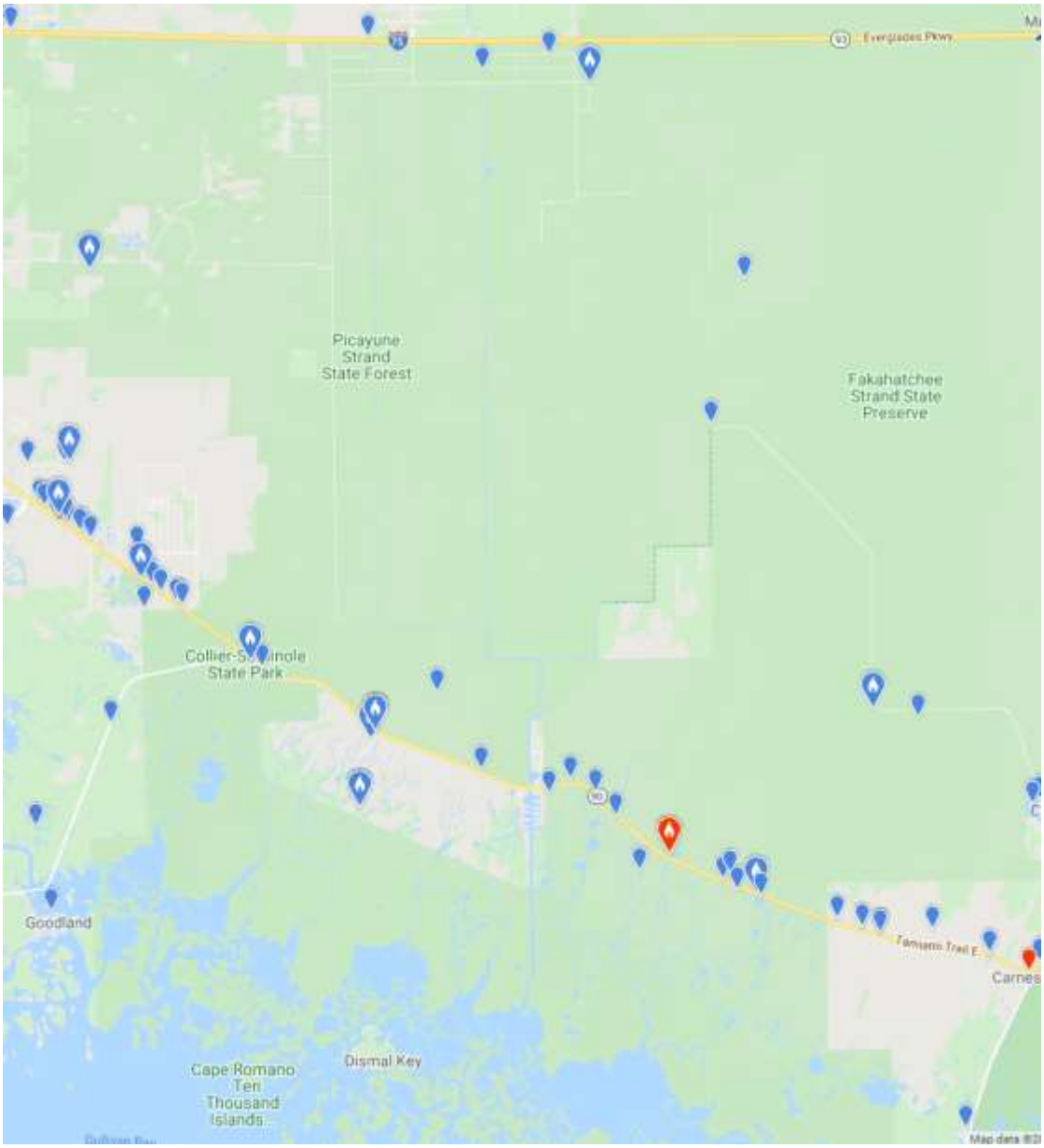

Figure 54: Map of historic Everglade snail kite observations in the vicinity of the PSRP from the eBird database (Cornell Lab of Ornithology 2019b).

ALT PC2 will not disrupt the habitat utilized by the Everglade snail kite and may add additional forage habitat in the form of additional bodies of water associated with the SWPF. The conveyance features will provide relief from additional ponding north of US-41 that would ultimately have reduced foraging areas due to water depth (Figure 55) and hydroperiod (Figure 56). USACE has determined that the implementation of this project may affect but is not likely to adversely affect the Everglade snail kite.

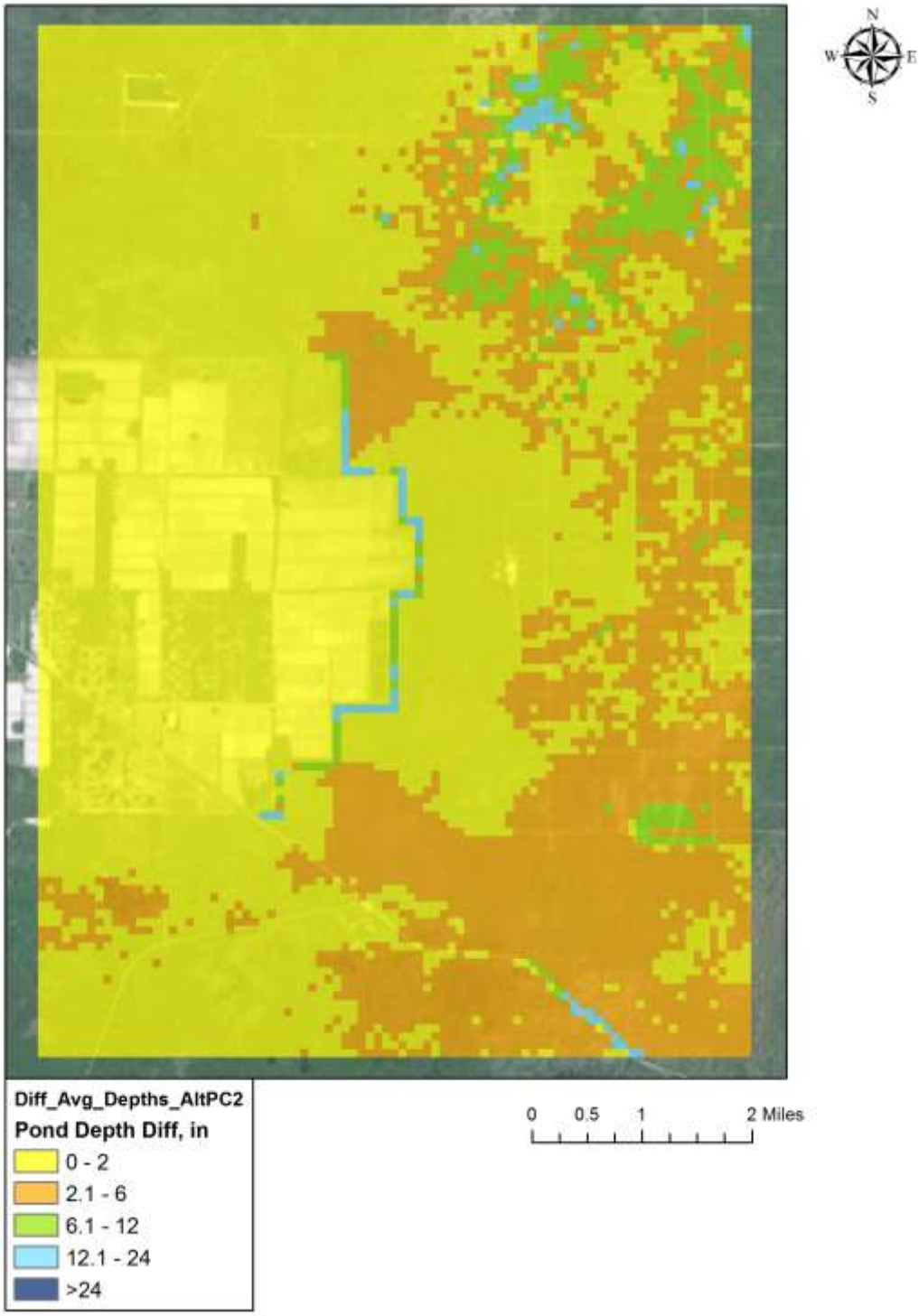

Figure 55: Difference in average ponding depth between the "Without Project" and "with ALT PC2" from the PSRP GSSHA model.

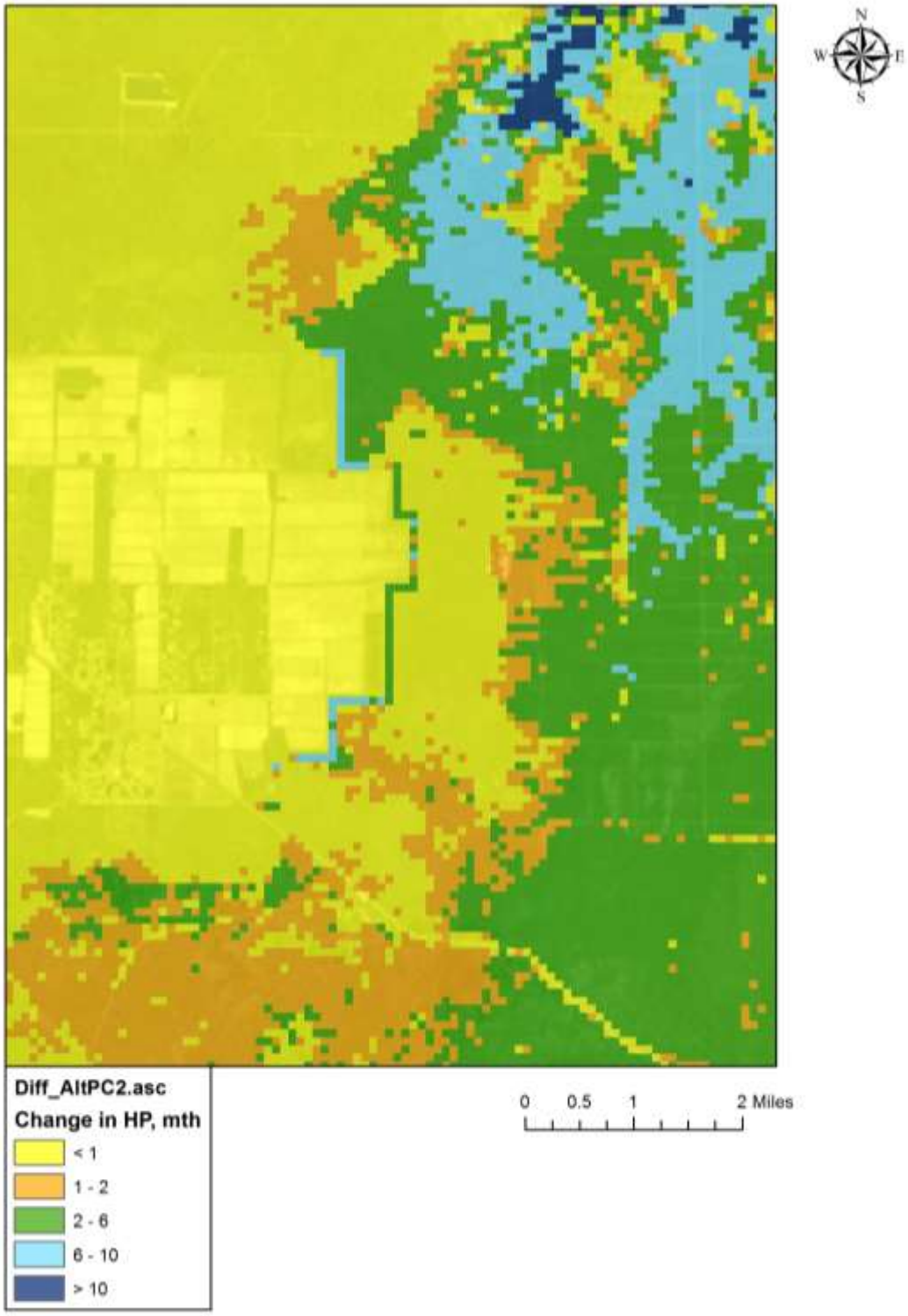

Figure 56: Difference in average hydroperiod between the "Without Project" and "with ALT PC2" from the PSRP GSSHA model.

7.2.4 Red-Cockaded Woodpecker and "May Affect" Determination

7.2.4.1 Species Description

The red-cockaded woodpecker was federal listed as endangered in October 1970. While there is no critical habitat designated for the species, there is a recovery plan that includes south Florida. The red-cockaded woodpecker is identified by its conspicuous white cheek patch, black and white cross-barred back, black cap and nape, white breast and flanks with black spots. In addition, the males have a small bright red spot on each side of the black cap. The bird is approximately 8½ inches in length with a wingspan of 14½ inches. The female is somewhat smaller and resembles the male in coloration, with the exception of a red streak alongside the black cap. The female is approximately 7⅜ inches with a wingspan of 13¼ inches (USFWS 1999).

Red-cockaded woodpeckers are a social species and live in groups with a breeding pair and up to four helpers, generally male offspring from the previous year. Approximately 200 acres of mature pine forests are necessary to support each group's nesting and foraging habitat needs. Juvenile females will leave the group prior to the breeding season and establish a breeding pair within a solitary male group. Breeding pairs are monogamous and will raise a single brood each breeding season. Three to four small white eggs will be laid within the roost cavity and incubated by members of the group for a period of ten to twelve days. Chicks are also fed by members of the group and remain within the roost cavity for approximately 26 days. Insects including ants, caterpillars, moths, grasshoppers, spiders, and beetle larvae comprise approximately 85 percent of their diet. The remainder of their diet consists of wild grapes, cherries, poison ivy berries, blueberries, and nuts such as pecans (USFWS 1999).

Red-cockaded woodpeckers live in mature pine forests, specifically those with longleaf pines averaging 80 to 120 years old and loblolly pines averaging 70 to 100 years old. Destruction of its preferred long-leaf pine habitat by humans or disease (pines afflicted by fungus or red-ring rot) resulted in the woodpecker becoming listed as endangered in 1970. The current range is from eastern Texas to the southeastern United States and southern Florida. Historically, red-cockaded woodpeckers were found abundantly from Texas to New Jersey and as far inland as Tennessee. The red-cockaded woodpecker is primarily an upland species, also inhabiting hydric pine flatwoods.

7.2.4.2 Determination of Effect

The red-cockaded woodpecker is unique amongst the cadre of woodpecker species with its choice of habitat and social structure. Red-cockaded woodpeckers inhabit pine-dominated pine/hardwood stands including mesic pine flatwoods, hydric pine flatwoods, and upland pine ridges within cypress (Figure 58). Unlike other woodpecker species, red-cockaded woodpeckers use living trees for their nesting and roosting trees. Preferential trees are living old growth trees that are at least 80 years old, have a dbh of 20.5 to 30.8 cm, and have heart rot fungus. According to the Recovery Plan for the red-cockaded woodpecker, each social group needs 200 acres of high quality pines to thrive. In south Florida, because habitat qualities are generally lower than those elsewhere in the red-cockaded woodpecker's range, more than 200 acres may be needed to support a healthy population (USFWS 2003).

Red-cockaded woodpeckers are located in the northwest portion of the Picayune Strand State Forest which includes the Belle Meade tract and small portion of the PSRP (Figure 57). The Picayune Strand State Forest contains a red-cockaded woodpecker essential support population unit as identified in the USFWS Final Red-cockaded Woodpecker Recovery Plan (2003). As of 2000, the number of active red-cockaded

woodpecker clusters was 3 (USFWS 2003). USFWS describes a "cluster" as open pine woodlands and savannahs with large old pines for nesting and roosting habitat (2003). According to the Recovery Plan, the Picayune Strand State Forest essential support population of red-cockaded woodpeckers will reach delisting size at 25 potential breeding groups which is anticipated to require 45 years to achieve (USFWS 2003). USFWS defines a "group" as a breeding pair with or without one or two male helpers (2003). Females can also be helpers, but do so much less frequently than males (USFWS 2003).

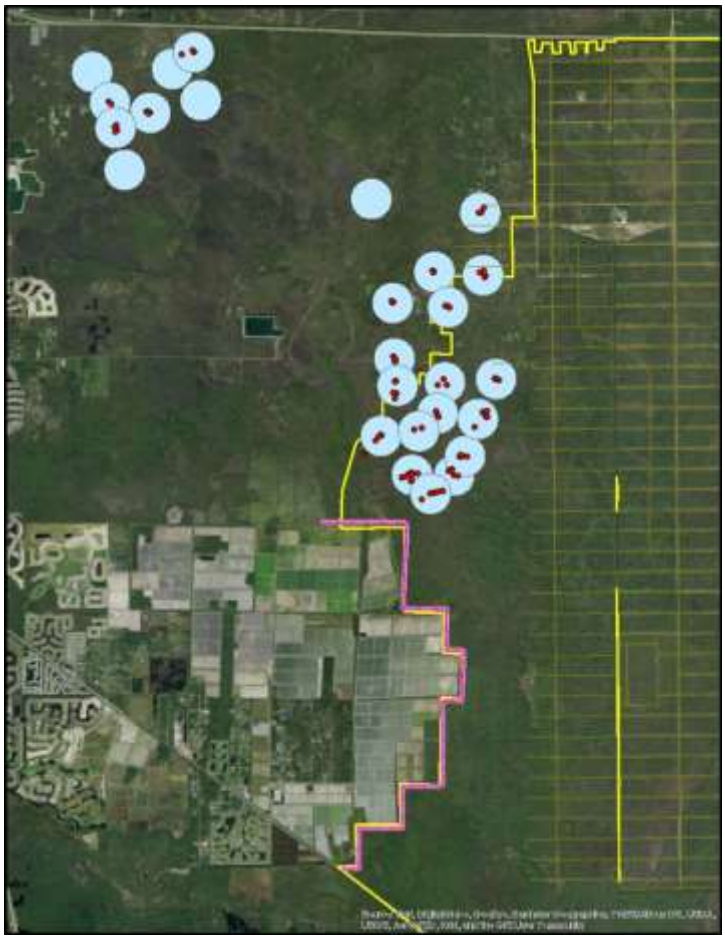

Figure 57: Map of red-cockaded woodpecker clusters (blue) with cavity trees (red dots) in relationship to the PSRP boundary and the SWPF levee alignment.

The current status of the Picayune Strand State Forest essential support population of red-cockaded woodpeckers is both positive and worrisome. The current population stands at 16 with 4 pairs present in the northwest corner of the Belle Meade Tract of the Picayune Strand State Forest and 12 pairs located north-north east of the proposed SWPF levee (USACE 2019a,b). It is anticipated that the smaller population of 4 pairs will be extirpated in the near future (USACE 2019a,b). The habitat of the smaller population has been severely impacted in recent years by flooding/rain events, Hurricane Irma, and the Greenway Fire (USACE 2019a). These events resulted in loss of old growth pines, one of which was known to be over 200 years old (USACE 2019a). USFWS acknowledges that the South/Central Florida Recovery Unit will not in itself sustain viable populations and that one or more of these populations may be lost to stochastic events; Translocation among populations within this unit are likely to be necessary for long-term maintenance of genetic variation (USFWS 2003). The Florida Fish and Wildlife Conservation

Commission is actively relocating first year red-cockaded woodpeckers from this smaller population to the Big Cypress National Preserve population (USACE 2019b). Since the classification of the Picayune Strand State Forest red-cockaded woodpecker population as an essential support population, USFWS and FWC have relocated 41 red-cockaded woodpeckers to the Picayune Strand State Forest population from donors in Apalachicola National Forest, Fort Stewart Georgia, Osceola National Forest, and Withlacoochee State Forest (USACE 2019b). FWC estimates the cost for relocating one woodpecker, including a minimum of five years of monitoring, at $10,000 per individual woodpecker meaning $410,000 has been spent on just relocating birds to augment the Picayune Strand State Forest population (USACE 2019b).

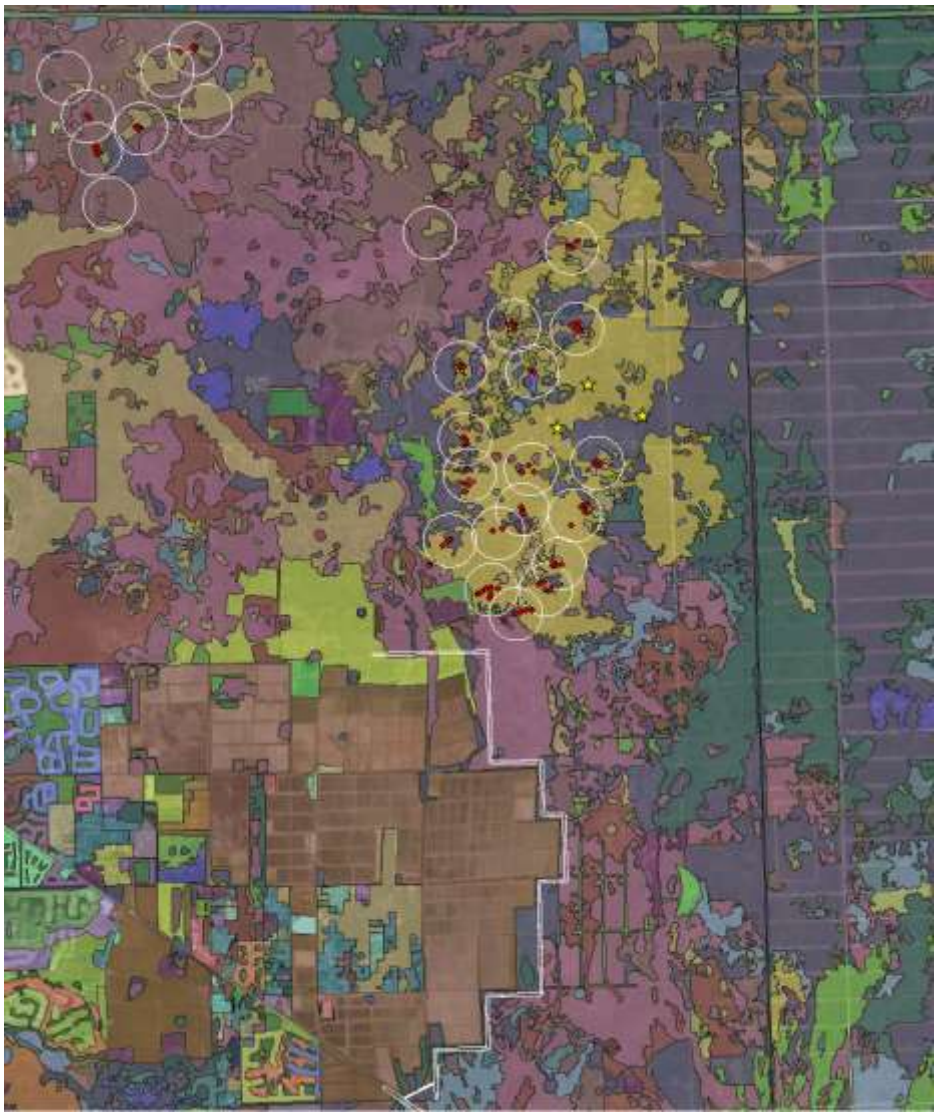

Figure 58: Natural communities breakdown associated with the clusters of red-cockaded woodpeckers (red dots = current cavity trees; yellow stars = recruitment trees) in the vicinity of the PSRP. The major natural communities where the RCW cluster trees are located include cypress-pine-cabbage palm and hydric pine flatwoods. Other communities include palmetto prairie, mixed shrub, mesic pine flatwoods, and cypress.

Modeling of ALT PC2 showed hydroperiods ranging from 2 months to 10 months along the eastern edge of the larger cluster group, an increase of 1 month to 9 months (Figure 59). Ponding depth for the same area increased by 2 inches to 4 inches. Changes in hydrology associated with the implementation of ALT PC2 in conjunction with the implementation of all of PSRP show potential, including the plugging of the Miller Canal, impacts to 8 of the 12 red-cockaded woodpecker breeding pairs associated with the larger sub-population within the Picayune Strand State Forest.

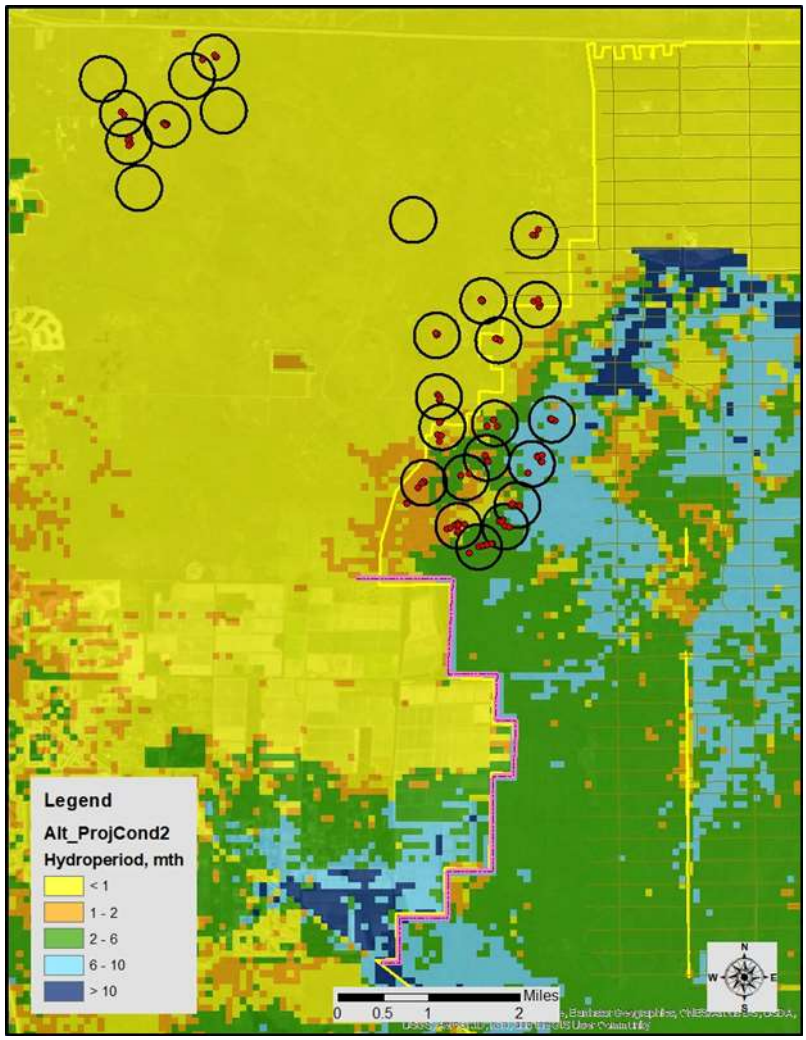

Figure 59: Hydroperiod for ALT PC2 with the rest of PSRP implemented in relation to the Picayune Strand State Forest red-cockaded woodpecker clusters.

Modeling results for both ponding depth and hydroperiod reveal a flowway of freshwater originating at the Miller Pump Station and associated spreader berm due to the plugging of the Miller Canal (Figure 60). Freshwater entering this flowway is directed into the southeastern side of the larger sub-population of red-cockaded woodpeckers in the Picayune Strand State Forest (Figure 60 and Figure 59). Discussions on the source of the concern, SWPF or Miller Canal plugging, occurred between August 2019 and February 2020. A sub-team of the larger PSRP Environmental Coordination Group focused on the red-cockaded woodpecker concern at an interagency meeting in December 2019. At this meeting, several potential options to avoid and minimize impacts were discussed. The sub-team decided one option to model was

the closure of the openings on the west half of the Miller Pump Station spreader berm as a potential solution to the hydrologic impacts of the full PSRP on the state forest red-cockaded woodpecker population.

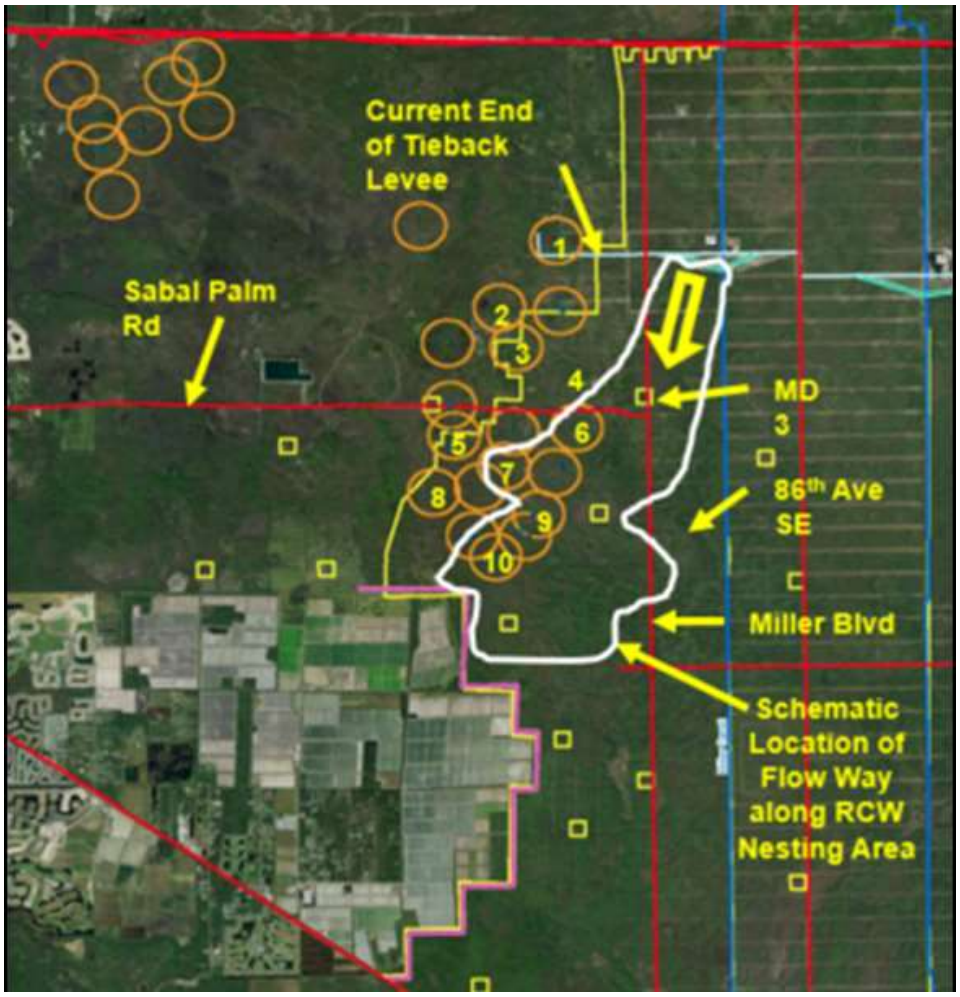

Figure 60: Hydrologic flowway originating from the Miller Pump Station and associated spreader berm towards the southeastern side of the larger Picayune Strand State Forest red-cockaded woodpecker sub-population.

Modeling results of the implementation of ALT PC2 with full PSRP implementation including the blocking of the western half of the Miller Pump Station spreader berm show a hydroperiod increase of 0 to 6 months (Figure 61). This is an improvement from the 1 to 10 month range of hydroperiod increase without modifying the Miller Pump Station spreader berm. Similarly, ponding depth decreases with the blocking of the western half of the spreader berm. Additional modeling results better show the impact of the implementation of ALT PC2 on the current state of the PSRP. A modeling scenario that included only the SWPF and conveyance features except for the implementation of the conveyance feature under CR-92 was completed to show the impacts of the this phase of the project without any other PSRP restoration implemented. Results show the hydrological impacts, both hydroperiod and ponding depth, in the vicinity of the Picayune Strand State Forest red-cockaded woodpecker population is not a result of implementing

the SWPF and conveyance features but instead is a cumulative effect of the full implementation of the PSRP and namely the plugging of Miller Canal (Figure 62).

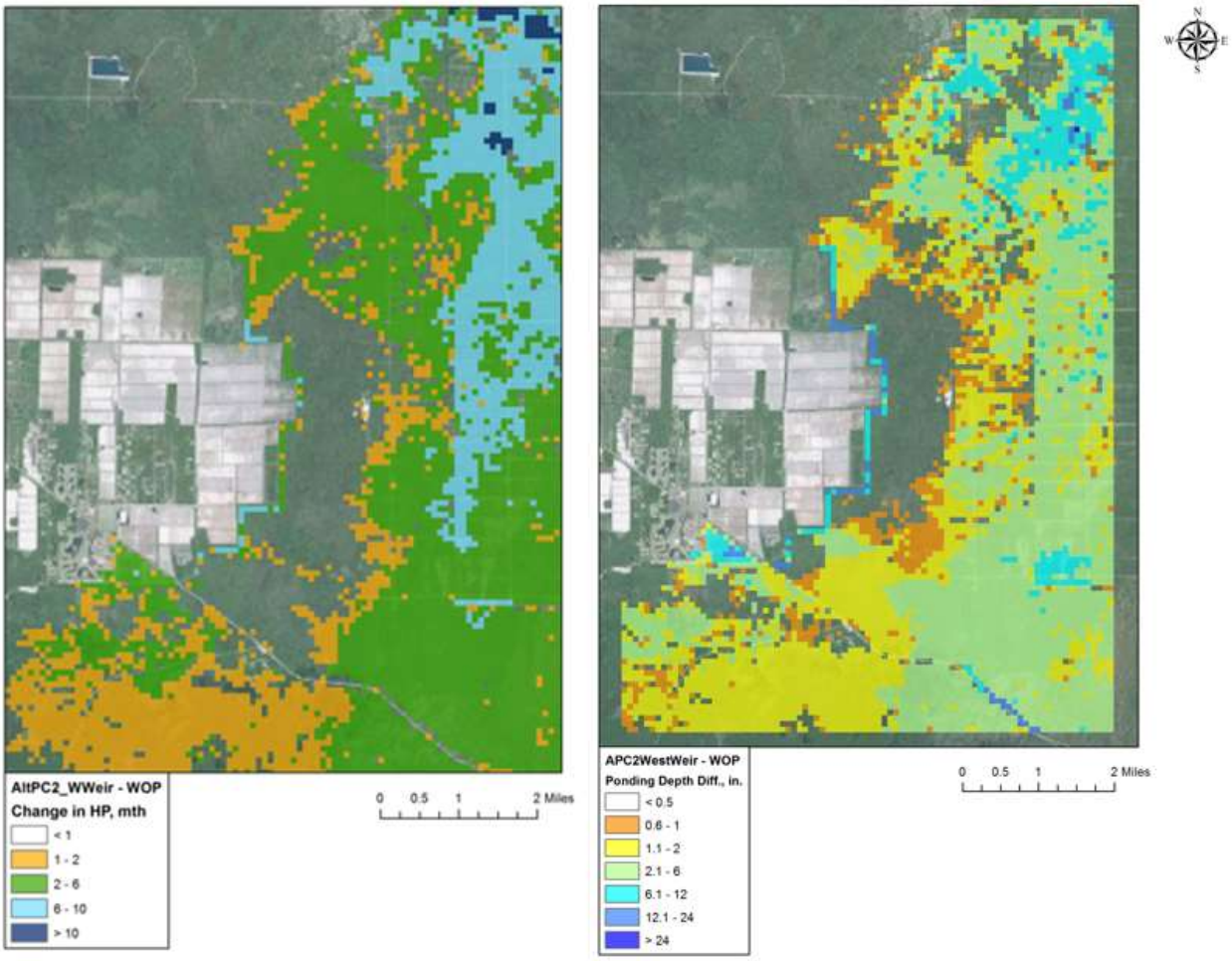

Figure 61: Hydrological modeling results (GSSHA model) for Full PSRP implementation including ALT PC2 and a modified Miller Pump Station spreader berm. In this scenario the Miller Pump Station spreader berm had the entire western side blocked. The left map represents the difference in hydroperiod (months) between ALT PC2 (with modified Miller spreader berm) and "without project" condition. The right map represents the difference in ponding depth (inches) between ALT PC2 (with modified Miller spreader berm) and "without project" condition.

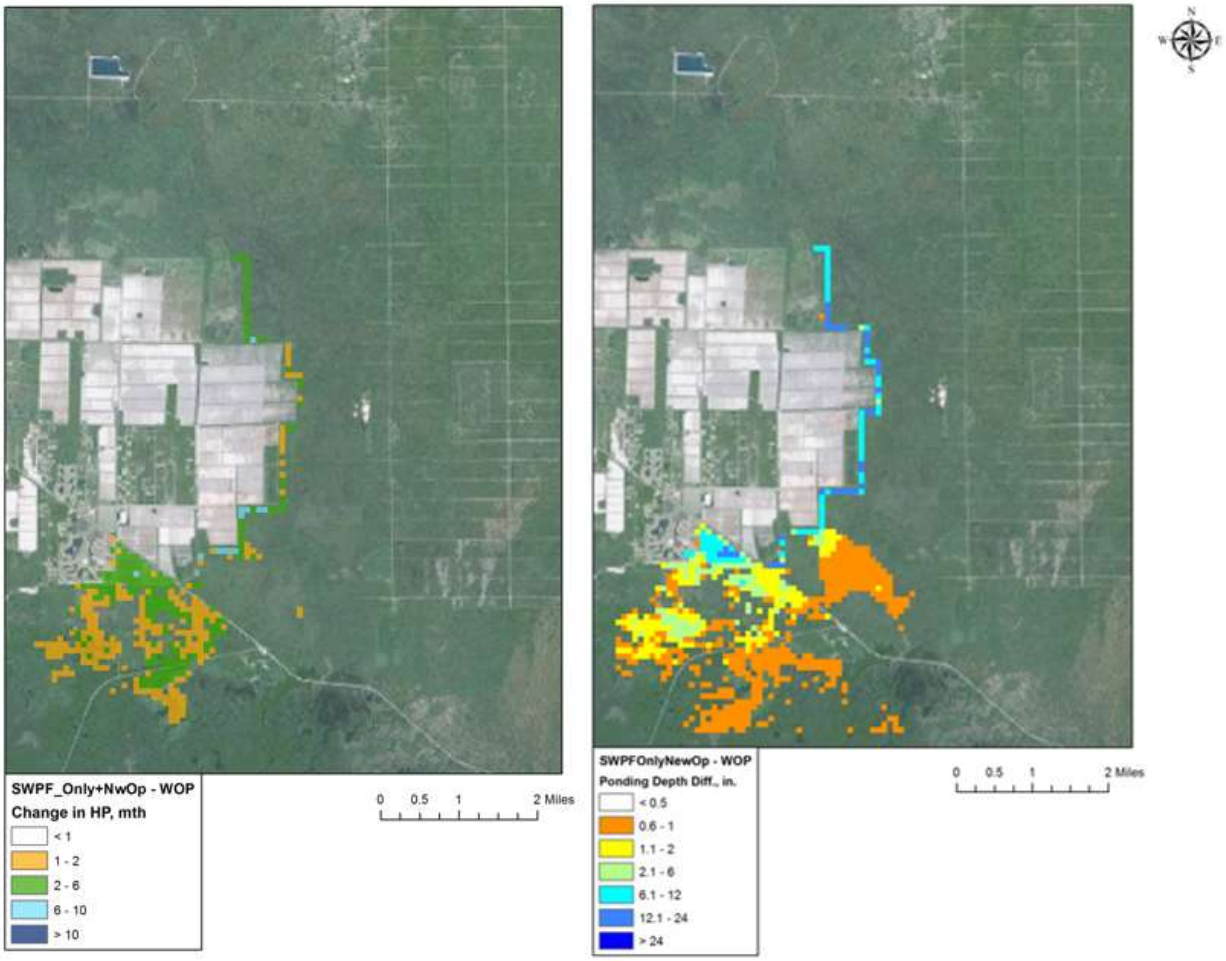

Figure 62: Hydrological modeling (GSSHA model) for the SWPF and conveyance features (without the opening under CR-92) without any other components of the PSRP present. The left map is for change in hydroperiod from "without project" conditions. The right map is for change in ponding depth from "without project" conditions.

Restoration of hydrology throughout the PSRP may have impacts to the foraging areas of the red-cockaded woodpecker. Their requirements for foraging habitat are not as stringent as those for nesting and roosting habitat. Red-cockaded woodpeckers have several different foraging strategies including: chipping away outer layers of bark to feed on arthropods, foraging on pine nuts and fruits occasionally, capturing flying insects during flight, and foraging location in trees (mostly pines). To further reduce competition for resources, male and female red-cockaded woodpeckers forage in different parts of a tree. Males forage on branches and upper trunk of trees, while females forage on the trunk below the lowest branches of a tree (Ligon 1968, Ramey 1980, Jackson and Parris 1995, USFWS 1999). Red-cockaded woodpeckers will forage to some degree on hardwood trees, bayheads, and cypress domes, but in general, mature pines constitute the primary foraging substrate (USFWS 1999). In southwest Florida, hydric pine flatwoods offer good foraging habitat. Good quality foraging habitat consists of 133 trees per hectare, 5 to 8 pine stems of 25.8 cm or larger dbh, or basal area of approximately 4.6 sq m per hectare (Beever and Dryden 1992, USFWS 1999). Home ranges in south and central Florida, including foraging habitat, are known to be 297 to 346 acres, but depends on the quality of habitat (USFWS 1999). Home ranges in nearby Big Cypress National Preserve (east of PSRP) have been documented as large as 742-989

acres most likely due to habitat, pineland, fragmentation (USFWS 1999). The average home range in Avon Park in South Florida is 396 acres with the largest measuring 890 acres and the most constrained measuring 173 acres (USFWS 1999).

In southwest Florida, hydric pine flatwoods provide the preferred critical nesting and foraging habitat for red-cockaded woodpeckers (Beever and Dryden 1992, USFWS 1999). The Picayune Strand State Forest contains 17,241 acres of hydric pine flatwoods (synonymous with wet flatwoods) and 6,926 acres of mesic flatwoods based on National Resource Conservation Service surveys (FDACS 2008). Within the foraging areas identified by USFWS (Figure 63), the majority of habitat, based on FLUCCS mapping efforts from 2014-2016, is cypress-pine-cabbage palm community and hydric pine flatwoods community. Other natural communities present in the foraging areas are palmetto prairie, mixed shrub, mesic pine flatwoods, and cypress (Figure 58). Much of the Belle Meade portion of the Picayune Strand State Forest will have minimal to no change (Figure 64) in association with ALT PC2 and the larger PSRP for that matter. Depending on microtopography in this area, modeled hydrologic regimes suggest natural communities should stay the same or shift to mesic pine flatwoods, palmetto prairie, and mesic hammock (Figure 64) (USACE 2004).

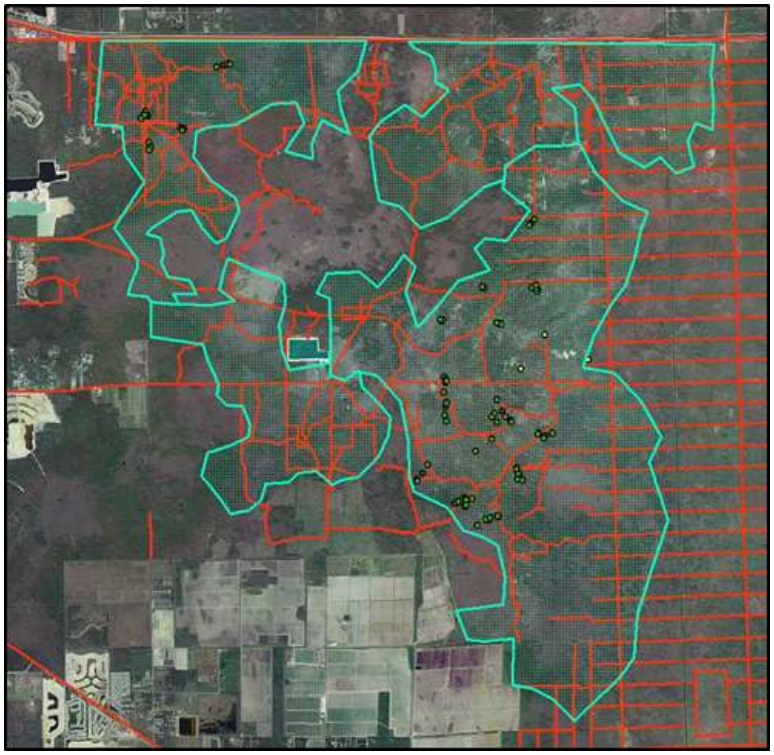

Figure 63: Map of red-cockaded woodpecker foraging areas (teal outline and shaded areas) of the Picayune Strand State Forest essential support population. Green dots are current red-cockaded woodpecker locations. Map created by USFWS (USACE 2019a).

Average Wet Season Water Level (in)	Hydroperiod (mon)	SGGE Non-Tidal Plant Communities	Non-Hydrologic Influences	Relative Abundance in SGGE	
				Natural	Current
≤-6	0	Tropical Hammock	No Fire	++	++
≤2	≤1	Mesic Pine Flatwoods	Fire	+++	+++
		Palmetto Prairie	>>>Fire	0	0
		Mesic Hammock	No Fire	0	++
		Brazilian Pepper	Exotic	0	++
		Palms in Flatwoods	Soils	+++	+++
		Palms in Hammock	Soils	+	+++
2 – 6	1 - 2	Hydric Pine Flatwoods	Fire	+++	+++
		Hydric Hammock	No Fire	0	+++
		Palms in Flatwoods	Soils	+++	+++
		Palms in Hammock	Soils	+	+++
6 – 12	2 - 6	Wet Prairie	Fire	+++	+++
12 – 24	6 - 10	Marsh	Fire	++	++
		Cypress Forest	< Fire	++++	++++
>24	>10	Open Water		0	0

Figure 64: Hydrologic regimes and other environmental factors that maintain the major plant community types. Relative abundance of these communities during natural and current conditions is indicated by the number of pluses from low abundance (+) to high abundance (++++). A zero (0) indicates the community is not present. Table adapted from the 2004 PSRP Final PIR/EIS (USACE 2004).

Further into the south and southeastern portions of the foraging area outlined by USFWS (Figure 63), current natural communities consist of cypress-pine-cabbage palm forest communities (wetland coniferous forest type), mixed shrub, mixed wetland hardwoods, and cypress (Figure 58). Based on modeling of hydroperiod and water depth, modeling results suggest shifts to hydric pine flatwoods, hydric hammock, wet prairie, marsh, and cypress will occur depending on microtopography and habitat management (i.e. fire, exotic plant treatment/removal). These shifts, of course, are cumulative effects of the entire PSRP and not impacts of ALT PC2 alone. ALT PC2 will not increase hydroperiod or water depth on its own (Figure 62). Those changes which will affect red-cockaded woodpecker nesting, roosting, and foraging habitat are a product of full PSRP implementation including the plugging of Miller Canal. The implementation of ALT PC2 does directly impact 125-150 acres of habitat permanently and 18.88 acres of potential habitat temporarily.

Modeling results of just the SWPF and conveyance features (minus CR-92 culvert) show there is no change in the hydroperiod and water depth in the vicinity of the red-cockaded woodpecker clusters in the Picayune Strand State Forest (Figure 62). However, USACE does acknowledge that the cumulative effects associated with ALT PC2 and the full implementation of PSRP (including features not constructed) most likely will result in impacts to the current red-cockaded woodpecker population and plans for recovery as stated in the USFWS Recovery Plan for the Red-cockaded Woodpecker. Prior to full implementation of the PSRP, the USACE would update the project operating manual and evaluate hydrologic changes in coordination with the FWS in order to determine project effects on the RCW and measures to be taken.

However, USACE has determined that ALT PC2, by itself, may affect but is not likely to adversely affect the red-cockaded woodpecker regarding nesting, roosting, or foraging.

7.2.5 Wood Stork and "May Affect Not Likely to Adversely Affect" Determination

7.2.5.1 Species Description

Measuring 45 in tall with a wing span of 60 to 65 in, the wood stork, *Mycteria americana*, is a large, white, long-legged wading bird that relies upon shallow, freshwater wetlands for foraging (USFWS 2013). Black primary and secondary feathers, a black tail and a blackish, featherless neck distinguish the wood stork from other wading birds species. This species was federally listed as endangered under the ESA on 28 February 1984. However, the species was reclassified as threatened on 30 June 2014.

The wood stork is found from northern Argentina, eastern Peru and western Ecuador north to Central America, Mexico, Cuba, Hispaniola, and the southeastern United States (USFWS 1999). In the United States, wood storks were historically known to nest in all coastal states from Texas to South Carolina (USFWS 1999; USFWS 2013). Wood storks are tied to wetlands, both freshwater and estuarine. They primarily nest in cypress or mangrove swamps and forage in freshwater marshes, narrow tidal creeks, and flooded tidal pools (USFWS 2013). Wood storks have also been observed in runoff and retention ponds, drainage ditches along roadsides, and neighborhood ponds.

Depressions in wetlands where fish become concentrated during dry down periods are of particular interest to wood storks for foraging (USFWS 2013). Small fish ranging from 1 to 6 inches long make up the wood stork's primary diet but may occasionally consume crustaceans, amphibians, reptiles, mammals, birds, and arthropods. (USFWS 1999; USFWS 2013). Wood storks have a specialized foraging technique referred to as grope-feeding or tacto-location (USFWS 2013). They forage by placing their bill in water approximately 6 to 10 inches deep with it partly agape, acting like a probe. When a fish touches the bill, the stork quickly snaps it shut with the average response time of 25 milliseconds (USFWS 2013).

The wood stork is highly colonial species nesting in large rookeries and feeding in flocks (USFWS 2013). While nesting periods vary depending on latitude, wood storks nest as early as October in South Florida with chicks fledging in February or March (USFWS 1999; USFWS 2013). They typically nest in the upper portions of cypress trees within domes or swamps which affords some protection from mammalian predators. They have also been known to nest in mangroves on islands or in/on man-made structures. Nests consist of two to five eggs with an average of two fledglings per successful nest under good conditions (USFWS 2013).

7.2.5.2 Determination of Effect

The primary cause of the wood stork population decline in the United States is loss of wetland habitats or loss of wetland function resulting in reduced prey availability. Almost any shallow wetland depression where fish become concentrated, either through local reproduction or receding water levels, may be used as feeding habitat by the wood stork during some portion of the year, but only a small portion of the available wetlands support foraging conditions (high prey density and favorable vegetation structure) that wood storks need to maintain growing nestlings. Browder et al. (1976) documented the distribution and the total acreage of wetland types occurring south of Lake Okeechobee, Florida, for the period 1900 through 1973. They combined their data for habitat types known to be important foraging habitat for

wood storks (cypress domes and strands, wet prairies, scrub cypress, freshwater marshes and sloughs, and saw grass marshes) and found these habitat types have been reduced by 35 percent since 1900.

Dahl (1990) estimates these states lost about 38 million acres, or 45.6 percent, of their historic wetlands between the 1780s and the 1980s. However, it is important to note wetlands and wetland losses are not evenly distributed in the landscape. Hefner et al. (1994) estimated 55 percent of the 2.3 million acres of the wetlands lost in the southeastern United States between the mid-1970s and mid-1980s were located in the Gulf-Atlantic coastal flats. These wetlands were strongly preferred by wood storks as nesting habitat. Currently, wood stork nesting is known to occur in Florida, Georgia, South Carolina, and North Carolina.

Hydrologic and environmental characteristics have strong effects on fish density, and these factors may be some of the most significant in determining foraging habitat suitability, particularly in southern Florida. Within the wetland systems of southern Florida, the annual hydrologic pattern is very consistent, with water levels rising during the wet season (June-October), and then receding gradually during the dry season (November-May). Wood storks nest during the dry season, and rely on the drying wetlands to concentrate prey items in the ever-narrowing wetlands (Kahl 1964). Because of the continual change in water levels during the wood stork nesting period, any one site may only be suitable for wood stork foraging for a narrow window of time when wetlands have sufficiently dried to begin concentrating prey and making water depths suitable for storks to access the wetlands (Gawlik 2002, Gawlik et al. 2004).

In addition to the concentration of fish due to normal drying, several other factors affect fish abundance in potential foraging habitats. Longer hydroperiod areas generally support more fish and larger fish (Trexler et al. 2000, Turner et al. 1999). In addition, nutrient enrichment (primarily phosphorus) within the oligotrophic Everglades wetlands generally results in increased density and biomass of fish in potential wood stork foraging sites (Rehage and Trexler 2006), and distances from dry-season refugia, such as canals, alligator holes, and similar long hydroperiod sites also affect fish density and biomass. Within the highly modified environments of southern Florida, fish availability varies with respect to hydrologic gradients, nutrient availability gradients, and it becomes very difficult to predict fish density. The foraging habitat for most wood stork colonies within southern Florida includes a wide variety of hydroperiod classes, nutrient conditions, and spatial variability.

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

Dense submerged and emergent vegetation may reduce foraging suitability by preventing wood storks from moving through the habitat and interfering with prey detection (Coulter and Bryan 1993). Some submerged and emergent vegetation does not detrimentally affect wood stork foraging, and may be important to maintaining fish populations. Wood storks tend to select foraging areas that have an open canopy, but occasionally use sites with 50 to 100 percent canopy closure (Coulter and Bryan 1993, Coulter

et al. 1999). Foraging sites with open canopies are more easily detected from overhead as wood storks are searching for food.

Gawlik (2002) characterized wood storks as “searchers” that employ a foraging strategy of seeking out areas of high density prey and optimal (shallow) water depths, and abandoning foraging sites when prey density begins to decrease below a particular efficiency threshold, but while prey was still sufficiently available that other wading bird species were still foraging in large numbers (Gawlik 2002). Wood stork choice of foraging sites was significantly related to both prey density and water depth (Gawlik 2002). Because of this strategy, wood stork foraging opportunities are more constrained than many of the other wading bird species (Gawlik 2002).

The wood stork population in the southeastern United States is increasing given the listing downgrade from endangered to threatened. Preliminary population totals indicate that the wood stork population has reached its highest level since it was listed as endangered in 1984. Wood stork use in the vicinity of the PSRP is no exception (Figure 65). The PSRP overall will restore 55,000 acres of wetlands. Recent modeling has shown there to be an increase in ponding depth and hydroperiods throughout the project footprint, including downstream (Figure 62). ALT PC2 may affect some foraging habitat lost due to the implementation of the SWPF but will have a beneficial affect overall for foraging and nesting habitat with the implementation of the ALT PC2 in conjunction with the hydrological restoration of the full PSRP. USACE has determined that ALT PC2 may affect but is not likely to adversely affect the wood stork.

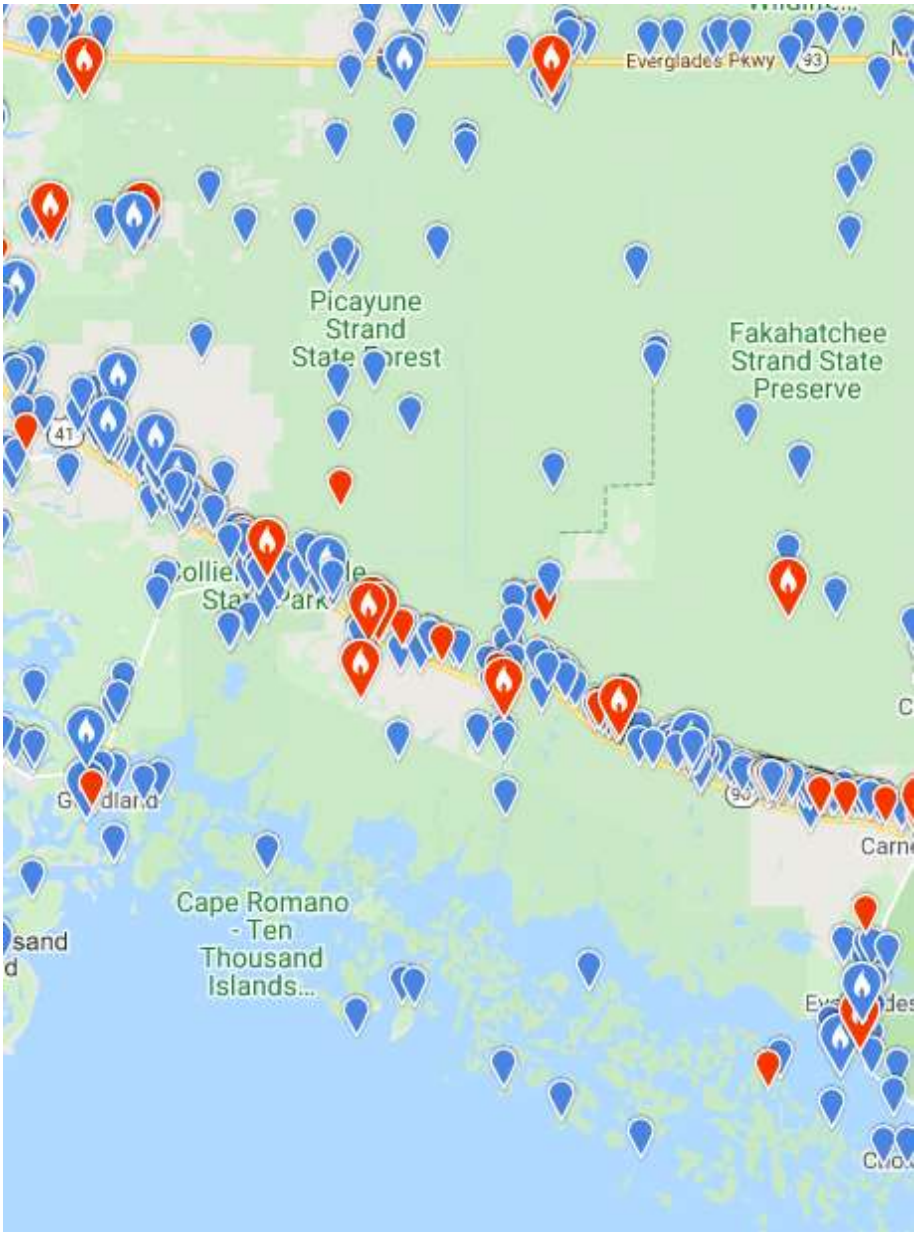

Figure 65: Map of historic wood stork observations in the vicinity of the PSRP from the eBird database (Cornell Lab of Ornithology 2019c).

7.2.6 Florida Bonneted Bat and "May Affect" Determination

7.2.6.1 Species Description

The endangered 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 (Owre 1978; Belwood 1992). 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. In general, bats will forage over ponds, streams and wetlands and require roosting habitat for daytime roosting, protection from predators and rearing of young (FFWCC 2011). 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 (FFWCC 2011). 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 (FFWCC 2011); however limited data suggests that a female may undergo a second birthing season possibly in January or February.

The Florida bonneted bat is Florida's only endemic bat. The range of this species is limited to southern Florida including two locations within the Kissimmee River Wildlife Management Area north of Lake Okeechobee in 2008. 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 BCNP, Fakahatchee Strand Preserve State Park, Kissimmee River Wildlife Management Area, Babcock Ranch and Fred C. Babcock and Cecil M. Webb Wildlife Management Area. 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. Figure 66 shows the consultation and focus area of the Florida bonneted bat.

Due to the species' small range, the greatest threats to Florida bonneted bats are loss of habitat, including the destruction of natural roost sites, and natural disasters such as hurricanes, since the impact could occur throughout its entire range. Other perceived threats include pesticide and herbicide use, which decreases the population of insects, the bats' primary prey. Critical habitat has not yet been designated for this species.

7.2.6.2 Determination of Effect

The Florida bonneted bat is Florida's only endemic bat 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 2013a). 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).

Figure 66: Florida Bonneted Bat Consultation Area (USFWS 2019).

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 (USFWS 2013).

Habitat use by the Florida Bonneted Bat within the PSRP and specifically in areas of construction associated with the SWPF and conveyance features is an uncertainty. Data collected in the field in reference to other PSRP restoration phases indicates that Florida bonneted bats at minimum forage within PSRP and roost in lands adjacent to the PSRP (Fakahatchee Strand). Given the presence of Florida bonneted bats within the PSRP and in adjacent lands, it is likely that at minimum these bats are foraging in the vicinity of the SWPF and conveyance features associated with ALT PC2, especially given their proximity to open water channels and farm fields. Although pre-construction surveys will be conducted, it is also a possibility that a roost tree could exist within the construction footprints of ALT PC2. Therefore, USACE has determined that ALT PC2 may affect the Florida bonneted bat.

7.2.7 Florida Panther and "May Affect Not Likely to Adversely Affect" Determination

7.2.7.1 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 supplemental BA by reference.

The Florida panther, also known as cougar, mountain lion, puma, and catamount, was once the most widely distributed mammal (other than humans) in North and South America, but it is now virtually exterminated in the eastern United States. Habitat loss has driven the subspecies known as the Florida panther into a small area, where the few remaining animals are highly inbred, causing such genetic flaws as heart defects and sterility. Recently, closely-related panthers from Texas were released in Florida and are successfully breeding with the Florida panthers. Increased genetic variation and protection of habitat may save the subspecies.

One of 30 cougar subspecies, the Florida panther is tawny brown on the back and pale gray underneath, with white flecks on the head, neck, and shoulder. Male panthers weigh up to 130 pounds and females reach 70 pounds. Preferred habitat consists of cypress swamps, pine, and hardwood hammock forests. The main diet of the Florida panther consists of white-tailed deer, sometimes wild hog, rabbit, raccoon, armadillo, and birds. Present population estimations range from 80 to 100 individuals. Florida panthers are solitary, territorial, and often travel at night. Males have a home range of up to 400 square miles and females about 50 to 100 square miles. Female panthers reach sexual maturity at about three years of age. Mating season is December through February. Gestation lasts about 90 days and females bear two to six kittens. Juvenile panthers stay with their mother for about two years. Females do not mate again until their young have dispersed. The main survival threats to the Florida panther include habitat loss due to human development and population growth, collision with vehicles, parasites, feline distemper, feline alicivirus (an upper respiratory infection), and other diseases.

7.2.7.2 Determination of Effect

Telemetry from radio collared panthers has been collected since 1981 across south Florida (Figures 68 and 69). Recorded telemetry follows the outline map of key area components of the Florida Panther Focus Area (Figure 67). The PSRP is in the heart of the Primary Zone of the Florida Panther Focus area meaning that the area is "currently occupied and supports the only known breeding population of Florida panthers in the world. These lands are important to the long-term viability and persistence of the panther in the wild." The agricultural lands adjacent to the southwest corner of the PSRP are designated as a Secondary Zone meaning these lands are, "contiguous with the Primary Zone and although these lands are used to a lesser extent by panthers, they are important to the long-term viability and persistence of the panther in the wild. Panthers use these lands in a much lower density than in the Primary Zone." Observation data from telemetry supports these definitions based on where panthers have historically been active in the vicinity of the PSRP (Figure 68).

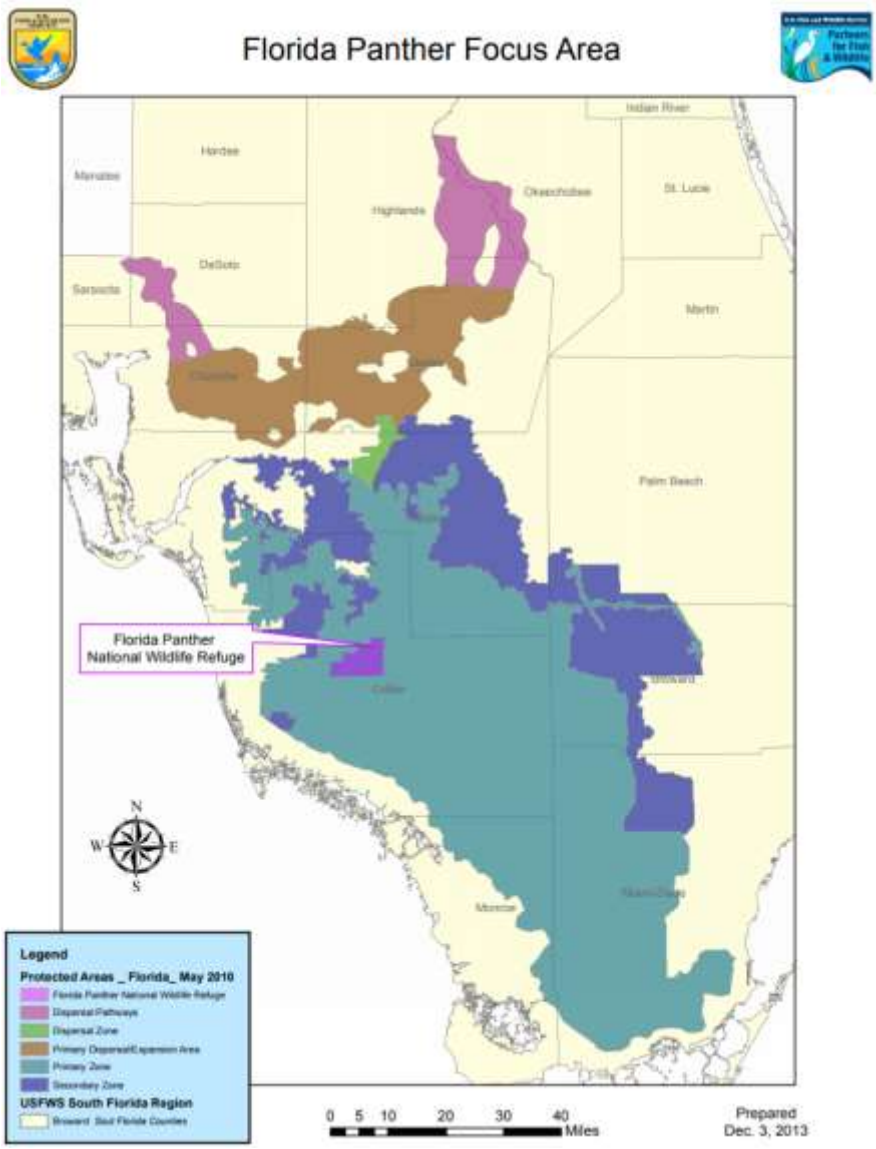

Figure 67: Map of different protected areas within the Florida Panther Focus Area (USFWS 2013b)

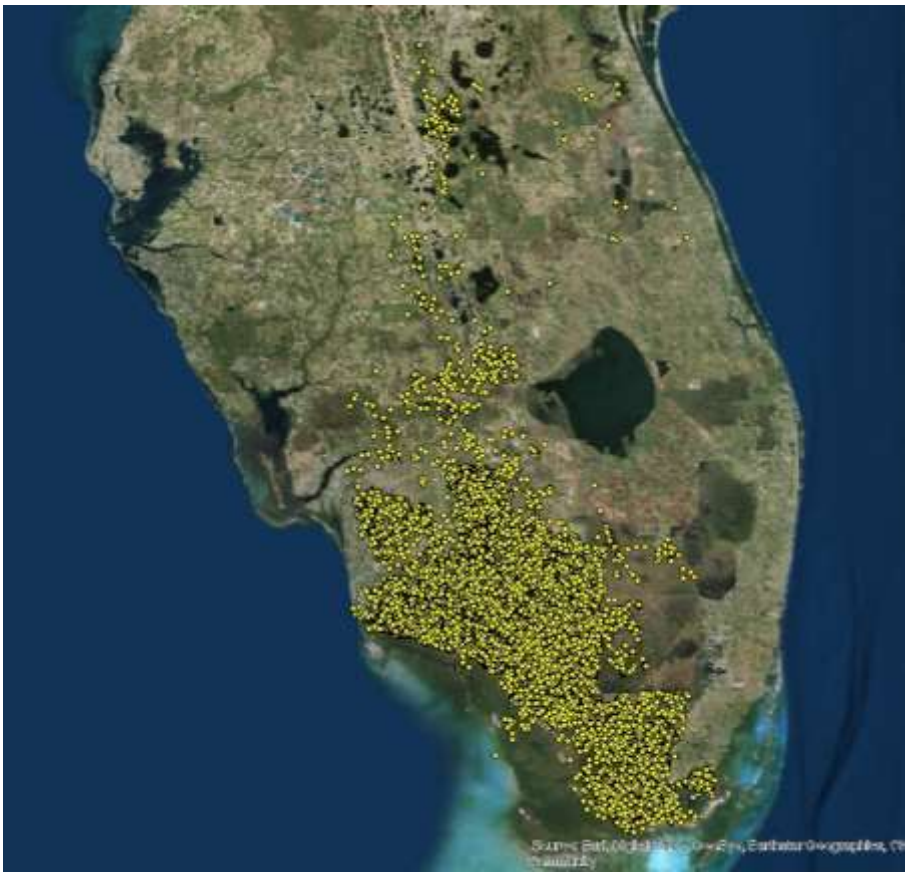

Figure 68: Florida Panther Telemetry Data from 1981 to 2017.

All construction related to the implementation of ALT PC2 is within the Primary Zone of the Florida Panther Focus Area and directly adjacent to Lipman and Deseret Farms which are designated as within a Secondary Zone of the Florida Panther Focus Area (Figures 67 and 69) (USFWS 2013b).

Figure 69: Florida Panther telemetry observations in the vicinity of PSRP between 1981 and 2017. Each dot color represents a tagged Florida panther.

Florida panthers require large, contiguous tracts of suitable habitat to provide for their needs. They make use of a both hydric and xeric habitats, including communities such as cypress forests, swamps, marshes, hardwood hammocks, and pine flatwoods. These types of communities provide a significant amount of cover for panthers to hide and forage in. Dense understory vegetation provides important areas for feeding, resting, and denning. Panthers are opportunistic predators feeding on prey such as domestic farm animal such as goats, rabbits, birds, domestic pets such as cats, opossums, rodents, and armadillos. However, 70% of their diet is comprised of wild hog, white-tailed deer, and raccoons.

7.2.7.3 Panther Habitat Unit Update

Implementation of ALT PC2 in conjunction with full implementation of the PSRP will provide a mosaic of habitats preferable to the Florida panther. PSRP is the CERP mitigation bank for panther habitat units. This BA will provide an update to the panther credit ledger. In this update, the ledger is being updated to include changes in the PSRP project boundary and will also include updates associated with lands needed for construction of ALT PC2.

Figure 71 shows the panther habitat units (PHUs) credited to the PSRP prior to updating the acreages for the updated PSRP boundary as well as the implementation of ALT PC2. Prior to this update, the PSRP ledger has accredit of 473,112 PHUs from a total of 55,149 acres of habitat (current vs restored/enhanced). With the acquisition of land over time, the boundary of the PSRP has changed (Figure 70). Both the eastern boundary (Figure 70 #1) and the western boundary (Figure 70 #2) have been extended as well as a reduction along the northwestern boundary (Figure 70 #3). The change in acreage after incorporating these two additions and one reduction equates to a net gain of 11,577 acres (Figure 72). The eastern boundary extension contains a total of 3,802 acres adding up to a credit of 28,821 PHUs (Table 5). The western boundary extension contains a total of 8,231 acres adding up to a credit of 73,407 PHUs (Table 6). The northwestern reduction contains a total of 456 acres adding up to a debit of 4,062 PHUs (Table 7).

Figure 70: Map showing changes in the PSRP boundary. The red line is the current boundary. The yellow line is the old boundary. Areas for adjustment include: east boundary extension (1), west boundary extension (2), and northwest boundary reduction (3).

Compensation Worksheet		Habitat types of land being offered as compensation (acres)					Habitat types of compensation land after enhancement (acres)			
Habitat Type	*Assigned Value*	Primary/d Zone	Secondary Zone	Other Zone	Habitat Units		Primary/d Zone	Secondary Zone	Other Zone	Habitat Units
Pine Forest	9.5	13376.1			127073		11928.2			113318
Hardwood-Pine	9.3				0					0
Cypress Swamp	9.2	23679			217847		37562.5			345575
Hardwood Swamp	9.2	1763.6			16225					0
Hardwood Forest	9	7296.9			65672		99.6			896
Dry Prairie	6.3	13.6			86					0
Unimproved Pasture	5.7				0					0
Shrub Swamp/Brush	5.5				0					0
Improved Pasture	5.2				0					0
Cropland	4.8				0					0
Orchards/Groves	4.7				0					0
Marsh/Wet Prarie	4.7	6732.6			31643		4708.4			22129
Xeric Scrub	4.5				0					0
Exotic/Nuisance Plants	3	273.3			820		0			0
Coastal Wetlands	3	795.9			2388		850.3			2551
Water	0	490			0					0
Urban	0	728			0					0
STA* or FEBs	4.5				0					0
Subtotal		55149	0	0	461753	0	55149	0	0	484470

Pre - Project Panther Habitat Units	461753
Post - Project Panther Habitat Units	484470
Panther Habitat Unit Change (Post - Pre)	22716
Panther Habitat Units needed (negative) or credit (positive)*	**473112**

*Numbers from March 12 2009 Biological opinion for Picayune Strand Restoration Table 17. Use this version, which was adjusted from the original C-43 derived version in Spreadsheet Picayune 2.

Figure 71: PSRP Panther Habitat Compensation Worksheet prior to this update.

Table 5: Panther Compensation Table for habitats found in the PSRP eastern boundary expansion. Both "Acreage" and "PHUs" are rounded to the nearest tenth.

Habitat Type (FLUCCS)	Acreage	Panther Compensation Worksheet Habitat Type	Assigned Value	PHUs
Hydric Pine Flatwoods	394.7	Pine Forest	9.5	3,749.4
Wetland Coniferous Forest	25.0	Pine Forest	9.5	237.1
Cypress-mixed Hardwoods	372.2	Cypress Swamp	9.2	3,424.3
Mixed Wetland Hardwoods	163.6	Hardwood Swamp	9.2	1,505.0
Cypress	118.3	Cypress Swamp	9.2	1,088.2
Cypress Dome	2.4	Cypress Swamp	9.2	22.1
Wetland Forest Mixed	451.1	Hardwood Forest	9.0	4,059.6
Mixed Shrub	987.6	Hardwood Forest	9.0	8,888.2
Palmetto Prairie	0.7	Dry Prairie	6.3	4.5
Shrubs & Brushland	12.4	Shrub Swamp/Brush	5.5	68.0
Wet Prairie	1,229.5	Marsh/Wet Prairie	4.7	5,778.4
Canal/Open Water	44.7	Water	0.0	0.0

Table 6: Panther Compensation Table for habitats found in the PSRP western boundary expansion. Both "Acreage" and "PHUs" are rounded to the nearest tenth.

Habitat Type (FLUCCS)	Acreage	Panther Compensation Worksheet Habitat Type	Assigned Value	PHUs
Hydric Pine Flatwoods	406.1	Pine Forest	9.5	3,858.2
Wetland Coniferous Forest	923.1	Pine Forest	9.5	8,769.6
Pine Flatwoods	224.5	Pine Forest	9.5	2,132.4
Upland Mixed – Coniferous/ Hardwood	112.1	Hardwood-Pine	9.3	1,042.2
Cypress – Mixed Hardwoods	472.5	Cypress Swamp	9.2	4,347.3
Mixed Wetland Hardwoods	62.0	Hardwood Swamp	9.2	570.7
Cypress	2,532.1	Cypress Swamp	9.2	23,295.3
Cypress – Domes/Heads	8.0	Cypress Swamp	9.2	73.7
Cypress – Pine – Cabbage	1,681.8	Cypress Swamp	9.2	15,472.2
Mixed Shrubs	1,115.8	Hardwood Forest	9.0	10,041.8
Wetland Forested Mixed	112.4	Hardwood Forest	9.0	1,011.2
Palmetto Prairie	93.5	Dry Prairie	6.3	589.2
Herbaceous (Dry Prairie)	107.6	Dry Prairie	6.3	677.8
Disturbed Lands	13.4	Unimproved Pasture	5.7	76.5
Shrub and Brushland	12.0	Shrub Swamp/Brush	5.5	65.9
Row Crops	7.5	Cropland	4.8	35.9
Fallow Cropland	54.7	Cropland	4.8	262.6
Wet Prairie	117.4	Marsh/Wet Prairie	4.7	552.0
Freshwater Marshes	13.8	Marsh/Wet Prairie	4.7	64.9
Saltwater Marshes	38.9	Coastal Wetlands	3.0	116.6
Melaleuca	19.5	Exotic/Nuisance Plant	3.0	58.5
Cabbage Palm	78.5	Exotic/Nuisance Plant	3.0	235.6
Mangrove Swamp	18.9	Coastal Wetlands	3.0	56.8
Commercial and Services	4.6	Urban	0.0	0.0

Table 7: Panther Compensation Table for habitats found in the PSRP northwestern boundary reduction. Both "Acreage" and "PHUs" are rounded to the nearest tenth.

Habitat Type (FLUCCS)	Acreage	Panther Compensation Worksheet Habitat Type	Assigned Value	PHUs
Pine Flatwoods	70.2	Pine Forest	9.5	666.9
Wetland Coniferous Forest	1.2	Pine Forest	9.5	11.4
Cypress – Pine – Cabbage	169.1	Cypress Swamp	9.2	1,555.7
Cypress	28.7	Cypress Swamp	9.2	264.0
Mixed Shrub	148.4	Hardwood Forest	9.0	1,335.6
Palmetto Prairie	27.7	Dry Prairie	6.3	174.5
Shrubs & Brushland	4.2	Shrub Swamp/Brush	5.5	23.1

Habitat Type (FLUCCS)	Acreage	Panther Compensation Worksheet Habitat Type	Assigned Value	PHUs
Freshwater Marshes	6.5	Marsh/Wet Prairie	4.7	30.6

Compensation Worksheet		Habitat types of land being offered as compensation (acres)					Habitat types of compensation land after enhancement (acres)			
Habitat Type	*Assigned Value*	Primary/d Zone	Secondary Zone	Other Zone	Habitat Units		Primary/d Zone	Secondary Zone	Other Zone	Habitat Units
Pine Forest	9.5	15247.3			144849		13526.2			128499
Hardwood-Pine	9.3	105.4			980		599.8			5578
Cypress Swamp	9.2	28741.7			264424		41346.2			380385
Hardwood Swamp	9.2	1988.8			18297					0
Hardwood Forest	9	9800.2			88202		99.6			896
Dry Prairie	6.3	168.4			1061					0
Unimproved Pasture	5.7	13.4			76					0
Shrub Swamp/Brush	5.5	34.6			190					0
Improved Pasture	5.2				0					0
Cropland	4.8	59.6			286					0
Orchards/Groves	4.7				0					0
Marsh/Wet Prarie	4.7	8083.4			37992		10270.2			48270
Xeric Scrub	4.5				0					0
Exotic/Nuisance Plants	3	368.8			1106		0			0
Coastal Wetlands	3	849.7			2549		850.3			2551
Water	0	534.7			0		33.7			0
Urban	0	729.5			0					0
STA* or FEBs	4.5				0					0
Subtotal		66726	0	0	560013	0	66726	0	0	566179

Pre - Project Panther Habitat Units	560013
Post - Project Panther Habitat Units	566179
Panther Habitat Unit Change (Post - Pre)	6166
Panther Habitat Units needed (negative) or credit (positive)*	**563096**

*Numbers from March 12 2009 Biological opinion for Picayune Strand Restoration Table 17. Use this version, which was adjusted from the original C-43 derived version in Spreadsheet Picayune 2.
*This update includes the addition of acreage along both the eastern and western boundary due to boundary change over time. This also includes a reduction in acreage no longer within the project boundary west of the tieback levee along the northwestern boundary.

Figure 72: Updated PSRP Panther Habitat Compensation Worksheet including the addition of acreage from the extension of the PSRP boundary to the east and west. This update also includes a reduction of acreage along the northwest boundary of the PSRP.

With the implementation of ALT PC2, some habitat will be lost to construction of features while others will become fragmented. The SWPF falls within the updated boundary of the PSRP (Figure 70). Table 8 shows the habitat acreage and associated PHUs within the footprint of the SWPF levee that will be directly impacted. The SWPF will directly affect 137.8 acres for a total of 1,224.4 PHUs which will be converted to an “urban” classification on the PSRP Panther Compensation Worksheet” (ledger).

Table 8: Panther Compensation Table for habitats found in the PSRP SWPF levee footprint. Both "Acreage" and "PHUs" are rounded to the nearest tenth.

Habitat Type (FLUCCS)	Acreage	Panther Compensation Worksheet Habitat Type	Assigned Value	PHUs
Hydric Pine Flatwoods	18.0	Pine Forest	9.5	171.0
Mixed Coniferous Forest	0.6	Hardwood – Pine	9.3	5.8
Cypress – Mixed Hardwoods	5.4	Cypress Swamp	9.2	49.9
Cypress	56.2	Cypress Swamp	9.2	517.2
Mixed Wetland Hardwoods	0.9	Hardwood Swamp	9.2	8.3
Mixed Hardwood Forest	1.2	Hardwood Forest	9.0	10.9
Wetland Forested Mixed	0.4	Hardwood Forest	9.0	3.8
Mixed Shrub	46.0	Hardwood Forest	9.0	414.4
Fallow Cropland	6.3	Cropland	4.8	30.0
Row Crops	2.7	Cropland	4.8	13.0

The SWPF will also indirectly affect habitat found between the designed SWPF and the existing farm levee (outside of the PSRP boundary). Table 9 reflects the habitat acreage and associated PHUs within the boundary of the PSRP (Figure 70) and the western footprint of the SWPF. The implementation of the SWPF will fragment (reduction) 109 acres which total 979 PHUs within the PSRP boundary (Figure 70). The footprint of the placement of the new opening under US-41 will reduce 0.2 acres of Wetland Coniferous Forest for a reduction of 2.0 PHUs.

Table 9: Panther Compensation Table for habitats found within the western PSRP boundary and western boundary of the PSRP SWPF levee footprint. Both "Acreage" and "PHUs" are rounded to the nearest tenth.

Habitat Type (FLUCCS)	Acreage	Panther Compensation Worksheet Habitat Type	Assigned Value	PHUs
Hydric Pine Flatwoods	6.7	Pine Forest	9.5	63.4
Cypress – Mixed Hardwoods	2.9	Cypress Swamp	9.2	26.8
Cypress	50.2	Cypress Swamp	9.2	462.1
Mixed Wetland Hardwoods	3.4	Hardwood Swamp	9.2	30.9
Mixed Shrub	41.7	Hardwood Forest	9.0	375.5
Fallow Cropland	4.0	Cropland	4.8	19.3
Row Crops	0.2	Cropland	4.8	1.0

With the update to acreage associated with the change in the PSRP boundary (Figure 7) combined with the conversion of habitat acreage within the up-to-date boundary for direct and indirect impact of the SWPF and ALT-PC2 new US-41 conveyance opening, the updated total of PHUs credited to the PSRP is 561,994 (Figure 73).

Compensation Worksheet		Habitat types of land being offered as compensation (acres)					Habitat types of compensation land after enhancement (acres)			
Habitat Type	*Assigned Value*	Primary/d Zone	Secondary Zone	Other Zone	Habitat Units		Primary/d Zone	Secondary Zone	Other Zone	Habitat Units
Pine Forest	9.5	15247.3			144849		13501.3			128262
Hardwood-Pine	9.3	105.4			980		599.2			5573
Cypress Swamp	9.2	28741.7			264424		41231.5			379330
Hardwood Swamp	9.2	1988.8			18297		-4.3			-40
Hardwood Forest	9	9800.2			88202		10.3			93
Dry Prairie	6.3	168.4			1061					0
Unimproved Pasture	5.7	13.4			76					0
Shrub Swamp/Brush	5.5	34.6			190					0
Improved Pasture	5.2				0					0
Cropland	4.8	59.6			286		-13.2			-63
Orchards/Groves	4.7				0					0
Marsh/Wet Prarie	4.7	8083.4			37992		10270.2			48270
Xeric Scrub	4.5				0					0
Exotic/Nuisance Plants	3	368.8			1106		0			0
Coastal Wetlands	3	849.7			2549		850.3			2551
Water	0	534.7			0		33.7			0
Urban	0	729.5			0		247.1			0
STA* or FEBs	4.5				0					0
Subtotal		66726	0	0	560013	0	66726	0	0	563975

Pre - Project Panther Habitat Units	560013
Post - Project Panther Habitat Units	563975
Panther Habitat Unit Change (Post - Pre)	3962
Panther Habitat Units needed (negative) or credit (positive)*	**561994**

*Numbers from March 12 2009 Biological opinion for Picayune Strand Restoration Table 17. Use this version, which was adjusted from the original C-43 derived version in Spreadsheet Picayune 2.
*This update includes the addition of acreage along both the eastern and western boundary due to boundary change over time. This also includes a reduction in acreage no longer within the project boundary west of the tieback levee along the northwestern boundary.
*This update includes the conversion of habitat acreage within the SWPF footprint and fragmented habitat between the PSRP western boundary and the western boundary or the SWPF footprint. Also included is the small conversion of habitat on the northern side of US-41 at the ALT PC2 new opening.

Figure 73: Updated PSRP Panther Habitat Compensation Worksheet including the addition of acreage from the extension of the PSRP boundary to the east and west, a reduction of acreage along the northwest boundary of the PSRP, and conversion of habitat associated with the SWPF and new US-41 conveyance feature opening. Acreages associated with features only include habitat within the PSRP boundary in this ledger.

Additionally, there is an indirect impact of the SWPF on habitat between its footprint and that of the farm levee that falls outside of the PSRP boundary. Table 10 reflects these acreages. These acres (Table 10) are not reflected in the updated PSRP Panther Compensation worksheet shown in Figure 73.

Table 10: Panther Compensation Table for habitats found west of the western PSRP boundary and east of the existing farm levee. Both "Acreage" and "PHUs" are rounded to the nearest tenth.

Habitat Type (FLUCCS)	Acreage	Panther Compensation Worksheet Habitat Type	Assigned Value	PHUs
Hydric Pine Flatwoods	0.5	Pine Forest	9.5	24.8
Cypress – Mixed Hardwoods	0.1	Cypress Swamp	9.2	1.2
Cypress	57.2	Cypress Swamp	9.2	525.9
Mixed Shrub	35.0	Hardwood Forest	9.0	314.6
Fallow Cropland	6.9	Cropland	4.8	33.1
Row Crops	0.5	Cropland	4.8	2.4

The implementation of ALT PC2 will directly result in conversion of 138 acres of panther habitat for the SWPF and new US-41 conveyance opening which equates to a direct loss of 1,226 PHUs. Indirectly, the implementation of ALT PC2 will result in the habitat fragmentation of 109 acres within the western boundary of the PSRP and 102 acres outside of the western boundary of the PSRP. While not a complete loss of panther habitat, USACE is classifying these fragmented habitats as lost. Thus, indirectly, the implementation of ALT PC2 will result in a loss of 979 PHUs within the PSRP boundary and a loss of 902 PHUs west of the PSRP boundary. Overall, the PSRP, with the inclusion of ALT PC2 will provide restoration of 66,726 acres for a total PHU credit of 561,994 (not counting the 109 fragmented acres west of the PSRP west boundary).

The implementation of ALT PC2 will have a negative direct and indirect impact to the panther from loss of habitat. However, ALT PC2 in conjunction with full implementation of the PSRP will provide a higher quantity and higher quality habitat for the panther. Thus, USACE has determined that ALT PC2 may affect but is not likely to adversely affect the Florida panther.

7.2.8 Eastern Indigo Snake and "May Affect Not Likely to Adversely Affect" Determination

7.2.8.1 Species Description

Eastern indigo snakes were listed as threatened in 1978 due primarily to habitat loss due to development. Further, as habitats become fragmented by roads, Eastern indigo snakes become increasingly vulnerable to highway mortality as they travel through their large territories (Schaefer and Junkin 1990). Declines in eastern indigo snake populations was also due to over-collection by the pet trade and mortality caused by rattlesnake collectors who gas gopher tortoise burrows to collect snakes (USFWS 2013).

The eastern indigo snake is the largest native non-venomous snake in North America, reaching lengths of up to 8.5 feet (Moler 1992). It is an isolated subspecies occurring in southeastern Georgia and throughout peninsular Florida. The eastern indigo snake prefers drier habitats, but may be found in a variety of habitats including pine flatwoods, scrubby flatwoods, floodplain edges, sand ridges, dry glades, tropical hammocks, edges of freshwater marshes, muckland fields, coastal dunes, cabbage palm hammocks, and xeric sandhill communities (Schaefer and Junkin 1990, USFWS 1999). Eastern indigo snakes also use agricultural lands and various types of wetlands. Observations over the last 50 years made by maintenance workers in citrus groves in east-central Florida indicate that eastern indigo snakes are most frequently observed near the canals, roads, and wet ditches (USFWS 2005). It is anticipated that eastern indigo snakes would be present in sugarcane fields since one of their prey species, the King snake (*Lampropeltis getula floridanus*) has been previously documented in sugarcane fields (Krysko 2002, USFWS 2005). Eastern indigo snakes need relatively large areas of undeveloped land to maintain their population. In general, adult males have larger home ranges than females or juveniles. In Florida, Smith (2003) indicated that female and male home ranges extend from 5 to 371 acres and 4 to 805 acres, respectively.

In south Florida, the eastern indigo snake is thought to be widely distributed. Given their preference for upland habitats (Steiner et al. 1983), eastern indigo snakes are not commonly found in great numbers in the wetland complexes of the Everglades region, even though they are found in pinelands, tropical hardwood hammocks, and mangrove forests in extreme south Florida (Duellman and Schwartz 1958, Steiner et al. 1983). They prefer dry, well drained sandy soils, and commonly use burrows and other natural holes as dens. Steiner et al. (1983) also reported that eastern indigo snakes inhabit abandoned agricultural land and human-altered habitats in south Florida.

7.2.8.2 Determination of Effect

The 2009 BO made the determination that the overall PSRP "may affect, likely to adversely affect" the eastern indigo snake stating their status within the action area (Figure 74) as:

> *"Within the action area, all existing and potential restored habitats, with the exception of asphalt roadways associated with I-75 and U.S. 41, are potential eastern indigo snake habitat. The eastern indigo snake is assume to be present within project boundaries and on adjacent private and public lands in the region. The PSRP area, along with NGGE, is known to be a popular collection site for amphibians and reptiles due to the accessibility associated with the 279-mile roadway grid that traverses the undeveloped subdivision of SGGE (Jones 1998). However, due to the cryptic nature of this snake and the lack of specific survey data, little information on indigo snakes is available for the PSRP site or the action area….Although we have little information on the distribution and abundance of indigo snakes within the action area, they have been documented using habitats similar to those in the proposed action area. Therefore, we assume indigo snakes are likely present on-site."*

In the 2009 BO, it was estimated that up to two (2) indigo snakes may be harmed (injury or mortality) incidental to project construction and initial re-hydration (USFWS 2009). As a result, the Standard Eastern Indigo Snake Construction Guidelines will be implemented during the construction of the SWPF and conveyance features included in ALT PC2 and partial plugging of the Faka Union Canal as will other project commitments and Terms and Conditions as contained in the 2009 BO will be in effect for this action. Therefore, USACE has determined that the construction associated with ALT PC2 "may affect, but is not likely to adversely affect" the eastern indigo snake.

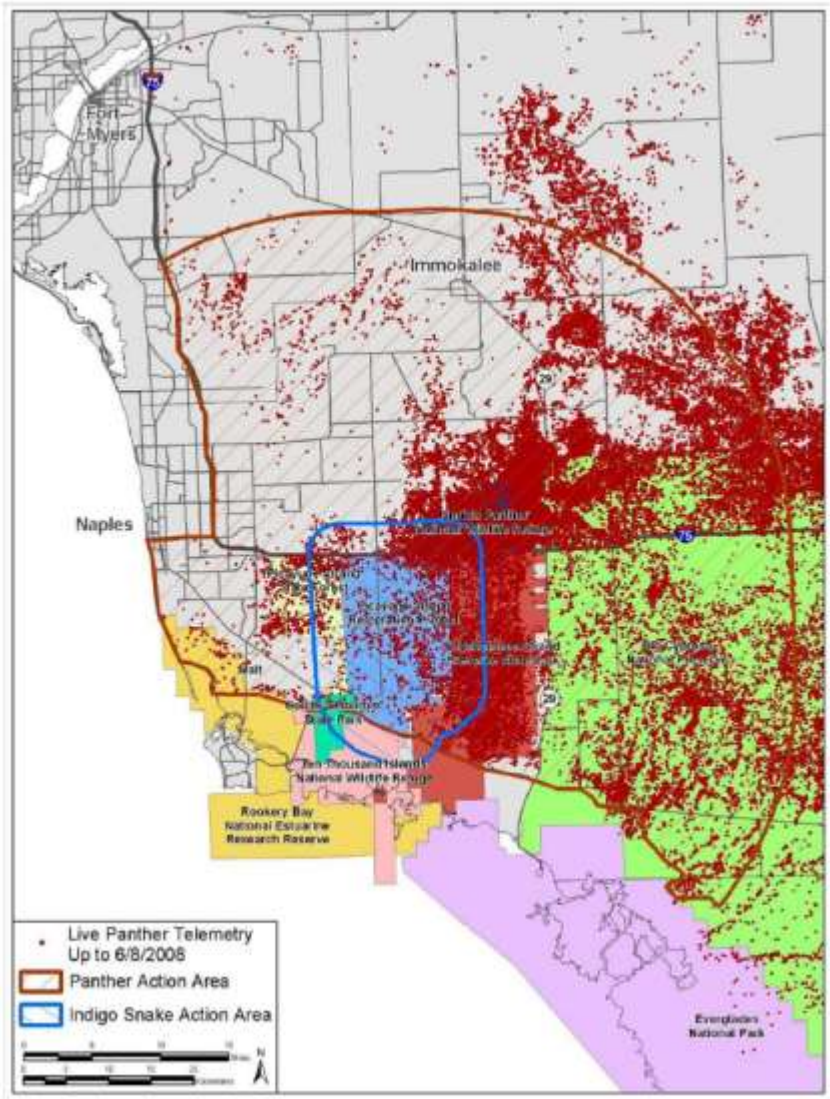

Figure 74: Action area for the Florida Panther (red outline) and eastern indigo snake (blue outline) for the PSRP as defined by the USFWS 2009 Biological Opinion (USFWS 2009).

7.2.9 West Indian Manatee and "May Affect Not Likely to Adversely Affect" Determination

7.2.9.1 Species Description

The West Indian manatee is a large, plant-eating aquatic mammal that can be found in the shallow coastal waters, rivers, and springs of Florida. The West Indian manatee, *Trichechus manatus*, was listed as endangered throughout its range in 1967 (32 FR 4061) and received Federal protection with the passage of the ESA in 1973. Because the West Indian manatee was designated as an endangered species prior to enactment of ESA, there was no formal listing package identifying threats to the species, as required by section 4(a)(1) of the Act.

West Indian manatees can be found throughout the southeastern United States. Because they are a subtropical species with little tolerance for cold, they remain near warm water sites in peninsular Florida during the winter. During periods of intense cold, West Indian manatees will remain at these sites and will

tend to congregate in warm springs and outfall canals associated with electric generation facilities. During warm interludes, West Indian manatees move throughout the coastal waters, estuaries, bays, and rivers of both coasts of Florida and are usually found in small groups. During warmer months, West Indian manatees may disperse great distances. West Indian manatees have been sighted as far north as Massachusetts and as far west as Texas and in all states in between (Rathbun et al. 1982, Fertl et al. 2005). Warm weather sightings are most common in Florida and coastal Georgia. They will once again return to warmer waters when the water temperature is too cold (Hartman 1979, Stith et al. 2006). West Indian manatees live in freshwater, brackish, and marine habitats, and can move freely between salinity extremes. It can be found in both clear and muddy water. Water depths of at least three to seven feet (one to two meters) are preferred and flats and shallows are avoided unless adjacent to deeper water.

Over the past centuries, the principal sources of Florida manatee mortality have been opportunistic hunting by man and deaths associated with unusually cold winters. As of July 2013, the FWC reported 672 West Indian manatee deaths. Today, poaching is rare, but high mortality rates from human-related sources threaten the future of the species. In general, the largest single mortality factor is collision with boats and barges. West Indian manatees also are killed in flood gates and canal locks, by entanglement or ingestion of fishing gear, and through loss of habitat and pollution (Florida Power and Light 1989). However, in 2013, most mortality was related to natural or undetermined causes (FWC 2013).

7.2.9.2 Determination of Effect

The implementation of ALT PC2 will provide much needed freshwater flow to areas along US-41 and south. Freshwater flow, as discussed earlier in this document, will provide much needed freshwater south which will reduce salinity. With reduced salinity, environmental conditions will diminish stress to seagrasses that are important to foraging manatees. However, seagrasses are also dependent upon light attenuation and turbidity. ALT PC2 in conjunction with the full implementation of PSRP will result in a mixture of agricultural runoff water and restoration water that will flow south of US-41. Dissolved organic material (including nitrogen and phosphorus) can reduce light reaching seagrasses limiting seagrass health and growth (Rudnick et al. 2005). In 2005, RECOVER developed a series of conceptual ecological models, including one for Florida Bay, located southeast of the PSRP study area. The model conceptualizes the how nutrients may influence the system (Figure 75).

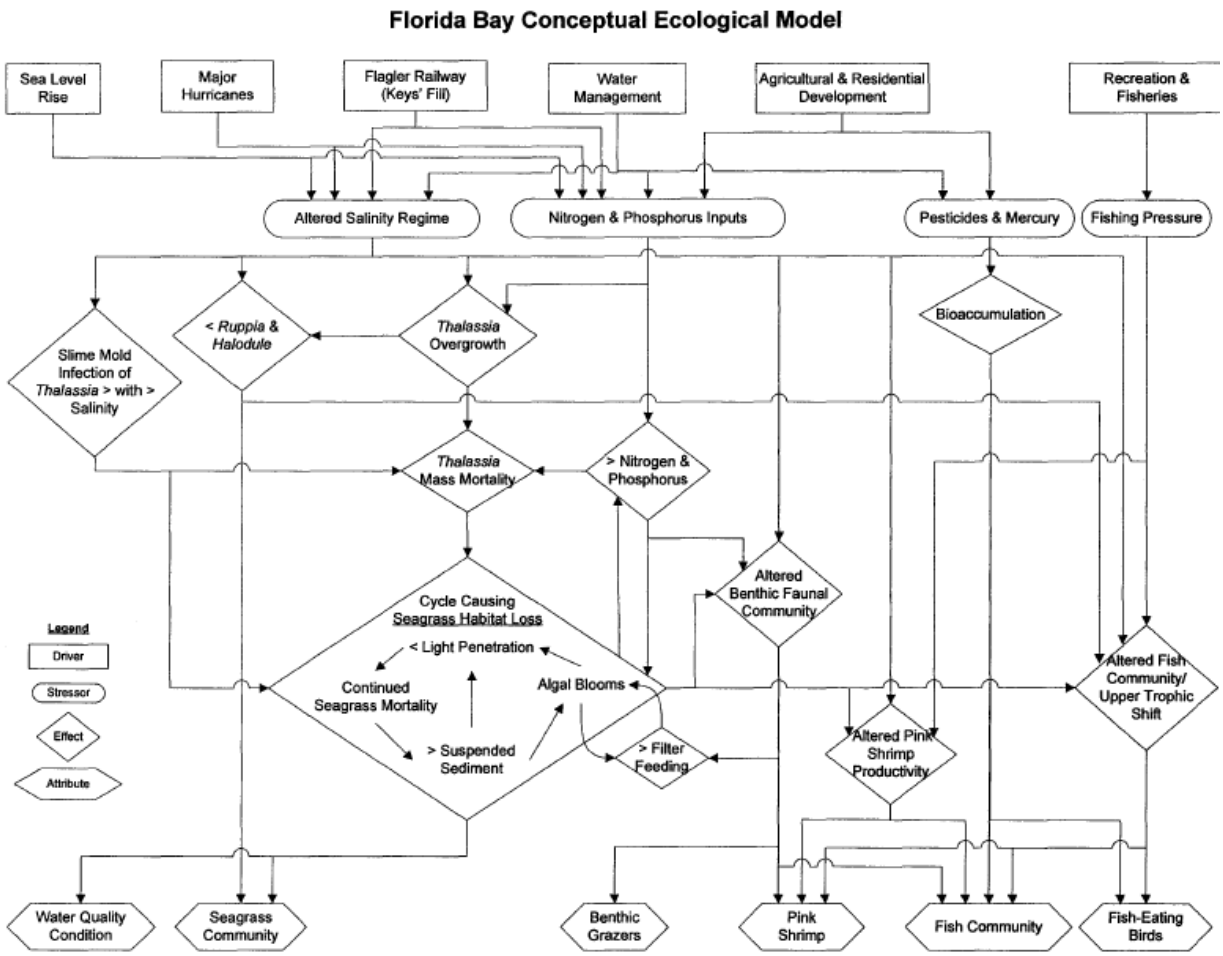

Figure 75: Diagram of the Florida Bay conceptual ecological model (Rudnick et al. 2005)

Increased freshwater flow south of US-41 and west of Faka Union Canal will improve conditions for optimal seagrass growth by reducing salinity (Figure 77). Figure 76 shows the average monthly total flow for "without project", "ALT PC2", and "SWPF Only + opening." The impact of the SWPF and conveyance features (excluding the modified CR-92 culvert) with no other PSRP features completed show some increase in flow while ALT PC2 which includes the SWPF and all conveyance features plus full PSRP implementation show larger increases. USGS monitored flow in Pumpkin River between 2008 and 2017 (Figure 78) which shows the largest annual flow in 2017 (Hurricane Irma) of nearly 8,000 acre-feet, annually. The next largest monitored flow year in that time period was 2013 with nearly 5,000 acre-feet, annually. For reference, one acre-foot for a calendar year is equivalent to 3,630 cubic feet per month. As shown in Figure 52, not much flow is needed to have a positive impact on high salinity.

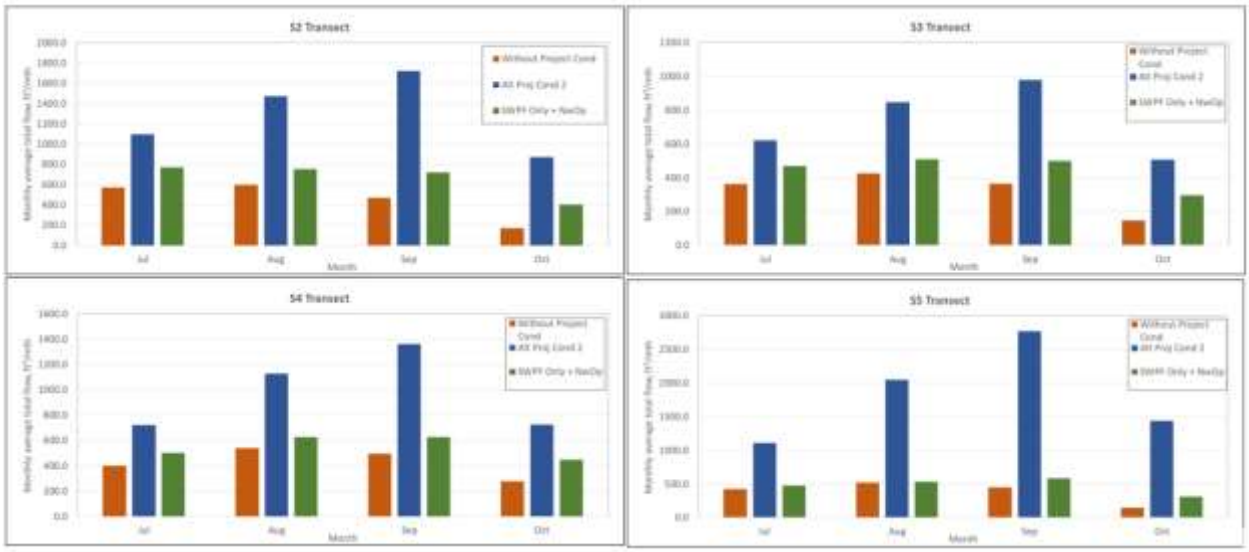

Figure 76: Average monthly total flow (ft³/month) for scenarios "Without Project," "ALT PC2," and "SWPF Only + new opening."

Figure 77: Location of GSSHA modeling flow transects associated with ALT PC2.

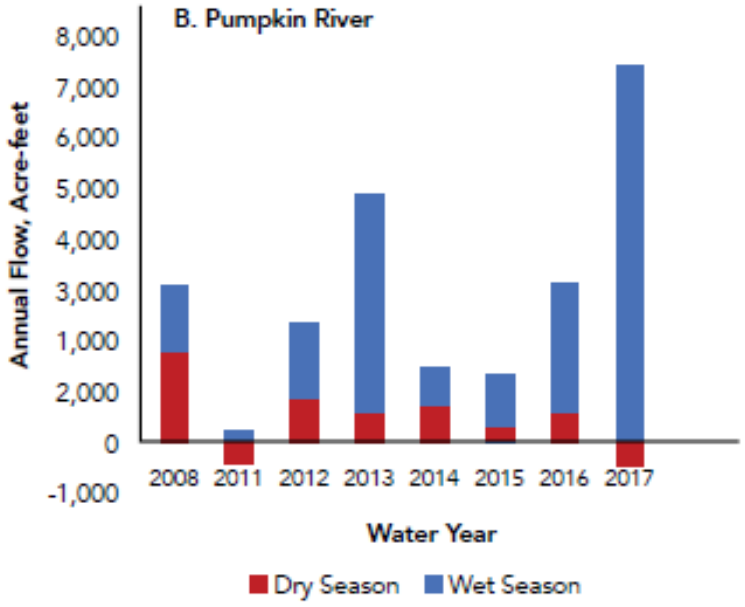

Figure 78: Annual flow (acre-feet) for Pumpkin River as monitored by USGS (RECOVER 2019).

Another potential hazard to the West Indian manatee is access through structures combined with flow in either direction (freshwater flow from upstream and tidal flow from downstream). Adaptive management measures are discussed later in this document as part of the discussion on conservation measures for the West Indian manatee. USACE has determined that the implementation of ALT PC2 may affect but is not likely to adversely affect the West Indian manatee.

7.2.9.3 West Indian Manatee Critical Habitat

Critical habitat for the West Indian manatee was designated in 1976 (50 CFR 17.95). The West Indian manatee's critical habitat includes waters associated with Ten Thousand Islands NWR, Cape Romano-Ten Thousand Islands Aquatic Preserve, Collier Seminole State Park, and Rookery Bay NERR (Figure 79). Another component of designated critical habitat is defined as U.S. territorial waters adjoining the coast islands including all connected bays, estuaries, and rivers throughout Collier County between Gordon's Pass north of Naples, FL through Whitewater Bay just north of Florida Bay along Florida's southwest coast (as revised 1 October 2000; 50 CFR Parts 1 to 199). This was one of the first designations of critical habitat for an endangered species and the first for an endangered marine mammal.

Critical habitat for any species is described as the specific area within the geographic area occupied by the species (at the time it is listed under the provisions of section 4 of the Act) on which are found those physical or biological features essential to the conservation of the species and which may require special management considerations or protection. No specific primary or secondary constituent elements were included in the critical habitat designation. However, ecologists agree that essential habitat features for the West Indian manatee include seagrasses for foraging, shallow areas for resting and calving, channels for travel and migration, warm water refugia during cold weather, and fresh water for drinking (USFWS 2001).

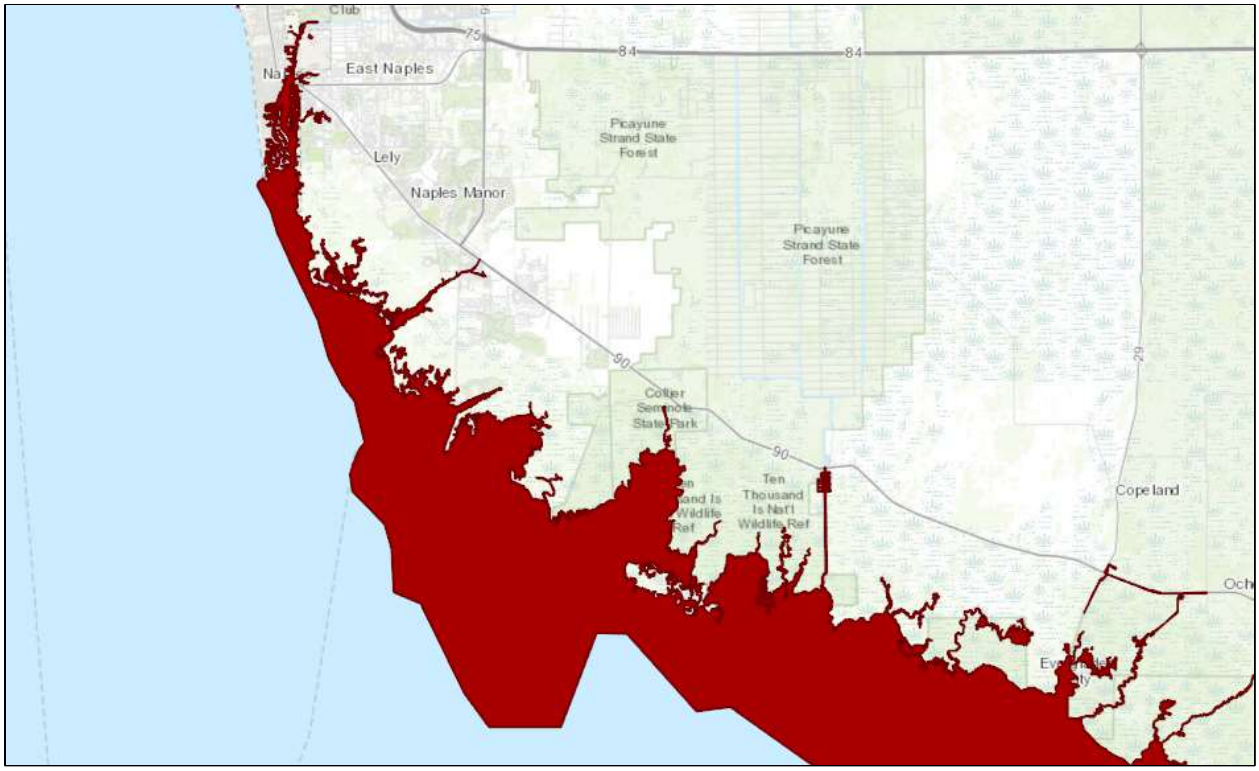

Figure 79: West Indian manatee designated critical habitat within the vicinity of the PSRP.

As reported in the 2019 RECOVER System Status Report, altered freshwater flows within the Ten Thousand Islands region have caused large plumes of freshwater near the mouth of the Faka Union River, and elevated salinities in other tributaries, such as Pumpkin River for example. USACE has contracted USGS to monitor salinity at East River, Faka Union River, Pumpkin River, Blackwater River, and Faka Union navigational channel boundary with the Gulf of Mexico since 2007-2008 (Figure 80). The sites to the west of Faka Union River had higher salinities, on average, than Faka Union river and East River (east of Faka Union Canal) (RECOVER 2019). During water years 2011 to 2017, salinity was greater than 37 ppt: 9% of the time at East River, 8% of the time at Faka Union River, and 20% of the time at Pumpkin River.

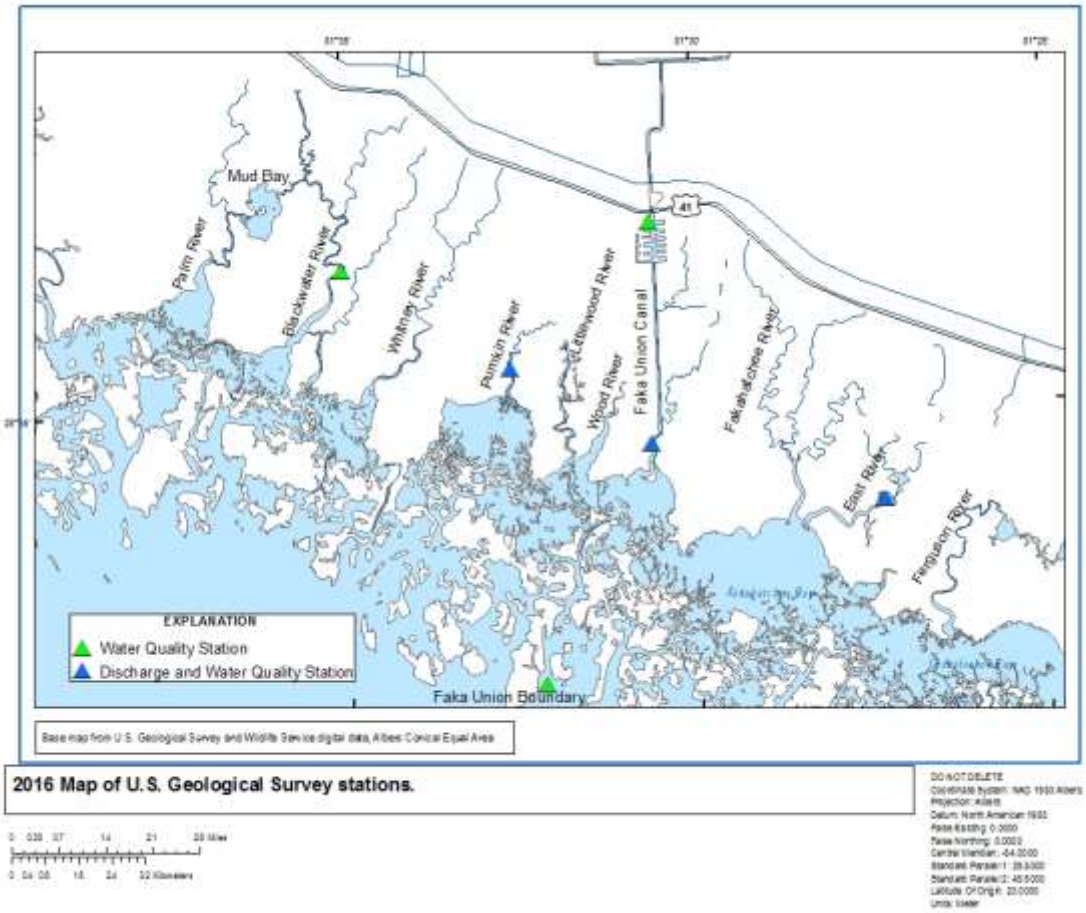

Figure 80: Map of USGS monitoring locations as contracted by the USACE RECOVER Program

Downstream waters, including estuaries, have been deprived of steady freshwater flow since the construction of US-41 and construction of the failed SGGE. In recent years, salinity levels have been consistently higher than levels of ecological preferability. Seagrasses generally suffer from high salinities due to long-term reductions in freshwater flow (Figure 81). While tolerant of short-term salinity fluctuations, seagrasses have an optimum salinity range of 24 to 35 ppt. Average annual salinity has been near the upper limits of the optimal salinity range for seagrasses with periodic fluctuations above the upper limit of the optimal range (35 ppt) which pushes the limits for healthy seagrass communities in the downstream estuaries of PSRP.

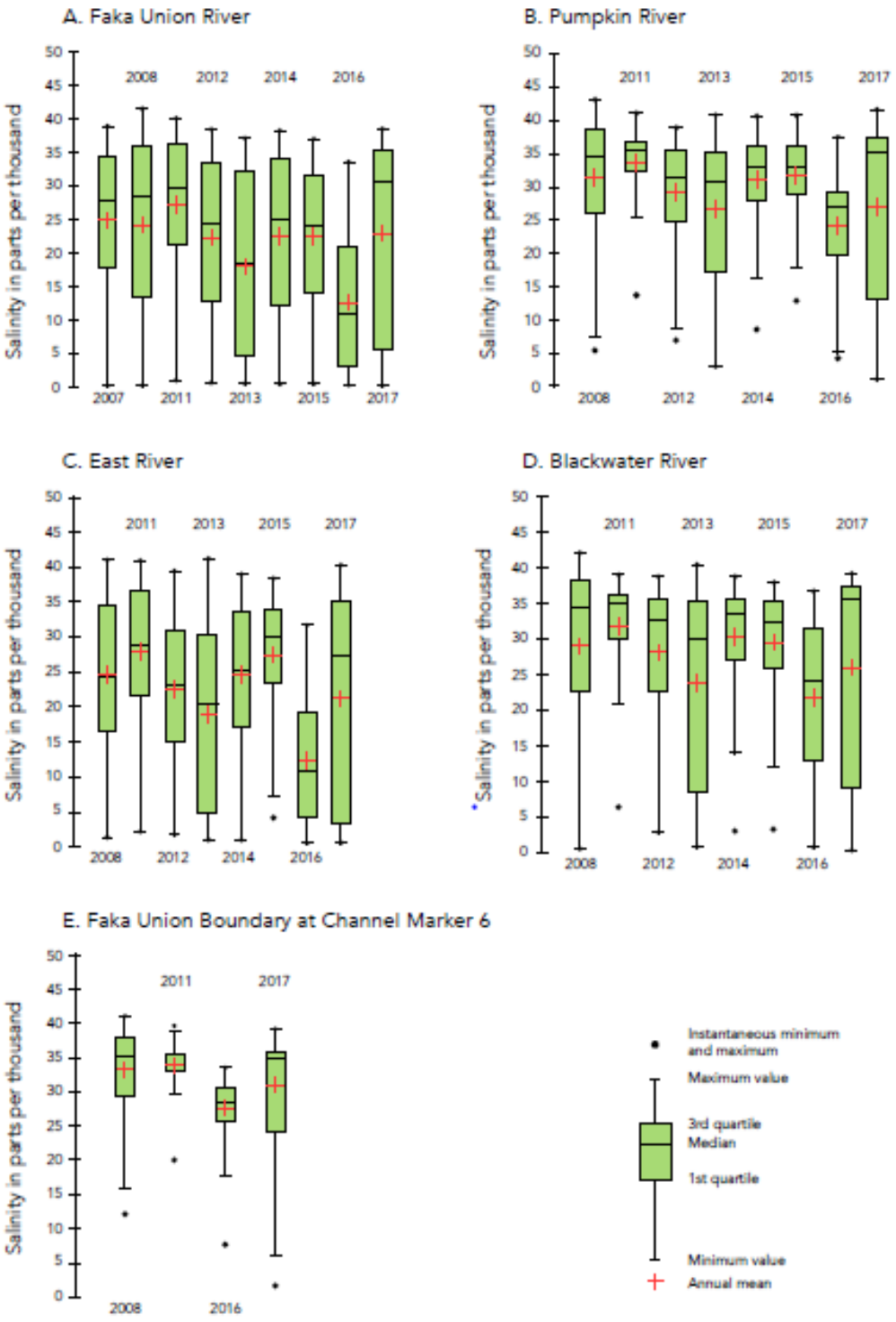

Figure 81: Boxplots showing salinity data by site and water year (RECOVER 2019).

Additionally, on 11 February 2015, PSRP project management received approval for the manatee mitigation feature outlined in the LRR. Congress, under Section 1001(15) of WRDA 2007, PL 110-114, as modified, authorized adding the manatee mitigation feature. SFWMD completed the construction of the

manatee mitigation feature along Faka Union Canal south of the Port of the Islands in 2016 (Figure 82). This feature has the capacity to support over 200 manatee during colder months of the year. Monitoring of the manatee mitigation feature during the dry season (winter) of 2018-19 (January and February 2019) revealed up to 20 manatees successfully using the refugia (Figure 83). USACE has determined ALT PC2 may affect but is not likely to adversely affect the critical habitat of the West Indian manatee.

Figure 82: PSRP Manatee Mitigation Refuge Structure completed in 2016 by the SFWMD.

Figure 83: Photograph of West Indian manatees utilizing the PSRP Manatee Mitigation Refuge (photo taken by FWC).

7.2.10 Gopher Tortoise and "May Affect" Determination and "May Affect" Determination

7.2.10.1 Species Description

Of the five North American tortoise species, the gopher tortoise, *Gopherus polyphemus*, is the only one found east of the Mississippi River. An upland dwelling reptile, the gopher tortoise is currently listed as a candidate species in the Eastern U.S. by the USFWS (Ernst et al. 1994, USFWS 2013). Aptly named for their burrowing prowess, the gopher tortoise has strong elephant-like back legs and flat, shovel-like front legs specialized for digging. Gopher tortoises may live up to 80 years in the wild and grow up to 15 inches long with a weight between eight and fifteen pounds. 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). Color morphology is apparent in Florida with individuals from coastal areas generally being darker than their inland counterparts.

Gopher tortoises have a preference for well-drained, sandy soils found in habitats such as longleaf pine sandhills, xeric oak hammocks, scrub, pine flatwoods, dry prairies, and coastal dunes (FWC 2020b). These habitats are well-suited for the gopher tortoise, providing for digging of burrows and nest building. Typical of well-drained sandy soils, vegetation has adapted as well with small herbaceous plants growing in abundance with shallow near surface root structures for water absorption. Habitats with open areas are beneficial for basking as gopher tortoises are ectothermic. Gopher tortoises are often present in fire regime habitats where fires reduce canopy cover and promote growth of shorter herbaceous plants.

Gopher tortoises spend approximately 80% of their time in burrows they construct by digging with their shovel-like front legs. Burrows can be up to 40 feet long and 10 feet deep (FWC 2020, GTC 2020). Each burrow has a single opening that is approximately equal to the length of the tortoise (GTC 2020). Each tortoise will construct multiple burrows within its range, traveling back and forth between them. The burrow itself is an important aspect in habitats occupied by gopher tortoises. These burrows provide shelter to 350 to 360 species, with some only being documented within a gopher tortoise burrow, making them a keystone species (FWC 2020, GTC 2020). Burrows provide gopher tortoises with a consistent atmosphere with consistent temperatures and humidity year round, as well as providing shelter from predators, weather, and other environmental hazards.

Gopher tortoises are sexually dimorphic, with males possessing a larger gular scute extending below the neck from the plastron. Males also have a concave plastron which adds in reproduction. Males (9 to 12 years) reach sexual maturity faster than females (10 to 21 years) (Ernst et al. 1994). However, timing to reach sexual maturity is dependent on availability of resources and latitude (Ernst et al. 1994). Breeding season occurs between April and June (GTC 2020). Once gravid, females will dig a nest in the apron of their burrow which is usually elevated and sandy due to the excavation and maintenance of the burrow. Clutch sized usually range between 3 and 15 eggs roughly the size of a ping pong ball (GTC 2020). However, as with most turtles and tortoises, clutch sizes at lower latitudes tend to have less eggs that are larger in size. FWC estimates the average clutch size as 5 to 9 eggs (2020). Deposited between May and July, incubation of eggs lasts between 80 and 110 days (FWC 2020).

Several threats have contributed to the decline of the gopher tortoise. Habitat loss and fragmentation is the primary threat due to development and urbanization. Other threats include improper land management, namely lack of fire, road mortality, and upper respiratory tract disease (Enge et al. 2006).

7.2.10.2 Determination of Effect

In early 2020, the Conservancy of Southwest Florida partnered with Collier-Seminole State Park to conduct a survey for gopher tortoise burrows within the park. During their survey, each burrow was identified regarding status: possibly occupied, abandoned, or occupied by another species (Figure 84). The purpose of these surveys were to identify where gopher tortoises are present for evaluation of effects related to ALT PC2 and full implementation of the PSRP.

Figure 84: Results of gopher tortoise surveys conducted by Conservancy of Southwest Florida and Collier Seminole State Park in February and March 2020. Burrow labels are: potentially occupied burrows (green), abandoned (red), and occupied by another species (yellow). The map is overlaid on a FLUCCS map showing different habitats that are discussed in this section. Footprints shown are: SWPF (white), US-41 new opening footprint (red), and CR-92 culvert (yellow).

Gopher tortoises generally prefer well-drained sandy soils which provide short herbaceaous forage and an easy substrate to burrow into. The gopher tortoise population within Collier Seminole State Park, downstream of the actions associated with ALT PC2 and the full implementation of PSRP have made use of areas with less preferable habitat based on species profile preferences. The soils (Figure 85) associated with the location of occupied and abandoned gopher tortoise burrows are: (a) holopaw fine sand, limestone substratum; (b) Immokalee fine sand; (c) oldsmar fine sand, limestone substratum; and (d) Ft. Drum and Malabar, high, fine sands (FDEP 2004).

- "Holopaw fine sand, limestone substratum" is nearly level, poorly drained soil found in sloughs and broad, poorly defined drainage ways with a surface layer approximately 5 inches thick and a subsurface layer of fine sand to a depth of about 57 inches, where limestone bedrock is found at about 62 inches. Permeability is moderate to moderately slow with an available water capacity of low. Under natural conditions, the seasonal high water table is within a depth of 12 inches for 3 to 6 months. During periods of high rainfall, the soil is covered by shallow, slowly moving water for about 7 days (FDEP 2004).

- "Immokalee fine sand" is a nearly level, poorly drained soil in flatwoods with a surface layer about 6 inches thick and a subsurface layer to a depth of about 35 inches, with subsoil extending to about 58 inches. The substratum extends to a depth of approximately 80 inches. Permeability is moderate with a low available water capacity. Under natural conditions, the season high water table is below a depth of 6 to 18 inches for 1 to 6 months. During other months, the water table is below 18 inches receding to more than 40 inches during extended dry periods (FDEP 2004).
- "Oldsmar fine sand, limestone substratum" is a nearly level, poorly drained soil in flatwoods with a surface layer is about 4 inches thick and a subsurface layer to a depth of about 35 inches, with subsoil extending to about 60 inches. Limestone bedrock is present at about 60 inches. Permeability is slow as is available water capacity. Under natural conditions, the seasonal high water table is between a depth of 6 to 18 inches for 1 to 6 months. During other months, the water table is below 18 inches receding to more than 40 inches during extended dry periods (FDEP 2004).
- "Ft. Drum and Malabar, high, fine sand" is a nearly level, poorly drained soil located on ridges along sloughs with a surface layer about 2 inches thick, a subsurface layer to a depth of 15 inches, with subsoil extending to about 72 inches. The substratum extends to a depth of about 80 inches. Permeability is rapid in the Ft. Drum soil but slow to very slow in Malabar soil. These soils are often found together fitting the same soil characteristics. The available water capacity for both soils is low. Under natural conditions, the seasonal high water table is within a depth of 6 to 18 inches for 1 to 6 months. During the other months, the water table is below 18 inches, receding to a depth of 40 inches during extended dry periods (FDEP 2004).

These soils (Figure 85) are indicative of the type of vegetation present. Natural vegetation typically supported by "holopaw fine sand, limestone substratum" consists of slash pine, cypress, cabbage palm, saw palmetto, waxmyrtle, sand cordgrass, chalky bluestem, and gulf muhly (FDEP 2004). For "Immokalee fine sand," typical natural vegetation is slash pine, saw palmetto, waxmyrtle, chalky bluestem, creeping bluestem, and pineland threeawn (FDEP 2004). For "oldsmar fine sand, limestone substratum," supported natural vegetation is cabbage palm, slash pine, saw palmetto, waxmyrtle, and chalky bluestem (FDEP 2004). For "Ft. Drum and Malabar, high, fine sand," supported natural vegetation is slash pine, saw palmetto, live oak, cabbage palm, waxmyrtle, chalky bluestem, creeping bluestem, low panicum, and pineland threeawn (FDEP 2004). The soils found in areas of gopher tortoise habitat use do not absorb water well and generally have low available water capacity meaning surface water generally continues to sheetflow across their habitat when surface water is present (wet season). Typical vegetation described is typical of gopher tortoise habitat throughout south and central Florida.

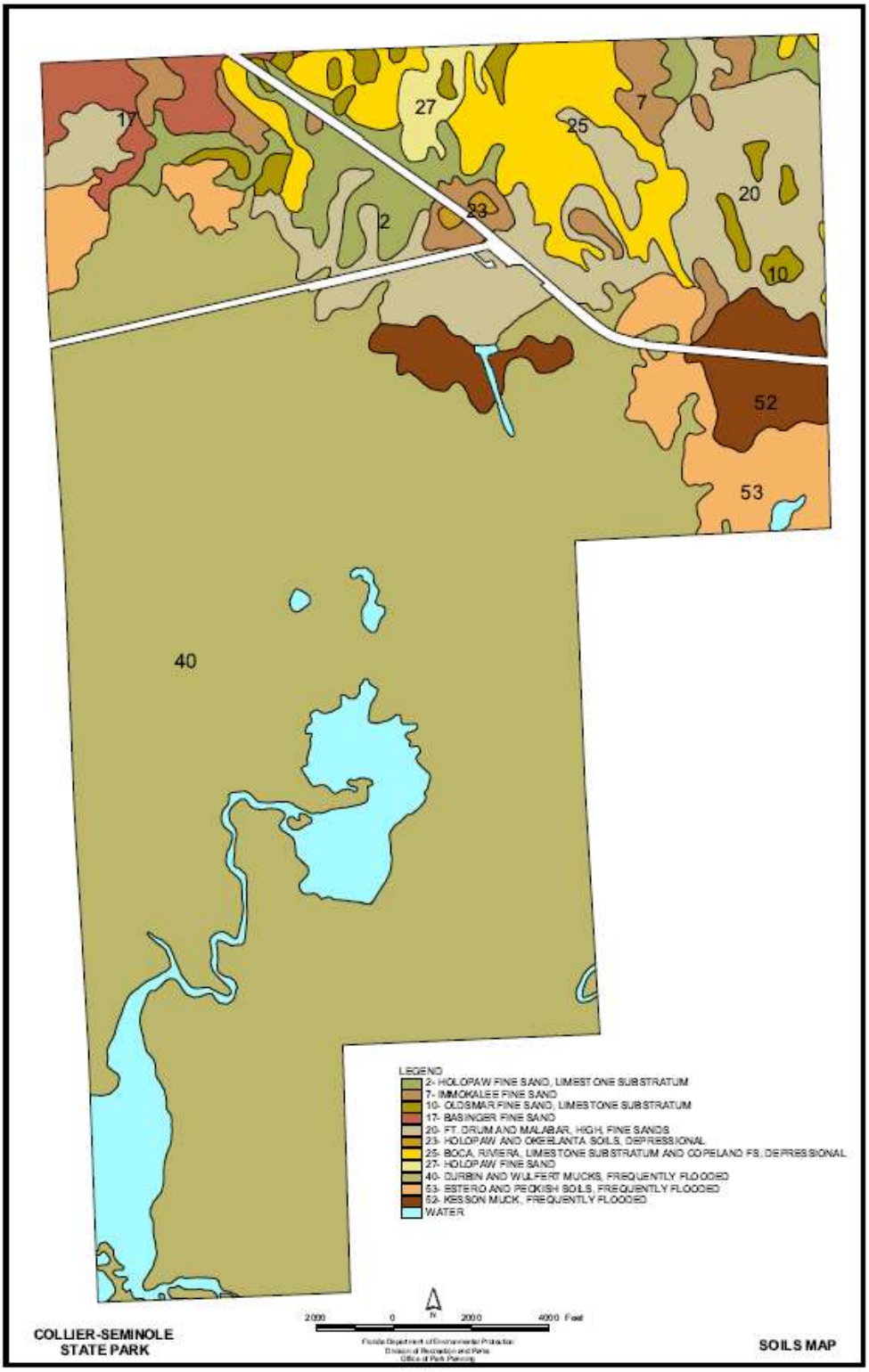

Figure 85: Soil profile of Collier-Seminole State Park located downstream of PSRP (FDEP 2004)

Gopher tortoise activity, identified by CSWF and CSSP (Figure 84), occur in small suite of habitat types on both sides of US-41. South of US-41 (Figure 86), habitats with gopher tortoise presence are: wetland

coniferous forest, dry prairie, hydric pine flatwoods, mixed wetland hardwoods, and wetland forested mixed based on FLUCCS mapping from 2016. North of US-41 (Figure 87), habitats with gopher tortoise presence are: wetland coniferous forest, hydric pine flatwoods, wetland forested mixed, mesic pine flatwoods, and cabbage palm. As the names suggest, a number of these habitats have a "wetter" hydrologic regime which is not surprising given the soil types and lower elevation.

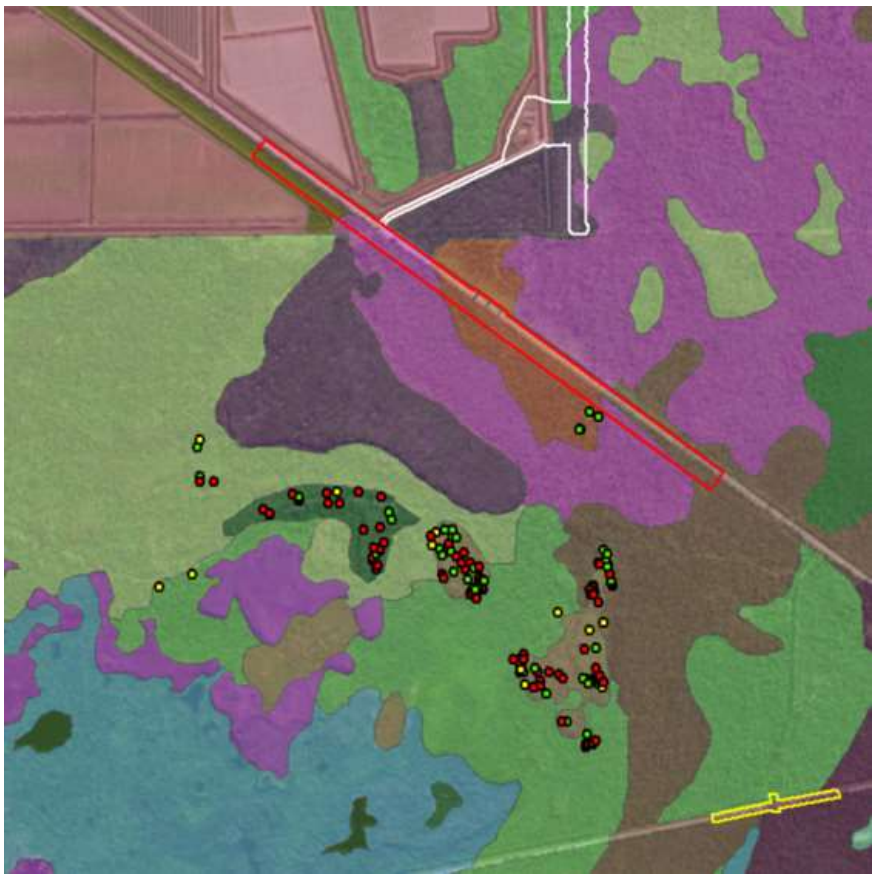

Figure 86: Location of gopher tortoise burrows south of US-41 as surveyed by the Conservancy of Southwest Florida and Collier Seminole State Park in February and March 2010. Burrows classifications are: potentially occupied (green), abandoned (red), and occupied by another species (yellow).

In the mid-to-late 1970s, gopher tortoises were studied in north Florida at Tall Timbers and Greenwood-Mitchell Plantations in Leon County, FL and Thomas County, GA during the winter months between 1976 and 1980 (Means 1982). Means made numerous observations of flooded burrows that were occupied at the time of observation. Observations included completely immersed tortoises (up to the nostrils) in water, partially immersed tortoises, and tortoises resting next to the inundated portions of their burrow only to retreat into the water to other portions of their burrow (Means 1982). In Means' study, flooding was a fairly common occurrence, showing that these gopher tortoises made no effort to avoid water in their burrows or abandoned them altogether (Means 1982, Ultsch and Anderson 1986, Diemer 1986). Means also hypothesized that some gopher tortoises utilize fall migrations from xeric to mesic soils due to a preference for more moist areas to construct overwintering burrows (McRae et al. 1981, Means 1982, Diemer 1986). In south Florida, the dry season represents similar issues of cooler temperatures with lower humidity and less moisture. Given the soil depths, permeability, and available water capacity present in

areas of gopher tortoise occupation in Collier Seminole State Park, burrows most likely hold moisture and have flooded portions of their burrow. During the wet season, higher water tables further reduce the soil depth available for "dry" burrowing.

Figure 87: Location of gopher tortoise burrows north of US-41 as surveyed by the Conservancy of Southwest Florida and Collier Seminole State Park in February and March 2010. Burrows classifications are: potentially occupied (green), abandoned (red), and occupied by another species (yellow)

The construction of the SWPF levee only will have minimal effect on the gopher tortoise populations in Collier Seminole State Park with the majority of the burrow locations experiencing no change in ponding depth from without project (without PSRP) and the implementation of only the SWPF (no other PSRP features) and a few experience a change of 2 inches maximum (Figure 88). The addition of conveyance features (excluding the CR-92 culvert modification) further increases the potential for impacts to the gopher populations in Collier Seminole State Park (Figure 89). However, the risk remains low as the majority burrows undergo no change with only a few experiencing an increase in ponding depth.

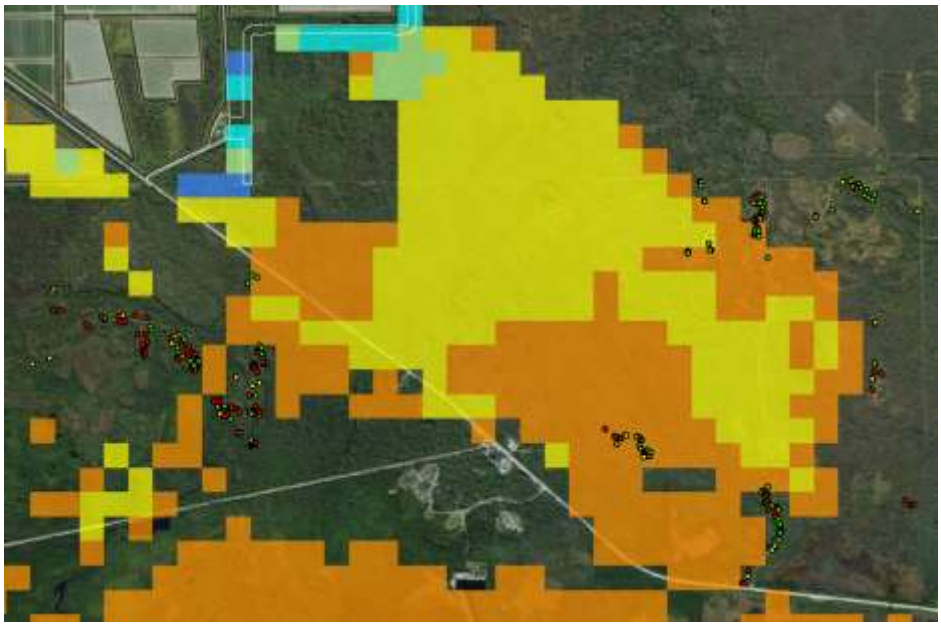

Figure 88: Difference in ponding depth between the construction of the SWPF only (no other PSRP features) and without PSRP. Gopher tortoise burrows classification: potentially occupied (green dot), abandoned (red dot), occupied by another species (yellow dot). Yellow polygons represent ponding depth change of 0.6 to 1 inches. Orange polygons represent ponding depth change of 1.1 to 2 inches. Areas with no color polygon have a ponding depth change of 0 inches.

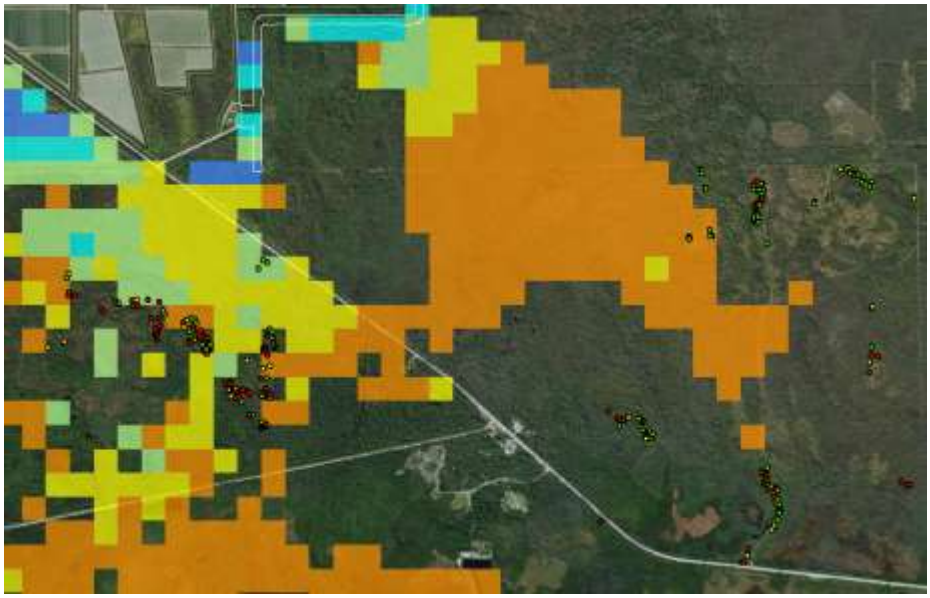

Figure 89: Difference in ponding depth between the construction of the SWPF only and conveyance features (excluding the CR-92 culvert modification with no other PSRP features) and without PSRP. Gopher tortoise burrows classification: potentially occupied (green dot), abandoned (red dot), occupied by another species (yellow dot). Yellow polygons represent ponding depth change of 0.6 to 1 inches. Orange polygons represent ponding depth change of 1.1 to 2 inches. Green polygons represent ponding depth change of 2.1 to 6 inches. Areas with no color polygon have a ponding depth change of 0 inches.

Most of the surveyed gopher tortoise burrows will experience a change in ponding depth between 0 and 2 inches with the implementation of ALT PC2 and along with full implementation of PSRP (Figure 90).

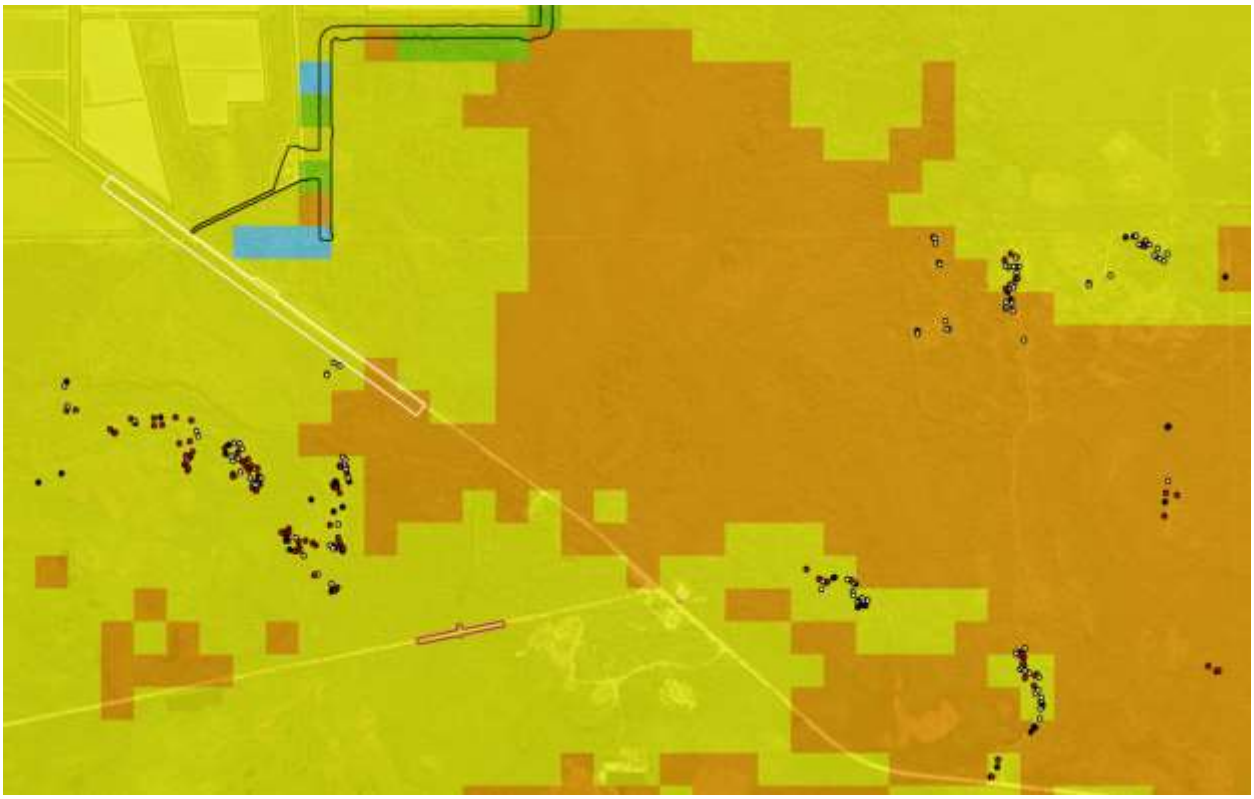

Figure 90: Difference in ponding depth between ALT PC2 (with full implementation of PSRP) and without PSRP. Gopher tortoise burrows classification: potentially occupied (white dot), abandoned (red dot), occupied by another species (black dot). Yellow polygons represent ponding depth change of 0 to 2 inches. Orange polygons represent ponding depth change of 2.1 to 6 inches.

Hydroperiod may represent more of a potential impact than ponding depth with more gopher tortoise burrows located in areas with increasing hydroperiod (Figure 91). The individual model cells of the GSSHA model are 120 m by 120 m with both ponding depth and hydroperiod data averaged for the cell. Gopher tortoises are notorious for taking advantage of microtopography within their range. Uncertainty always existed around natural variability. Topography changes, erosion, frequency of fire, hurricanes, drought, etc. create a wide mosaic of microtopographic landscapes which the gopher tortoise will use to its advantage. Castellon et al found that gopher tortoises tolerate habitats with extremely shallow water tables in southern Florida (Avon Park) (2020). Locally, their data found that gopher tortoises gravitated towards higher elevations, making use of microtopography, in Avon Park where relief was so minimal and gradual that it was imperceptible in the field. (Castellon et al. 2020). At Avon Park, gopher tortoises burrow use was higher during wet years and movement between burrows increased (Castellon et al. 2012, 2020). Lastly, similar to most of South Florida, Avon Park has relatively flat topography, predominance of flatwoods, and natural scarcity of sandhill habitats (Castellon et al. 2020). In Avon Park, effects of microtopography superseded effects of site-wide elevation trends on burrow presence and intensities (Castellon et al. 2020).

Given the soil types with their hydrologic characteristics and depths in conjunction with wetland-centric habitats presently being used, mobility of gopher tortoises, and known behavior of occupying flooded burrows without incident, gopher tortoises should be capable of adjusting to the hydrologic changes that will occur as a result of the implementation of ALT PC2. However, in some locations these gopher tortoises will have to adjust to the higher and drier areas during the wet season (modeled months of July through October) which coincides with the warmer months of south Florida. The majority of the year, ponding depth and hydroperiod will be lessened due to drier conditions. Literature has shown that damp or even wet soils and burrows are preferable to the gopher tortoise to prevent desiccation (Means 1982).

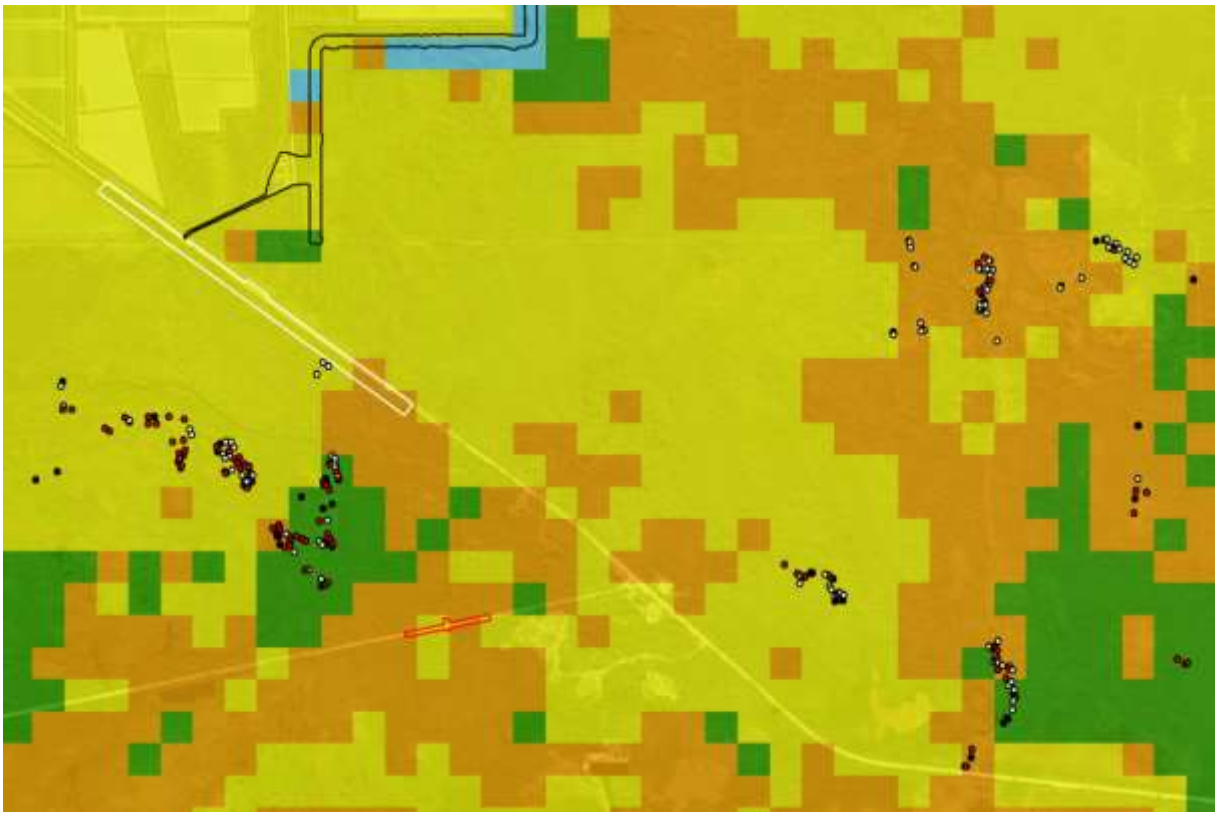

Figure 91: Difference in hydroperiod between ALT PC2 (with full implementation of PSRP) and without PSRP. Gopher tortoise burrows classification: potentially occupied (white dot), abandoned (red dot), occupied by another species (black dot). Yellow polygons represent a hydroperiod change of less than one month. Orange polygons represent a hydroperiod change of 1 to 2 months. Green polygons represent a hydroperiod change of 2 to 6 months.

Hydrological attributes such as ponding depth and hydroperiod may not be as problematic to gopher tortoises as discussed above. However, gopher tortoise behavior, even in wetter conditions show that their preference is drier sandier soils which are easier to excavate. Wetter burrows may be beneficial in hotter months for temperature regulation, drinking water, and to prevent dessication but leave a reliance on microtopographical variance of their home range and more movement between burrows which could increase potential threats as exposure to overheating, predators, and additional energy expenditure. Wetter conditions in and around the burrow may also serve as indicator of soil moisture as an indicator of potential food resources. Given this information, USACE has determined that the implementation of ALT PC2 may affect the gopher tortoise.

8 CONSERVATION MEASURES

USACE acknowledges the potential usage and occurrence of the previously discussed threatened and endangered species and/or critical habitat within the PSRP study area. USACE will review the USFWS BO associated with this BA when it is received and discuss recommended conservation measures in consultation with USFWS. To achieve a determination of may affect, not likely to adversely affect for those species where potential project-related effects were identified, USACE will employ best management practices and published or recommended conservation measures during implementation of the ALT PC2 as well as the partial plugging of the Faka Union Canal. Specific conservation measures considered to reduce impacts to species in this BA are discussed below are more clearly identified in the follow species specific sub-sections.

8.1 Florida Bonneted Bat

The Florida bonneted bat was listed in November 2013, approximately 9 years after the original PIR/EIS for the PSRP was finalized. Any consultation between USACE and USFWS prior to November 2013 didn't include this species. In 2018, USACE began implementing several restoration components of the PSRP: eastern stair steps plugging, including road removal and clearing, and northern road removal, which included removing roads north of the tieback levee and associated clearing. In order to proceed with these phases, USACE contracted USFWS staff from the Florida Panther/Ten Thousand Islands NWRs for both of these phases in order to conduct Florida bonneted bat surveys following the official USFWS guidance for Florida Bonneted Bat monitoring and acoustic surveys as outlined in the December 2013 USFWS Florida Bonneted Bat Guidelines and the 2016 USFWS Biological Opinion on the Florida Bonneted Bat for the Eastern Stair Steps restoration phase (USFWS 2013a, USFWS 2016). The realization of the cost, effort (coordination), and time associated with following the survey protocols in the 2016 USFWS BO, generated additional consultation between USACE and the USFWS in 2018.

Via 2018 consultation, USACE, SFWMD, and USFWS agreed on a path forward for avoiding and minimizing impacts to the Florida bonneted bat and other listed and locally important species, while reducing cost and timing delays while improving efficiency and interagency communication. The conservation measures developed from consultation in 2018 are: (1) currently being employed; (2) consistent with the 2019 Florida bonneted bat consultation guidelines and consultation map (Figure 66); and (3) will continue for the SWPF and conveyance features. Those measures are:

- USACE has contracted the FWC to conduct a three monitoring project on the Florida bonneted bat in the PSRP footprint. This study will revolve around acoustic surveying and capture-release tagging to assess bat activity in relation to vegetation/natural community type, hydrology, and stage of restoration on the project. Areas monitored inside the PSRP footprint will be compared to monitored sites in nearby/adjacent lands including Collier Seminole State Park, Fakahatchee Strand State Park, Florida Panther National Wildlife Refuge, and Picayune Strand State Forest (Belle Meade). This project will provide a great opportunity to fill in knowledge gaps of how the Florida bonneted bat is using a widely protected (federal and state managed lands) area and how hydrologic restoration affects their population dynamics.
- Prior to the start of restoration on any new section of land or water, USACE will contract USFWS to perform pre-construction wildlife surveys of the new are to be restored. These surveys will include surveying for potential roost trees and surveying any tree cavities that could potentially house Florida bonneted bats.

- Wildlife survey reports will be reviewed by USACE and USFWS (Naples Sub-office) prior to restoration crews starting work. Once reviewed, approval to proceed, approval to proceed with caveats, or do not proceed determinations will be provided.
- Restoration/construction crews will be educated on the Florida bonneted bat. Any observations of the bat in flight, fleeing from a roost, on the ground or fallen tree will halt restoration work immediately until instruction has been given by USFWS and USACE.

Additionally, USACE will ensure the construction of the SWPF and conveyance features will consider the following best management practices as outlined in the October 2019 Florida Bonneted Bat Consultation Guidelines (USFWS). The best management practices employed are (USFWS 2019):

<u>BMPs for development, construction, and other general activities</u>

- If potential roost trees or structures need to be removed, check cavities for bats within 30 days prior to removal of trees, snags, or structures. When possible, remove structure outside of breeding season (e.g., January 1 – April 15). If evidence of use by any bat species is observed, discontinue removal efforts in that area and coordinate with the USFWS on how to proceed.
- When using heavy equipment, establish a 250 foot (76 m) buffer around known or suspected roosts to limit disturbance to roosting bats.
- Protect known Florida bonneted bat roost trees, snags or structures and trees or snags that have been historically used by Florida bonneted bats for roosting, even if not currently occupied, by retaining a 250 foot (76 m) disturbance buffer around the roost tree, snag, or structure to ensure that roost sites remain suitable for use in the future.
- Avoid and minimize the use of artificial lighting, retain natural light conditions, and install wildlife friendly lighting (i.e., downward facing and lowest lumens possible). Avoid permanent night-time lighting to the greatest extent practicable.
- Incorporate engineering designs that discourage bats from using buildings or structures. If Florida bonneted bats take residence within a structure, contact the Service and Florida Fish and Wildlife Conservation Commission prior to attempting removal or when conducting maintenance activities on the structure.

<u>BMPs for ecological land management</u>

- Protect potential roosting habitat during ecological land management activities, if feasible. Avoid removing trees or snags with cavities.
- When using heavy equipment, establish a buffer of 250 feet (76 m) around known roosts to limit disturbance to roosting bats.

8.2 Red-Cockaded Woodpecker

The current breeding pair population stands at 16 active woodpecker clusters (12 if you exclude the 4 clusters in the northwest) located north of the agricultural area (Figure 57). Expectations of the USFWS for the Picayune Strand State forest population was for there to be 8 active woodpecker clusters by 2020 (USFWS 2003). With the active clusters at double what was predicted or established as expected by the USFWS, the translocation program and habitat management practices associated with the Picayune Strand State Forest show its effectiveness at perpetuating/supplementing a population. Given the level

of effort and cost discussed previously in this BA, USACE is committed to ensure the red-cockaded woodpecker population continues to thrive within the Picayune Strand State Forest. In order to ensure continued success, USACE has assessed the potential impacts of implementation of the SWPF and conveyance features which are discussed in Section 7.2.4.

Analysis completed for assessment of impacts to federally listed species for the SWPF and conveyance features provided important details with respect to the full implementation of the PSRP. Under full implementation of the PSRP, all features included in the PIR and LRR, including the SWPF and conveyance features, show potential hydrological impacts to the red-cockaded woodpecker population north on the northwest outskirts of the PSRP footprint. Modeling results of hydroperiod and ponding depth were produced in late February 2020 for: (1) the implementation of the SWPF by itself with no other PSRP features implemented (without project conditions), including pump stations, spreader berms, roads removed, and canals plugged (Figure 92); (2) the implementation of the SWPF and conveyance features (minus the new culvert under CR-92 with no other PSRP features implemented (Figure 93). Implementation of these modeling scenarios include the SWPF and specifically defined conveyance features of ALT PC2 in conjunction with the without project condition; meaning those scenarios do not include the implementation of the pump stations, spreader berms, tieback levee, manatee mitigation area, roads removed, or canals plugged.

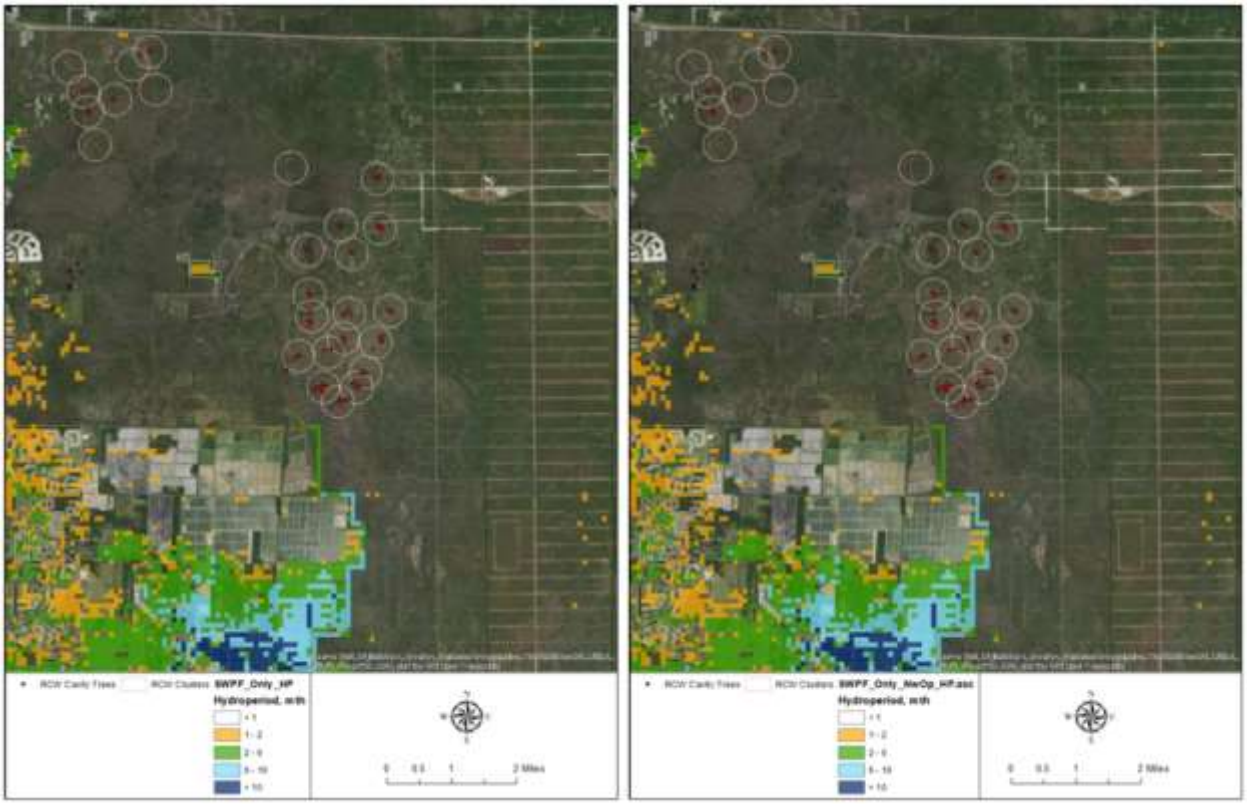

Figure 92: Hydrological modeling results (GSSHA model) for aspects of the ALT PC2 in conjunction with "without project condition". In these scenarios, no components of the PSRP have been implemented other than those described. The left map represents the hydroperiod (months) of the construction of the SWPF levee only. The right map represents the hydroperiod (months) of the construction of the SWPF levee plus conveyance features excluding the new opening under CR-92.

The implementation of ALT PC2 is not the cause of hydrological impacts to the red-cockaded woodpecker population associated with the Picayune Strand State Forest. Due to the modeling results of the full PSRP showing likely impacts to the RCW population, for foraging and cavity trees (nesting and roosting), USACE completed another modeling scenario that simulated the implementation of blocking the western half of the Miller Spreader Berm with the full implementation of PSRP including ALT PC2. This scenario, developed by the Environmental Team's Red-cockaded Woodpecker Sub-Team, was modeled to assess any changes to impacts that could occur from manipulation of the Miller Pump Station-Spreader Berm-Canal Plugging complex. While not resolving the potential negative impacts to the red-cockaded woodpecker population, the scenario with the blocking of the western side of the Miller Spreader Berm (Figure 94) did show substantial reduction in hydroperiod. This reduction further shows that the impacts to the red-cockaded woodpecker are a result of the plugging of the Miller Canal and operations of the Miller Pump Station.

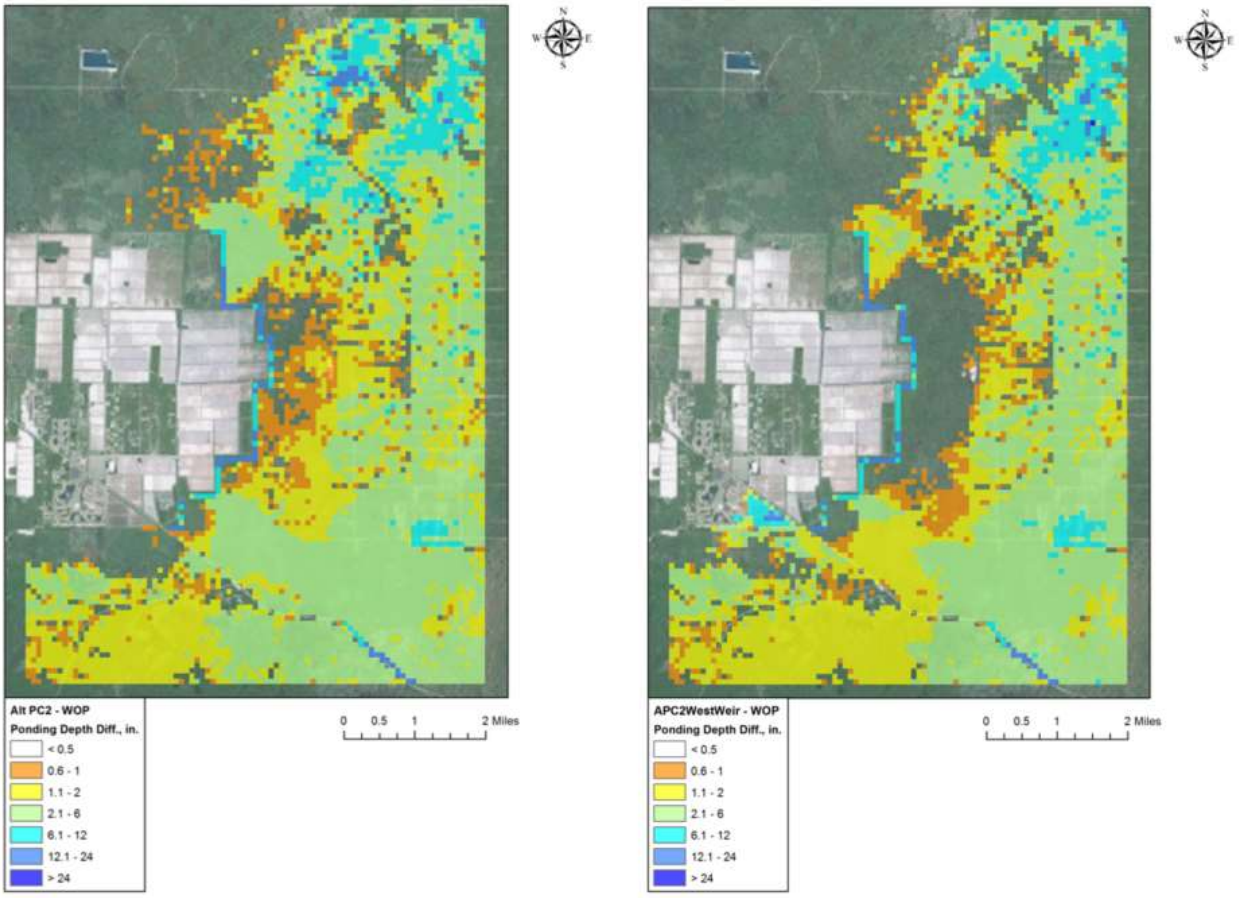

Figure 93: Hydrological modeling results (GSSHA model) for Full PSRP implementation including ALT PC2 and a modified Miller Pump Station spreader berm. In this scenario the Miller Pump Station spreader berm had the entire western side openings blocked. The left map represents the difference in ponding depth (inches) between ALT PC2 (without modified Miller spreader berm) and "without project" condition. The right map represents the difference in ponding depth (inches) between ALT PC2 (with modified Miller spreader berm) and "without project" condition.

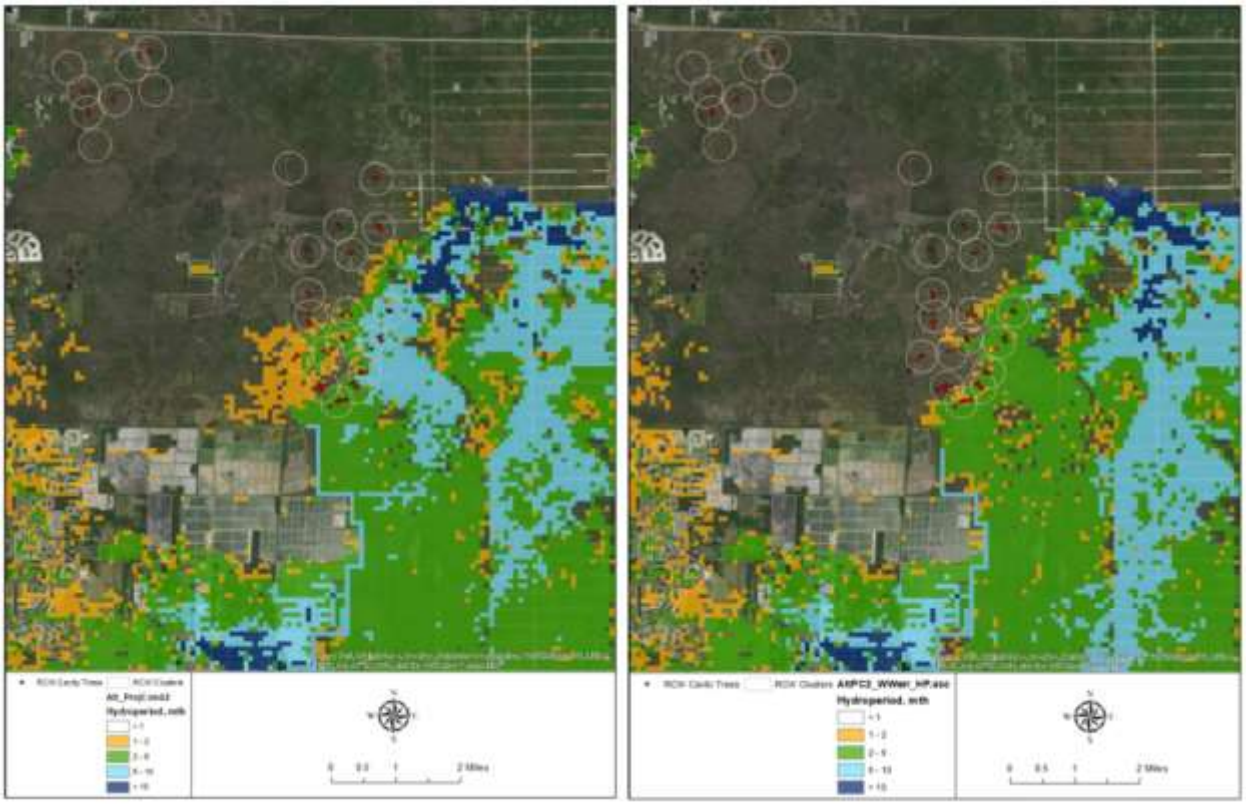

Figure 94: Hydrological modeling results (GSSHA model) for Full PSRP implementation including ALT PC2 and a modified Miller Pump Station spreader berm. In this scenario the Miller Pump Station spreader berm had the entire western side openings blocked. The left map represents the hydroperiod (months) of ALT PC2 (without the modified Miller spreader berm). The right map represents the hydroperiod of ALT PC2 (with modified Miller spreader berm).

USACE, in conjunction with partnering agencies, will continue to look into how the full implementation of the PSRP, including the plugging of the Miller Canal and start of the operational period for Miller Pump Station, will impact the red-cockaded woodpecker in the Picayune Strand State Forest. The steps USACE will take to conserve this population of woodpeckers are:

- USACE commits to working with USFWS, FWC, and FFS to develop a conservation, or protection, strategy that will avoid and minimize impacts to the red-cockaded woodpecker nesting, and roosting, habitat.
- USACE commits to working with USFWS, FWC, and FFS to develop strategies to avoid and minimize impacts to red-cockaded woodpecker habitat.
- USACE will continue to coordinate with partner agencies to discuss and evaluate “developed” strategies for effectiveness of protection measures for the red-cockaded woodpeckers and of methodologies for avoidance and minimization of impacts.
- USACE commits to additional design, modeling, and analysis to identify measures to avoid and minimize impacts to red-cockaded woodpecker habitat prior to moving forward with construction of plugs to restore Miller Canal.

8.3 Florida Panther

Conservation guidance and recommendations provided in the 2009 USFWS Biological Opinion for the PSRP will be implemented for the implementation of ALT PC2 and the plugging of the northern 3.3 miles of the Faka Union Canal.

8.4 West Indian Manatee

Conservation guidance and recommendations provided in the 2009 USFWS Biological Opinion for the PSRP will be implemented for the implementation of ALT PC2 and the plugging of the northern 3.3 miles of the Faka Union Canal. CERP manatee guidelines, developed by the CERP Interagency Manatee Task Force, shall also be followed with implementation of ALT PC2 and the plugging of the northern 3.3 miles of the Faka Union Canal (2006, USFWS 2009).

8.5 Eastern Indigo Snake

Conservation guidance and recommendations provided in the 2009 USFWS Biological Opinion for the PSRP will be implemented for the implementation of ALT PC2 and the plugging of the northern 3.3 miles of the Faka Union Canal. Included in the 2009 USFWS Biological Opinion for the PSRP were standard protection measures for the eastern indigo snake (USFWS 2009). The four standard protection measures will be incorporated into the implementation of ALT PC2.

9 CONCLUSIONS

This BA was prepared with the best available scientific and commercial information. USACE recognizes the need for re-initiation of consultation if modifications to the project are made and/or additional information involving potential effects to federally listed species becomes available. USACE commits to maintain ongoing communications with USFWS, NMFS, FWC, FDEP, and FFS in the event of project modifications. This BA document is being submitted to support a request for formal consultation with USFWS pursuant to Section 7 of the ESA.

USACE acknowledges the possible to probable existence of numerous federally listed candidate, threatened, and endangered species as identified in the USFWS letter defining potentially affected species (2017a) within the boundaries of the PSRP study area in association with the SWPF and conveyance features. In accordance with the ESA, USACE has evaluated 30 species and 3 critical habitats for potential effects as a result of implementing ALT PC2 and the partial plugging of the northern 3.3 miles of the Faka Union Canal (Table 11).

Table 11: Determination of effects for federally listed species associated with the PSRP SWPF and Conveyance Features, as well as, the partial plugging of the northern 3.3 miles of the Faka Union Canal.

Common Name	Scientific Name	Federal Status	Determination
American alligator	*Alligator mississippiensis*	T (SA)	MANLAA
American crocodile	*Crocodylus acutus*	T	MANLAA
Loggerhead sea turtle	*Caretta caretta*	T	No effect
Green sea turtle	*Chelonia mydas*	E	No effect

Common Name	Scientific Name	Federal Status	Determination
Leatherback sea turtle	*Dermochelys coriacea*	E	No effect
Hawksbill sea turtle	*Eretmochelys imbricata*	E	No effect
Kemp's ridley sea turtle	*Lepidochelys kempii*	E	No effect
Cape Sable seaside Sparrow	*Ammodramus maritimus mirabilis*	E	No effect
Florida scrub jay	*Aphelocoma coerulescens*	T	No effect
Ivory-billed woodpecker	*Campephilus principalis*	E	No effect
Piping plover	*Charadrius melodus*	T	No effect
Red knot	*Calidris canutus rufus*	T	No effect
Audubon's crested caracara	*Polyborus plancus audubonii*	T	No effect
Everglade snail kite	*Rostrhamus sociabilis plumbeus*	E	MANLAA
Kirtland's Warbler	*Setophaga kirtlandii*	*(Delisted – Oct 2019)	No effect
Roseate tern	*Sterna dougallii dougallii*	T	No effect
Wood stork	*Mycteria americana*	T	MANLAA
Florida leafwing butterfly	*Anaea troglodyte floridalis*	E	No effect
Bartram's hairstreak butterfly	*Strymon acis bartrami*	E	No effect
Cassius blue butterfly	*Leptotes cassius theonus*	T (SA)	No effect
Ceraunus blue butterfly	*Hemiargus ceraunus antibubastus*	T (SA)	No effect
Miami blue butterfly	*Cyclargus thomasi bethunebakeri*	E	No effect
Nickerbean blue butterfly	*Cyclargus ammon*	T (SA)	No effect
Stock Island tree snail	*Orthalicus reses*	T	No effect
Florida prairie clover	*Dalea carthagenensis floridana*	E	No effect
Red-cockaded woodpecker	*Picoides borealis*	E	May affect
Florida bonneted bat	*Eumops floridanus*	E	May affect
Florida panther	*Puma concolor coryi*	E	MANLAA
Eastern indigo snake	*Drymarchon couperi*	T	MANLAA
West Indian manatee	*Trichechus manatus*	T	MANLAA
Gopher tortoise	*Gopherus polyphemus*	C	May affect

Within PSRP, a failed large scale residential development implemented a network of infrastructure, including canals and roadways, which significantly altered the hydrology of Picayune Strand State Forest. Picayune Strand State Forest is an important piece of land that provides ecological and hydrological connectivity as it is surrounded by federal and state managed lands and provides important refuge to a number of federally listed species. To date, it is estimated that approximately 80% of the funds for PSRP have been spent with only 20% to 30% of the benefits achieved. A major step in project completion is the implementation of the SWPF and associated conveyance features which will provide flood risk management to the adjacent agricultural lands to the southwest of the project. Once in place, the remaining features of the PSRP can be implemented for hydrological restoration of the full project.

Many imperiled species residing within the PSRP and downstream will benefit from increased freshwater sheetflow. American crocodiles will have improved conditions for the juvenile stage of live with reduced salinities making it easier and less costly for osmoregulation. Birds including caracara, and snail kite, wood stork, and other wading birds will also benefit from increased freshwater flow as habitats preferential for nesting become more readily available over time. Increased prey production will also occur as more wetland habitat will improve their population bases, providing more foraging opportunities for these species among others that may prey upon fish and other small animals reliant on this food web base.

This BA has also updated the PSRP Florida Panther Habitat Units ledger to include the updated project boundary and changes associated with ALT PC2. With the extension of the project boundary in the past, there was increase in panther habitat units for this project.

Already an approved feature, the partial plugging of the northern 3.3 miles of the Faka Union Canal will provide a head start on hydrological restoration towards the center of the project without resulting in any significant flooding issues as Miller Canal, Western Stair Steps, and lower Faka Union Canal will continue to drain lands to the west and south within the project footprint. Both the implementation of ALT PC2 and the partial plugging of Faka Union will lead to greater achievement of benefits and allow the PSRP to move forward with the understanding that protection of species protected under the ESA will continually need to be evaluated and consulted upon as the PSRP continues towards completion. The next federal action will be the update of the project operating manual prior to implementation of any future phases of PSRP beyond the actions described here in. Additional future ESA coordination will be pursued by USACE for the planning of the plugging of Miller Canal to address any potential impacts associated with that Federal action, including those impacts described within this document.

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Florida Ecological Services Office
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May 11, 2020

Andrew Kelley, Colonel
District Commander
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Service Consultation Code:	41420-2009-F-0469
Original Service Log No.:	4-1-04-F-5260
Applicant:	U.S. Army Corps of Engineers
Project:	Picayune Strand Restoration Project - Southwest Protection Feature
County:	Collier

Dear Colonel Kelley:

The U.S. Fish and Wildlife Service (Service) has reviewed your request for consultation dated April 6, 2020, and the Biological Assessment (BA) submitted by the U.S. Army Corps of Engineers (Corps) for the Southwest Protection Feature (SWPF) of the Picayune Strand Restoration Project (PSRP), including additional conveyance features as well as the plugging of the northern 3.3 miles of the Faka Union Canal (Project). The primary purpose of the Project is to provide flood risk management to the agricultural properties adjacent to the southwest corner of the PSRP in accordance with the Savings Clause (Section 601(h)(5) of the Water Resources Development Act (WRDA) 2000. The Corps made effect determinations for the federally listed threatened or endangered species listed in Table 1 based on their analysis of the Project. This letter is a Request for Additional Information and is submitted in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act) (87 Stat. 884; 16 U.S.C. 1531 *et seq.*). The Service has not received all of the information necessary to initiate consultation on the Project.

Species	Status	May Affect, Not Likely to Adversely Affect	May Affect
American alligator (*Alligator Mississippiensis)*	T	X	
American crocodile (*Crocodylus acutus)*	T	X	
Gopher tortoise (*Gopherus Polyphemus)*	C		X
Eastern indigo snake (*Drymarchon Couperi)*	T	X	
Everglade snail kite (*Rostrhamus sociabilis plumbeus)*	E	X	
Wood stork (*Mycteria Americana)*	T	X	
Red-cockaded woodpecker (*Picoides borealis)*	E		X
Florida bonneted bat (*Eumops floridanus)*	E		X
Florida panther (*Puma concolor Coryi)*	E	X	
West Indian manatee (*Trichechus Manatus)*	T	X	

Table 1. Effects determinations made by the Corps.

PROJECT DESCRIPTION

The SWPF is a flood risk management feature that was included in the 2004 PSRP Final PIR/EIS as a conceptualized levee surrounding agricultural lands located on the southwest corner of the PSRP boundary. The SWPF, formerly called the 6L levee, was conceptualized as a 17.25 mile long feature in the original PSRP PIR/EIS designed to prevent an increase in surface water levels due to operating the PSRP. More detailed hydraulic and hydrologic modeling associated with the PSRP using updated LIDAR and the Gridded Surface Subsurface Hydrologic Analysis (GSSHA) model platform determined that the SWPF could be reduced to only 8.75 miles. The SWPF levee included in the current Project is a modification of the 8.75 mile levee included in the 2014 PSRP Final LRR/EA which reduces the footprint and direct impact to wetland communities in the southwest corner of the larger PSRP footprint (USACE 2014). The implementation of the SWPF is critical to the completion of the PSRP. Full implementation of the PSRP includes the plugging of the entire Miller Canal, Faka Union Canal, and Western Stair Steps Canal. These canals cannot be plugged in their entirety until the SWPF is constructed managing flood risk for those agricultural lands southwest of PSRP.

The selected plan for the SWPF, ALT PC2, meets the flood risk management needs for the agricultural lands located southwest of the PSRP footprint proper. The SWPF levee in this alternative is 7.5 miles in length and includes a seepage/borrow canal between the existing levee and the new SWPF levee. There is approximately 950 foot gap between the southern terminus of the levee and US-41. Additionally, the elevation of the levee was set to be 2.5 feet (ft) above the 100 year maximum computed water surface profile. The levee steps down (in elevation) from

11.5 ft North American Vertical Datum of 1988 (NAVD88) in the north to 7.5 ft NAVD88 in the south (6 inches at a time), generally maintaining a minimum 2.5 ft of superiority. The average width of the SWPF levee embankment is 41 ft.

ALT PC2 incorporates the following conditions: all four canals (Miller, Faka Union, Merritt, and Prairie) are plugged, the Stair Steps are plugged, most of the roads and side ditches are removed, the tieback levee and manatee mitigation feature are complete, the SWPF levee is constructed and all three pump stations are built and operational. ALT PC2 includes the below additional features aimed at improving conveyance of water south to the estuarine systems and to reduce water ponding against the north side of US-41. With the addition of the SWPF levee, the LRR identified the need for additional conveyance of water from the PSRP proper to the downstream estuaries.

Conveyance Canal

At 20 ft wide and 4 ft deep, the conveyance canal was designed to capture overflow from the east farm ditch and efficiently convey the water to the south and out into the Picayune Strand State Forest (approximately 1,000 ft from US-41). This canal will also collect seepage from the increased water levels from the Picayune Strand State Forest. Maximum flow rates in the conveyance canal range from approximately 95 cubic ft per second (cfs) to 120 cfs for the 5 year through 100 year storm events, with an average velocity of less than 1 foot per second (fps) during peak discharge.

SWPF Levee Conveyance Culvert

The levee culvert is a flap gated culvert structure that discharges into the Picayune Strand State Forest approximately 1 mile north of US-41. This structure consists of two 5 foot diameter barrel culverts with a 110 cfs total capacity with 0.3 ft of head.

SWPF Levee Access Road Culverts

The levee access road will have culverts at the crossings over the existing east farm drainage ditch and the new conveyance canal. Each crossing will have three 5 ft diameter culvert pipes. Positioned underneath the levee access road, this feature is required for conveyance of water south in both the east farm ditch and the conveyance canal to flow out of the southern terminus. Each structure pipe has a capacity of 110 ft cfs with 0.1 ft of head.

New US-41 Culverts

The new opening under US-41 is a series of box culverts. The feature consists of three 12 ft by 4 ft concrete box culverts spaced 120 ft apart. The designed flow rate of this structure is 200 cfs with 0.1 ft of head.

Modification of Indian Village Entrance Culvert

The conveyance feature at the entrance to Indian Village is a modification of an existing structure as opposed to implementation of a new structure. The existing Indian Village entrance culvert consists of three 3 ft diameter corrugated HDPE pipes. With implementation of ALT PC2, one additional culvert pipe will be added. The design flow rate for this structure is 95 cfs with 0.3 ft of head.

Modification of CR-92 Culvert
The CR-92 culvert is located downstream of Bridge 37. This structure will reconnect a historic drainage channel that was cut off with the construction of CR-92. The design flow rate for this structure is 100 cfs with 0.4 ft of head.

Partial Faka Union Canal Plugging
For protection of the agricultural lands southwest of the PSRP footprint, complete plugging of the Faka Union Canal, as described in the PIR, cannot be completed prior to the construction of the SWPF. Of the remaining features outside of the SWPF and conveyance features, the only plausible feature remaining that could increase project benefits attained without potentially increasing flood risk was partially plugging the Faka Union Canal.

Plugging of the Faka Union Canal was modeled using "mile-long" increments to assess if any of the Faka Union could be plugged without creating any temporary flood risk to property owners and listed species. The plugging of the northern 3.3 miles is the scenario that provides the most benefits without creating flood risk is to partially plug the northern 3 miles of the Faka Union Canal.

The Project components of partial plugging of the northern 3.3 miles of the Faka Union Canal incorporate the already constructed tie back levee and the Faka Union spreader berm. Approximately 3.3 miles of the Faka Union Canal will be plugged from the tieback levee and spreader weir extending southward. The Faka Union Canal will be plugged with adjacent existing fill from along the Faka Union Canal and fill from spoil piles located north of the tieback levee. Canal plugs will be constructed beginning at approximately 66th Avenue and ending at approximately 92nd Avenue. The canal plugs at the avenues will be approximately 100 ft long at the top and slope at 6H:1V on either end to the existing canal bottom. The plug fill will be end dumped into the canal without dewatering. The fill will be placed until the plug surface is at the required elevation and provides a surface which can be proof-rolled without pumping. A turbidity barrier will be placed downstream of the southernmost plug in each work area. Excess fill that is available north of the tie-back levee will be hauled in and will be used to create additional plugs in order to fill as much of the canal as possible.

Special canal plugs will also be constructed at the tieback levee and spreader weir. The special canal plugs at the tieback levee and spreader weir will be approximately 400 ft long at the top and slope at 6H:1V on either end to the existing canal bottom. The canal will be demucked, filled, and compacted to construct the plugs. The tie-back levee and spreader weir special canal plugs were previously authorized. The partial plugging of the Faka Union Canal is considered a "temporary" state and will not remain partially plugged as a long term feature.

COMMENTS

Endangered Species Act Section 7 consultation was completed in 2009 with the March 12, 2009 biological opinion issued by the Service for the implementation of the PSRP. The proposed action in the 2009 biological opinion, and the biological assessment submitted to the Service by the Corps, included the backfilling of the entire Faka Union Canal. The

backfilling of 3.3 miles of the Faka Union Canal should not be separated out as part of the current proposed action as it has already been reviewed and consulted on previously.

Although the current proposed action is part of the larger Picayune Strand Restoration Project it should only include those activities associated with the construction of the Southwest Protection Feature or related actions not previously consulted on as part of the larger project. The construction of the Southwest Protection Feature serves no purpose without the full implementation of the PSRP in its entirety. Therefore, the Southwest Protection Feature has no independent utility "but for" the PSRP restoration and is, therefore, interrelated with the Project. Effects of the construction of the Southwest Protection Feature are analyzed together with the effects of other activities that are interrelated to, or interdependent with, that action (see 50 CFR § 402).

The Service recommends the following steps to properly adhere to ESA- Section 7 regulations and policies:

1. Respond to this RAI as appropriate to supplement the BA.
2. Request reinitiation of the 2009 PSRP Biological Opinion (BO) through a formal consultation letter describing the new proposed action and acknowledging adverse effects to RCWs and Florida panthers. Steps 1 and 2 can be combined into the same document. The Service is willing to review any draft documents prior to finalizing them.
3. The Service will issue a Biological Opinion amending the 2009 BO incorporating the new actions.

On March 23, 2020, the Service submitted comments on the Corps application for the Comprehensive Everglades Restoration Plan Regulation Act permit to the Florida Department of Environmental Protection and copied the Corps. These comments included requests for a copy of the modified Preliminary Project Operations Plan; a copy of the Corps Project modeling that demonstrated no effects or beneficial effects to habitat affected by the partial backfill including discharges to estuaries under a fully operational pump station contributing to two unfilled canals; and an update on compliance with exotic and nuisance plant management plans. These requests were made to determine compliance with the existing Project consultation. Panther habitat benefits for the CERP Panther Conservation Bank did not include an interim construction condition or discharges to open canals with a fully-operational Faka Union pump station.

- The Corps has included a significant expansion of the PSRP by more than 11,000 acres(ac) as a part of the currently proposed action. This expansion has potential effects to listed species that were not previously considered and in itself would be a change to the original project that requires reinitiation of consultation. Additionally, a reduction of 456 ac is proposed for the northwest Project boundary as consulted upon in 2009. This is a reduction in CERP Florida Panther Conservation Bank credits. Has the Corps coordinated with the appropriate state landowners and/or agencies affected by this expansion/reduction?

- The Corps states in the biological assessment that freshwater flows and nutrient loads will be introduced to new locations with the construction of new conveyance features

under Hwy-41 and CR-92. Has the Corps analyzed if these new flows will degrade water quality in those new locations and whether or not those flows will have any effects to listed species? Information used to assess these effects should be provided, including seasonal flow estimates and their effects on downstream estuaries.

- Changes in hydrology associated with the implementation of ALT PC2 in conjunction with the implementation of all of PSRP show impacts to 8 of the 12 red-cockaded woodpecker breeding pairs associated with the larger sub-population within the Picayune Strand State Forest. The Corps makes the following statement in the biological assessment; "The implementation of ALT PC2 does directly impact 125-150 ac of habitat permanently and 18.88 ac of potential habitat temporarily." Effects to red-cockaded woodpeckers also include changes in forage habitat. Corps hydrological models predict hydroperiod changes that will affect vegetation type and structure. The Corps should provide a land classification map such as FLUCCs for the existing vegetation on the Project and a predicted vegetation map post-project based on the hydrological model results for the Project. The general location and predicted changes by acre should be provided. Therefore, the Corps effect determination of "may affect, not likely to adversely affect" for the red-cockaded woodpecker is not supported by their own analysis. The Corps should change their effects determination to "may affect, likely to adversely affect" for the red-cockaded woodpecker and request formal consultation from the Service on this species.

- The Corps has determined that ALT PC2 will have a "negative direct and indirect impact to the panther from loss of habitat." However, you go on to say in the biological assessment that "ALT PC2 in conjunction with full implementation of the PSRP will provide a higher quantity and higher quality habitat for the panther." The Corps then makes a "may affect, not likely to adversely affect" determination for the Florida panther. This analysis and determination were made based on using the full implementation of the PSRP. The analysis needs to be limited to the effects of the proposed action under consultation, which is ALT PC2 The Corps effects analysis must evaluate changes in habitat consistent with the Service's Panther Habitat Assessment Methodology. Corps hydrological models predict hydroperiod changes that will affect (change) vegetation type and structure. The Corps should provide a land classification map such as FLUCCs for the existing vegetation on the Project and a predicted vegetation map post-project based on the hydrological model results for the Project. The general location and predicted changes by acre should be provided.

- The Corps BA accurately cites the 2018 agreement between the Corps, Service, and SFWMD to conduct ecological studies for the Florida bonneted bat. The Corps subsequently prepared a Scope of Work and a contractual agreement which provides for 2 years of work by the Corps contractor, the Florida Fish and Wildlife Conservation Commission. We met the Corps contractor in January 2020 and suggested some modifications and additional detail be provided in preparation for this consultation. Some methodologies were still being developed and field studies currently underway likely resulted in some changes in methodology or scope. The Service will require the final

proposal and contractual details for the pre-and post-project bat studies to assess the "may affect" determination.

- The Corps has suggested an update to the PSRP/CERP Panther Conservation Bank credit allocation based on the expansion of the PSRP boundary, including impacts from the implementation of ALT PC2. The Service appreciates the Corps' efforts to update the credit allocation; however, the credit allocation and associated analysis will need to be completed by the Service since these were originally calculated and approved as part of another Section 7 consultation and biological opinion.

- The Corps has not provided sufficient information on the effects to the eastern indigo snake (EIS) for us to support a "may affect, not likely to adversely affect" determination. Specifically, the habitat change information requested for the Florida panther and red-cockaded woodpecker must also be compiled for the EIS, and a determination of location on or within 0.6 miles of the project action area (including Collier-Seminole State Park) must be determined. It would appear that if the eastern indigo snake is present on or near the site, that habitat will be directly, if not indirectly affected and may require formal consultation.

- "May affect, not likely to adversely affect" determinations have been provided for the Audubon's caracara, West Indian manatee, wood stork, Everglade snail kite, and American crocodile. With the addition of pre- and post-Project habitat information (wood stork, snail kite), specific location data relative to the SWPF (manatee), and additional conservation measures including nest buffers and/or monitoring (caracara and American crocodile) we may be able to concur with the Corps' determinations.

- The Corps has determined that ALT PC2 "may affect" the gopher tortoise, a candidate species. Is the Corps requesting a conference on the effects to the gopher tortoise?

- The action area for the Project is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. Corps hydrological modeling indicates significant habitat impacts to Collier-Seminole State Park. Potential effects are associated with freshwater discharges to the Ten Thousand Islands National Wildlife Refuge and Rookery Bay National Estuarine Research Reserve. The action area should be redefined to include these areas as well as well as action area standards for individual listed species.

- All project features related to this federal action must be included for evaluation. The South Florida Water Management District has discussed some additional project elements outside the federal process (canal maintenance at U.S. 41 and an associated maintenance road). These proposals have no utility outside of the federal action and must be consulted upon.

- Additionally, predicted hydroperiods and surface water flows south of the Marco Island Grade in Collier-Seminole State Park must be evaluated to determine if effects to the

active bald eagle nest tree at that location would occur as a result of this project, consistent with the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c).

The consultation process for the Project will not begin until we receive all of the information or a statement explaining why that information cannot be made available. We will notify you when we receive sufficient information to initiate consultation; our notification will also outline the dates within which consultation should be complete. The South Florida Ecological Services Field Office will strive to meet the statutory consultation deadlines. We are available to assist in detailing any information requests provided in this letter.

If you have any questions or concerns about this consultation or the consultation process in general, please feel free to contact Kim Dryden (kim_dryden@fws.gov).

Sincerely,

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

cc: electronic copy only
Corps, Jacksonville, Florida, (Angie Dunn, Stephen Baisden, Mike Simmons, Andy LoSchiovo)
Service, Florida Panther NWR, Naples, Florida (Kevin Godsea)
Service, Area II Refuge Supervisor, Vero Beach, Florida (Kathy Burchett)
SFWMD, West Palm Beach (Joanna Weaver, Ashie Akpoji)
SFWMD, Naples (Lisa Koehler, JJ Bentencourt, Mike Duever)
FFS, Ft. Myers, Florida (Sean Allen, Mike Weston, Mike Knight)
FDEP, West Palm Beach, Florida (Tracy Robb, Paul Julian, Courtney Deal)
FDEP, Tallahassee, Florida (Natalie Barfield, Tucker Smith, Ed Smith)
RBNERR, Naples, Florida (Keith Laakkonen, Jeff Carter, Brita Jesson)
CSSP, Naples, FL (Maulik Patel, Matt Kruse)
FDEP, Div. of Recreation and Parks, Osprey, Florida (Chris Becker)
FWC, Naples, Florida (Dan Mitchell, Jessica Spickler, Darrell Land, Mark Lotz)
FWC, Tallahassee, Florida (FWC-CPS)

APPENDIX B: COASTAL ZONE CONSISTENCY DETERMINATION

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- **Coastal Zone Management Act Consistency Statement**

FLORIDA COASTAL MANAGEMENT PROGRAM

FEDERAL CONSISTENCY EVALUATION PROCEDURES

Picayune Strand Restoration Project Southwest Protection Feature, Additional Conveyance Features, and Partial Plugging of the Faka Union Canal

Collier County

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.

Table B- summarizes the process and procedures under the Coastal Zone Management Act for Federal Actions and for Non-federal Applicants*.

Table B-1. Process and procedures under the Coastal Zone Management Act.

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).

Coastal Zone Consistency Statement by Statute/Enforceable Policy

PARTS I AND II, CHAPTER 161, F.S., DENNIS L. JONES BEACH AND SHORE PRESERVATION ACT

Coastal areas are among the state's most valuable natural, aesthetic, and economic resources; and they provide habitat for a variety of plant and animal life. The state is required to protect coastal areas from imprudent activities that could jeopardize the stability of the beach-dune system, accelerate erosion, provide inadequate protection to upland structures, endanger adjacent properties, or interfere with public beach access. Coastal areas used, or likely to be used, by sea turtles are designated for nesting, and the removal of vegetative cover that binds sand is prohibited. This statute provides policy for the regulation of construction, reconstruction, and other physical activities related to the beaches and shores of the state. Additionally, this statute requires the restoration and maintenance of critically eroding beaches.

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

PART II, CHAPTER 163, F.S., INTERGOVERNMENTAL PROGRAMS: GROWTH POLICY, COUNTY AND MUNICIPAL PLANNING; LAND DEVELOPMENT REGULATION

These statutes implement comprehensive planning programs to guide and control future development in the state. The comprehensive planning process encourages units of local government to preserve, promote, protect, and improve the public health, safety, comfort, good order, appearance, convenience, law enforcement and fire prevention, and general welfare; prevent the overcrowding of land and avoid undue concentration of population; facilitate the adequate and efficient provision of public facilities and services; and conserve, develop, utilize, and protect natural resources within their jurisdictions.

Chapter 163, Part II Intergovernmental Programs: Growth Policy; County and Municipal Planning; Land Development Regulation

Enforceable policies include:

Section 163.3164, F.S. Community Planning Act; definitions;

Section 163.3177, F.S. Required and optional elements of comprehensive plan; studies and surveys

> (3)(a). requiring the comprehensive plan to have a capital improvements element that considers the need and location of public facilities to encourage the efficient use of such facilities;
>
> (6)(a). requiring comprehensive plans to have a future land use plan element designating proposed future general distribution, location, and extent of the uses of land for residential uses, commercial uses, industry, agriculture, recreation, conservation, education, public buildings and grounds, other public facilities, and other categories of the public and private uses of land; maximize the use of existing facilities and services through redevelopment, urban infill development, and other strategies for urban revitalization;
>
> (6)(b). must consider land use compatibility issues around airports, and shall address land use compatibility consistent with chapter 333 regarding airport zoning;

(6)(d). designate environmentally sensitive lands for protection; and

(7)(a). include innovative approaches to development which may better serve to protect and maintain the economic viability of agricultural and other predominately rural land uses;

Subsection 163.3178 Coastal management. (1) local government comprehensive plans restrict development activities where such activities would damage or destroy coastal resources, and that such plans protect human life and limit public expenditures in areas that are subject to destruction by natural disaster.

(2) coastal management elements of comprehensive plans shall be based on studies, surveys, and data; be consistent with coastal resource plans prepared and adopted pursuant to general or special law; and contain:

(d) A component which outlines principles for hazard mitigation and protection of human life against the effects of natural disaster, including population evacuation, which take into consideration the capability to safely evacuate the density of coastal population proposed in the future land use plan element in the event of an impending natural disaster. The Division of Emergency Management shall manage the update of the regional hurricane evacuation studies, ensure such studies are done in a consistent manner, and ensure that the methodology used for modeling storm surge is that used by the National Hurricane Center.

(e) A component which outlines principles for protecting existing beach and dune systems from human-induced erosion and for restoring altered beach and dune systems.

(f) A redevelopment component which outlines the principles which shall be used to eliminate inappropriate and unsafe development in the coastal areas when opportunities arise.

(g) A shoreline use component that identifies public access to beach and shoreline areas and addresses the need for water-dependent and water-related facilities, including marinas, along shoreline areas. Such component must include the strategies that will be used to preserve recreational and commercial working waterfronts as defined in s. 342.07.

(h) Designation of coastal high-hazard areas and the criteria for mitigation for a comprehensive plan amendment in a coastal high-hazard area as defined in subsection (9). The coastal high-hazard area is the area below the elevation of the category 1 storm surge line as established by a Sea, Lake, and Overland Surges from Hurricanes (SLOSH) computerized storm surge model. Application of mitigation and the application of development and redevelopment policies, pursuant to s. 380.27(2), and any rules adopted thereunder, shall be at the discretion of local government.

(i) A component which outlines principles for providing that financial assurances are made that required public facilities will be in place to meet the demand imposed by the completed development or redevelopment. Such public facilities will be scheduled for phased completion to coincide with demands generated by the development or redevelopment.

(j) An identification of regulatory and management techniques that the local government plans to adopt or has adopted in order to mitigate the threat to human life and to control proposed

development and redevelopment in order to protect the coastal environment and give consideration to cumulative impacts.

Subsection 163.3180 Concurrency. (2) Consistent with public health and safety, sanitary sewer, solid waste, drainage, adequate water supplies, and potable water facilities shall be in place and available to serve new development no later than the issuance by the local government of a certificate of occupancy or its functional equivalent. Prior to approval of a building permit or its functional equivalent, the local government shall consult with the applicable water supplier to determine whether adequate water supplies to serve the new development will be available no later than the anticipated date of issuance by the local government of a certificate of occupancy or its functional equivalent. A local government may meet the concurrency requirement for sanitary sewer through the use of onsite sewage treatment and disposal systems approved by the Department of Health to serve new development.

(5),

(a) If concurrency is applied to transportation facilities, the local government comprehensive plan must provide the principles, guidelines, standards, and strategies, including adopted levels of service to guide its application.

(e) If a local government applies transportation concurrency in its jurisdiction, it is encouraged to develop policy guidelines and techniques to address potential negative impacts on future development:

1. In urban infill and redevelopment, and urban service areas.

2. With special part-time demands on the transportation system.

3. With de minimis impacts.

4. On community desired types of development, such as redevelopment, or job creation projects.

Paragraph 163.3194(1)(a), F.S. After a comprehensive plan, or element or portion thereof, has been adopted in conformity with this act, all development undertaken by, and all actions taken in regard to development orders by, governmental agencies in regard to land covered by such plan or element shall be consistent with such plan or element as adopted.

Subsection 163.3202(2), F.S. Local land development regulations shall contain specific and detailed provisions necessary or desirable to implement the adopted comprehensive plan and shall as a minimum:

(a) Regulate the subdivision of land.

(b) Regulate the use of land and water for those land use categories included in the land use element and ensure the compatibility of adjacent uses and provide for open space.

(c) Provide for protection of potable water wellfields.

(d) Regulate areas subject to seasonal and periodic flooding and provide for drainage and stormwater management.

(e) Ensure the protection of environmentally sensitive lands designated in the comprehensive plan.

(f) Regulate signage.

(g) Provide that public facilities and services meet or exceed the standards established in the capital improvements element required by s. 163.3177 and are available when needed for the development, or that development orders and permits are conditioned on the availability of these public facilities and services necessary to serve the proposed development. Not later than 1 year after its due date established by the state land planning agency's rule for submission of local comprehensive plans pursuant to s. 163.3167(2), a local government shall not issue a development order or permit which results in a reduction in the level of services for the affected public facilities below the level of services provided in the comprehensive plan of the local government.

(h) Ensure safe and convenient onsite traffic flow, considering needed vehicle parking.

Section 163.3220, F.S. The Legislature finds and declares that:

(2)(a) The lack of certainty in the approval of development can result in a waste of economic and land resources, discourage sound capital improvement planning and financing, escalate the cost of housing and development, and discourage commitment to comprehensive planning.

(b) Assurance to a developer that upon receipt of his or her development permit or brownfield designation he or she may proceed in accordance with existing laws and policies, subject to the conditions of a development agreement, strengthens the public planning process, encourages sound capital improvement planning and financing, assists in assuring there are adequate capital facilities for the development, encourages private participation in comprehensive planning, and reduces the economic costs of development.

(3) In conformity with, in furtherance of, and to implement the Local Government Comprehensive Planning and Land Development Regulation Act and the Florida State Comprehensive Planning Act of 1972, it is the intent of the Legislature to encourage a stronger commitment to comprehensive and capital facilities planning, ensure the provision of adequate public facilities for development, encourage the efficient use of resources, and reduce the economic cost of development.

Response: The proposed project has been coordinated with various Federal, state and local agencies during the planning process. The proposed project meets the primary goal of the State Comprehensive Plan through preservation and protection of the environment.

CHAPTER 187, F.S., STATE COMPREHENSIVE PLAN

The state comprehensive plan provides basic policy direction to all levels of government regarding the orderly social, economic, and physical growth of the state. The goals, objectives, and policies of the state comprehensive plan are statewide in scope and are consistent and compatible with each other. The statute provides direction for the delivery of governmental services, a means for defining and achieving the specific goals of the state, and a method for evaluating the accomplishment of those goals.

Response: The proposed project has been coordinated with various Federal, state and local agencies during the planning process. The proposed project meets the primary goal of the State Comprehensive Plan through preservation and protection of the environment.

CHAPTER 252, F.S., EMERGENCY MANAGEMENT

The state of Florida is vulnerable to a wide range of emergencies, including natural, technological, and manmade disasters and this vulnerability is exacerbated by the tremendous growth in the state's population, especially the growth in the number of persons residing in coastal areas, in the elderly population, in the number of seasonal vacationers, and in the number of persons with special needs. This chapter directs the state to reduce the vulnerability of its people and property to natural and manmade disasters; prepare for, respond to and reduce the impacts of disasters; and decrease the time and resources needed to recover from disasters. Disaster mitigation is necessary to ensure the common defense of Floridians' lives and to protect the public peace, health, and safety. The policies provide the means to assist in the prevention or mitigation of emergencies that may be caused or aggravated by the inadequate planning or regulation of facilities and land uses. State agencies are directed to keep land uses and facility construction under continuing study and identify areas that are particularly susceptible to natural or manmade catastrophic occurrences.

Response:

The proposed project purpose is to ensure continued flood risk reduction and enhance the hydrologic regime within the Picayune Strand State Forest and downstream estuaries. Therefore, this work would be consistent with the efforts of Division of Emergency Management. The southwest protection feature with additional conveyance features and the partial plugging of the Faka Union Canal will not affect public peace, health and safety, or the lives and property of the people of Florida..

CHAPTER 253, F.S., STATE LANDS

The Board of Trustees of the Internal Improvement Trust Fund (Trustees) is vested and charged with the acquisition, administration, management, control, supervision, conservation, protection, and disposition of all lands owned by the state. Lands acquired for preservation, conservation and recreation serve the public interest by contributing to the public health, welfare, and economy. In carrying out the requirements of this statute, the Trustees are directed to take necessary action to fully: conserve and protect state lands; maintain natural conditions; protect and enhance natural areas and ecosystems; prevent damage and depredation; and preserve archaeological and historical resources. All submerged lands are considered single-use lands to be maintained in natural condition for the propagation of fish and wildlife and public recreation. Where multiple-uses are permitted, ecosystem integrity, recreational benefits, and wildlife values are conserved and protected.

No lease of the type covered by this law shall be granted, sold, or executed south of 26° north latitude off Florida's west coast and south of 27° north latitude off Florida's east coast…. After July 31, 1990, no oil or natural gas lease shall be granted, sold, or executed covering lands located north of 26°00'00" north latitude off Florida's west coast to the western boundary of the state bordering Alabama … or located north of 27°00'00" north latitude off Florida's east coast to the northern boundary of the state bordering Georgia ….

Response: The proposed project will conserve, protect, restore, and enhance natural conditions within state lands. This proposed project will make a positive contribution to preserving water, fish and wildlife, cultural, and wetland resources within the State of Florida and therefore, complies with the intent of this chapter.

CHAPTER 258, F.S., STATE PARKS AND PRESERVES

The Chapter addresses the state's administration of state parks, aquatic preserves, and recreation areas, which are acquired to emblemize the state's natural values and to ensure that these values are conserved for all time. Parks and preserves are managed for the non-depleting use, enjoyment, and benefit of Floridians and visitors and to contribute to the state's tourist appeal. Aquatic Preserves have exceptional biological, aesthetic, and scientific value and are set aside for being maintained essentially in its natural or existing condition. Disruptive physical activities and polluting discharges are highly restricted in aquatic preserves. State managed wild and scenic rivers possess exceptionally remarkable and unique ecological, fish and wildlife, and recreational values and are designated for permanent preservation and enhancement for both the present and future.

Response: The proposed project would help improve environmental conditions at state parks or aquatic preserves in the region. The project will comply with the intent of this chapter.

CHAPTERS 259, F.S., LAND ACQUISITION FOR CONSERVATION OR RECREATION

This chapter addresses public ownership of natural areas for purposes of maintaining the state's unique natural resources; protecting air, land, and water quality; promoting water resource development to meet the needs of natural systems and citizens of this state; promoting restoration activities on public lands; and providing lands for natural resource based recreation. Lands are managed to protect or restore their natural resource values, and provide the greatest benefit, including public access, to the citizens of this state.

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

CHAPTERS 260, F.S., FLORIDA GREENWAYS AND TRAILS ACT

A statewide system of greenways and trails is established to conserve, develop, and use the natural resources of Florida for healthful and recreational purposes. These greenways and trails provide open space benefiting environmentally sensitive lands and wildlife and provide people with access to healthful outdoor activities. The greenways and trails serve to implement the concepts of ecosystem management while providing, where appropriate, recreational opportunities such as horseback riding, hiking, bicycling, canoeing, jogging, and historical and archaeological interpretation.

Response: The proposed project is anticipated to increase the availability of freshwater deliveries from Picayune Strand State Forest to lands and estuaries south of US-41, including Collier Seminole State Park, Rookery Bay Aquatic Preserve, Rookery Bay National Estuarine Research Reserve, and Ten Thousand islands National Wildlife Refuge. The proposed project will improve hydrologic conditions throughout these estuaries by reducing point source freshwater discharge through the Faka Union Canal and providing conveyance of freshwater to downstream estuaries improving habitat conditions and functions. The Picayune Strand Restoration Project and areas downstream include portions of the statewide system of greenways and trails.

CHAPTER 267, F.S., FLORIDA HISTORICAL RESOURCES ACT

The management and preservation of the state's archaeological and historical resources are addressed by this chapter. This chapter recognizes the state's rich and unique heritage of historical resources and directs the state to locate, acquire, protect, preserve, operate, and interpret historical and archeological resources for the benefit of current and future generations of Floridians. Objects or artifacts with intrinsic historical or archeological value located on, or abandoned on, state-owned lands or state-owned submerged lands belong to the citizens of the state. The state historic preservation program operates in conjunction with the National Historic Preservation Act of 1966 to require state and federal agencies to consider the effect of their direct or indirect actions on [significant] historical and archeological resources. These resources cannot be destroyed or altered unless no prudent alternative exists. Unavoidable impacts must be mitigated.

Response: Pursuant to Section 106 of the National Historic Preservation Act, the USACE is consulting on the determination that the implementation of the Proposed Action (Southwest Protection Feature, additional conveyance features, and partial plugging of the Faka Union Canal) will not have adverse effects to historic properties with the Florida State Historic Preservation Officer, the Miccosukee Tribe of Indians of Florida, the Seminole Tribe of Florida, and the Seminole Nation of Oklahoma. Consultation is ongoing and will meet all responsibilities under Chapter 267..

CHAPTER 288, F.S., COMMERCIAL DEVELOPMENT AND CAPITAL IMPROVEMENTS

The statutory framework promotes and develops the general business, trade, and tourism components of the state economy. The chapter includes requirements to protect and promote the natural, coastal, historical, and cultural tourism assets of the state; foster the development of nature-based tourism and recreation; and upgrade the image of Florida as a quality destination. Natural resource-based tourism and recreational activities are critical sectors of Florida's economy. The needs of the environment must be balanced with the need for growth and economic development.

Response: The proposed project will be compatible with tourism for this area and therefore, is consistent with the goals of this Chapter.

CHAPTER 334, F.S., FLORIDA TRANSPORTATION CODE

The chapter addresses the state's policy concerning transportation administration. It establishes the responsibilities of the state, the counties, and the municipalities in the planning and development of the transportation systems serving the people of the state and to assure the development of an integrated, balanced statewide transportation system. This is necessary for the protection of public safety and general welfare and for the preservation of all transportation facilities in the state.

Response: Public transportation systems will be temporarily impacted by this project. Transportation along US-41 and CR-92 where additional conveyance will be implemented include the temporary construction of road access around these construction footprints in order to maintain accessibility and traffic flow and therefore, is consistent with the goals of this Chapter.

CHAPTER 339, F.S., TRANSPORTATION FINANCE AND PLANNING

The chapter addresses the finance and planning needs of the state's transportation system.

Response: Public transportation systems will be temporarily impacted by this project. Transportation along US-41 and CR-92 where additional conveyance will be implemented include the temporary construction of road access around these construction footprints in order to maintain accessibility and traffic flow and therefore, is consistent with the goals of this Chapter.

CHAPTER 379, F.S., 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: The project will help improve ecological conditions in the downstream estuaries of the PSRP. The project will provide direct positive impacts on saltwater resources to the Ten Thousand Islands Region by replacing man-made point source discharges of freshwater with more natural sheet flow with more even distribution into these estuaries. This may benefit seagrass and fish and wildlife resources. Based on the overall impacts, the project is consistent with the goals of this chapter.

CHAPTER 379.102, F.S., LIVING LAND AND FRESHWATER RESOURCES

This chapter establishes the Game and Freshwater Fish Commission (now called the Florida Fish and Wildlife Conservation Commission) and directs it to manage freshwater aquatic life and wild animal life and their habitat to perpetuate a diversity of species with densities and distributions that provide sustained ecological, recreational, scientific, educational, aesthetic, and economic benefits.

Response: The project will have a long-term beneficial effect on freshwater aquatic life and wildlife. The project will increase foraging opportunities for wading birds and other wildlife within the Picayune Strand State Forest and adjacent public lands. The project is consistent with the intent of this chapter.

CHAPTER 373, F.S., FLORIDA WATER RESOURCES ACT OF 1972

The waters of the state of Florida are managed and protected to conserve and preserve water resources, water quality, and environmental quality. This chapter addresses sustainable water management; the conservation of surface and ground waters for full beneficial use; the preservation of natural resources, fish, and wildlife; protecting public land; and promoting the health and general welfare of Floridians. The state manages and conserves water and related natural resources by determining whether activities will unreasonably consume water, flood properties, degrade water quality, or adversely affect environmental values.

Specifically, under Part IV of Chapter 373, the Department of Environmental Protection, water management districts, and delegated local governments review and take agency action on wetland resource, environmental resource, and stormwater permit applications, which address the construction, alteration, operation, maintenance, abandonment, and removal of any stormwater management system, dam, impoundment, reservoir, or appurtenant work or works, including dredging, filling and construction activities in, on, and over wetlands and other surface waters.

Response: A cooperating agency for the project is the SFWMD (non-federal sponsor for the project), which is the state agency responsible for implementing this statute. The USACE and the SFWMD have coordinated planning efforts to ensure compatibility with established policies. The project is consistent with the goals of this chapter.

CHAPTER 375, F.S., OUTDOOR RECREATION AND CONSERVATION ACT OF 1963

The chapter requires the FDEP to develop a comprehensive multipurpose outdoor recreation plan in coordination with other governmental entities, including the SFWMD. The purpose of the plan is to document recreational supply and demand, describe current recreational opportunities, estimate the need for additional recreational opportunities, and propose the means to meet the identified needs.

Response: The goals and objectives of this project are to ensure flood risk reduction and restore hydrology in order to improve habitat conditions for native fish and wildlife resources in the PSRP and downstream estuaries, including the Ten Thousand Islands Region. Recreational opportunities in the PSRP, including downstream lands and estuaries, may be enhanced through implementation of the project as this project will make a positive contribution to preserving water, fish and wildlife, cultural, and wetland resources within the State of Florida. This project complies with the intent of this Chapter.

CHAPTER 376, F.S., POLLUTANT DISCHARGE PREVENTION AND CONTROL ACT

Regulating the transfer, storage, and transportation of pollutants, and the cleanup of pollutant discharges is essential for maintaining the coastal waters, estuaries, tidal flats, beaches, and public lands adjoining the seacoast in as close to a pristine condition as possible. The preservation of the seacoast as a source of public and private recreation and the preservation of water and certain lands are matters of the highest urgency and priority. This chapter provides a framework for the protection of the state's coastline from spills, discharges, and releases of pollutants as a result of the transfer, storage, and transportation of such products. The discharge of pollutants into or upon any coastal waters, estuaries, tidal flats, beaches, and lands adjoining the seacoast of the state is prohibited. The chapter requires hazards and threats of danger and damages resulting from any pollutant discharge to be evaluated; requires the prompt containment and removal of pollution; provides penalties for violations; and ensures the prompt payment of reasonable damages from a discharge. Portions of Chapter 376, F.S., complement the national contingency plan portions of the federal Water Pollution Control Act.

Response: Discharge of pollutants into or upon coastal waters, estuaries, tidal flats, beaches, and lands adjoining the seacoast are not expected as a result of the project. A Draft Environmental Assessment addressing project impacts has been prepared and will be reviewed by the appropriate resource agencies including the Florida Department of Environmental Protection (FDEP). Environmental protection measures will be implemented to ensure that no lasting adverse effects on water quality, or other environmental resources will occur. Water quality certification will be sought from the State. The project complies with the Chapter.

CHAPTER 377, F.S., ENERGY RESOURCES

The chapter addresses the regulation, planning, and development of the energy resources of the state. The chapter provides policy to conserve and control the oil and gas resources in the state, including products made therefrom and to safeguard the health, property, and welfare of Floridians. The Department of Environmental Protection (DEP) is authorized to regulate all phases of exploration, drilling,

and production of oil, gas, and other petroleum products in the state. The chapters describe the permitting requirements and criteria necessary to drill and develop for oil and gas. DEP rules ensure that all precautions are taken to prevent the spillage of oil or any other pollutant in all phases of extraction and transportation. The state explicitly prohibits pollution resulting from drilling and production activities. No person drilling for or producing oil, gas, or other petroleum products may pollute land or water; damage aquatic or marine life, wildlife, birds, or public or private property; or allow any extraneous matter to enter or damage any mineral or freshwater-bearing formation. Penalties for violations of any provisions of this chapter are detailed.

Not approved as enforceable policy: Sections 377.06, .24(9), and .242(1)(a)5. All deal with regulation of oil and gas resources.

Response: This Chapter does not apply. The project does not involve the exploration; drilling or production of gas, oil or petroleum product.

CHAPTER 379, F.S., FISH AND WILDLIFE CONSERVATION

The framework for the management and protection of the state of Florida's wide diversity of fish and wildlife resources are established in this statute. It is the policy of the state to conserve and wisely manage these resources. Particular attention is given to those species defined as being endangered or threatened. This includes the acquisition or management of lands important to the conservation of fish and wildlife. This chapter contains specific provisions for the conservation and management of marine fisheries resources. These conservation and management measures permit reasonable means and quantities of annual harvest, consistent with maximum practicable sustainable stock abundance, as well as ensure the proper quality control of marine resources that enter commerce.

This chapter also supports and promotes hunting, fishing, and the taking of game opportunities in the State. Hunting, fishing, and the taking of game are considered an important part in the state's economy and in the conservation, preservation, and management of the state's natural areas and resources.

Sections 379.2511 (lease of state-owned water bottoms for growing oysters and clams) and 379.362 (wholesale and retail saltwater products dealers; regulation), F.S., are not approved as enforceable policy.

Response: The goals and objectives of this project include the improvement of habitat conditions for native fish and wildlife resources through hydrological restoration and conveyance in PSRP and downstream estuaries, including the Ten Thousand Islands Region. This project complies with the intent of this Chapter.

CHAPTER 380, F.S., LAND AND WATER MANAGEMENT

Land and water management policies are established to protect natural resources and the environment; and to guide and coordinate local decisions relating to growth and development. The statute provides that state land and water management policies, to the maximum possible extent, be implemented by local governments through existing processes for the guidance of growth and development and that all the existing rights of private property be preserved in accord with constitutions of this state and of the United States. The chapter establishes the Areas of Critical State Concern designation, the Florida Communities Trust as well as the Florida Coastal Management Act. The Florida Coastal Management Act provides the basis for the Florida Coastal Management Program which seeks to protect the natural, commercial, recreational, ecological, industrial, and aesthetic resources of Florida's coast.

Not approved as enforceable policy: Section 380.23(3)(d). [consistency review of] federal activities within the territorial limits of neighboring states when the Governor and the department determine that significant individual or cumulative impact to the land or water resources of the state would result from the activities.

Response: The project incorporates restoration components primarily intended ensure flood risk reduction to adjacent lands and to benefit freshwater wetlands and estuarine resources in PSRP and downstream estuaries, including the Ten Thousand Islands Region, by reducing point source discharge of freshwater and providing natural sheet flow distribution of freshwater flows through the PSRP and downstream estuaries. The goals and objectives of the project are to improve habitat conditions for native fish and wildlife species. Impacts of the project have been detailed within the Draft Environmental Impact Statement. The project complies with the Chapter.

CHAPTER 381, F.S., PUBLIC HEALTH: GENERAL PROVISIONS

The chapter establishes public policy concerning the state's public health system, which is designated to promote, protect, and improve the health of all people in the state.

Chapter 381 Public Health: General Provisions

Enforceable policy includes only Sections 381.001 Legislative intent; public health system; 381.0011 Duties and powers of the Department of Health.; 381.0012 Enforcement authority; 381.006 Environmental health; 381.0061 Administrative fines; 381.0065 Onsite sewage treatment and disposal systems; regulation; 381.0066 Onsite sewage treatment and disposal systems; fees; and, 381.0067 Corrective orders; private and certain public water systems and onsite sewage treatment and disposal systems.

Response: This project will not affect the state's public health system and therefore, this Chapter is not applicable.

CHAPTER 388, F.S., MOSQUITO CONTROL

Mosquito control efforts of the state are to achieve and maintain such levels of arthropod control as will protect human health and safety and foster the quality of life of the people, promote the economic development of the state, and facilitate the enjoyment of its natural attractions by reducing the number of pestiferous and disease-carrying arthropods. It is the policy of the state to conduct arthropod control in a manner consistent with protection of the environmental and ecological integrity of all lands and waters throughout the state.

Response: The project will not further the propagation of mosquitoes or other pest arthropods. The project complies with the Chapter.

CHAPTER 403, F.S., FLORIDA AIR AND WATER POLLUTION CONTROL ACT

Florida Air and Water Pollution control policies conserve state waters; protect and improve water quality for consumption and for the propagation of fish and wildlife; and maintain air quality to protect human health and plant and animal life. This chapter provides wide-ranging authority to address various environmental control concerns, including air and water pollution; electrical power plant and transmission line siting; the Interstate Environmental Control Compact; resource recovery and management; solid and

hazardous waste management; drinking water protection; pollution prevention; ecosystem management; and natural gas transmission pipeline siting.

Not approved as enforceable policy: subsections 403.7125(2) and (3), F.S.

> (2) The owner or operator of a landfill …shall establish a fee, or a surcharge on existing fees or other appropriate revenue-producing mechanism, to ensure the availability of financial resources for the proper closure of the landfill.
>
> (3) An owner or operator of a landfill … may provide financial assurance to the department in lieu of the requirements of subsection (2).

Response: A Draft Environmental Assessment addressing project impacts has been prepared and will be reviewed by the appropriate resource agencies including the FDEP. Environmental protection measures will be implemented to ensure that no lasting adverse effects on water quality, air quality, or other environmental resources will occur. The project complies with the Chapter.

CHAPTER 553, F.S., BUILDING CONSTRUCTION STANDARDS

The chapter addresses building construction standards and provides for a uniform Florida Building Code.

Enforceable policy includes only Sections 553.73 (Florida Building Code) and 553.79 (Permits; applications; issuance; inspections).

Response: The project includes construction of a levee to ensure flood risk reduction to adjacent lands southwest of the PSRP. Design and construction of project features will be in accordance with federal requirements. The project complies with this chapter.

CHAPTER 582, F.S., SOIL AND WATER CONSERVATION

It is the state's policy to promote the appropriate and efficient use of soil and water resources, protect water quality, prevent floodwater and sediment damage, preserve wildlife, protect public lands, and protect and promote the health, safety, and general welfare of the people of this state. Farm, forest, and grazing lands are among the basic assets of the state; and the preservation of these lands is necessary to protect and promote the health, safety, and general welfare of its people. These measures help to preserve state and private lands, control floods, maintain water quality, prevent impairment of dams and reservoirs, assist in maintaining the navigability of rivers and harbors, preserve wildlife and protect wildlife habitat, protect the tax base, protect public lands, and protect and promote the health, safety, and general welfare of the people of this state.

Response: The project will include appropriate erosion control plans and measures to ensure compliance The project complies with the intent of this Chapter.

CHAPTER 597, F.S., FLORIDA AQUACULTURE POLICY ACT

The chapter establishes public policy concerning the cultivation of aquatic organisms in the state. The intent is to enhance the growth of aquaculture, while protecting Florida's environment. This includes a requirement for a state aquaculture plan which provides for the coordination and prioritization of state aquaculture efforts, the conservation and enhancement of aquatic resources, and which provides

mechanisms for increasing aquaculture production for the creation of new industries, job opportunities, income for aquaculturists, and other benefits to the state.

Response: The project does not include aquaculture activities, and therefore, this Chapter does not apply.

APPENDIX C: CLEAN WATER ACT SECTION 404(B)(1) EVALUATION

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1 INTRODUCTION

This appendix provides a Section 404(b)(1) evaluation for Picayune Strand Restoration Project—Southwest Protection Feature (PSRP-SWPF), Additional Conveyance, and Partial Plugging of the Faka Union Canal. It generally addresses the potential environmental effects of the wetland and aquatic ecosystem alterations expected from the construction of PSRP-SWPF, Conveyance, and Partial Plugging of Faka Union Canal features and associated dredge and fill activities.

1.1 Location

Overall Project Area: The PSRP consists of approximately 94 square miles located between I-75 and U.S. Highway 41 (US-41), also known as Tamiami Trail (Figure 1). It is situated southwest of the Florida Panther National Wildlife Refuge, north of Ten Thousand Islands National Wildlife Refuge and Rookery Bay National Estuarine Research Reserve, north-northeast of Collier-Seminole State Park, east of the Belle Meade CARL Project area, and west of the Fakahatchee Strand State Park.

Southwest Protection Feature and Conveyance: The SWPF is on lands managed by Picayune Strand State Forest, Collier-Seminole State Park, and the Florida Department of Transportation (FDOT). The SWPF is located in the southwest corner of the PSRP area, east of Tomato Road, Lipman Farms, and Deseret Farms (Figure 2). Similarly, the additional conveyance features discussed in this Supplemental EA are on lands managed by the same entities, and are located along U.S.-41 and County Road 92 (CR-92) in the southwest corner of the PSRP area.

Faka Union Canal Partial Plugging: The Faka Union Canal systems included 4 canals (Miller, Faka Union, Merritt, and Prairie [west to east] with the Faka Union Canal being the longest and centrally located (Figure B-1). The Faka Union Canal is located through the center (north to south) of the PSRP, starting in the northern NGGE and flowing south through Port of the Islands (POI) to discharge in the Ten Thousand Islands NWR. The project area for the partial plugging of Faka Union Canal is the section of Faka Union Canal extending 3.3 miles south of the Faka Union Spreader Berm (Figure C-3). Fill material from spoil piles adjacent to Faka Union Canal north of Faka Union Pump Station (Figure C-4) will hauled south and used for backfilling the canal.

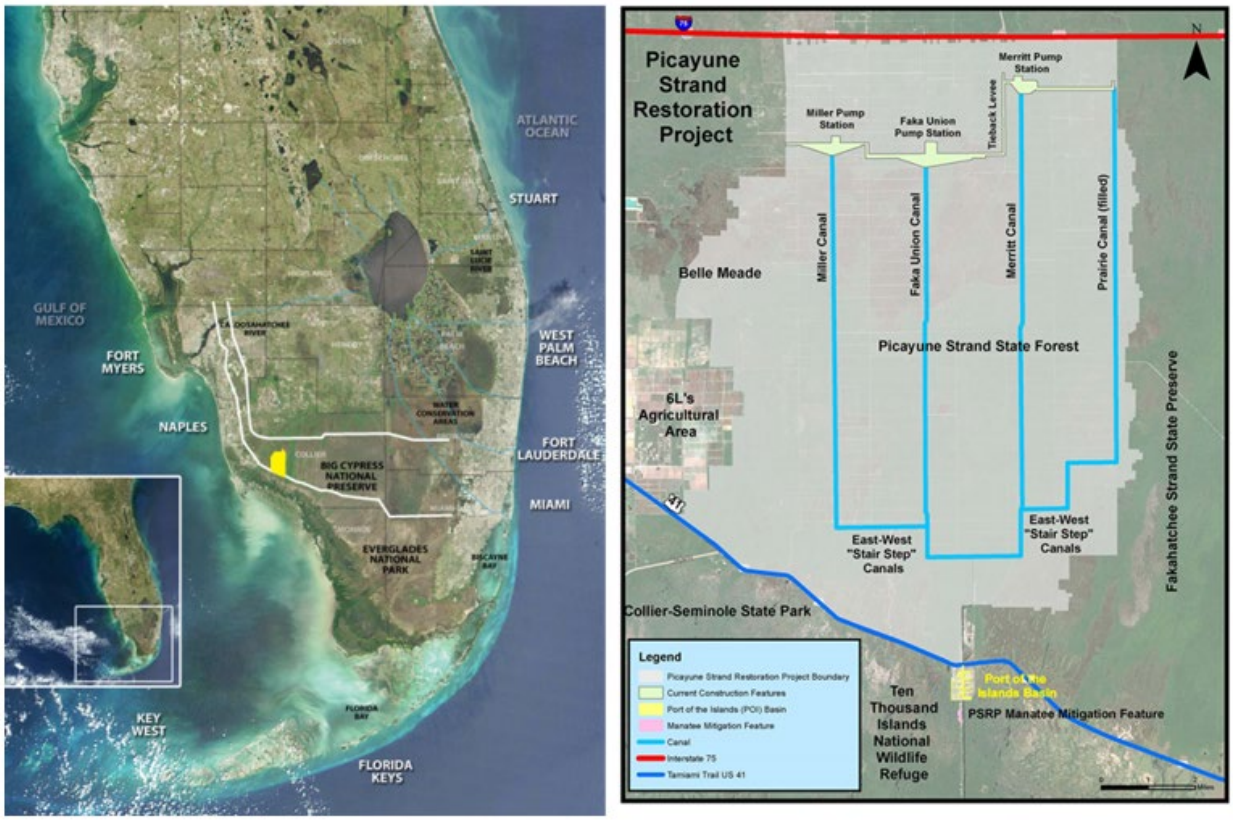

Figure 75. Map of PSRP project area.

1.2 Project Description

The purpose of PSRP as identified in the 2004 PIR/EIS, the purpose of the project 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.

The SWPF and additional conveyance features are designed to provide the existing level of flood risk management to farmlands to the west of the PSRP project area once the remaining PSRP canals have been plugged. The SWPF levee is approximately 7.5 miles in length (Figure 2), and includes a levee culvert structure near the southern terminus consisting of two 5 ft diameter culverts with flap gates, a levee access road conveyance structure consisting of three 5 ft diameter culverts, a 20 ft wide by 4 ft deep conveyance canal between the existing farm levee and the SWPF, new opening under US-41 consisting of a series of three 12 ft x 4 ft box culverts spaced 120 ft apart, placement of an additional 3 ft culvert to the existing three 3 ft culverts at the entrance to the small village on the north side of US-41 just east of the

intersection of US-41 and CR-92 (San Marco Rd), and a new 10 x 3 ft box culvert under CR-92, west of the Collier Seminole State Park campground.

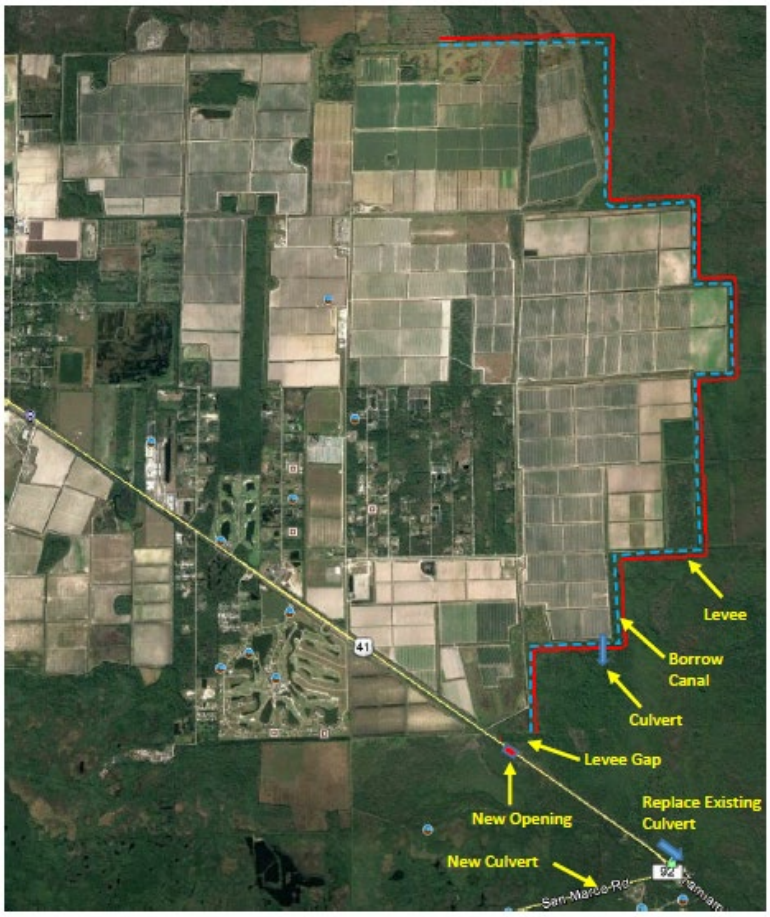

Figure 76. Alternative PC2—SWPF & Conveyance Features Location

This partial plugging of Faka Union Canal consists of the plugging of the northern 3.3 miles of the Faka Union Canal (Figure 3). Plugs would be placed at 66th Ave, 68th Ave, 70th Ave, 72nd Ave, 74th Ave, 76th Ave, 78th Ave, 80th Ave, 82nd Ave, 84th Ave, 86th Ave, 88th Ave, 90th Ave, and 3.3 miles (at 92nd Ave) south of the Faka Union Spreader Berm. These plugs will make use of spoil at the end of these roads and adjacent to the west side of the Faka Union Canal. Approximately 300 ft of spoil is present along the west side of the Faka Union south of the Faka Union Spreader Berm Additional spoil from the west side of the Faka Union Canal and south of the Faka Union Pump Station will be used as needed to complete these plugs. Each plug are designed to be 100 ft long at minimum. If needed, additional spoil along the Faka Union Canal (both sides) north of the Faka Union Pump Station will be used if additional spoil is needed to complete the plugs. North of the Faka Union Pump Station, the approximate amount of spoil along the west side of the canal (between 64th Ave and I-75) contains approximately 80.4 acres of spoil available for use of plugging the Faka Union Canal. North of the Faka Union Pump Station, the approximate amount of spoil along the east side of the canal (between 52nd Ave and I-75) contains approximately 26.2 acres of spoil available for use of plugging the Faka Union Canal.

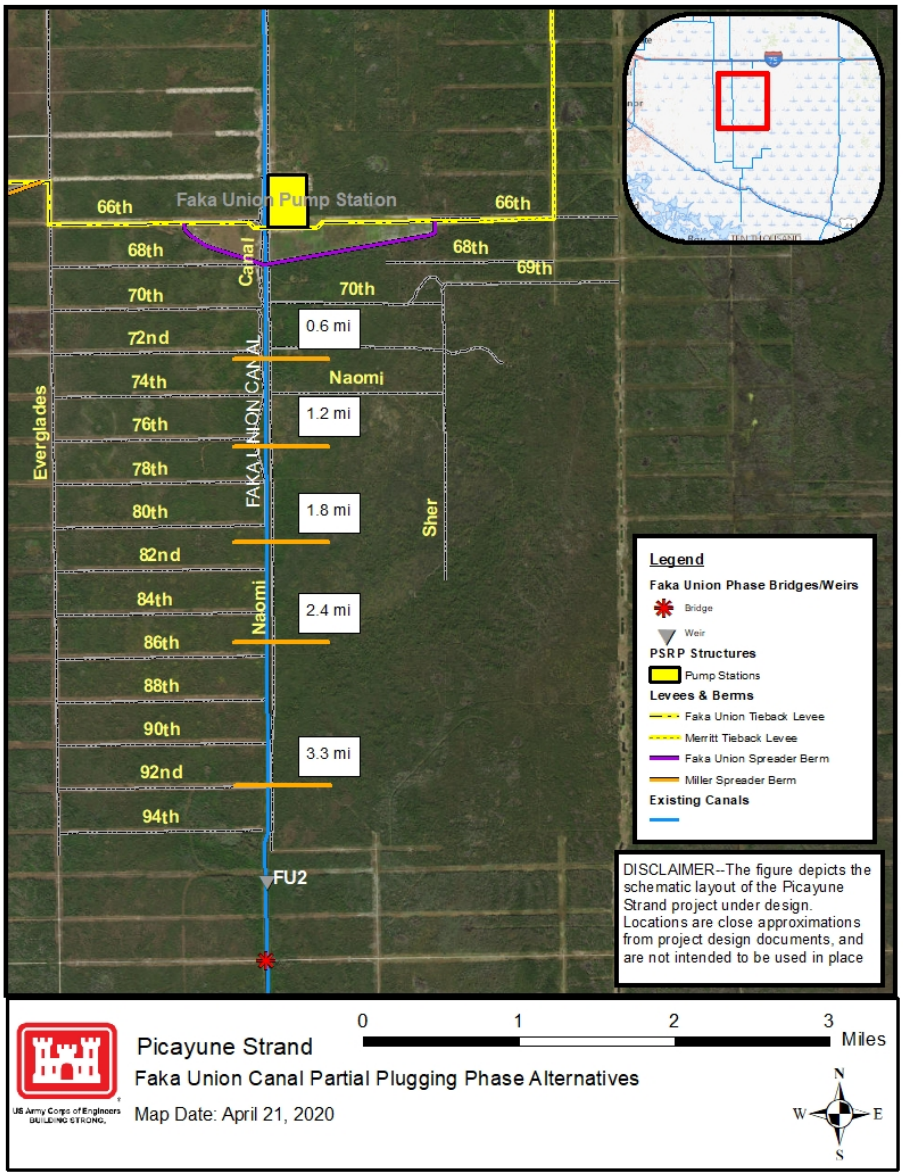

Figure 77. Faka Union Canal Partial Plugging Project Location; the 3.3 mile location is the Preferred Alternative (Alternative 5).

1.2.1 Authority and Purpose

The 2004 PIR/EIS was approved by the Office of the Chief of Engineers on 15 September 2005. The project was authorized for construction by Section 1001(15) of Water Resources Development Act (WRDA) of 2007, Public Law 110-114 and was later modified to add the manatee mitigation feature (also referred to as the manatee refugium feature) by Section 1401 (9)5 of the WRDA of 2016, Public Law 114-322. The 2004 PIR/EIS presents the results and recommendations of investigations into restoration of natural water flow across 94 square miles of western Collier County that were drained for an extensive residential development.

The need to provide flood risk management to private lands adjacent to the project footprint was identified in the PIR/EIS. At that time, the SWPF was included as a conceptualized levee surrounding the agricultural lands (6L Farms at the time). The natural topography of the PSRP footprint slopes from the northeast corner to the southwest corner across the Picayune Strand State Forest. Using a new Gridded Surface/Subsurface Hydrological Analysis (GSSHA) model and updated LIDAR data, the LRR provided more detail of the impacts of potential flooding as result of implementation of the PSRP and validated the need to include the SWPF. However, the extent of the levee for flood risk management was nearly reduced in half, from 17.25 miles (PIR/EIS) to 8.75 miles (LRR). This conceptual change was incorporated in the WRDA of 2016 which amended the authorization of PSRP under WRDA 2007. The authorized project also includes the plugging of the Faka Union Canal.

The project components portrayed in the 2004 PIR/EIS were conceptual and required significant refinement during the detailed project design phase. Detailed modeling information obtained through design phase investigations in the 2013 LRR provided more accurate details and highlighted the reduction in length of the SWPF and the need for additional conveyance features to reduce ponding of water north of US-41. The 2004 PIR/EIS provided sequencing for implementation of construction features. The 2004 PIR/EIS states that the plugging of Miller Canal and Faka Union Canal cannot occur prior to the implementation of the SWPF. These components represent a design refinement to ensure continued flood protection level of service and were authorized under the PSRP authority.

As stated in the 2000 Comprehensive Everglades Restoration Plan (CERP), the Southern Golden Gate Estates (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.

1.3 General Description of Dredged or Fill Material

The western portion of the PSRP area where the SWPF and Conveyance will be constructed consists of current and former agricultural fields (SWPF) and the US-41 & CR-92 roadways and associated drainage canals/ditches. The central portion of the PSRP area where the Faka Union Canal will be plugged consists of a former wetland that was subdivided, including construction of canals and roadways, but was never completed.

1.4 General Characteristics of Material

Local fill materials consist of sands with traces of organics, silts, and limestone fragments in the top two to ten feet that is typically underlain by one to 12 feet of silty or clayey sands on top of porous limestone bedrock.

1.5 Quantity of Material (cubic yards)

Table 1 provides a description of construction features and the volume of fill material per construction feature. **Table 2** shows potential wetland impacts resulting from construction of PSRP-SWPF, Conveyance Features, and Partial Faka Union Canal Plugging components. In total, approximately 323 acres of wetlands will be impacted due to construction of PSRP SWPF, Conveyance Features, and Partial Faka Union Canal Plugging. However, partial plugging of the Faka Union Canal will result in hydrological restoration

for an estimated 8,352 acres between the Faka Union Spreader Canal and 92nd Ave. (north to south) and between Miller Canal and Merritt Canal (west to east). All acreages will be updated and confirmed prior to construction through the Florida Department of Environmental Protection (FDEP) permitting process and upon completion of a wetland assessment report. This information will be included in this Appendix in the Final EA.

Table 1. Description of construction feature and volume of fill material per construction feature.

Feature	Description of Component	Volume of Material (CY)
SWPF Levee	Levee	250,000
US-41 and CR-92 Conveyance Culverts and Temporary Road Alignment	Culverts	3,000
	Temporary Roads	5,500
Faka Union Plugs	Canal Plugs	90,000

Table 2. Potential wetland impacts resulting from construction of SWPF, Conveyance Features, and Partial Plugging of Faka Union Canal features.

Wetland Acreage Type (Acres)	SWPF (with attached conveyance features)	CR-92 culvert	US-41 opening	Indian Village Entrance Culvert	Staging Area (US-41)	Partial Faka Union Plugging[3]	Total
Construction Footprint	137.4	20.8[1]	20.8[1]	20.8[1]	20.8[1]	227.4	385.6
Emergent Palustrine	3.922	0	0	0	0	4.143	8.065
Forested Palustine	54.334	0.359	2.126	0.008	0	34.3	91.127
Scrub-Shrub Palustrine	66.918	0	5.200	0	0	92.676	164.794
Unconsolidated Riverine	0.373	0	0	0	0.001	58.196	58.57
Unconsolidated Estuarine	0	0.046	0.024	0	0	0	0.07
Total Wetland Acres	125.546	0.405	7.349	0.008	0.001	189.316	322.625
Upland Acres	11.854	13.037[2]	13.037[2]	13.037[2]	13.037[2]	38.084	62.975

[1] The acreage for these conveyance are combined to total 20.8 acres.

[2] The upland acreage for these conveyance features are combined to total 13.037.

[3] NWI classifies some areas as wetlands although spoil has been present since the construction of the Faka Union Canal.

1.6 Source of Material

Fill material used to construct the new SWPF will be taken from the borrow canal west of the levee. Fill material for the conveyance features and temporary road construction will be obtained from a local borrow pit. Fill material for the Faka Union Canal plugs will be taken from spoil piles adjacent to Faka Union Canal.

1.7 Description of the Proposed Discharge Site

Reference Section 1.1 which describes the proposed discharge sites and **Section 1.6** which describes the source of fill material for construction of PSRP-SWPF, Additional Conveyance, and Partial Plugging of the Faka Union Canal components.

1.7.1 Location

Reference **Section 1.1** for a description of the project location. **Figure 2** and **Figure 3** show the project footprints and impacted areas resulting from construction of PSRP-SWPF, Conveyance Features, and Partial Plugging of the Faka Union Canal components.

1.7.2 Size

The overall construction footprint of the SWPF levee is 137.4 acres and the overall construction footprint for the Conveyance features is 20.8 acres. The construction footprint Faka Union partial plugging is 227.4 acres (106.4 acres north of the Faka Union Pump Station for spoil removal and 121 acres south of the Faka Union Pump Station for spoil removal and plugging.

1.7.3 Site

Reference **Section 1.1** for a description of the project location. The PSRP area is unconfined, farmed and previously farmed areas, and a subdivided area (i.e., former Southern Golden Gate Estates) that were formerly wetlands. Canals and roads constructed in the 1960s during development of the PSRP area significantly altered the hydrology, changing water flow type and direction from slow southwesterly sheetflow to preferential north-to-south canal flow that discharges into Faka Union Bay.

Figure 2 and **Figure 3** show the project footprints and impacted areas resulting from construction of PSRP-SWPF, Additional Conveyance, and Partial Plugging of the Faka Union Canal components.

1.7.4 Habitat

The habitat in the PSRP area currently consists of Tropical, Mesic, and Hydric Hammocks, Mesic and Hydric Pine Flatwoods, Wet Prairie, Marsh, Cypress Forest, and Open Water with some areas dominated by invasive exotic species like Brazilain Pepper (*Schinus terebinthifolius*) and melaleuca (*Melaleuca. quinquenervia*). The native sabal palm (*Sabal palmetto*), also commonly called the cabbage palm, has become dominant throughout much of the PSRP Project Area during the past few decades.

1.7.5 Timing and Duration of Discharge

Dewatering for construction of conveyance features may be required. During culvert construction, there may be local sediment disturbance but discharge is expected to be negligible. Discharges from dewatering

activities will be managed such that turbidity in the adjacent canal does not exceed turbidity standards. Produced groundwater may be directed to an upland containment area or into adjacent conveyance canals. The contractor will be required to minimize any discharges to the adjacent canal due to dewatering activities that may be required. Any dewatering activity must be approved by the FDEP/SFWMD as required and that approval will be obtained by the contractor. Project construction for the conveyance features is expected to take approximately one year. Once the new culverts are constructed, water will be conveyed by gravity flow through.

Dewatering is not anticipated for construction of the SWPF or partial plugging of the Faka Union Canal. Open water construction for the SWPF will be limited to the area where culverts are installed in the agricultural drainage ditch to create the levee access road. Plugs will be constructed for the Faka Union Partial Plugging area by pushing adjacent spoil piles into the canal. Turbidity barriers would be placed downstream of all open water construction areas to prevent exceedance of turbidity standards.

1.7.6 Description of Disposal Method

Organic materials removed for construction of the SWPF levee and for clearing partial plugging spoil piles will be burned onsite in accordance with FDEP and Florida Forest Service permit requirements unless the contractor decides on another method approved by USACE/SFWMD. Offsite disposal of vegetation at local landfills is strongly discouraged due to limited landfill capacity and disposing of vegetation onsite will minimize opportunities for the spread of exotic plant species on SFWMD lands.

1.8 Factual Determinations (Section 230.11)

The determination of effects of each proposed discharge shall include the following: (a) physical substrate determinations, (b) water circulation, fluctuation, and salinity determinations, (c) suspended particulate/turbidity determinations, (d) contaminant determinations, (e) aquatic ecosystem and organism determinations, (f) determination of proposed disposal sites, (g) determination of cumulative effects on the aquatic ecosystem, and (h) determination of secondary effects on the aquatic ecosystem.

1.8.1 Substrate Elevation and Type

The natural topography of the area is nearly flat except for unnatural features (e.g., canals, levees, and roads).

1.8.2 Sediment Type

The substrate at the construction site is limestone rock overlain with sandy soil.

1.8.3 Dredge/Fill Material Movement

For the SWPF and Conveyance Features there will be no appreciable movement of material. It will rest on limestone rock. Plugs in the Faka Union Canal would be compacted to prevent washing out, and no appreciable movement is expected.

1.8.4 Physical Effects on Benthos

For Faka Union Canal Partial Plugging, all potential benthos in the plug fill locations will be covered, however open pools left between plugs provide benthic invertebrate habitat adjacent to the plugs. For

the conveyance features, placement of rock during construction would cover benthic communities located within the footprint of the structures. In-water excavation activities would result in mortality of macro-invertebrates within these areas. However, rapid colonization of newly placed rock substrates would be anticipated with resulting minimal long-term effects.

1.8.5 Water Circulation, Fluctuation, and Salinity Determination

Water near the SWPF construction area would flow into the newly constructed borrow canal and/or sheetflow off-site. Water at the conveyance structures would move to other adjacent culverts and gravity flow through them. Water will sheet flow where new plugs are constructed in the Faka Union Canal, and continue to flow in the canal downstream of plugs. The PSRP area north of Tamiami Canal is freshwater, however, the Tamiami canal is tidally influenced (brackish) and this condition would remain unchanged.

1.8.6 Suspended Particulate/Turbidity Determinations

Turbidity would be temporary and limited to the time of construction. The PSRP features will be constructed using local borrow materials that are not expected to cause long-term impacts to turbidity. Turbidity will be managed using BMP's to comply with state WQ standards. Best management practices will be used to minimize the suspension and transport of soils, and levee materials into water adjacent to or downstream of the construction area including use of sediment controls, turbidity screens, or sediment blockages for adjacent wetlands.

In general, any short-term impacts to water quality associated with construction of the project will be ameliorated by best management practices for erosion and sedimentation control, and monitoring during construction. Longer-term impacts to water quality not associated with fill and associated with the operation of project features will be addressed through operational monitoring and adaptive management actions, if potentially adverse effects are observed or predicted.

1.8.7 Expected Changes in Suspended Particulates and Turbidity Levels in the Vicinity of the Disposal Site

Temporary localized increases in suspended particulates and turbidity levels can be expected during construction. Such increases are generally short term and insignificant. All appropriate measures to reduce and contain turbidity will be employed to prevent violations of State Water Quality Standards.

1.8.8 Effects on Chemical and Physical Properties of the Water Column

Chemical and physical properties of the water column are characterized by light penetration, dissolved oxygen, toxic metals, organics, and pathogens, and aesthetics of the water column.

1.8.8.1 Light Penetration

During construction operations there will be a temporary insignificant reduction in light penetration in the canals and adjacent marsh in the immediate vicinity of the activity. Once construction is complete, light penetration is expected to return to pre-construction levels.

1.8.8.2 Dissolved Oxygen

During construction operations there will be a temporary reduction in the dissolved oxygen content in the water column due to organic sediment oxygen demand from the disturbed soils in the immediate vicinity of the activity. Once construction is complete, dissolved oxygen is expected to return to pre-construction levels.

1.8.8.3 Toxic Metals, Organics, and Pathogens

Generally, no toxic metals, anthropogenic organics, or pathogens are anticipated to be released by project construction.

1.8.8.4 Aesthetics of the Water Column

During construction, visual aesthetics will be temporarily, locally affected. However, after completion, aesthetics will improve due to an increase in quantity and quality of wetland habitat.

1.8.9 Effects on Biota

Effects on biota include three taxonomic groups as described in the following three sub-sections.

1.8.9.1 Primary Productivity and Photosynthesis

During construction, disposal of excavated materials will adversely affect wetlands in the immediate vicinity by destroying vegetation and smothering biota. However, project operation will improve the primary productivity and photosynthesis due to an increase in quantity and quality of wetland habitat.

1.8.9.2 Suspension/Filter Feeders

During construction there will be a temporary increase in turbidity and possibly a decrease in suspension/filter feeders due to construction activities. This temporary increase in turbidity will be short-term and should not have any long-term negative impact on these highly fecund organisms. The implantation of the project should benefit these organisms by creating a higher quality wetland habitat.

1.8.9.3 Sight Feeders

During construction there will be a temporary increase in turbidity and possibly a decrease in sight feeders due to construction activities. Because the majority of sight feeders are highly mobile and can move outside the affected area, no significant impacts to these organisms are expected. When the project is operational, sight feeders will benefit from the higher quality wetland habitat.

1.8.10 Contamination Determinations

Section 3.16 of the EA describes HRTW identified with the project area. HTRW that has been identified within the construction footprints of the PSRP-SWPF, Additional Conveyance, and Partial Plugging of the Faka Union Canal project components will be remediated by the NFS prior to construction. Construction is not expected to result in the discovery of HTRW.

1.8.11 Aquatic Ecosystem and Organism Determinations

No long-term adverse impacts on aquatic organisms are anticipated. The proposed project is not expected to cause or contribute to violations of state water quality standards, jeopardize the existence of any federally endangered or threatened species, nor impact a marine sanctuary. No significant degradation is expected, and all appropriate and practicable steps will be taken to avoid or minimize impacts.

1.8.11.1 Effects on Plankton

No adverse impacts to plankton are anticipated.

1.8.11.2 Effects on Benthos

No adverse impacts to benthic organisms are anticipated other than displacement of those organisms in the construction footprint of the proposed project.

1.8.11.3 Effects on Nekton

No adverse impacts to nektonic organisms are anticipated other than displacement of those organisms in the construction footprint of the proposed project.

1.8.11.4 Effects on Aquatic Food Web

Periphyton forms the base of the food web within the project area. No adverse impacts to the aquatic food web are anticipated, other than minor temporary impacts within the construction footprint of various features.

1.8.11.5 Effects on Special Aquatic Sites

Special aquatic sites include sanctuaries and refuges, wetlands, mudflats, vegetated shallows, coral reefs, and riffle and pool complexes. They are geographic areas, large or small, possessing special ecological characteristics of productivity, habitat, wildlife protection, or other important and easily disrupted ecological values. These areas are generally recognized as significantly influencing or positively contributing to the general overall environmental health or vitality of the entire ecosystem of a region.

1.8.11.5.1 Sanctuaries and Refuges

The PSRP Project Area comprises of the southern portion of the Faka Union Canal system that are adjacent to several Outstanding Florida Waters (OFW) and Aquatic Preserves & Refuges, including the Picayune Strand State Forest (PSSF) and Collier Seminole State Park OFWs, Rookery Bay State Aquatic Preserve, Rookery Bay National Estuarine and Research Reserve, and the Ten Thousand Islands National Wildlife Refuge. The construction of canals, levees and roads within the Faka Union Basin have eliminated the historical freshwater sheet flow and resulted in changes to the timing, distribution and quantity of flow within the system that have influenced water quality conditions in the project area and impacted the downstream estuaries of the Ten Thousand Islands Region. From west to east, estuaries of Ten Thousand Islands National Wildlife Refuge that receive water from the upstream PSRP Project Area include: Goodland Bay, Sugar Bay, Palm Bay, Mud Bay, Buttonwood Bay, Blackwater River, Gill Rattle Creek, Whitney River, Pumpkin Bay, Pumpkin River, Little Wood River, Wood River, Faka Union Bay, and Fakahatchee Bay (USFWS 2019-- https://www.fws.gov/southeast/pubs/TenThousandIslands-

tearsheet.pdf). In particular, salinity levels have been severely altered in three major estuarine systems including: Blackwater River, Pumpkin Bay, and Faka Union Bay, and in the smaller intervening estuaries. The large centralized freshwater inputs through the Faka Union Canal in the wet season contribute to large fluctuations in the salinity levels in the Faka Union Bay and extended hypersaline periods within the surrounding estuaries. Hypersaline periods are caused by reduction of sheetflow west of Faka Union Bay that artifically increases salinity during the rainy season. This results in enormous shocks to the aquatic biota of the Faka Union Bay.

Implementation of the full restoration project would achieve the hydrological restoration authorized in the PSRP and would benefit water quality by changing the timing and distribution of flows (i.e., sheetflow vs canal flow) and improving hydroperiods across the project area. As stated in the PIR/EIS, the primary regional scale benefit of the PSRP project is to improve the timing and distribution of freshwater flows and reduce damaging point source flows through Faka Union Canal to the downstream estuary. The PSRP would reconnect a major flow-way through PSSF to its historical flow path, reestablishing a portion of the natural flows to the estuaries, rehydrating wetlands, and restoring ecological connectivity with surrounding public lands including Federal refuges, Federal estuaries, state parks, state forests, and state estuaries.

1.8.11.5.2 Wetlands

Construction of the PSRP SWPF, Conveyance Features, and Partial Faka Union Canal Plugging features will impact approximately 323 acres of wetlands. However, the partial plugging of the Faka Union Canal will result in hydrological restoration for an estimated 8,352 acres within the PSRP. Additionally, freshwater would sheetflow within SWPF prior to entering one of the existing canals before exiting the PSRP through the Faka Union Canal near US-41. Point source discharge at the southern end of the Faka Union Canal will be reduced with the partial plugging from current levels. The completion of the Conveyance Features will provide freshwater deliveries to the estuarine system south of US-41 improving estuarine functions and habitat. The completion of the SWPF will allow for the completion of the rest of the PSRP. Without the SWPF, the remainder of the Faka Union Canal, Miller Canal, and the Western Stair Step Canal will not be plugged due to the increase in flood risk to adjacent lands. Wetland function is expected to improve in this area. The proposed action would help enhance environmental conditions in the region. Reference **Section 1.5**. All acreages will be updated and confirmed prior to construction through the FDEP permitting process and upon completion of a wetland assessment report. This information will be included in this Appendix in the Final EA.

1.8.11.5.3 Mud Flats

No adverse impacts to mud flats (tidal flats) are anticipated. There are no mud flats within the project footprint, however, there are mud flats downstream that will benefit from improved conveyance of freshwater into the estuarine system. Estuarine ecological function is expected to improve in this area.

1.8.11.5.4 Vegetated Shallows

No adverse impacts to submerged aquatic vegetation are anticipated, other than minor temporary impacts within the construction footprint of various features. Construction of and implementation of additional conveyance provided by the SWPF and Conveyance Features and Partial Faka Union Canal Plugging will allow benefits to existing wetlands (fresh and estuarine) to be achieved by improving sheet

flow south of US-41 and by reducing point source discharge flow through the Faka Union Canal. Wetland function is expected to improve in this area.

1.8.11.5.5 Hardground and Coral Reef Communities

There are no hard bottom or coral reef communities within the project footprint, therefore, none should be impacted by the proposed project.

1.8.11.5.6 Riffle and Pool Complexes

There are no riffle or pool complexes within the project footprint, therefore, none should be impacted by the proposed project.

1.8.11.6 Threatened and Endangered Species

Federally listed threatened and endangered species are potentially present in the project area and downstream. The USACE is consulting with the U.S. Fish and Wildlife Service (USFWS) on effects determinations for these federally listed species within the project area. A Biological Assessment is included in **Appendix A** of the EA to document potential effects to threatened and endangered species. Consultation is ongoing.

1.8.12 Proposed Disposal Site Determinations

A 7.5 mile levee will be constructed on the western boundary of the PSRP and additional conveyance features will be constructed on US-41 and CR-92. Spoil piles along the Faka Union Canal will be used to fill (i.e., partially plug) approximately 3.3 miles the Faka Union Canal. There will be no long-term adverse impacts to the project area resources as a result of the placement of excavated material.

1.8.13 Mixing Zone Determination

It is expected that implementation of best management practices will avoid the need for a mixing zone downstream of project features. Where material is placed to backfill existing canals or other excavated areas, discharged material will not cause unacceptable changes to water quality requirements as specified by the State of Florida's Water Quality Certification permit procedures No adverse impacts related to depth, current velocity, direction and variability, degree of turbulence, stratification, or ambient concentrations of constituents are expected from implementation of the project.

1.8.14 Determination of Compliance with Applicable Water Quality Standards

The PSRP-SWPF, Conveyance Features, and Partial Faka Union Canal Plugging project complies with water quality standards applicable to the project and adjacent waters. Proposed features are located in and adjacent to waters designated as Class III by the State of Florida. In accordance with Florida Administrative Code (F.A.C.) Rule 62-302 ("Surface Water Quality Standards"), the use classification of Class III waters is "Recreation, Propagation, and Maintenance of a Healthy, Well-Balanced Population of Fish and Wildlife." In addition to the minimum and general criteria for surface waters found in Section 62-302.500(1) F.A.C., there are numerous water quality criteria for specific parameters for Class III waters listed in Section 62-302.530, F.A.C. Although the proposed plan is not expected to affect most of the parameters listed in this rule, certain parameters (e.g., turbidity, dissolved oxygen and nutrients) listed in the criteria may be affected by construction and operations activities. The construction and operation of the proposed project

components will comply with federal and state water quality standards. The USACE will comply with conditions specified in the Section 401 State Water Quality Certification obtained for the PSRP-SWPF, Additional Conveyance, and Partial Plugging of the Faka Union Canal projects.

1.8.15 Potential Effects on Human Use Characteristics

These evaluations presented in the following subsections address municipal and private water supply, recreational and commercial fisheries, water related recreation, aesthetics, parks and preserves.

1.8.15.1 Municipal and Private Water Supply

No municipal or private water supplies would be adversely impacted by the implementation of the project.

1.8.15.2 Recreational and Commercial Fisheries

No recreational resources or commercial fisheries would be adversely impacted by the implementation of the project.

1.8.15.3 Water Related Recreation

No recreational resources or commercial fisheries would be adversely impacted by the implementation of the project.

1.8.15.4 Aesthetics

Construction of permanent structures would result in the ability to complete the remaining restoration features of the PSRP. Without the construction of the SWPF and Conveyance Features, the full plugging of the Faka Union Canal, Miller Canal, and Western Stair Step Canal cannot be completed due to an increase in flood risk to adjacent properties. Potential impacts to aesthetics within the project area would be construction-related and temporary, lasting only for the duration of construction. Some vegetation may be disturbed or removed during construction. Reference **Section 1.5** for a discussion of potential wetland impacts resulting from construction.

1.8.15.5 Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves

The PSRP would reconnect a major flow-way through PSSF to its historical flow path, reestablishing a portion of the natural flows to the estuaries, rehydrating wetlands, and restoring ecological connectivity with surrounding public lands including Federal refuges, Federal estuaries, state parks, state forests, and state estuaries. Reference **Section 1.8.11.5.1**.

1.8.16 Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act, Congress define Essential Fish Habitat (EFH) as "*...those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity*." Essential fish habitat includes all types of aquatic habitat—wetlands, coral reefs, seagrasses, and mangroves—where fish spawn, breed, feed, or grow to maturity. Three fishery management councils (FMC)—the Gulf of Mexico, South Atlantic, and U.S. Caribbean—are responsible for identifying EFH for

federally managed species in the southeast United States. The definition of EFH may include habitat for an individual species or an assemblage of species, whichever is appropriate within each FMC.

1.8.16.1 Essential Fish Habitat in the Area

The programmatic BO provided to the USACE by NMFS on 17 December 2013 states that the PSRP has the potential to affect smalltooth sawfish, smalltooth sawfish critical habitat, and sea turtles. Additionally, the USACE is including loggerhead critical habitat due to its presence in downstream estuaries. NMFS stated "…In addition to restoring freshwater wetlands, the project (PSRP) will improve estuarine water quality by increasing groundwater recharge and reducing large and unnatural freshwater inflows." The USACE has ongoing consultation with NMFS in regards to potential impacts on EFH from the proposed action.

1.8.16.2 Assessment of Effects on Hard bottom and Coral Reef Communities

This project is not expected to affect coral reefs or hard bottom communities. Coral reefs and hard bottom communities are located offshore of waters affected by the project.

1.8.16.3 Assessment of Effects on Sanctuaries and Refuges

The PSRP would reconnect a major flow-way through PSSF to its historical flow path, reestablishing a portion of the natural flows to the estuaries, rehydrating wetlands, and restoring ecological connectivity with surrounding public lands including Federal refuges, Federal estuaries, state parks, state forests, and state estuaries. Reference **Section 1.8.11.5.1**.

1.8.16.4 Assessment of Effects on Wetlands

Construction of the PSRP SWPF, Conveyance Features, and Partial Faka Union Canal Plugging features will impact approximately 323 acres of wetlands. However, the partial plugging of the Faka Union Canal will result in hydrological restoration for an estimated 8,352 acres within the PSRP. Additionally, freshwater would sheetflow within SWPF prior to entering one of the existing canals before exiting the PSRP through the Faka Union Canal near US-41. Point source discharge at the southern end of the Faka Union Canal will be reduced with the partial plugging from current levels. The completion of the Conveyance Features will provide freshwater deliveries to the estuarine system south of US-41 improving estuarine functions and habitat. The completion of the SWPF will allow for the completion of the rest of the PSRP. Without the SWPF, the remainder of the Faka Union Canal, Miller Canal, and the Western Stair Step Canal will not be plugged due to the increase in flood risk to adjacent lands. Wetland function is expected to improve in this area. The proposed action would help enhance environmental conditions in the region. Reference **Section 1.5**. All acreages will be updated and confirmed prior to construction through the FDEP permitting process and upon completion of a wetland assessment report. This information will be included in this Appendix in the Final EA.

1.8.16.5 Assessment of Effects on Mud Flats

No adverse impacts to mud flats (tidal flats) are anticipated. There are no mud flats within the project footprint, however, there are mud flats downstream that will benefit from improved conveyance of freshwater into the estuarine system. Estuarine ecological function is expected to improve in this area.

1.8.16.6 Assessment of Effects on Vegetated Shallows

No adverse impacts to submerged aquatic vegetation are anticipated, other than minor temporary impacts within the construction footprint of various features. Construction of and implementation of additional conveyance provided by the SWPF and Conveyance Features and Partial Faka Union Canal Plugging will allow benefits to existing wetlands (fresh and estuarine) to be achieved by improving sheet flow south of US-41 and by reducing point source discharge flow through the Faka Union Canal. Wetland function is expected to improve in this area.

1.8.16.7 Assessment of Effects on Riffle and Pool Complexes

There are no riffle or pool complexes within the project footprint, therefore, none should be impacted by the proposed project.

1.8.16.8 Assessment of Effects on Plankton

No adverse impacts to plankton are anticipated.

1.8.16.9 Assessment of Effects on Benthos

No adverse impacts to benthic organisms are anticipated other than displacement of those organisms in the construction footprint of the project.

1.8.16.10 Assessment of Effects on Nekton

No adverse impacts to nektonic organisms are anticipated other than displacement of those organisms in the construction footprint of the proposed project.

1.8.16.11 Determination of Effects on Essential Fish Habitat

The programmatic BO provided to the USACE by NMFS on 17 December 2013 states that the PSRP has the potential to affect smalltooth sawfish, smalltooth sawfish critical habitat, and sea turtles. Additionally, the USACE is including loggerhead critical habitat due to its presence in downstream estuaries. NMFS stated "…In addition to restoring freshwater wetlands, the project (PSRP) will improve estuarine water quality by increasing groundwater recharge and reducing large and unnatural freshwater inflows." The USACE has ongoing consultation with NMFS in regards to potential impacts on EFH from the proposed action. The USACE anticipates no adverse impacts to EFH as defined by the Magnuson-Stevens Fishery Conservation and Management Act. Partial plugging of the Faka Union Canal is anticipated to reduce flows through the Faka Union Canal, thereby reducing impacts from point source discharge of freshwater through the southern end of the Faka Union Canal in the Ten Thousand Islands Region. Additionally, the completion of the SWPF will allow for the completion of the plugging of the remaining canals. Without the SWPF, these remaining canals are not able to be plugged due to the increase in flood risk to adjacent properties. The completion of the SWPF, and subsequently the remainder of the PSRP, will provide additional freshwater deliveries as sheet flow through the numerous opening under US-41 delivering freshwater to downstream estuaries, improving EFH. The completion of Conveyance Features associated with the SWPF also improve freshwater delivery to downstream estuaries improving EFH.

1.8.17 Determination of Cumulative Effects on the Aquatic Ecosystem

Construction of the PSRP SWPF, Conveyance Features, and Partial Faka Union Canal Plugging features will provide additional freshwater to downstream estuaries improving salinity conditions and improving EFH. The reduction of point source discharges is also a benefit of the proposed action. Improved salinity envelopes in these estuaries will benefit habitat and conditions for threatened and endangered estuarine and mobile marine animals who utilize these downstream estuaries for food, shelter, and nurseries. Improved salinity conditions due to the delivery of freshwater (non-point source) will also improve conditions for sessile or semi-sessile species such as SAV, oysters, and other important estuarine invertebrates. The overall benefit to the regional system (including PSRP and downstream estuaries) is expected to be far greater than localized adverse effects resulting from construction of PSRP SWPF, Conveyance Features, and Partial Faka Union Canal Plugging components. Wetland function is expected to improve in this area.

1.8.18 Determination of Secondary Effects on the Aquatic Ecosystem

No adverse secondary impacts on the aquatic ecosystem will occur due to construction. During construction the sites will be contained with sedimentation barriers. Erosion will be controlled by appropriate erosion control techniques. Sedimentation will be controlled during construction. An ecological and water quality monitoring plan will be implemented during and after construction and specific environmental commitments, engineering and design commitments, and operational commitments will be incorporated to avoid, minimize, and/or mitigate for adverse effects. Permit compliance monitoring will be conducted to characterize project impacts to water quality. A water quality monitoring plan was submitted to FDEP with the application for water quality certification.

1.9 Findings of Compliance or Non-compliance with the Restrictions on Discharge

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

At this time, no practicable alternatives exist which have less adverse impact on the aquatic ecosystem.

The discharge of fill materials is not anticipated to cause or contribute to violations of any applicable state water quality standards for Class III waters or Outstanding Florida Waters where applicable. The discharge operation is not anticipated to violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

The placement of fill materials in the project area is not anticipated to jeopardize the continued existence of any species listed as threatened and endangered or result in the likelihood of destruction or adverse modification of any critical habitat as specified by the Endangered Species Act of 1973, as amended.

The placement of fill material is not anticipated to result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreational and commercial fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. The life stages of aquatic species and other wildlife is not anticipated to be adversely affected. Significant adverse effects on aquatic ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values are not anticipated.

Based on the guidelines, the proposed discharge site for the discharge of fill and/or dredged material is specified as complying with the requirements of these guidelines.