

June 2017

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# **Environmental Assessment and Finding of No Significant Impact**

**PLANNED TEMPORARY DEVIATION TO AFFECT  
RELIEF OF HIGH WATER LEVELS WITHIN WATER  
CONSERVATION AREA 3A**

## **Broward and Miami-Dade Counties, Florida**



**US Army Corps  
of Engineers** ®  
Jacksonville District

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## **FINDING OF NO SIGNIFICANT IMPACT**

### **PLANNED TEMPORARY DEVIATION TO AFFECT RELIEF OF HIGH WATER LEVELS WITHIN WATER CONSERVATION AREA 3A (WCA 3A)**

#### **BROWARD AND MIAMI-DADE COUNTY, FLORIDA**

I have reviewed the Environmental Assessment (EA) for the Proposed Action. This Finding incorporates by reference all discussions and conclusions contained in the EA enclosed hereto. Operations in the project area are currently governed by the Modified Water Deliveries to Everglades National Park Project G-3273 Constraint Relaxation/S-356 Field Test and S-357N Revised Operational Strategy Increment 1 Plus (Increment 1.1 and 1.2; hereafter referred to as MWD Increment 1 Plus), which is a deviation to the 2012 Water Conservation Areas, Everglades National Park and Everglades National Park to South Dade Conveyance System Water Control Plan (2012 Water Control Plan). The EA and Finding of No significant Impact (FONSI) for that action is dated February 16, 2017.

The U.S. Army Corps of Engineers (Corps), Jacksonville District, is initiating a planned temporary deviation from MWD Increment 1 Plus and the 2012 Water Control Plan in order to provide high water relief for Water Conservation Areas (WCA) 1, 2A and 3A until the WCA 3A 3-station gage average falls below Zone A. The WCAs are flooding in a manner that inundates tree islands and other wildlife habitat, and if sustained will negatively impact birds and mammals dependent on that habitat. If the rate of rise is not mitigated to limit the prolonged duration of high water conditions, there is potential for these high water levels to pose greater risks to valuable natural resources, public health, safety or welfare as the wet season and hurricane season continue due to reduced flood storage.

The Proposed Action, consists of four major components to include 1) opening of S-12A, S-12B, S-343A, S-343B and S-344 structures prior to the official opening date of July 15, 2017; 2) opening of S-152 to discharge water from WCA 3A to WCA 3B; 3) increasing discharges at S-332D from 250 cubic feet per second (cfs) to 500 cfs to increase discharge from WCA 3A to the South Dade Conveyance System using the S-333 and S-334, if needed; and 4) increasing discharge at S-197 from 400 cfs to 2,400 cfs to accommodate additional flows from WCA 3A to the South Dade Conveyance System using S-333 and S-334 while retaining capacity to manage local basin run off. These deviations are expected to continue until the WCA-3A 3-station gage average falls below Zone A of the regulation schedule.

Expedited consultation of this planned temporary deviation was coordinated with various Federal and state agencies as well as federally-recognized tribes. Emergency consultation pursuant to Section 7 of the Endangered Species Act (ESA) of 1973, as amended, is on-going with the U.S. Fish and Wildlife Service under provisions of the 2016 Everglades Restoration Transition Plan Biological Opinion and is in full compliance with the ESA.

Based on information analyzed in the EA, reflecting pertinent information obtained from agencies having jurisdiction by law and/or special expertise, I conclude that the Proposed Action will not significantly affect the quality of the human environment and does not require an Environmental Impact Statement. Reasons for this conclusion are in summary:

- a. Under provisions of emergency consultation the Corps has determined that the Proposed Action may affect, but is not likely to adversely affect, the endangered Cape Sable seaside sparrow, endangered Everglade snail kite and wood stork. Opening of S-12A, S-12B, S-343A, S-343B and S-344 structures prior to the official opening date of July 15, 2017 and increased pumping at S-

332D will not be implemented as part of this planned temporary deviation until emergency ESA consultation has been completed.

- b. The Corps 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. The Florida Department of Environmental Protection concurred with the Corps determination on June 26, 2017.
- c. The Proposed Action has been coordinated with the Florida State Historic Preservation Officer and the appropriate federally recognized Tribes in accordance with the National Historic Preservation Act and consideration given under the National Environmental Policy Act. The Corps has determined that the Proposed Temporary Action will have no adverse effect on historic properties eligible or potential eligible for the National Register of Historic Places. The State Historic Preservation Officer and the Miccosukee Tribe of Indians of Florida have concurred with the determination of no adverse effect. The Proposed Action has been coordinated with the Seminole Tribe of Florida; however, no formal comments from the Seminole Tribe have been received regarding the Proposed Action. Coordination on effects with other interested parties is ongoing.
- d. The Proposed Action is not anticipated to adversely affect water quality and water quality certification has been waived. The Florida Department of Environmental Protection issued an Emergency Final Order on June 23, 2017 and waived water quality certification for those activities authorized by this Emergency Final Order. The Proposed Action is in compliance with the Clean Water Act.
- e. The Proposed Action will maintain the authorized purposes of the Central and Southern Florida Project, including flood control, water supply for municipal, industrial, and agricultural uses, prevention of saltwater intrusion, water supply for ENP, and protection of fish and wildlife.
- f. The Corps completed this EA in accordance with ER 200-2-2 to address the federal action of the planned temporary deviation to the water control plan to address immediate concerns with high water levels within WCA 3A. The signed FONSI will be circulated for public review. The Corps may generate a supplemental EA as necessary to discuss and disclose any additional effects to the human environment that may not have been addressed within this EA.

In view of the above and the attached EA, and after consideration of coordination with Federal and state agencies and tribal representatives, I conclude that the Proposed Action would not result in a significant effect on the human environment. This FONSI incorporates by reference all discussions and conclusions contained in the EA enclosed herewith.



JASON A. KIRK, P.E.  
Colonel, U.S. Army  
District Commander

27 JUN 2017

Date

**ENVIRONMENTAL ASSESSMENT  
ON  
PLANNED TEMPORARY DEVIATION TO AFFECT RELIEF OF HIGH WATER LEVELS  
WITHIN WATER CONSERVATION AREA 3A (WCA 3A)**

**BROWARD AND MIAMI-DADE COUNTIES, FLORIDA**

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**APPENDIX B PERTINENT CORRESPONDENCE**

**ENVIRONMENTAL ASSESSMENT  
ON A PLANNED TEMPORARY DEVIATION TO AFFECT RELIEF OF HIGH WATER  
LEVELS WITHIN WATER CONSERVATION AREA 3A (WCA 3A)**

**BROWARD AND MIAMI-DADE COUNTIES, FLORIDA**

**1.0 PROJECT PURPOSE AND NEED**

**1.1 PROJECT AUTHORITY**

The Central and Southern (C&SF) Project for Flood Control and Other Purposes was initially authorized by the Flood Control Act of 1948, Public Law 80-858, approved June 30, 1948. The remaining works of the Comprehensive Plan were authorized by the Flood Control Act of 1954, Public Law 83-780, approved September 3, 1954. There have been numerous modifications to the original C&SF Project authority. Examples of these modifications specific to this action include the 1992 Modified Water Deliveries to Everglades National Park General Design Memorandum and Environmental Impact Statement, and 1994 C&SF Project General Reevaluation Report and Environmental Impact Statement.

**1.2 PROJECT LOCATION**

The water management operating criteria relating to the proposed action affects an area within the C&SF Project located in South Florida and includes Lake Okeechobee, the Caloosahatchee and St. Lucie Estuaries, Water Conservation Area 3 (WCA 3), Everglades National Park (ENP), and adjacent areas. Features of the proposed action are located in Broward and Miami-Dade Counties (**Figure 1**).

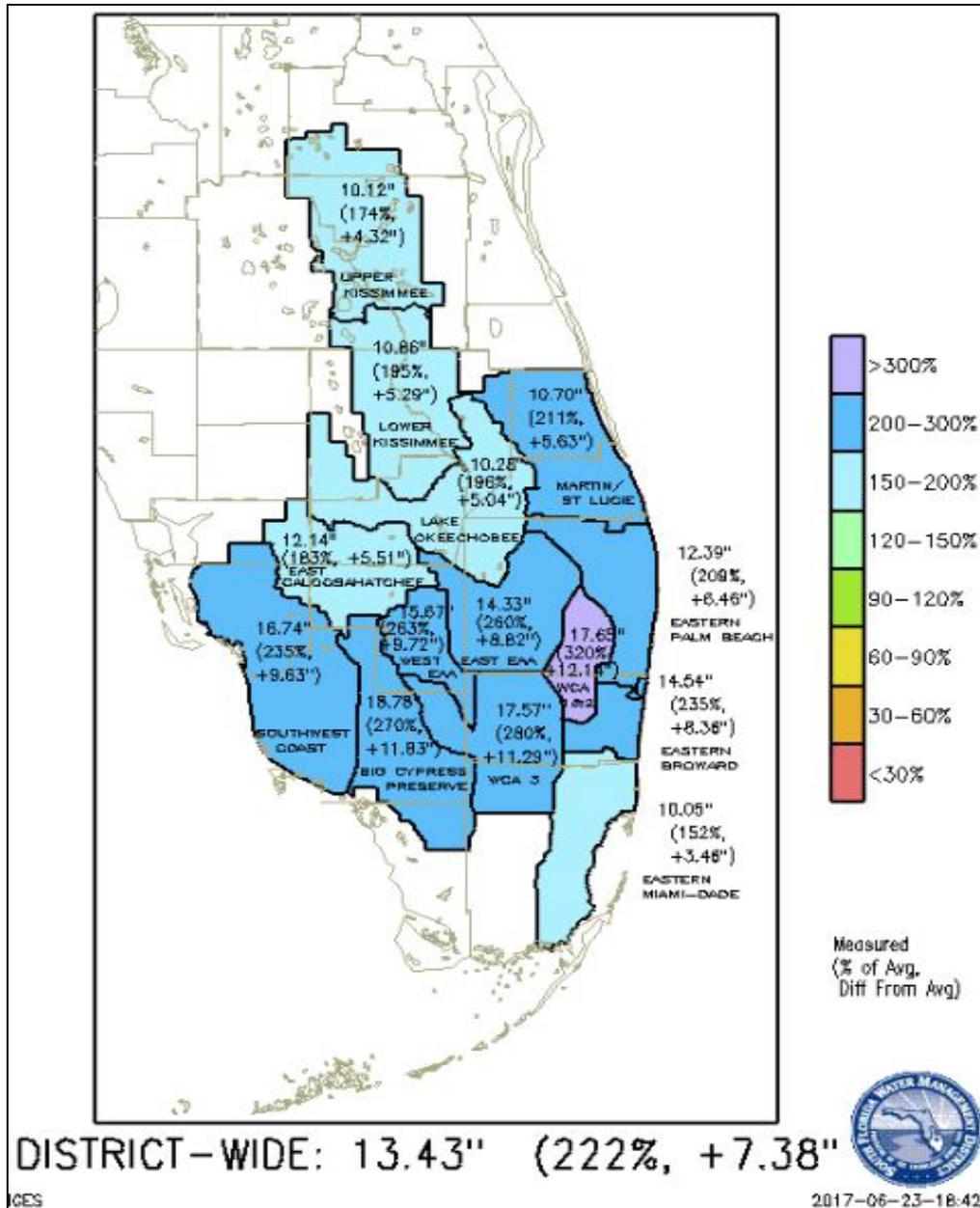


A series of early wet season storms that have occurred since June 5, 2017 have caused hydrologic conditions within the C&SF Project to change very rapidly from very dry conditions to very wet conditions within South Florida, with the WCAs along with the Everglades Agricultural Area (EAA) accumulating most of the rainfall. **Table 1** and **Figure 2** illustrate the extraordinary quantity of precipitation experienced across the WCAs and the EAA. WCA-3A alone received 18.35 inches in precipitation since June 1, which is almost 300% of the average for this time of year.

**TABLE 1. TOTAL PRECIPITATION EXPERIENCED WITHIN C&SF PROJECT ACTION AREA BETWEEN JUNE 1, 2017 AND JUNE 23, 2017**

<b>Area</b>	<b>Precipitation</b>	<b>% of Average</b>
East EAA	14.33inches	260% (average 5.51 inches)
WCA-1 & WCA-2	17.65 inches	320% (average 5.51 inches)
WCA-3	17.57 inches	280% (average 6.28 inches)

All areas of South Florida are inundated with water restricting the ability to safely move water to mitigate the effects of flooding. Immediate action is necessary to deviate from permitted water management practices to move flood water out of the WCAs, and subsequently provide opportunities to move more water south out of the WCAs. Therefore, the Corps is initiating a planned temporary deviation from the approved Water Control Plan for purposes of alleviating high water conditions within the project area. The proposed action is expected to mitigate for severe ecologic and economic losses that could result from prolonged high water levels. Loss of natural resources directly affects fisheries and fishing, seafood harvesting and ecotourism.



**FIGURE 2: PRECIPITATION MAP WITHIN THE PROJECT AREA BETWEEN JUNE 2 AND JUNE 23, 2017 (MAP COURTESY OF SOUTH FLORIDA WATER MANAGEMENT DISTRICT).**

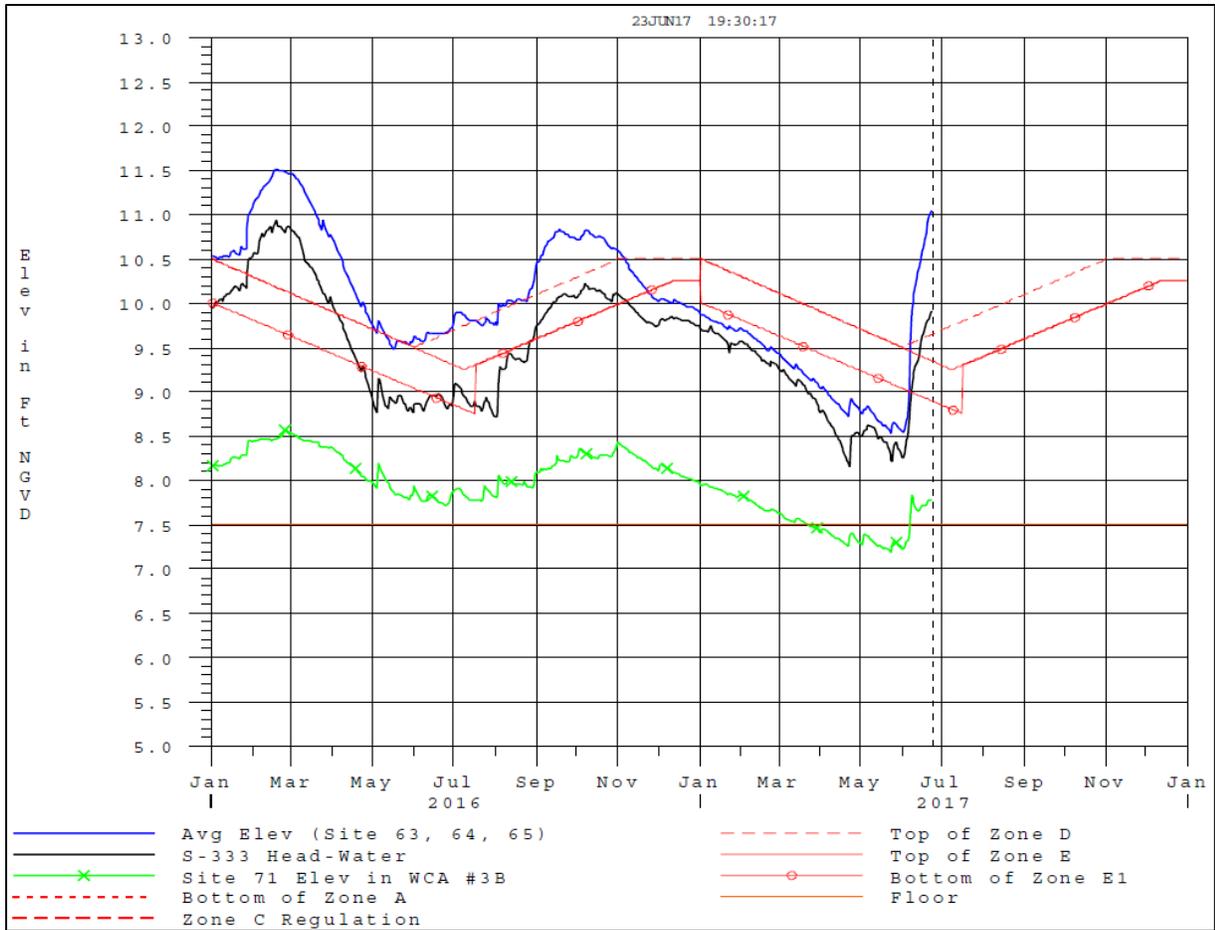
Due to this unprecedented rainfall during the month of June 2017, WCA 1, WCA 2A and WCA 3A are all above Zone A of their respective regulation schedules (**Table 2**). In addition, the EAA, which is located directly north of the WCAs and sends excess water south into the WCAs, has also received a significant amount of rainfall, further exacerbating the sharp rate of rise in the WCAs in June 2017.

**TABLE 2. WCA STAGES COMPARED TO REGULATION SCHEDULE (DATA REFLECTS STAGES ON JUNE 23, 2017).**

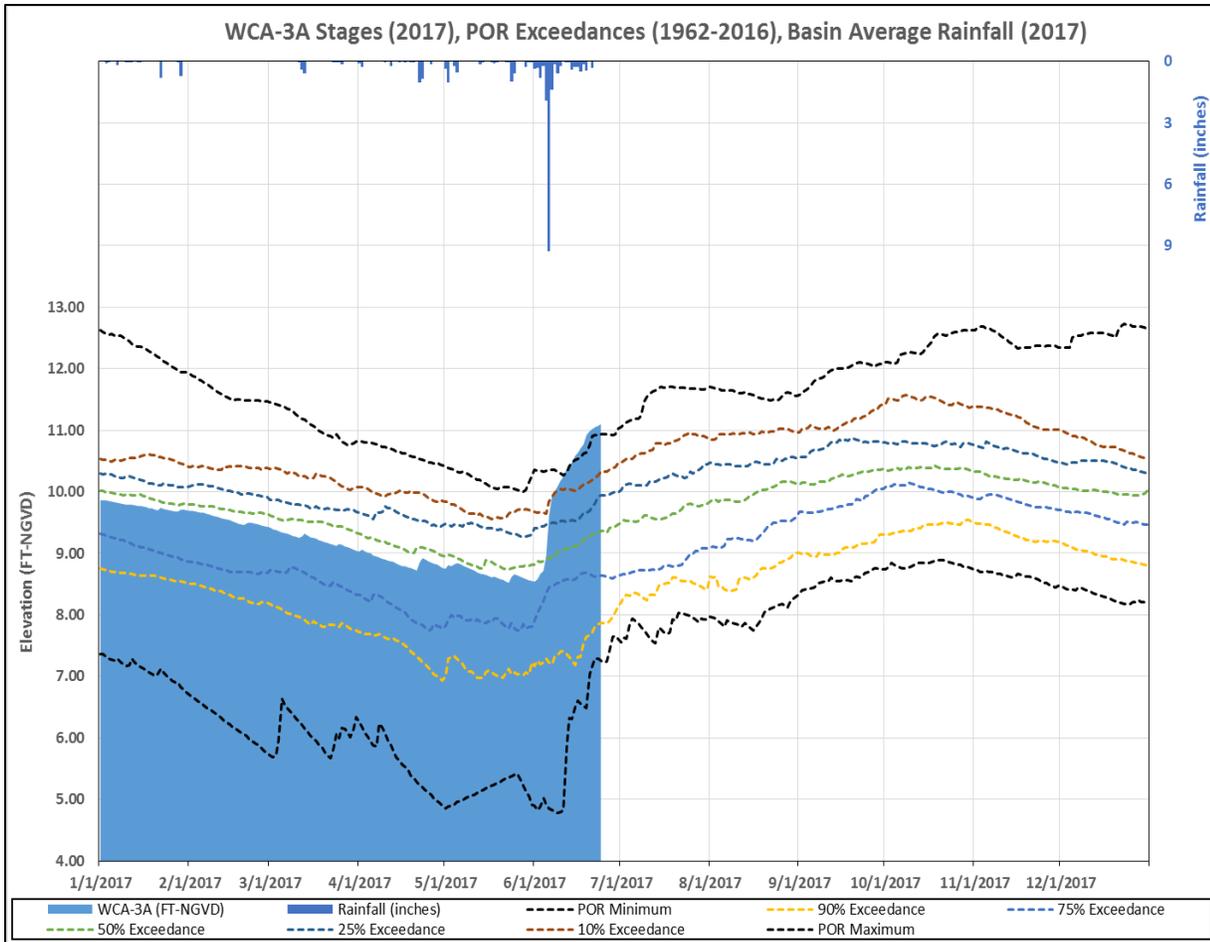
<b>Area</b>	<b>Current Stage (feet NGVD)</b>	<b>Regulation Schedule (feet NGVD)</b>	<b>Deviation from Regulation Schedule (feet)</b>
WCA-1	16.68	15.75	0.93
WCA-2A	14.30	11.00	3.30
WCA-3A	11.05	9.35	1.70 (1.4 ft. above Zone A)

The stages within WCA 3A are the most concerning because construction, environmental constraints, and current system capacity limit the volume of water that can be moved out of the system. Its regulation schedule is currently above the maximum regulation schedule as shown in **Figure 3** and the maximum exceedance elevation for this time of the year, as shown in **Figure 4**.

Based on consideration of the current approved levee screening risk assessments for WCA-3A, CESAJ Engineering Division recommends evaluating and implementing all available and appropriate water management options to immediately lower WCA-3A high water stages when the WCA-3A 3 gage average stage is forecast to exceed 12.7 feet NGVD. The WCA-3A average stage of 12.7 feet NGVD corresponds to approximately 12.0 feet NGVD at the 3-65 gage location (3A-28), which triggers initiation of semi-weekly high water inspections by the SFWMD along the L-28 and L-29 levee segments which border WCA-3A. The WCA-3A average stage of 12.7 feet NGVD also coincides with the period-of-record (1962-2017) high water stage in WCA-3A, and exceedance of this elevation will encroach into the required 2.5 feet of levee freeboard at the low point (el. 14.3 ft., NGVD29) of the L-29 Levee along southern WCA-3A (L-29 Section 2).



**FIGURE 3. WCA-3A STAGE HYDROGRAPH AND REGULATION SCHEDULE**



**FIGURE 4. WCA-3A COMPARED TO 1962-2016 EXCEEDANCE STATISTICS (JUNE 25, 2017)**

#### 1.4 RELATED ENVIRONMENTAL DOCUMENTS

The Corps has documented a number of environmental documents relevant to the Proposed Action:

- *General Design Memorandum and Environmental Impact Statement, Modified Water Deliveries to Everglades National Park*, U.S. Army Corps of Engineers, Jacksonville District, June 1992
- *C-111, Central and Southern Florida Project for Flood Control and Other Purposes, Final General Reevaluation Report and Environmental Impact Statement*, U.S. Army Corps of Engineers, Jacksonville District 1994
- *1998 Emergency Deviation from Test 7 of the Environmental Program of Water Deliveries to Everglades National Park to Protect the Cape Sable Seaside Sparrow, Central and Southern Florida Project for Flood Control and Other Purposes, Final Environmental Assessment*, U.S. Army Corps of Engineers, Jacksonville District, 1999
- *Jeopardy and Adverse Modification Biological Opinion on the Modified Water Delivery to Everglades National Park Experimental Program to Everglades National Park and Canal-111 South Dade Projects*, U.S. Fish and Wildlife Service, Vero Beach, Florida 1999
- *Comprehensive Review Study of the Central and Southern Florida Project, Comprehensive Everglades Restoration Plan Final Integrated Feasibility Report and Programmatic Environmental Impact Statement*, U.S. Army Corps of Engineers, Jacksonville District 1999

- *General Reevaluation Report and Final Supplemental Environmental Impact Statement, 8.5 Square Mile Area*, U.S. Army Corps of Engineers, Jacksonville District, July 2000
- *Central and Southern Florida Project for Flood Control and Other Purposes, Interim Structural and Operational Plan, Emergency Deviation from Test 7 of the Experimental Program of Water Deliveries to Everglades National Park for Protection of the Cape Sable Seaside Sparrow Final Environmental Assessment*, U.S. Army Corps of Engineers, Jacksonville District, 2000
- *Interim Operating Plan for the Protection of the Cape Sable Seaside Sparrow Final Supplemental Environmental Impact Statement*, U.S. Army Corps of Engineers, Jacksonville District, 2002
- *Biological Opinion, Final Interim Operating Plan*, U.S. Fish and Wildlife Service, Vero Beach, Florida, November 17, 2006
- *Interim Operational Plan for the Protection of the Cape Sable Seaside Sparrow Final Supplemental Environmental Impact Statement*, U.S. Army Corps of Engineers, Jacksonville District, December 2006
- *C-111 Engineering Documentation Report*, U.S. Army Corps of Engineers, Jacksonville District, May 2007
- *Draft Environmental Assessment; Design Modifications for the Canal 111 Project*, U.S. Army Corps of Engineers, Jacksonville District, June 2007
- *Modified Water Deliveries to Everglades National Park Tamiami Trail Modifications Final Limited Reevaluation Report and Environmental Assessment*, U.S. Army Corps of Engineers, Jacksonville District, June 2008
- *Draft Environmental Assessment; Proposed Interim Operating Criteria for 8.5 Square Mile Area Project*, U.S. Army Corps of Engineers, Jacksonville District, November 2008
- *Revised Draft Environmental Assessment; Proposed Interim Operating Criteria for 8.5 Square Mile Area Project*, U.S. Army Corps of Engineers, Jacksonville District, April 2009
- *Canal-111 Spreader Canal Project Implementation Report*, U.S. Army Corps of Engineers, Jacksonville District, 2009
- *Biological Opinion, Canal-111 Spreader Canal*, U.S. Fish and Wildlife Service, Vero Beach, Florida, August 25, 2009
- *Biological Opinion, Everglades Restoration Transition Plan*, U.S. Fish and Wildlife Service, Vero Beach, Florida, November 17, 2010
- *Central and Southern Florida Project Comprehensive Everglades Restoration Plan C-111 Spreader Canal Western Project Final Integrated Project Implementation Report and Environmental Impact Statement*, U.S. Army Corps of Engineers, Jacksonville District, January 2011
- *Environmental Assessment; Proposed Interim Operation Criteria for 8.5 Square Mile Area Project*, U.S. Army Corps of Engineers, Jacksonville District, June 2011
- *Environmental Assessment; Design Refinement for the 8.5 Square Mile Area*, U.S. Army Corps of Engineers, Jacksonville District, August 2012
- *Environmental Assessment for Expansion of C-111 Detention Area and Associated Features South Miami-Dade County*, U.S. Army Corps of Engineers, Jacksonville District, May 2012
- *Everglades Restoration Transition Plan Final Environmental Impact Statement*, U.S. Army Corps of Engineers, Jacksonville District, October 19, 2012
- *Environmental Assessment; G-3273 Constraint Relaxation/S-356 Field Test and S-357N Operational Strategy*, U.S. Army Corps of Engineers, Jacksonville District, May 2015.
- *Environmental Assessment and Finding of No Significant Impact; Modifications to the C-111 South Dade North and South Detention Areas and Associated Features*, U.S. Army Corps of Engineers, Jacksonville District, December 2016.

- *Environmental Assessment and Proposed Finding of No Significant Impact; Modifications to the C-111 South Dade Project, L-31W*, U.S. Army Corps of Engineers, Jacksonville District, July 2016.
- *Environmental Assessment; L-29 Canal and South Dade Conveyance System Temporary Emergency Deviation to Affect Relief of High Water Levels within Water Conservation Area 3A*, U.S. Army Corps of Engineers, Jacksonville District, February 2016
- *Supplemental Environmental Assessment; L-29 Canal and South Dade Conveyance System Temporary Emergency Deviation to Alleviate High Water Levels in Water Conservation Area 3A*, U.S. Army Corps of Engineers, Jacksonville District, May 2016.
- *Environmental Assessment Temporary Emergency Deviation to Alleviate High Water Levels in Water Conservation Area 3A (S-344 Deviation)*, U.S. Army Corps of Engineers, Jacksonville District, April 2016.
- *Environmental Assessment and Finding of No Significant Impact: G-3273 Constraint Relaxation/S-356 Field Test and S-357N Revised Operational Strategy Increment 1 Plus (Increment 1.1 and 1.2)*, U.S. Army Corps of Engineers, Jacksonville District, April 2016. February 2017.

Information contained within the previous NEPA documents listed above, as well as others described later, is incorporated by reference into this EA.

## **1.5 DECISIONS TO BE MADE**

This EA will evaluate whether to initiate a planned temporary deviation to current C&SF operations as governed by MWD Increment 1 Plus which is a deviation to the 2012 Water Control Plan. This EA will document and evaluate alternatives to accomplish that goal. The No Action Alternative and other reasonable alternatives will be studied in detail to determine the Preferred Alternative.

## **1.6 SCOPING AND ISSUES**

Please reference **Appendix B** for pertinent correspondence.

## **1.7 PERMITS, LICENSES, AND ENTITLEMENTS**

Information regarding this planned temporary deviation has been submitted to the Florida Department of Environmental Protection (FDEP) per specific condition 18 of the Comprehensive Everglades Restoration Plan Regulation Act (CERPRA) permit number 0246512-003. FDEP has issued a testing approval for MWD Increment 1 Plus.

Coastal Zone Management Act coordination may involve modifications to the following:

1. Modification to File No. 0306639-003, S-197 Control Structure Project, Environmental Resource Permit: SFWMD permit
2. Modification to File No. 0246512-0003 and test authorization, Modified Water Deliveries to the Everglades National Park Project, CERPRA permit: Corps permit
3. Modification to File No. 0246512-012, C-111 South Dade and Modified Water Deliveries to Everglades National Park Project: Corps permit
4. Modification, if deemed necessary by FDEP for revised operations to S-333 S-335, S-337,S-343A, S-343B and S-344 to the Non Everglades Construction Everglades Forever Act Permit File No. 0237803-001: SFWMD permit

5. Modification to the C-111 South Dade Emergency Order No. 9 may be required to adjust the operations for S-332B/C/D and S-328.
6. Modification to CERPRA Permit File No. 0304879-003 for the Decomp Physical Model (S-152)

The Corps has determined the proposed action is consistent to the maximum extent practicable with Florida's Coastal Management Program. On June 23, 2017, the FDEP issued an Emergency Final Order in response to high rainfall and flooding in the South Florida region, specifically the Everglades Protection Area that threatens certain stormwater management systems, works and impoundments and poses an imminent or immediate danger to valuable natural resources, the public health, safety or welfare (**Appendix B**). As part of the FDEP Emergency Final Order, FDEP temporarily modified operations of the projects listed above and permitted immediate employment of any remedial means deemed necessary to redress the emergency. FDEP waived water quality certification for those activities authorized by this Emergency Final Order.

Pursuant to the Emergency Final Order, the Corps shall continue water quality and hydrologic monitoring of the existing permitted Corps project features, to identify and evaluate water quality and hydrologic Conditions. The monitoring work provides water quality data associated with state water quality standards and the long-term phosphorus concentration limits contained within the Settlement Agreement to the Federal Everglades lawsuit (Case No. 88-1886), and hydrologic data necessary for the adaptive operation of the pump stations to evaluate the effects on wildlife, water supply and flood protection in the C&SF project.

## **2.0 PROPOSED ACTION AND ALTERNATIVES**

Each of the following alternatives described below were considered and evaluated against the project purpose and need and associated environmental impacts considered.

Alternative A (No Action Alternative): The No Action Alternative would continue current C&SF water management operations as defined in MWD Increment 1 Plus which is a deviation to the 2012 Water Control Plan.

Alternative B (Relaxation of the L-29 Canal Constraint; SDCS Modifications): Alternative B relaxes the current 7.5 feet National Geodetic Vertical Datum (NGVD) of 1929 maximum operating limit in the L-29 Canal up to 8.5 feet NGVD. Alternative B also includes lowered canal stages within the SDCS and increased pumping to include the S-332D within southern Miami-Dade County.

Alternative C (SDCS Modifications; Use of S-152): Alternative C maintains lowered canal stages within the SDCS from MWD Increment 1 Plus and includes increased pumping to include the S-332D within southern Miami-Dade County. In addition, Alternative C also includes operation of Structure 152 (S-152) currently being operated under the Comprehensive Everglades Restoration Plan Decentralization and Sheetflow Enhancement Project (Decomp) Physical Model. The Decomp Physical Model (DPM) is located in Miami-Dade County along the southern end of the L-67A and L-67C canals within WCA 3 and includes 10, 60-inch culverts in the L-67A levee (S-152) and a 3,000 foot gap in the L-67C levee with three 1,000 foot backfill treatments for purposes of passing water from WCA 3A to WCA 3B.

Alternative D (Early opening of S-12A/B, S-343A/B, S-344, SDCS Modifications; Use of S-152): Alternative D is the same as Alternative C except for the inclusion of early opening of the S-12A, S-12B, S-343A, S-343B and S-344 structures. In accordance with the 2016 Everglades Restoration Transition Plan (ERTP) Biological Opinion (BO) under Increment 1 Plus, the S-12A, S-12B, S-343A, S-343B and

S-344 structures are closed through July 14 annually to protect the endangered Cape Sable seaside sparrow (CSSS). Under Alternative D, these structures would open upon implementation of the planned temporary deviation to facilitate release of water from WCA 3A.

## 2.1 ISSUES AND BASIS FOR CHOICE

This planned temporary deviation is envisioned to reduce water stages within WCA 3A to the extent practicable given the current infrastructure as well as downstream system constraints to include on-going construction, flood mitigation and environmental considerations including threatened and endangered species. The alternatives described in **Section 2.0** were formulated, considered, and evaluated based on the achievement of project purpose and need and compliance with project constraints (**Section 1.3**). Potential effects on the human environment were also evaluated (**Section 4.0**).

Alternative A, the No Action Alternative, would maintain operations as identified within the 2012 Water Control Plan and MWD Increment 1 Plus operational strategy. Current operations are not sufficient to significantly reduce stages within WCA 3A and further operational flexibility is required in order to reduce outflow constraints within WCA 3A given the current and future projected conditions. Alternative A does not meet the project purpose and need as described in **Section 1.3**. Current projections indicate that around July 9 the gates at S-12A and S-12B will be overtopped, releasing water into the ENP.

Alternative B includes raising the maximum operating limit constraint within the L-29 Canal up to 8.5 feet NGVD along with operational modifications within the SDCS. Alternative B would provide significant benefits to WCA 3A by reducing stages, however, implementation of Alternative B would also pose serious and irrecoverable risks to on-going construction contracts within C-111 South Dade Project and the 8.5 Square Mile Area (SMA) Project construction footprints.

Alternative C would allow for increased operational flexibility to remove water directly from WCA 3A through use of the S-152 structure. The S-152 is part of the DPM and is utilized to deliver experimental flows into the pocket between L-67A and L-67C to evaluate environmental responses to flow and evaluate the effects of partial and complete backfilling of canals and levee modifications. The combined maximum flow of 750 cfs is not sufficient to significantly reduce stages within WCA 3A given the lack of outlet capacity in WCA 3B. Thus due to the limited capacity of S-152 and system constraints within WCA 3B, Alternative C would likely provide minimal benefit to WCA 3A as compared with Alternative D. Alternative C also includes operational modifications within the SDCS which would facilitate increased water flow through ENP and Taylor Slough, assisting stages in WCA 3A. The opening of S-152 will contribute approximately 525 cfs extra flow out of WCA-3A into WCA-3B, or an extra 1,050 ac-ft per day of mitigation for 3A. Due to cultural resource constraints, operations of the S-152 shall not occur without complimentary operations of the S-355A and S-355B. Alternative C may result in negative effects on Manatee Bay and Branes Sound through increase in S-197 pump operations from 400 cfs to 2,400 cfs.

Alternative D allows for operational flexibility to remove water directly from WCA-3A through the use of the S-152 structure as described within Alternative C (including use of the S-355A and S-355B) but it also includes the provision to open the S-12A, S-12B, S-343A, S-343B and S-344 structures prior to their scheduled opening date of July 15, 2017. These structures are all direct outlets from WCA 3A, thereby, providing a significant benefit to directly reduce stages within WCA 3A. Currently, between all three WCAs there is approximately 1,185,000 ac-ft of excess water above schedule. Opening these structures will contribute approximately 1,600 cfs extra flow out of WCA-3A, or an extra 3,200 ac-ft per day. The S-12A, S-12B, S-343A, S-343B and S-344 are all closed until July 15 annually for protection of the

endangered CSSS as outlined within the July 22, 2016, U.S. Fish and Wildlife Service (USFWS) Jeopardy BO. In that BO, USFWS determined that unless alternatives to current water operational practices are explored and implemented, continued implementation of ERTTP is likely to jeopardize the continued existence of the CSSS. The July 22, 2016 BO presented a Reasonable and Prudent Alternative (RPA) that would avoid jeopardizing the CSSS. The RPA identified operational modifications and expediting restoration initiatives for some of the structures in the southern portion of the Everglades ecosystem to provide suitable nesting habitat for the endangered CSSS. One main element of the RPA was additional seasonal closures to outlet structures within WCA 3A (*i.e.* S-12A, S-12B, S-343A, S-343B, S-344), with the flexibility to open under high water conditions between October and November. The opening of S-197 is necessary to move the increased discharges described above out of SCDS. Similar to Alternative C, Alternative D may also result in negative effects on Manatee Bay and Branes Sound through increase in S-197 pump operations from 400 cfs to 2,400 cfs.

The 2016 ERTTP BO also included hydrological targets to include 90 dry days in CSSS habitat during the CSSS nesting season defined as March 1 through July 15. It is important to note that the Corps met the 2016 ERTTP BO nesting window target during the 2017 CSSS breeding season. Furthermore, the EDEN Sparrow Viewer indicates that less than 4% of CSSS-Ax habitat is available for breeding, and the SFWMD positional analysis projections for stage levels at NP-205 indicate a zero percent probability of water stages receding below ground for the remainder of the 2017 wet season based on the historical simulated rainfall period.

The Corps also evaluated the current and forecasted conditions in the attached analysis (**Appendix A**), supporting the determination that the S-12A and S-12B structures would probably overtop on or before July 9, 2017. In order to avoid overtopping, which will trigger a limited gate opening sufficient to prevent the gate overtopping condition for the applicable structure(s), the Corps would need to open these structures prior to the projected July 9, 2017 date. The Corps has currently maximized outflows from WCA 3A as well as limited inflows to the extent practicable given conditions within the upstream basins. Other steps the Corps is implementing to reduce stages in WCA 3A include maximizing discharge through S-12C, S-12D, S-333, S-334, and S-151, and maximizing discharges to tide from each of the WCAs. Despite implementation of these steps WCA 3A is projected to continue to rise and reach the top of the S-12A and S-12B slide gates at elevation 11.0 feet NGVD around July 9, 2017.

The Corps recognizes the commitments made within the 2016 ERTTP BO and remains committed to implementation of the RPA. One such commitment is to complete construction of the C-111 South Dade and 8.5 SMA construction projects. Completion of these critical construction components will allow implementation of the 2016 BO RPA to include the MWD Increment 2 and MWD Increment 3 (Combined Operations Plan) in accordance with the schedule identified in the 2016 ERTTP BO RPA. In order to facilitate ongoing construction efforts through July 2017 to the maximum extent practicable, the Corps will maintain water elevations within the C-111 South Dade and 8.5 SMA construction footprints at or below stage levels corresponding to the MWD Increment 1 Plus (Increment 1.1) maximum operating limit of 7.5 feet NGVD in the L-29 Canal. In light of this constraint, the remaining options to further reduce stages within WCA 3A are to remove the seasonal closure constraints on the S-12A, S-12B, S-343A, S-343B, S-344 and S-332D structures.

Based upon the impact analysis conducted within this EA, Alternative D is the Preferred Alternative. This plan is expected to best meet the project purpose and need while minimizing any negative impacts. Alternative D best utilizes current capacity and existing structures within the C&SF Project to increase water deliveries from WCA 3A to ENP. Immediate action is necessary to deviate from current water management practices for the purposes of removing water from WCA 3A.

## 2.2 ALTERNATIVES ELIMINATED FROM DETAILED EVALUATION

Alternative B (Relaxation of the L-29 Canal Constraint; South Dade Conveyance System Modifications) was eliminated from detailed evaluation. The rationale for the elimination of this alternative was due to inclusion of relaxation of the L-29 Canal and lessons learned from the 2016 Emergency Deviation (USACE 2016).

Due to the very strong El Niño during the 2015 to 2016 dry season, WCA 3A experienced unseasonable high water levels. The first half of the dry season (November 2015-January 2016) was the wettest for this period since record keeping began in 1932. To protect natural resources within WCA 3A in correspondence dated February 11, 2016, the Governor of Florida requested that the Corps take immediate action to relieve flooding of the Everglades WCAs by raising the level of the L-29 Canal to 8.5 feet, NGVD so that substantial volumes of water could be moved from WCA 3A to ENP through Shark River Slough (SRS). The Corps initiated a temporary emergency deviation to the stage maximum operating limit of 7.5 feet, NGVD in the L-29 Canal on February 15, 2016 at the request of the Governor, for purposes of providing high water relief in WCA 3A. The 2016 Temporary Emergency Deviation also included other operational changes needed to mediate any concern with increased seepage from ENP into the SDCS. The Corps approved the SFWMD request for additional operational flexibility to increase WCA 3A discharge by raising the L-29 constraint up to 8.5 feet, NGVD with corresponding lowering of the 8.5 SMA L-31N, and C-111 Canals to compensate for the resulting higher stages and increased groundwater seepage along the eastern boundary of ENP and further expanded utilization of Column 2 operations to convey WCA 3A releases to the SDCS.

Residents within the 8.5 SMA expressed concern during implementation of the 2016 Temporary Emergency Deviation due to observed increases in ground and surface water. In response to these concerns, the SFWMD constructed temporary measures including the use of temporary pumps and an open channel connection between the C-358 Canal and the C-357 Canal prior to construction of S-357N to maintain flood mitigation requirements for the 8.5 SMA; the S-357N is a gated control structure that will connect the C-358 Seepage collection canal to the existing C-357 Canal, upstream of S-357 within 8.5 SMA. The SFWMD also constructed temporary plugs in the drainage swales located north and south of Richmond Drive (SW 168<sup>th</sup> Street), and a berm around the western end of the C-358 Canal (**Section 1.3.2** of the MWD Increment 1 Plus EA). Design refinements associated with the C-111 South Dade Project include the extension of the L-357 W Levee from the 8.5 SMA Detention Cell to the southern limits of Richmond Drive and the completion of the remaining levee segment to cross Richmond Drive, including construction of a ramp over the new levee segment to maintain western access to ENP, as currently anticipated under Contract 8 and Contract 8A of the C-111 South Dade Project. The temporary plugs were constructed to help decrease potential increases in groundwater stages adjacent to the existing LPG-1 groundwater monitoring gauge, which is located to the north of Richmond Drive between

SW 213<sup>th</sup> Avenue and the L-357 W Levee alignment, in the absence of the completion of the L-357W extension (USACE 2017).

During the 2016 Temporary Emergency Deviation, the SFWMD also installed temporary culverts in the southern levee of the 8.5 SMA Detention Cell in an area where the planned degrading of the S-360W weir will take place to connect the 8.5 SMA Detention Cell to the future C-111 South Dade Northern Detention Area, as currently anticipated under modifications to the C-111 South Dade Project (USACE 2016a). This effort was undertaken by the SFWMD in order to limit the increase in water depth in the 8.5 SMA Detention Cell that may be associated with the additional S-357 pumping coincident with the connection of the C-358 Canal to the C-357 Canal. By not allowing significant water storage depths within the 8.5 SMA Detention Cell, the potential for backwater drainage effects on the southwest corner of the 8.5 SMA (LPG-1 Gage) caused by retardation of the regional groundwater flow to the southeast is reduced.

During the 2016 Temporary Emergency Deviation, temporary flowage authorizations from private land owners along the L-29 Canal were obtained by the SFWMD allowing maximum stages of 8.5 feet, NGVD. With some improvements made by the SFWMD during the 2016 Temporary Emergency Deviation, sustained stages over 8.0 feet, NGVD were implementable during the period covered by the temporary flowage authorizations. Additional existing constraints at the remaining private ownerships along the L-29 Canal limited the peak operating stage during the 2016 Temporary Emergency Deviation to about 8.3 feet NGVD. These parcels have since been acquired by the Department of the Interior, however, the Corps still needs a real estate instrument to allow the Corps to flow water across these proprietries. This instrument is anticipated to be acquired prior to October 2017.

As identified within the MWD Increment 1 Plus EA, raising of the L-29 Canal maximum operating limit above 7.5 feet NGVD up to 7.8 feet NGVD is contingent upon compliance with all of the following conditions: (1) acquisition of required real estate interest and any associated improvements for the private ownership along Tamiami Trail including receipt of Tamiami Trail Bridge and roadway channel and flowage easements from the Florida Department of Transportation; (2) completion of the C-358 Canal (Richmond Drive Seepage Collection Canal) and installation of S-357N (C-358 control structure); (3) completion of sufficient portions of Contracts 8 (construction of the C-111 NDA L-315 western levee and the L-357W Extension Levee between Richmond Drive and the 8.5 SMA Detention Cell) and completion of the Contract 8A berms inside the 8.5 SMA Detention Cell. To date the identified contingencies for (1) and (3) have been completed, therefore, Alternative B was eliminated from detailed evaluation.

A temporary by-pass culvert between C-358 and C-357 was completed by the Corps during the 2016 Temporary Emergency Deviation, and this by-pass culvert is anticipated to accommodate raising the L-29 Canal maximum operating limit up to 7.8 feet NGVD. Independent of this deviation request to address WCA-3A high water conditions, the Corps is actively coordinating with the construction contractors and other agencies to expedite the schedule raising the L-29 Canal maximum operating limit to 7.8 feet NGVD. Based on the current projected construction schedule, the remaining segments of the L-315 western levee will be complete by the end of August 2017.

Another reason for elimination of Alternative B is the 2016 ERTTP BO. A BO states the opinion of the USFWS as to whether a federal action is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of designated critical habitat. USFWS issued a new BO for ERTTP on July 22, 2016, developed in formal Endangered Species Act (ESA) consultation with the Corps. As a result of this consultation, USFWS determined that current conditions within endangered CSSS habitat, threaten the survival of the CSSS, and as a result, USFWS issued a “jeopardy” opinion, which explains that unless alternatives to current water operational practices are explored and implemented, continued implementation of ERTTP is likely to jeopardize the continued existence of the CSSS. The revised BO, issued July 22, 2016 presented a RPA that would avoid jeopardizing the CSSS. The RPA identified operational modifications and expediting restoration initiatives for some of the structures in the southern portion of the Everglades ecosystem to provide suitable nesting habitat for the endangered CSSS. Main elements of the RPA are: habitat performance targets; actions to move water east; surveys and studies; and adaptive management. These RPA actions include additional seasonal closures to outlet structures within WCA 3A (S-12A, S-12B, S-343A, S-343B, S-344), with the flexibility to open under high water conditions between October and November, and adjustments in operations in the SDCS that will enable additional flows to Biscayne Bay during the dry season and increased flows toward eastern ENP to extend hydroperiods during the early dry season.

In response to the BO, the Corps has committed to taking specific actions to comply with the BO terms and conditions and implementing the RPA. One such action to move water east is to raise the L-29 Canal stage up to 8.5 feet NGVD. MWD Increment 2 is the action that will allow this operational change and in accordance with the 2016 ERTTP BO RPA will be implemented prior to March 1, 2018. In order to implement this action, the Corps will need to complete construction of the C-111 South Dade NDA (Contracts 8 and portions of Contract 8A), along with completing construction of the 8.5 SMA Project. In order to complete these critical construction features for the NDA that are scheduled for completion by October 2017, no discharges from the 8.5 SMA Detention Cell into the interior portion of the NDA construction footprint may be allowed to facilitate completion of ongoing construction. In order to facilitate construction, the L-29 maximum canal limit during summer 2017 must not be raised above 7.5 feet NGVD. Delayed completion of the in-progress C-111 South Dade Contract 8 and Contract 8A construction efforts may preclude completion of the North Detention Area (NDA). Operation of the NDA to receive 8.5 SMA flood mitigation discharges from the S-357 pump station is a prerequisite for raising the L-29 Canal maximum operating limit from 7.8 feet NGVD up to 8.5 feet NGVD under the planned MWD Increment 2 field test.

## 2.3 PREFERRED ALTERNATIVE

Based upon the impact analysis conducted within this EA, Alternative D is the Preferred Alternative. This plan is expected to best meet the project purpose and need identified in **Section 1.3**. Summary details of the Preferred Alternative are listed below:

- Open S-12A, S-12B, S-343A, S-343B and S-344 prior to official opening date of July 15, 2017;
- Open S-152 to discharge water from WCA-3A to WCA-3B;

- Increase discharge at S-332D from 250 cfs to 500 cfs to increase discharge from WCA 3A to the SDCS using S-333 and S-334, if needed; and
- Increase the discharge at S-197 to 2,400 cfs from the current maximum release of 400 cfs to accommodate additional flows from WCA 3A to the SDCS using S-333 and S-334 while retaining capacity to manage local basin runoff.

### **3.0 AFFECTED ENVIRONMENT**

#### **3.1 GENERAL ENVIRONMENTAL SETTING**

The remaining portion of the Greater Everglades wetlands includes a mosaic of interconnected freshwater wetlands and estuaries located primarily south of the EAA. A ridge and slough system of patterned, freshwater peat lands extends throughout the WCAs into SRS in ENP. The ridge and slough wetlands drain into tidal rivers that flow through mangrove estuaries into the Gulf of Mexico. Higher elevation wetlands that flank either side of SRS are characterized by marl substrates and exposed limestone bedrock. Those wetland areas located to the east of SRS include the drainage basin for Taylor Slough, which flows through an estuary of dwarf mangrove forests into northeast Florida Bay. The Everglades wetlands merge with the forested wetlands of Big Cypress National Preserve (BCNP) to the west of WCA 3.

Declines in ecological function of the Everglades have been well documented. Construction of canals and levees by the C&SF Project has resulted in the creation of artificial impoundments and has altered hydroperiods and depths within the project area. The result has been substantially altered plant community structures, reduced abundance and diversity of animals and spread of non-native vegetation.

A complete description of the affected environment with respect to Increment 1 is discussed within the EA and FONSI dated May 27, 2015 (USACE 2015). Further information regarding 8.5 SMA can be found within the July 2000 8.5 SMA GRR/FSEIS (USACE 2000), 2011 Proposed Interim Operating Criteria for 8.5 SMA EA (USACE 2011), and 2012 design refinement for the 8.5 SMA EA (USACE 2012a).

#### **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.

### **3.3 GEOLOGY AND SOILS**

The geology and soils of South Florida represent many of the opportunities, constraints, and impacts of regional water management. The high transmissivity of the Biscayne Aquifer allows rapid recharge of lower east coast well fields while it sets the stage for water competition between the Everglades and Biscayne Bay regarding the issue of seepage control. The loss of peat soils of the Everglades provides an indicator of ecosystem change due to drainage activities. Peat soils predominate in previously flooded areas. Peat soils have subsided as a result of oxidation due to drainage, which has affected local topography and hydroperiods.

The lower east coast on the Atlantic Coastal Ridge is mostly underlain by thin sand and Miami Limestone that are highly permeable and moderately to well-drained. To the west of the coastal ridge, soils of the lower east coast contain fine sand and loamy material and have poor drainage. Rockland areas on the coastal ridge in Miami-Dade County are characterized by weathered limestone surfaces and karst features such as solution holes and sinkholes. Higher elevation marshes of the southern Everglades on either side of SRS are characterized by calcitic marl soils deposited by calcareous algal mats and exposed lime rock surfaces with karst features such as solution pits and sinkholes.

### **3.4 STUDY AREA LAND USE**

The existing land use within the study area varies widely from agricultural to high-density multi-family and industrial urban uses. Much of the land use/cover change occurring in South Florida over the past several years can be categorized as either the creation of new developments in previously natural or agricultural areas, or the change in the types of agriculture practiced. Generally, urban development is concentrated along the Lower East Coast (LEC) from Palm Beach County to Miami-Dade County. WCA 3, located directly north of ENP, is part of the Everglades Complex of Wildlife Management Areas and are managed by the Florida Fish and Wildlife Conservation Commission (FWC).

### **3.5 HYDROLOGY**

The major characteristics of South Florida's hydrology are: (1) local rainfall; (2) evapotranspiration; (3) canals and water control structures; (4) flat topography; (5) the highly permeable surficial aquifer along a thirty to forty mile-wide coastal strip. Local rainfall is the source of all of South Florida's fresh water. The surface water that is not removed from the land by evapotranspiration and seepage to the underlying aquifer is drained to the Atlantic Ocean, Florida Bay, or the Gulf of Mexico by very slow, shallow sheetflow through wetlands or relatively quickly through man-made canals.

Levees and canals constructed during the last 60 years under the C&SF Project have divided the former Everglades into areas designated for development and areas for fish and wildlife benefits, natural system preservation, and water storage. The natural areas consist of the three WCAs located north of Tamiami Trail. ENP is located south of Tamiami Trail. The WCAs provide detention storage for water from Lake Okeechobee, the EAA, and parts of the east coast region.

Detention of water helps prevent floodwaters from inundating the east coast urban areas; provides water supply and detention for east coast urban and agricultural areas and ENP; improves the water supply for east coast communities by recharging underground freshwater reservoirs; reduces seepage; and provides control for saltwater intrusion in coastal aquifers. While the WCAs may reduce the severity of the drainage of the Everglades caused by the major canal systems, thus reducing impacts to fish and wildlife caused by the major drainage systems, the levees surrounding the WCAs still function to impound the Everglades, precluding the historic flow patterns. The C&SF Project infrastructure, combined with operational constraints, makes it difficult to provide natural timing, volume and distribution. In wet periods, water is impounded in the WCAs and then discharged to ENP or coastal canals for eventual release to tide. During dry periods, water can flow through the canals to coastal areas and bypass the ENP wetlands.

### **3.5.1 WATER CONSERVATION AREAS 3A AND 3B**

The largest WCA is WCA 3, which is divided into two parts, 3A and 3B. It is approximately 40 miles long from north to south and covers approximately 915 square miles. Ground elevations slope southeasterly one to three feet in ten miles ranging from 13 feet NGVD in northwest WCA 3A to six feet, NGVD in southeast WCA 3B. The area is enclosed by approximately 111 miles of levees, of which 15 miles are common to WCA 2. An interior levee system across the southeastern corner of the area reduces seepage into an extremely pervious aquifer.

The upper pool, WCA 3A, provides an area of approximately 752 square miles for storage of excess water from the following sources: regulatory releases from WCA 2A; rainfall excess from approximately 750 square miles in Collier and Hendry counties (through Mullet Slough); flood control inflows from 71 square miles of the former Davie agricultural area lying east of pump station S-9 in Broward County; and excess water from a 208 square mile agricultural drainage area of the Miami Canal and other adjacent EAA areas to the north. WCA 3A provides water supply to the LEC, as well as the SDCS, in accordance with the WCA 3A Regulation Schedule, and WCA 3A provides water deliveries to ENP in accordance with the Rainfall Formula and the WCA 3A Regulation Schedule, collectively referred to as the Rainfall Plan (USACE 2006). Due to its limited discharge capacity compared to the spatial extent of the watershed from which it receives water, consecutive rainfall events have the potential to quickly utilize potential storage within WCA 3A and result in discharges from WCA 3A to SRS and/or the SDCS via the S-12 structures and/or S-333 and S-334.

South of WCA 3 and within ENP, the northern portion of SRS is also partially divided by the remaining 5.5 miles of the L-67 Extension Levee, which extends south from the southern terminus of L-67A at Tamiami Trail. Outflows from WCA 3A to ENP are regulated according to the WCA 3A Regulation Schedule, with some additional WCA 3A outflows to ENP from groundwater seepage across Tamiami Trail and seasonal surface water flows through the L-28 gaps, which then continue south along the L-28 borrow canal towards the Tamiami Trail bridges west of S-12A.

Stage variability within WCA 3 typically follows an annual cycle; the levels vary from high stages in the late fall and early winter to low stages at the beginning of the wet season (typically late May or early June). Water stages within WCA 3A typically exceed the top of the WCA 3A Regulation Schedule during the months of August through October, with this duration extended to earlier in

the wet season (May) and/or later into the dry season during wet years (November and December). Above-normal rainfall patterns associated with El Niño conditions during the dry season months (November through May) may also result in water stages which exceed the top of the Regulation Schedule. Overall, water stage decreases from northwest to southeast within WCA 3, consistent with the general direction of surface water flow and prevailing topography within WCA 3. Water depth is typically between one to two and a half feet, with the shallower waters in the higher elevation northwestern portion of WCA 3. Water stages and depths in WCA 3B are typically much lower than water stages and depths in WCA 3A, due to limited surface water inflows into WCA 3B and the reduction of seepage from WCA 3A to WCA 3B consistent with the design purpose of the L-67A and L-67C levees. Water levels in WCA 3B are affected by seepage losses to the east towards the L-30 borrow canal and seepage losses to the south towards the L-29 Canal.

Water supply deliveries from the C&SF Project (also known as the Regional system) to coastal canals are utilized to recharge coastal well fields and to prevent saltwater intrusion into the Biscayne aquifer. When canal levels drop below adequate recharge levels due to a combination of well field drawdowns, evaporation, and lack of rainfall, water supply deliveries are typically made from the Regional system. When canal levels drop in Miami-Dade County, regional water supply is delivered from WCA 3A through one of two delivery routes. Depending on system conditions, both routes may be utilized concurrently. For the northern delivery route from WCA 3A, water supply deliveries are either released from S-151 to the Miami Canal within WCA 3B (C-304), followed by downstream releases to either Miami-Dade County's SDCS by utilizing S-337 and/or by utilizing S-31 to release into the C-6 Canal. For the southern delivery route from WCA 3A, water supply deliveries are released from S-333 (from the upstream L-67A Canal), passed through the L-29 Canal, and are released to the SDCS by utilizing S-334.

The most important component of the groundwater system within the study area is the Biscayne aquifer, an unconfined aquifer unit underlying an area of approximately 3,000 square miles in southeast Florida, from southern Palm Beach County southward through Broward County to South Miami-Dade County. Groundwater in WCA 3 generally flows from the northwest to the southeast, with extensive seepage across the eastern and southern levees, L-30 (southeast corner of WCA 3B) in particular. However, the direction of groundwater flow may be locally influenced by rainfall, drainage canals, or well fields. Fluctuations in groundwater levels are seasonal. Groundwater levels within WCA 3 are influenced by water levels in adjacent canals. Where there is no impermeable formation above the aquifer, surface water recharges the system and the groundwater level can rise freely. In times of heavy rainfall, the aquifer fills and the water table rises above the land surface, contributing to seasonal inundation patterns throughout the area.

### **3.5.2 NORTHEAST SHARK RIVER SLOUGH**

Northeast Shark River Slough (NESRS) is a complex area located in the northeast corner of ENP. It is currently the northern terminus of SRS, which is aligned from the northeast to southwest across ENP. Tamiami Trail is the northern boundary, the L-31N Canal the eastern boundary, and the L-67 Extension Canal the western boundary of the NESRS. Prior to construction and operation of the C&SF Project, NESRS would have been characterized as wet most of the year, but regional developments have impacted historic freshwater routes into the area. In addition, if historic levels

are not maintained through the end of the wet season, significant reductions in surface water can occur during the dry season below historic dry season levels.

Water enters NESRS primarily from WCA 3A via S-333, and then to the L-29 Borrow Canal and subsequent passage through several sets of culverts and the one-mile Tamiami Trail bridge (completed as part of the MWD Project in 2013) under Tamiami Trail. S-355A and S-355B may also be used to deliver water from WCA 3B to the L-29 Canal for subsequent passage through the culverts to NESRS. The discharges made from WCA 3A through the S-12 structures and S-333 are target flows determined from the Rainfall Plan (USACE 2012a). Under the Rainfall Plan in the 2012 Water Control Plan, water deliveries would be computed and operations adjusted weekly, if necessary based on the sum of two components: a rainfall response component and a WCA 3A regulatory component. The normal operational target flow distribution is 55% through the S-333 into NESRS and 45% through the S-12 structures into ENP west of the L-67 Extension. Eastern portions of the ENP are also influenced by the system of canals and structures that provide flood control and water supply for the LEC urban and agricultural areas. The operational intent of the Rainfall Plan under the 2012 Water Control Plan and the Increment 1.1 and 1.2 field test is to maximize discharge capacity from S-333 prior to utilization of the S-12s. The Rainfall Plan target distribution through S-333 may exceed 55% of the Rainfall Plan target. Additional details for the Rainfall Plan are provided in Section 3.6.

### **3.5.3 WESTERN SHARK RIVER SLOUGH**

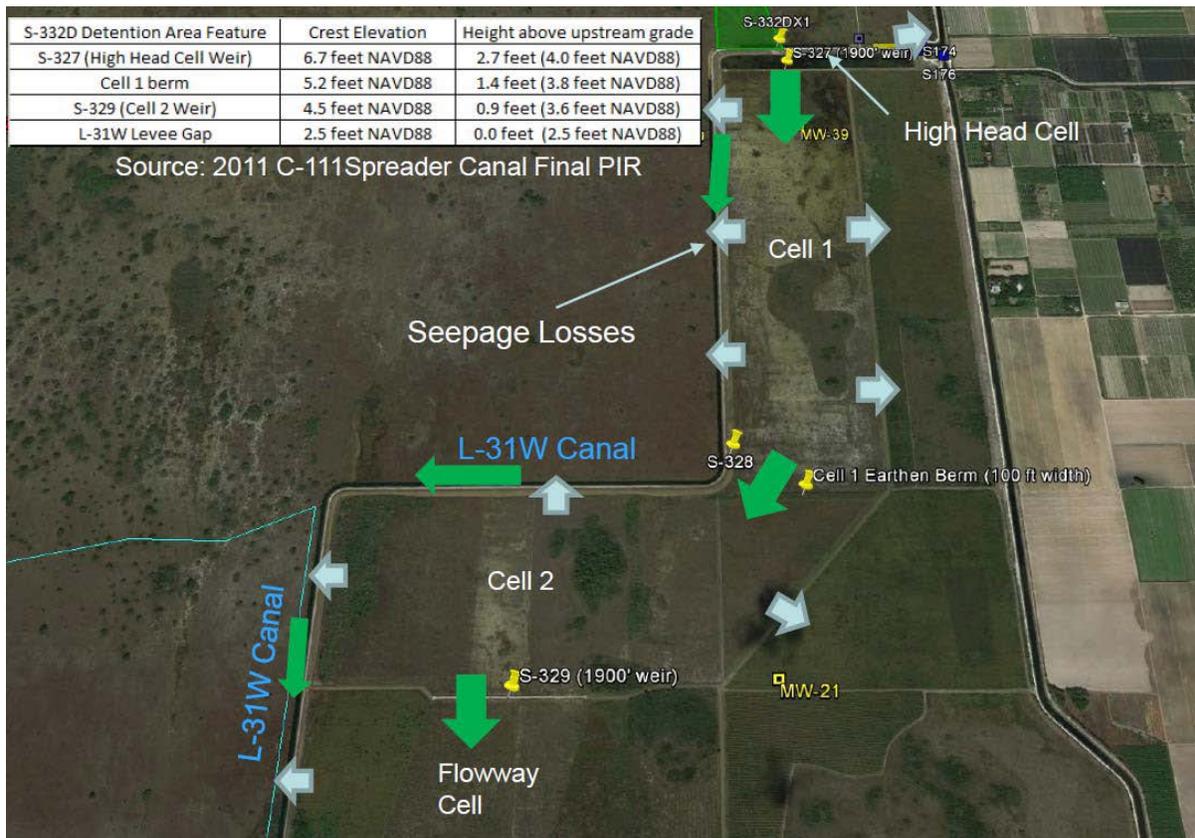
Western SRS located to the west of L-67 Extension Levee and bounded on the north by Tamiami Trail, is primarily influenced by rainfall and water management operations at the S-12 structures (A, B, C and D). Under the 2012 Water Control Plan, the utilization of the S-12 structures and the seasonal sequential closure periods beginning from the west at S-12A (November 1 through July 15) and S-12B (January 1 through July 15) is meant to move water from WCA 3A into SRS while providing conditions for Cape Sable seaside sparrow Subpopulation-A (CSSS-A) nesting and breeding. The seasonal closures window for S-12A and S-12B was expanded to initiate on October 01 under the Increment 1.1 and Increment 1.2 field test, except under prescribed high water conditions within WCA 3A. Releases from WCA 3A are specified by the Rainfall Plan, which includes the regulation schedule for WCA 3A and the Rainfall Formula. This Rainfall Based Management Plan consists of a rainfall-based delivery target and a supplemental regulatory component that specifies the total amount of water to be delivered to ENP in weekly volumes through the S-333 and S-12 structures. The operational intent of the Rainfall Plan under the 2012 Water Control Plan and the Increment 1.1 and 1.2 field test is to maximize discharge capacity from S-333 prior to utilization of the S-12s. When S-12s capacity is required the structure should be opened from east to west. Additional details for the Rainfall Plan are provided in Section 3.6.

### **3.5.4 TAYLOR SLOUGH**

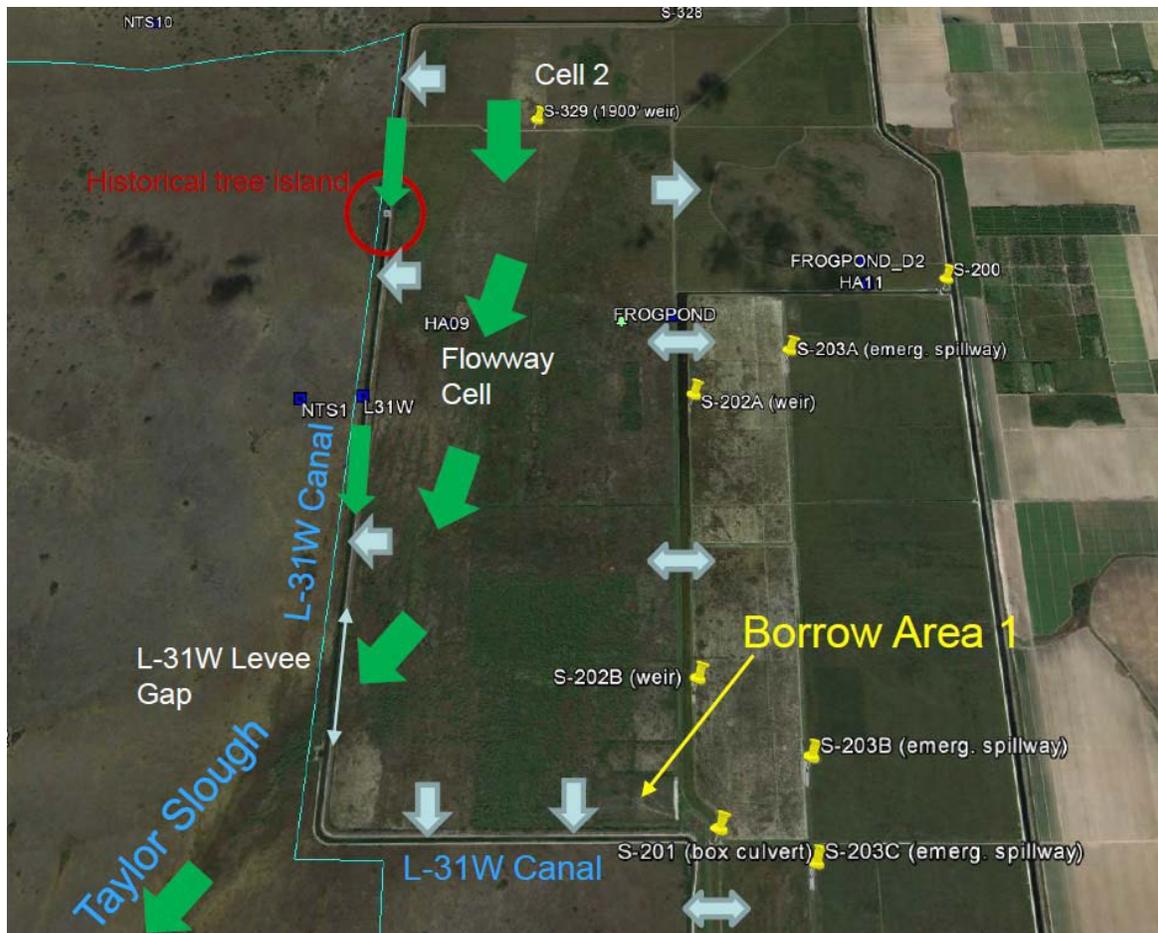
Taylor Slough is in the southeast quadrant of ENP. The area through the Rocky Glades and Taylor Slough is higher in elevation compared to ground levels north, south, or west. Because of this characteristic, the area is normally drier than other areas in the ENP. The Rocky Glades and Taylor Slough are somewhat like an island or a peninsula extending from the canals into the ENP. Under E RTP, specified C-111 basin canal water levels/ranges and S-332D pump station operations have

resulted in Taylor Slough being provided water from the C-111 Basin mainly during the wet season. During the dry season, under ERTF, water deliveries to Taylor Slough were limited to provide conditions conducive to CSSS Sub-population C nesting (325 cfs from December 1 – January 31; 250 cfs from February 1 – July 14).

Since completion of the S-332D Detention Area in 2003, maximum surface water flows observed at the Taylor Slough Bridge (approximately 1.8 miles downstream of the existing L-31W gap and the remnant S-332/S-332I pump stations) typically range between 250 and 550 cfs during the wet season months of June to October. The flow at Taylor Slough includes contributions from the S-332D Detention Area and flow-way, southerly flow within the remnant L-31W Canal (including significant seepage inflows from the S-332D Detention Area), and drainage from the adjacent ENP wetlands. The S-332D Detention Area includes the High Head Cell (a portion of the S-327 weir was degraded by SFWMD in August 2016, as part of the C-111 South Dade Project), the Cell 1 detention area, the Cell 2 detention area, and the flow-way cell. **Figure 4** and **Figure 5** provide an overview of the S-332D Detention Area and the northern reaches of the L-31W Canal, including prevalent surface water flow pathways (indicated by green arrows) and seepage/groundwater flow pathways (indicated by blue arrows). Backfill and/or plugs within the remnant segments of the L-31W Canal will reduce seepage losses from the S-332D Detention Area to the L-31W Canal, reduce drainage of the adjacent ENP wetlands by the L-31W Canal, and promote increased sheetflow to Taylor Slough. Additional plugs along the L-31W Canal are currently planned as part of the C-111 South Dade Project (Reference **Section 1.3.2** of the MWD Increment 1 Plus EA).



**FIGURE 5. NORTHERN S-332D DETENTION AREA.**



**FIGURE 5. SOUTHERN S 332D DETENTION AREA**

### 3.5.5 LOWER EAST COAST AREA

The LEC area is located to the east of the L-31N, L-31W, and C-111 canals. Under ERTTP, specified canal water levels/ranges are meant to provide flood protection, water supply, and prevention of saltwater intrusion for the LEC. The LEC can be provided water supply from WCA 3A and Lake Okeechobee according to their respective regulation schedules. In wet conditions, the excess water from the LEC is discharged to tide.

### 3.5.6 8.5 SQUARE MILE AREA

The 8.5 SMA is a primarily residential area adjacent to, but west of, the L-31N Canal. The 8.5 SMA, which is also known as the Las Palmas community, is bordered on both the west and north by NESRS. The community has water management infrastructure consisting of a perimeter levee, a seepage collection canal, a pump station (S-357), and a southern detention area meant to collectively provide flood mitigation as part of the MWD Project (USACE 2000). An additional seepage collection canal and gated water control structure (S-357N), which are being constructed along the southern boundary of the 8.5 SMA (along Richmond Drive) as part of the MWD Project, are presently planned for completion in August 2017.

### **3.5.7 BISCAYNE BAY**

Biscayne Bay is a shallow, tidal sound located near the extreme southeastern part of Florida. Biscayne Bay, its tributaries, and Card Sound are designated by the State of Florida as aquatic preserves, while Card and Barnes Sounds are part of the Florida Keys National Marine Sanctuary. A significant portion of the central and southern portions of Biscayne Bay comprise Biscayne National Park. Under ERTTP, specified canal water levels/ranges are meant to provide flood protection for the portions of the LEC and Miami-Dade County, which may result in discharges to Biscayne Bay.

### **3.5.8 FLORIDA BAY**

Florida Bay and the Ten Thousand Islands comprise approximately 1,500 square miles of ENP. The bay is shallow, with an average depth of less than three feet. To the north is the Florida mainland and to the south lie the Florida Keys. Sheet flow across the marl prairies of the southern Everglades and 20 creek systems fed by Taylor Slough and the C-111 Canal provide direct inflow of freshwater to the bay. Surface water from SRS flows into Whitewater Bay and these flows may also provide essential recharge for central and western Florida Bay. Exchange with Florida Bay occurs when this lower salinity water mass flows around Cape Sable into the western sub-region of the bay.

## **3.6 REGIONAL WATER MANAGEMENT (OPERATIONS)**

The C&SF Project contains multiple water bodies created by the existing C&SF levee infrastructure and implementation of the water management operating criteria, including WCA 1, WCA 2, and WCA 3. Associated with the inflow to and discharge from the water bodies is an infrastructure of structures and canals that are managed by the implementation of water management operating criteria that can include specified water levels or ranges. The WCA 3A Interim Regulation Schedule, which was implemented with ERTTP, is a compilation of water management operating criteria, guidelines, rule curves, and specifications that govern storage and release functions. Typically, a regulation schedule has water level thresholds which vary with the time of year and result in discharges. The threshold lines of regulation schedules define the discharge zones and are traditionally displayed graphically. Additionally, a corresponding table is typically used to identify the structure discharge rules for the zones. As with most regulation schedules, the WCA 1, WCA 2, and WCA 3A regulation schedules must take into account various, and often conflicting, project purposes. The WCAs are regulated for the Congressionally-authorized C&SF Project purposes to provide: flood control; water supply for agricultural irrigation, municipalities and industry, and ENP; regional groundwater control and prevention of saltwater intrusion; enhancement of fish and wildlife; and recreation. An important component of flood control is the maintenance of marsh vegetation in the WCAs, which provide a dampening effect on hurricane-induced wind tides that have the potential to affect residential areas to the east of the WCAs. The marsh vegetation, along with the east coast protection levee, also prevents floodwaters that historically flowed eastward from the Everglades from flowing into the developed areas along the southeast coast of Florida.

Besides releases from WCA 2A via the S-11 structures, WCA 3A receives inflow from pumping stations S-8, S-9, and S-140. The S-9 pump station removes runoff in the area west of

Ft. Lauderdale known as Western C-11. The S-9A pump station, located adjacent to the S-9 pump station, returns seepage water from WCA 3A and WCA3B collected in the L-37, L-33 and the US 27 borrow canals. The S-140 pump station serves the 110 square mile area north and east of the interceptor canal and west of L-28. S-140 is used to maintain canal levels below 10.5 feet, NGVD unless gravity flow into WCA 3A is possible at an adequate rate. Water also enters northeastern WCA 3A by gravity through the S-150 gated culvert. Discharges at S-142 are made from WCA 3A into the North New River Canal. The SFWMD can pump runoff from the North New River Canal and the C-13 Canal into WCA 3A through S-142 by operating their pump station, G-123.

Water levels in WCA 3A are managed primarily by five gated spillways: the S-12 structures (S-12A, S-12B, S-12C, and S-12D) and S-333. Additionally, the S-151, S-343A, S-343B and S-344 gated culvert structures can be utilized to discharge from WCA 3A. From July 2002 through October 2012, WCA 3A was regulated according to a seasonally varying 8.75 to 10.75 feet, NGVD regulation schedule and the Rainfall Plan (initiated in 1985), as per IOP (2002 IOP EIS and 2006 IOP Final Supplemental EIS). In October 2012, the WCA 3A Regulation Schedule was revised with implementation of the ERTTP recommended plan through the 2012 Water Control Plan. Revisions to the WCA 3A Regulation Schedule included incorporation of the WCA-3A 1960 9.5 to 10.5 feet NGVD Zone A, along with expansion of Zone D forward to December 31 and expansion of Zone E1 backwards to January 1. The discharges made from WCA 3A through the S-12s and S-333 are target flows determined from the Rainfall Plan; when WCA 3A is in Zone A, these target flows are the maximum flow possible based on structure design capacities and consideration of downstream operational constraints. Under the Rainfall Plan, water deliveries are computed and operations adjusted weekly, if necessary based on the sum of two components: a rainfall response component and a WCA 3A supplemental regulatory component. The Rainfall Plan provides for the rainfall response component within all zones of the WCA 3A Regulation Schedule, with the additional regulatory release requirement added when the WCA 3A water levels fall within the higher regulation schedule zones above Zone E, including Zone E1. Under current ERTTP water management practice, which were unchanged with both Increment 1 and Increment Plus, discharge capacity from S-333 into the L-29 Canal and NESRS is maximized prior to utilization of the S-12 structures, in order to limit potential effects from WCA 3A discharges on the CSSS western subpopulation (CSSS-A). When flows through the S-12 structures are determined necessary by the WCA 3A Regulation Schedule and the Rainfall Plan, water managers prioritize flow through the easternmost S-12 structures as capacity allows, in order to minimize flow through the S-12A and S-12B structures. The historical operational target flow distribution of 55% through S-333 into NESRS and 45% through the S-12 structures into ENP west of the L-67 Extension is no longer used as a constraint governing water management operations of WCA 3A and northern ENP under ERTTP. Weekly WCA 3A water management release decisions are coordinated with ENP. MWD Increment Plus specifies seasonal closure of the S-343A, S-343B, S-344, S-12A and S-12B structures, with the following rigid closure periods: October 1 through July 14 for S-343A, S-343B, S-344; November 1 through July 14 for S-12A; and December 1 through July 14 for S-12B. Except under prescribed WCA 3A high water conditions, the S-12A and S-12B seasonal closure period will initiate on October 01. There are no prescribed closure periods for S-12C or D, although either or both of these structures may be closed when Rainfall Plan target releases are achieved through S-333.

Water deliveries to eastern ENP (NESRS) are controlled by the stage in L-29 Canal, as pressure from the water within the canal (hydraulic head), is required to force water through the Tamiami Trail culverts and the one mile bridge and into ENP. As the L-29 Canal stage increases, more water is forced beneath the road through 17 sets of culverts (49 total culverts, three culverts per set in most locations) and the one mile bridge. The L-29 Canal maximum operating stage has been limited under ERTTP and previous regional operating plans due to concerns regarding: (1) potential flooding and seepage effects within residential or agricultural areas of Miami-Dade County; (2) potential damage to the Tamiami Trail roadway sub-base; and (3) potential flooding effects to privately-owned real estate adjacent to Tamiami Trail and within eastern ENP. The MWD Tamiami Trail Modifications (TTM) Project, which was completed in December 2013, included construction of the one mile bridge and Tamiami Trail roadway reconstruction/resurfacing to allow for the maximum operating stage in the L-29 Canal to be raised from 7.5 feet to 8.5 feet, NGVD following the acquisition of the required real estate interests by the Corps and ENP. Following completion of the MWD TTM Project, the MWD Increment Plus water management operating criteria for the L-29 Canal between S-333 and S-334 is meant to limit the L-29 Canal stage to no more than 7.5-7.8 feet, NGVD in response to potential flooding effects to privately-owned real estate adjacent to Tamiami Trail and within eastern ENP which may result from extended durations with higher operating stages in the L-29 Canal (above 7.5-7.8 feet, NGVD). Increment 1.2 includes the capability to raise the L-29 Canal stage maximum operating limit from 7.5 up to 7.8 feet, NGVD, contingent upon compliance with all of the following conditions: (1) acquisition of required real estate interest and any associated improvements for the private ownership along Tamiami Trail including receipt of Tamiami Trail Bridge and roadway channel and flowage easements from the Florida Department of Transportation; (2) completion of the C-358 Canal (Richmond Drive Seepage Collection Canal) and installation of S-357N (C-358 control structure); (3) completion of sufficient portions of Contracts 8 (construction of the C-111 NDA L-315 western levee and the L-357W Extension Levee between Richmond Drive and the 8.5 SMA Detention Cell) and completion of the Contract 8A berms inside the 8.5 SMA Detention Cell. ERTTP also included an additional operational constraint for the L-29 Canal water level related to potential flooding and seepage effects within residential and/or agricultural areas of Miami-Dade County; this constraint, which is removed during implementation of the MWD Increment 1 Plus planned deviation, required S-333 discharges to NESRS will be discontinued when the G-3273 water level within NESRS reaches 6.8 feet, NGVD during the normal Column 1 mode of operations, or S-333 discharges into the L-29 Canal to be matched with S-334 discharges out of the L-29 Canal when operating under the Column 2 mode of operations.

When WCA 3A water levels are in Zone A of the WCA 3A Interim Regulation Schedule, S-343A, S-343B, and S-344 can be utilized to discharge from WCA 3A into BCNP outside if the prescribed closure period for these gated culvert structures. Discharges can also be made through S-343A, S-343B and S-344 when agreed to by SFWMD, Corps, and NPS to extend hydroperiods within BCNP. The S-151 gated culvert structure is located along the Miami Canal and operated according to the WCA 3A Interim Regulation Schedule (USACE 2012a). S-151 discharges into the Miami Canal (C-304) in WCA 3B for flood diversion and for the purpose of providing water supply to LEC canals and the SDCS. Under existing conditions, water does not flow directly from WCA 3B into the L-29 Borrow canal. There are two discharge structures, gated spillways S-355A and S-355B, along L-29 south of WCA 3B that are designed to move water from WCA 3B into the L-29 Canal. The S-355 structures are completed components of the MWD Project, intended to

function in concert with the proposed MWD S-345 structures along L-67A/L-67C to address the MWD Project objective of restoring WCA 3B as a functioning component of the Everglades hydrologic system and restoration of water deliveries to NESRS.

There are three distinct modes of water management operations for MWD Increment 1 Plus, which are consistent with the previous IOP (2002, 2006 Supplement) and ERTTP (2012 Water Control Plan): Column 1, Column 2, and water supply. Column 1 refers to the condition when regulatory releases from WCA 3A can be met by normal operation of the WCA 3A regulatory outlets (the S-12 structures, S-333, S-151, S-343A, S-343B, and/or S-344). Column 2 refers to the condition when regulatory releases from WCA 3A are made via S-333 to the L-29 Canal and via S-334 to the L-31N Canal and the SDCS; Column 2 operations generally require the use of pump stations S-331, S-332B, S-332C, and S-332D. During Column 2 operations, the control stages along the L-31N Canal are also lowered to minimize potential flood impacts to the SDCS and also to provide the necessary downstream gradient for the S-334 releases to reach S-332B, S-332C, and S-332D pump stations. Column 2 operations are used to offset or mitigate for potential adverse effects on WCA 3A related to actions taken to protect CSSS sub-population A within western ENP, including seasonal closure of the S-12A and S-12B regulatory outlets under ERTTP (S-12C seasonal closure criteria were additionally included with IOP). The IOP/ERTTP generally prescribed that the Column 2 mode of operation would be used when any S-12 structure is closed in order to protect the CSSS (November 1 through July 14, under ERTTP), although Column 1 operations would continue until the capacity of the S-12 structures that remain open is insufficient to handle the discharge from WCA 3A. Similarly, the IOP/ERTTP generally prescribed that Column 2 operations may continue past re-opening of the S-12 structures (July 15) to mitigate for adverse effects on WCA 3A stage levels resulting from the ERTTP closures of S-12A, S-12B, S-343A, S-343B, and S-344, based on comparison to WCA stage levels that would have been expected under the WCA 3A Regulation Schedule in place prior to the 2000 Interim Structural and Operational Plan (ISOP; the predecessor of IOP 2002); the cited 1985 WCA 3A Regulation Schedule was first incorporated the Rainfall Plan and included no seasonal closures for the S-12s. Under historical IOP and ERTTP operations, the Column 2 mode of operations has also been used as an additional water management tool for WCA 3A high water conditions. Beginning in 2014, the Corps and SFWMD are applying a WCA 3A water budget accounting tool to track the expected effect on WCA 3A stage levels resulting from the ERTTP closures of S-12A, S-12B, S-343A, S-343B, and S-344.

MWD Increment 1 Plus is a planned deviation from ERTTP that includes modifications determined as necessary, following review of monitoring data associated with Increment 1 and the 2016 Temporary Emergency Deviation, to the Increment 1 operational strategy to maintain the Congressionally-authorized flood mitigation requirements within the 8.5 SMA and to facilitate completion of the Canal 111 South Dade Projects ongoing construction necessary for Increment 2 of the field test. Increment 1, which was initiated on October 15, 2015 maintained the ERTTP maximum operating limit of 7.5 feet, NGVD in the L-29 Canal, while relaxing the G-3273 constraint for S-333, and utilizing S-356 for control of the seepage to the L-31N Canal.

### **3.7 FLOOD CONTROL**

Water management and flood control is achieved in South Florida through a variety of canals, levees, pumping stations, and control structures within the WCAs, ENP, and SDCS. The WCAs provide a detention reservoir for rainfall over the WCAs, excess water from the EAA and parts of

the east coast region, and for flood discharge from Lake Okeechobee to tide. The WCAs provide levees to prevent the Everglades floodwaters from inundating the east coast urban areas; provide a water supply for the east coast areas and ENP; improve water supply for east coast communities by recharging underground freshwater reservoirs; reduce seepage; ameliorate salt-water intrusion in coastal well fields; and provide mixed quality habitat for fish and wildlife in the Everglades.

The East Coast Canals are flood control and outlet works that extend from St. Lucie County southward through Martin, Palm Beach, and Broward Counties to Miami-Dade County. The East Coast Canal watersheds encompass the primary canals and water control structures located along the LEC and their hydrologic basins. The main design functions of the project canals and structures in the East Coast Canal area are to protect the adjacent coastal areas against flooding; store water in conservation areas west of the levees; control water elevations in adjacent areas; prevent salt-water intrusion and over-drainage; provide freshwater to Biscayne Bay; and provide for water conservation and public consumption. The East Coast Canals consist of 40 independently operated canals, one levee, and 50 operating structures, consisting of 35 spillways, 14 culverts, and one pump station. The project operates to prevent major flood damage; however, due to urbanization, the existing surface water management system now has to handle greater peak flows than in the past. The SDCS provides a way to deliver water to areas of south Miami-Dade County. This canal system was overlaid on the existing flood control system. Many of these canals are used to remove water from interior areas to tide in times of excess water.

The C-111 South Dade Project was authorized to remove 40 percent of the Standard Project Flood (SPF) flows. This purpose remains an important objective because of the remaining agriculture within the basin. The South-Dade County Basin (south of the S-331 pump station) is provided flood protection by operation of the S-332B/S-332C/S-332D pump stations completed under the C-111 South Dade Project and through operation of the L-31N and C-111 Canal control structures (S-176, S-177, S-18C, and S-197). The South-Dade County basin may also receive inflows from upstream basin drainage through the S-331 pump station and the adjacent S-173 gated culvert structure. Under the 2012 Water Control Plan and MWD Increment 1 Plus, S-331/S-173 releases are the result of water management operations to: (1) maintain target L-31N Canal stages; (2) provide flood mitigation to the 8.5 SMA eastern areas when sufficient capacity is available at S-357 and maintain flood mitigation for the 8.5 SMA when S-357 operational capacity is limited; and (3) WCA 3A regulatory releases to the SDCS from S-334 during ERTF Column 2 operations. The COP will include regional hydrologic modeling in order to balance the ecological restoration objectives of the MWD and C-111 South Dade projects while demonstrating compliance with the project constraints. This will include flood mitigation requirements to prevent potential MWD project-induced flood damages in the 8.5 SMA and to maintain the level of flood damage reduction associated with the 1994 C-111 GRR-EIS Recommended Plan. The performance of the C-111 South Dade Project features, with respect to both project objectives and constraints, is dependent on the outcome of the COP, including details of the operational plans and operational constraints within WCA 3A, ENP, and the 8.5 SMA.

### **3.8 VEGETATIVE COMMUNITIES**

The Everglades landscape is dominated by a complex of freshwater wetland communities that includes open water sloughs and marshes, dense grass- and sedge-dominated marshes, forested islands, and wet marl prairies. The primary factors influencing the distribution of dominant

freshwater wetland plant species of the Everglades are soil type, soil depth, and hydrological regime (USFWS 1999). These communities generally occur along a hydrological gradient with the slough/open water marsh communities occupying the wettest areas (flooded more than nine months per year), followed by sawgrass marshes (flooded six to nine months per year), and wet marl prairie communities (flooded less than six months per year) (USFWS 1999). The Everglades freshwater wetlands eventually grade into intertidal mangrove wetlands and sub tidal seagrass beds in the estuarine waters of Florida Bay. Development and drainage over the last century have dramatically reduced the overall spatial extent of freshwater wetlands within the Everglades, with approximately half of the pre-drainage 2.96 million acres of wetlands being converted for development and agriculture (Davis and Ogden 1997). Alteration of the normal flow of freshwater through the Everglades has also contributed to conversions between community types, invasion by exotic species, and a general loss of community diversity and heterogeneity.

Vegetative communities of the WCAs have suffered from both over-drainage and prolonged periods of inundation associated with the stabilization of water levels (USACE 1999). Many areas of WCA 3A still contain relatively good wetland habitat consisting of a complex of tree islands, sawgrass marshes, wet prairies, and aquatic sloughs. However, the northern portion of WCA 3A has been over-drained, resulting in increased fire frequency and the associated loss of tree islands, wet prairie, and aquatic slough habitat. Northern WCA 3A is currently dominated largely by mono-specific sawgrass stands and lacks the diversity of communities that exists in southern WCA 3A. In southern WCA 3A, Wood and Tanner (1990) first documented the trend toward deep water lily dominated sloughs due to impoundment. In approximately 1991, the hydrology of southern WCA 3A shifted to deeper water and extended hydroperiods resulting in corresponding shifts in vegetation communities (Zweig and Kitchens 2008). Typical Everglades vegetation, including tree islands, wet prairies, sawgrass marshes, and aquatic sloughs is contained in WCA 3B. However, within WCA 3B, the ridge and slough landscape has been severely degraded by the virtual elimination of overland sheetflow due to the L-67 Canal and Levee system. WCA 3B experiences very little overland flow and has become primarily a rain-fed system pre-dominated by shorter hydroperiod sawgrass marshes with relatively few sloughs or tree islands remaining. Water levels in WCA 3B are also too low and do not vary seasonally, contributing to poor ridge and slough patterning. Loss of sheetflow to WCA 3B has also accelerated soil loss reducing elevations of the remaining tree islands in WCA 3B and making them vulnerable to high water stages.

Vegetative trends in ENP have included a substantial shift from the longer hydroperiod slough/open water marsh communities to shorter hydroperiod sawgrass marshes (Davis and Ogden 1997; Armentano et al. 2006). In addition, invasion of sawgrass marshes and wet prairies by exotic woody species has led to the conversion of some marsh communities to forested wetlands (Gunderson et al. 1997).

The estuarine communities of Florida Bay have also been affected by upstream changes in freshwater flows through the Everglades. 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 (USFWS 1999). Mangrove communities along Biscayne Bay have also seen a reduction in freshwater inflows and a reduction in historic habitat range by urban and agricultural development leaving only a remnant ribbon of

suitable habitat immediately adjacent to the bay. Both bays experiences salinities in excess of 40 practical salinity unit on a seasonal basis. Manatee Bay and Barnes Sound are presently characterized by extended periods with little or no freshwater input, interspersed with erratic large volume discharges from the C-111 Canal, which is presently the major source of freshwater flows.

In contrast to the vast extent of wetland communities, upland communities comprise a relatively small component of the Everglades landscape and are largely restricted to Long Pine Key, the northern shores of Florida Bay, and the many tree islands scattered throughout the region. Vegetative communities of Long Pine Key include rockland pine forest and tropical hardwood forest. In addition, substantial areas of tropical hardwood hammock occur along the northern shores of Florida Bay and on elevated portions of some forested islands.

The vast majority of wetland features within the 8.5 SMA have undergone varying degrees of disturbance related to land clearing for agricultural or residential improvements and invasion by exotic species. Generally, wetlands with the least amount of disturbance are located in the western areas of the 8.5 SMA. The developed (eastern) portion of the 8.5 SMA, except the Federal Aviation Administration (FAA) radar facility, is virtually devoid of wetlands, whereas a zone extending down the central portion is dotted by wetlands intermixed within agricultural and residential land uses. Many of the wetland communities include varying densities of exotics including: Brazilian pepper (*Schinus terebinthifolius*), Australian pine (*Casuarina equisetifolia* L.), and melaleuca (*Melaleuca quinquenervia*). The 8.5 SMA includes an Australian pine forest that is very dense, supporting a sparsely vegetated understory and ground cover. A prevalent ground cover species is sawgrass, growing within a thick layer of duff comprised entirely of pine needles. Australian pine can be found in monotypic stands, along marsh and prairie edges, and in abandoned fields. Brazilian pepper is common along roadsides and also forms dense wooded plots throughout the 8.5 SMA (USACE 2012a).

### 3.9 FISH AND WILDLIFE RESOURCES

Aquatic macro invertebrates form a vital link between the algal and detrital food web base of freshwater wetlands and the fishes, amphibians, reptiles, and wading birds that feed upon them. Important macro invertebrates of the freshwater aquatic community include crayfish (*Procambarus alleni*), riverine grass shrimp (*Palaemonetes paludosus*), amphipods (*Hyallela aztecus*), Florida apple snail (*Pomacea paludosa*), Seminole ramshorn (*Planorbella duryi*), and numerous species of aquatic insects (USACE 1999).

Small freshwater marsh fishes are also important processors of algae, plankton, macrophytes, and macro invertebrates. Marsh fishes provide an important food source for wading birds, amphibians, and reptiles. Common small freshwater marsh species include the native and introduced golden topminnow (*Fundulus chrysotus*), least killifish (*Heterandria formosa*), Florida flagfish (*Jordenella floridae*), golden shiner (*Notemigonus crysoleucas*), sailfin molly (*Poecilia latipinna*), bluefin killifish (*Lucania goodei*), oscar (*Astronotus ocellatus*), eastern mosquitofish (*Gambusia holbrooki*), and small sunfishes (*Lepomis* spp.) (USACE 1999).

Within the Greater Everglades, numerous sport and larger predatory fishes occur in deeper canals and sloughs. Common species include largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), redear sunfish (*Lepomis microlophus*), black crappie (*Pomoxis*

*nigromaculatus*), Florida gar (*Lepisosteus platyrhincus*), threadfin shad (*Dorosoma petenense*), gizzard shad (*Dorosoma cepedianum*), yellow bullhead (*Ameiurus natilis*), white catfish (*Ameiurus catus*), bowfin (*Amia calva*), and tilapia (*Tilapia* spp.) (USACE 1999). Larger fishes are an important food source for wading birds, alligators, otters, raccoons, and mink.

The freshwater wetland complex supports a diverse assemblage of reptiles and amphibians. Common amphibians include the greater siren (*Siren lacertina*), Everglades dwarf siren (*Pseudobranchius striatus*), two-toed amphiuma (*Amphiuma means*), pig frog (*Rana grylio*), southern leopard frog (*Rana sphenoccephala*), Florida cricket frog (*Acris gryllus*), southern chorus frog (*Pseudacris nigrita*), squirrel tree frog (*Hyla squirela*), and green tree frog (*Hyla cinerea*) (USACE 1999). Amphibians also represent an important forage base for wading birds, alligators, and larger predatory fishes (USACE 1999).

Common reptiles of freshwater wetlands include the American alligator (*Alligator mississippiensis*), snapping turtle (*Chelydra serpentina*), striped mud turtle (*Kinosternon bauri*), mud turtle (*Kinosternon subrubrum*), cooter (*Chrysemys floridana*), Florida chicken turtle (*Deirochelys reticularia*), Florida softshell turtle (*Trionyx ferox*), water snake (*Natrix sipidon*), green water snake (*Natrix cyclopion*), mud snake (*Francia abacura*), and Florida cottonmouth (*Agkistrodon piscivorus*) (USACE 1999).

The freshwater wetlands of the Everglades are noted for their abundance and diversity of colonial wading birds. Common wading birds include the white ibis (*Eudocimus albus*), glossy ibis (*Plegadus falcenellus*), great egret (*Casmerodius albus*), great blue heron (*Ardea herodias*), little blue heron (*Egretta caerulea*), tricolored heron (*Egretta tricolor*), snowy egret (*Egretta thula*), green-backed heron (*Butorides striatus*), cattle egret (*Bubulcus ibis*), black-crowned night heron (*Nycticorax nycticorax*), yellow-crowned night heron (*Nycticorax violacea*), roseate spoonbill (*Ajaia ajaja*), and wood stork (*Mycteria americana*) (USACE 1999).

Mammals that are well-adapted to the aquatic and wetland conditions of the freshwater marsh complex include the rice rat (*Oryzomys palustris natator*), round-tailed muskrat (*Neofiber alleni*), and river otter (*Lutra canadensis*). Additional mammals that may utilize freshwater wetlands on a temporary basis include the white-tailed deer (*Odocoileus virginianus*), Florida panther (*Puma concolor coryi*), bobcat (*Lynx rufus*), and raccoon (*Procyon lotor*).

Conditions within the 8.5 SMA provide important resources for opportunistic small animals including raccoons, rabbits, squirrels, songbirds, hawks, kestrels, crows, turkey vultures, frogs, and various reptiles. White-tailed deer have been observed. On-site surveys have found the greatest degree of species richness within the forested wetland systems within the ENP lands to the west of the 8.5 SMA, whereas species richness was lowest in wetlands on higher elevations (7.0-8.0 feet, NGVD) in the eastern regions of the 8.5 SMA, in close proximity to L-31N (USACE 2011). This eastern region of the 8.5 SMA is dedicated to agricultural and residential land uses, and provides only marginal benefits to resident wildlife (USACE 2012a).

The change in fish and wildlife diversity and wetland function between the western and eastern portions of the 8.5 SMA correlates with an elevation gradient (increasing elevations from west to east) and land use. Both elevation and land use are interdependent co-variables as lower elevations

correlate with frequent flooding that limits the extent and type of land use. Higher elevations are more compatible with agricultural, commercial, and residential land uses. A recent overview of wildlife observed within the 8.5 SMA can be found in the 2011 Proposed Interim Operating Criteria for 8.5 SMA EA (USACE 2011), and 2012 design refinement for the 8.5 SMA EA (USACE 2012a).

### 3.10 THREATENED AND ENDANGERED SPECIES

#### 3.10.1 FEDERALLY PROTECTED SPECIES

The Corps has coordinated with USFWS and National Marine Fisheries Service (NMFS), in accordance with Section 7 of the Endangered Species Act, to determine federally-listed threatened and endangered species that are either known to occur or are likely to occur within the project area (Table 3).

**TABLE 3. FEDERALLY THREATENED AND ENDANGERED SPECIES WITHIN THE PROJECT AREA.**

Common Name	Scientific Name	Status
<b>Mammals</b>		
Florida panther	<i>Puma concolor coryi</i>	E
Florida manatee	<i>Trichechus manatus latirostris</i>	E, CH
Florida bonneted bat	<i>Eumops floridanus</i>	E
<b>Birds</b>		
Cape Sable seaside sparrow	<i>Ammodramus maritimus mirabilis</i>	E, CH
Everglade snail kite	<i>Rostrhamus sociabilis plumbeus</i>	E, CH
Piping plover	<i>Charadrius melodus</i>	T
Red-cockaded woodpecker	<i>Picoides borealis</i>	E
Roseate tern	<i>Sterna dougallii</i>	T
Wood stork	<i>Mycteria Americana</i>	T
<b>Reptiles</b>		
American Alligator	<i>Alligator mississippiensis</i>	T, SA
American crocodile	<i>Crocodylus acutus</i>	T, CH
Eastern indigo snake	<i>Drymarchon corais couperi</i>	T
Gopher tortoise	<i>Gopherus polyphemus</i>	C
Green sea turtle	<i>Chelonia mydas</i>	E
Hawksbill sea turtle	<i>Eretmochelys imbricate</i>	E
Kemp's Ridley sea turtle	<i>Lipodochelys kempii</i>	E
Leatherback sea turtle	<i>Dermochelys coriacea</i>	E
Loggerhead sea turtle	<i>Caretta</i>	T

<b>Fish</b>		
Smalltooth sawfish	<i>Pristis pectinata</i>	E
<b>Invertebrates</b>		
Bartram's hairstreak butterfly	<i>Strymon acis bartrami</i>	E
Elkhorn coral	<i>Acropora palmata</i>	T, CH
Florida leafwing butterfly	<i>Anaea troglodyta floridalis</i>	E
Miami blue butterfly	<i>Cyclargus thomasi bethunebakeri</i>	E
Schaus swallowtail butterfly	<i>Heraclides aristodemus ponceanus</i>	E
Staghorn coral	<i>Acropora cervicornis</i>	T, CH
Stock Island tree snail	<i>Orthalicus reses</i> (not incl. <i>nesodryas</i> )	T
<b>Plants</b>		
Crenulate lead plant	<i>Amorpha crenulata</i>	E
Deltoid spurge	<i>Chamaesyce deltoidea</i> spp. <i>deltoidea</i>	E
Garber's spurge	<i>Chamaesyce garberi</i>	T
Johnson's seagrass	<i>Halophila johnsonii</i>	E, CH
Okeechobee gourd	<i>Cucurbita okeechobeensis</i> ssp. <i>okeechobeensis</i>	E
Small's milkpea	<i>Galactia smallii</i>	E
Tiny polygala	<i>Polygala smallii</i>	E
Big pine partridge pea	<i>Chamaecrista lineata</i> var. <i>keyensis</i>	E
Blodgett's silverbush	<i>Argythamnia blodgettii</i>	T
Cape Sable thoroughwort	<i>Chromolaena frustrata</i>	E, CH
Carter's small-flowered flax	<i>Linum carteri</i> var. <i>carteri</i>	E, CH
Everglades bully	<i>Sideroxylon reclinatum</i> spp. <i>austrofloridense</i>	C
Florida brickell-bush	<i>Brickellia mosieri</i>	E, CH
Florida bristle fern	<i>Trichomanes punctatum</i> spp. <i>floridanum</i>	E
Florida semaphore cactus	<i>Consolea corallicola</i>	E, CH
Sand flax	<i>Linum arenicola</i>	E

### 3.10.2 STATE LISTED SPECIES

The project area also provides habitat for several state listed species **Table 4**.

**TABLE 4. STATE LISTED SPECIES WITHIN THE PROJECT AREA**

Common Name	Scientific Name	Status
Mammals		
Florida black bear	<i>Ursus americanus floridanus</i>	T
Everglades mink	<i>Mustela vison evergladensis</i>	T
Florida mouse	<i>Podomys floridanus</i>	SC
Florida mastiff bat	<i>Eumops glaucinus floridanus</i>	E
Birds		
Piping plover	<i>Charadrius melodus</i>	T
Snowy plover	<i>Charadrius alexandrinus</i>	T
American oystercatcher	<i>Haematopus palliatus</i>	E
Brown pelican	<i>Pelecanus occidentalis</i>	SC
Black skimmer	<i>Rynchops niger</i>	SC
Least tern	<i>Sterna antillarum</i>	T
White-crowned pigeon	<i>Columba leucocephalus</i>	T
Least tern	<i>Sterna antillarum</i>	T
Limpkin	<i>Aramus guarauna</i>	SC
Little blue heron	<i>Egretta caerulea</i>	SC
Tricolored heron	<i>Egretta tricolor</i>	SC
Snowy egret	<i>Egretta thula</i>	SC
Reddish egret	<i>Egretta rufescens</i>	SC
White ibis	<i>Eudocimus albus</i>	SC
Roseate spoonbill	<i>Ajajaajaja</i>	SC
Fish		
Mangrove rivulus	<i>Rivulus marmoratus</i>	SC
Invertebrates		
Miami blue butterfly	<i>Cyclargus [=Hermiargus] thomasi bethunebakeri</i>	E
Florida tree snail	<i>Liguus fasciatus</i>	SC
Plants		
Pine-pink orchid	<i>Bletia purpurea</i>	T
Lattace vein fern	<i>Thelypteris reticulata</i>	E
Eatons spikemoss	<i>Selaginella eatonii</i>	E
Wright's flowering fern	<i>Anemia wrightii</i>	E
Tropical fern	<i>Schizaea pennula</i>	E
Mexican vanilla	<i>Manilla mexicana</i>	E

E=Endangered; T=Threatened; SC=Species of Special Concern

### 3.11 ESSENTIAL FISH HABITAT

The Magnuson-Stevens Fishery Conservation and Management Act, 16USC 1801 et seq. Public Law 104-208 reflects the Secretary of Commerce and Fishery Management Council authority and responsibilities for the protection of essential fish habitat (EFH). The southern estuaries comprise Biscayne National Park and a large portion of ENP and are a shallow estuarine system (average depth less than 3 feet). Florida Bay is the main receiving water of the greater Everglades. The southern estuaries contain essential fish habitat for corals; coral reef and live bottom habitat; red drum (*Sciaenops ocellatus*); penaeid shrimps; spiny lobster (*Panulirus argus*); other coastal migratory pelagic species and the snapper-grouper complex. Essential fish habitat in the southern estuaries is comprised of seagrasses, estuarine mangroves, intertidal flats, the estuarine water column, live/hard bottoms, and coral reefs.

## 3.12 WATER QUALITY

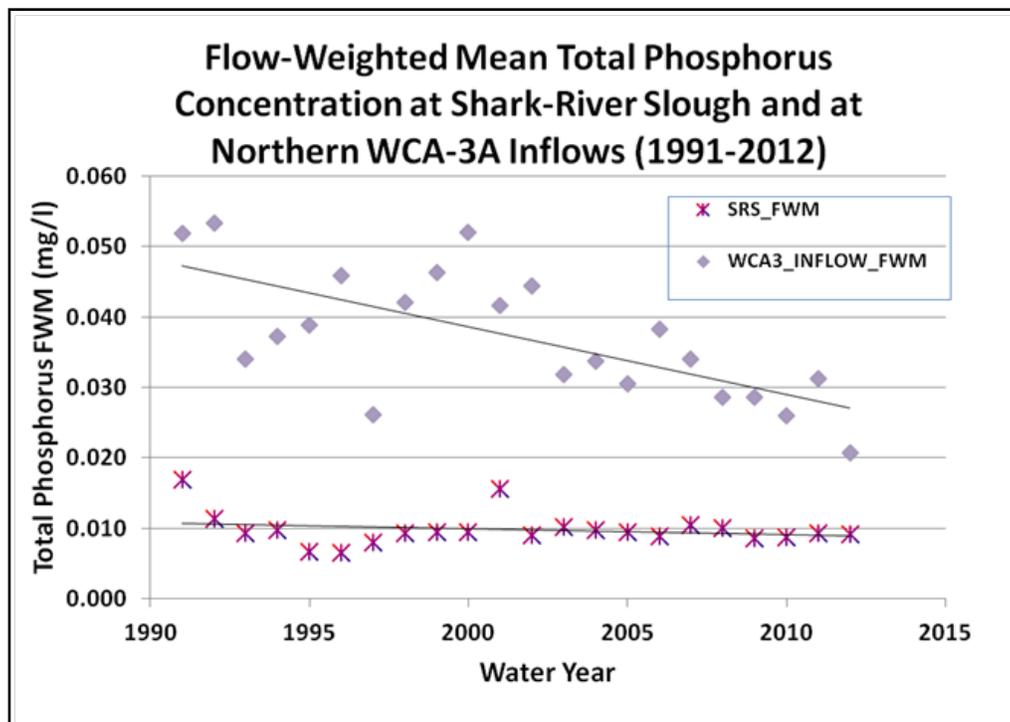
Water quality in the study area is significantly influenced by development. The C&SF Project led to significant changes in the landscape by opening large land tracts for urban development and agricultural uses, and by the construction of extensive drainage networks. Natural drainage patterns in the region have been disrupted by the extensive array of levees and canals which has resulted in further water quality degradation. The water quality of the study area is largely controlled by Lake Okeechobee and the EAA to the north and urban and agricultural development southeast of ENP. The northern WCAs are fed from Lake Okeechobee as well as runoff from the EAA. Stormwater Treatment Areas (STAs) were constructed to reduce total phosphorus from surface water runoff releases from Lake Okeechobee. Water quality impairment within the study area can generally be attributed to nutrients and bioavailable forms of mercury. A short discussion of nutrients is provided below followed by a review of water quality within the project area. This proposed action will have no impacts on mercury deposition (atmospheric source) or mercury methylation (due to factors not influenced by this proposed action, such as sulfur content in the water column etc).

### 3.12.1 NUTRIENTS

Nutrients such as phosphorus and nitrogen compounds are a concern in the estuaries, WCAs, ENP, and Lake Okeechobee since they result in an imbalance of flora and fauna. To address nutrient discharges the FDEP has recently established surface water quality numeric nutrient criteria for all Florida water bodies and developed National Pollution Discharge Elimination (NPDES) Total Maximum Daily Loads (TMDLs) for many watersheds with excessive nutrient pollution. TMDLs for phosphorus and/or nitrogen currently exist for Lake Okeechobee. Additional information on the status and implementation of TMDLs within the study area can be found at <http://www.dep.state.fl.us/water/tmdl/>. Within the Everglades Protection Area, phosphorus concentrations are regulated by the “Phosphorus Rule” 62-302.540 F.A.C. and are subject to the terms of the 1992 Consent Decree in *United States v. South Florida Water Management, District (S.D. Fla No. 88-1886-CIV-MORENO)*.

Total phosphorus is the nutrient of concern within WCA 3 and NESRS. Under the current conditions, total phosphorus concentrations at the structures involved in this project area are higher than that the wet season average and are expected to drop as the marsh recovers from dryout conditions. Any discharges from the S152 are required to be at or below 10ppb total phosphorus (geomean). SRS was in compliance with the SA requirements for Water Year (WY) 2016 (October 1, 2015- September 30, 2016).

**Figure 7** illustrates background information on total phosphorus concentrations at SRS and northern WCA 3A inflows. Due to the long duration of the upstream wet season conditions in the WCA's, water quality was good (low phosphorus concentrations) for deliveries to WCA 3B and the ENP NESRS during WY 2016 as compared to average rainfall and dry years. It is expected for WY 2017 that water quality will be good (low phosphorus concentrations as measured on a flow weighted mean average for WY 2017) for WCA 3A and SRS, based on the past rainfall patterns and expected average rainfall for the wet season. Even with no additional rainfall (very low likelihood), the volume of water in the WCA's is sufficiently high enough to allow marsh recovery (low phosphorus concentration achieved) for the remainder of the wet season.



**FIGURE 6. FLOW-WEIGHTED MEAN TOTAL PHOSPHORUS CONCENTRATION AT SHARK RIVER SLOUGH AND NORTHERN WCA 3A INFLOWS.**

### 3.13 NATIVE AMERICANS

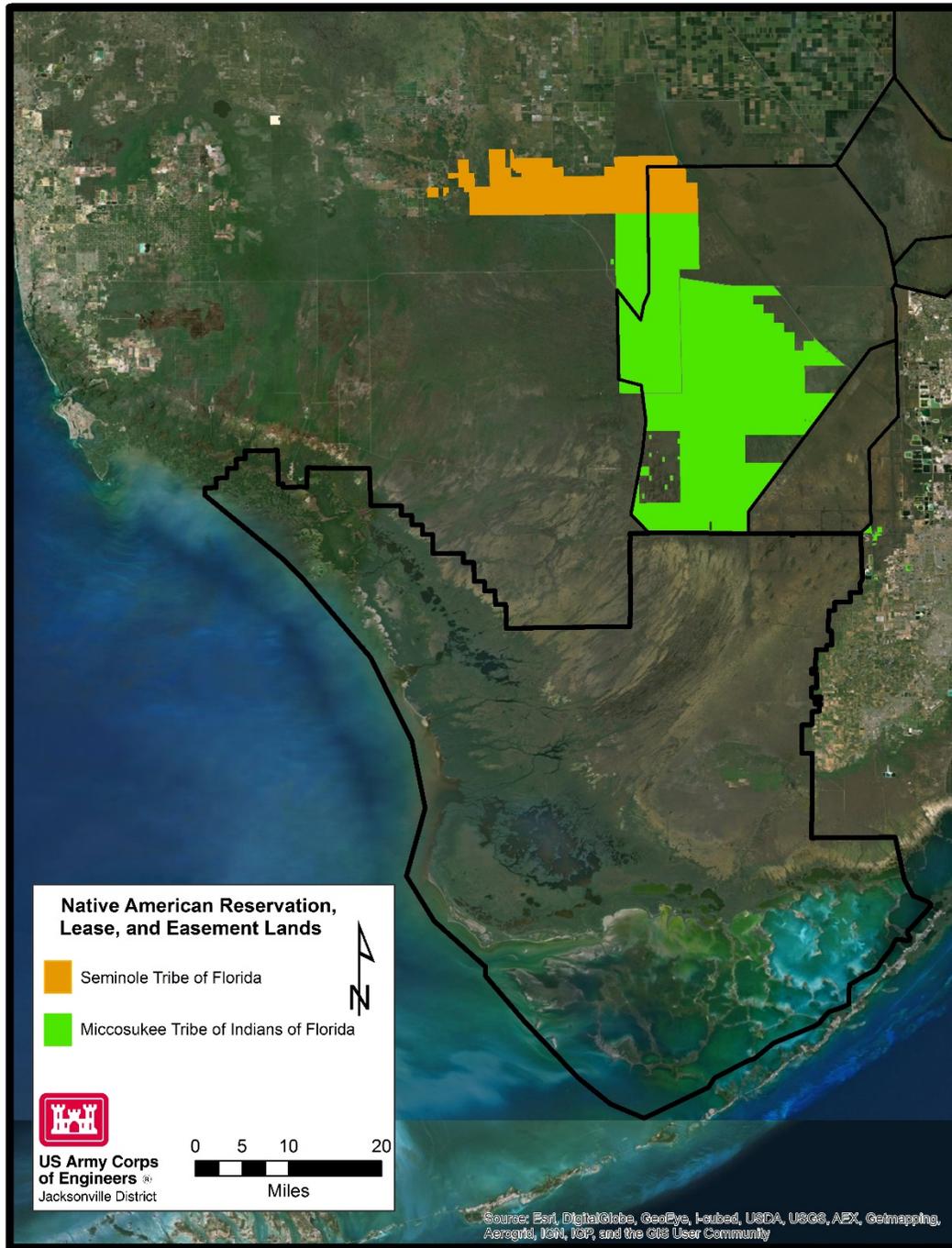
There are two federally recognized tribes (Miccosukee Tribe of Indians of Florida and the Seminole Tribe of Florida) that are located within and adjacent to the project area (**Figure 8**). Both tribes maintain a strong connection to the project area through continued use and regard the indigenous populations of Florida as their ancestors. The project area includes a large segment of the Miccosukee Tribe's Alligator Alley Reservation which spans portions of WCA 3A, the Tamiami Trail Reservation Area which consists of three parcels of land used for commercial services, and the Miccosukee Reserved Area which is the center of the Miccosukee Indian population. In addition, both tribes have leases and easements within WCA 3A and have historically recognized rights within ENP that stems from the Native Americans who lived within the ENP boundary prior to the parks creation.

The Miccosukee Tribe of Indians of Florida and Seminole Tribe of Florida have a long history of living within the project area. Both tribes moved into the region during the eighteenth and nineteenth centuries from Georgia and Alabama. Fleeing the U.S. Army and the forced relocation policies of the Indian Removal Act (1830), the Miccosukee and Seminoles were part of Native American groups commonly referred to as Seminoles; however, there are references to some of the groups involved in the conflict as Mikasuki, which supports the subsequent separation of the two groups (Weisman 1999). Many of these groups fled into the swamp areas of South Florida and made their homes within the Everglades and other remote areas of region. The coming of the Civil War led to the abandonment of the removal efforts and the various Native American groups were largely left alone until the late nineteenth century. In 1928 the Tamiami Trail opened, cutting through the Everglades and bringing along with it tourists and explorers into the region, and, for

the first time, bringing complete access for the various tribes to participate in the larger economy that was growing in South Florida.

As early as 1894, the Federal governmental and later the State of Florida started to acquire lands within the Big Cypress area. However, initial attempts to relocate tribal members to these areas failed as there were simply no incentives to abandon traditionally occupied areas in favor of the new lands (Weisman 1999). “The Indian New Deal changed that, and for the first time, services, programs, and land were brought together...at Big Cypress” (Weisman 1999:125). In the 1930s, the Federal Government started to bring services to the various Seminole groups. Some of the groups relocated and started to receive Federal aid, while some groups resisted government intrusion into their lives and remained in various traditional areas that now included sites along Tamiami Trail (Weisman 1999). Throughout the next two decades the Federal Government instituted various aid programs to assist the Native American groups living within the reservations until the early 1950s. In the early 1950s, the Federal Government’s policies radically changed, as it was felt that native groups should now join “mainstream society” and that Federal aid should come to an end (Weisman 1999:131). Being faced with a reduction in support and possible termination of recognition as a group by the government, various Native American groups on these reservations began to organize and form their own tribal governments to assist in the protection of their interests. In 1957, the Seminole Tribe of Florida received Federal recognition. However, wishing to remain separate and to maintain their own identity, many of the groups along the Tamiami Trail refused to join and instead held out to form their own government that would be federally recognized in 1962 as the Miccosukee Tribes of Indians of Florida.

Today most of the Miccosukee Tribe lives within the confines of the reservation located along the forty mile bend of Tamiami Trail while many of the Seminoles Tribal members live on various reservations properties with the largest being those of Big Cypress, Hollywood, and Brighton Reservations. In addition to the Federal reservation, the Miccosukee Tribe has also established a perpetual lease to large portions of the WCA 3A area while the Seminole Tribe has a lease within the northwestern portion of WCA 3A. The members of both groups maintain a traditional life style that is intricately connected to the Everglades. Traditional practices of hunting, fishing and general living are still maintained, along with modern entrepreneurship through various enterprises such as cattle ranching and with tourism related businesses along Tamiami Trail. Today, both tribes have vibrant, thriving cultures based within the Everglades region. These practices continue to tie the Tribes to the Everglades in such a way that careful consideration of effects is warranted.



**FIGURE 8. MAP OUTLINING THE LOCATION OF TRIBAL RESERVATION, LEASED AND EASEMENT LANDS.**

### 3.14 CULTURAL RESOURCES

Within the larger region that includes ENP and WCA3, there are numerous recorded archeological sites indicative of Native American habitation. Prior to European contact, the Everglades were a heavily populated area. Native Americans traveled via canoe and on foot through the saw grass

and inhabited many of the tree islands that dot the landscape. The earliest known habitation sites date to the Early Archaic period (7,500 BC) when the Everglades were much drier. However, within the larger area of South Florida, evidence of Paleo-Indian (12,000 to 7,500 BC) habitation has also been recorded (i.e. Warm Mineral Springs (8SO18) and Little Salt Spring (8SO79) (Griffin 1988). Some of the Early Archaic habitation sites have only recently been rediscovered as the result of managed drainage programs in South Florida. As the climate warmed and sea level rose, many Native Americans abandoned the lowest of the tree islands as they became submerged. This process continued through what is known as the Middle Archaic, until climate conditions stabilized around 300 BC at the start of the Late Archaic. Today many sites from both the Early and Middle Archaic periods are no longer submerged and may have more modern Native American use.

After the Archaic period, the region became incorporated into what is known as the Glades region and remained inhabited until European contact, when Old World diseases and slave raiding heavily reduced the Native populations during the late 1,500s-1,700s. Many of the tree islands through this portion of the Everglades have sites associated to the Glades period. This period has been broken down into successive stages starting with Glades I, which dates from 500 BC to 750 AD, Glades Period II dating from 750 to 1,200 AD, and Glades Period III dating from 1,200 AD to European contact in the 1,500s. Typical habitation sites through this region are commonly referred to as middens, which are the accumulation of daily life activities on these tree islands. Material remains can stretch from the surface to well over one meter below the surface on certain islands. Native American burials can also be found among these habitation sites.

After European contact, Native American populations in the region continuously declined and remained at low levels until Miccosukee and Seminole tribal groups moved into the area while fleeing the U.S. Army and U.S. Governments' forced relocation program. Many sites associated with both the Miccosukee and Seminole tribes are known to exist throughout the region.

The broad region of ENP and WCA 3 has been subject to numerous cultural resource investigations and have been found to contain a wide variety of cultural resources that vary within their significance. There are archaeological resources associated with some of the earliest habitation sequences within South Florida and relatively recent sites directly associated with modern Native American tribes who were removed from ENP shortly after its creation.

Approximately 277 cultural resources, as identified in the Florida Master Site File, are located within the project area. Of these resources, 121 sites are located within WCA 3 north of the L-29 canal. The majority of these sites were identified based on a 1987 aerial analysis of the WCA and the presence of archaeological materials was not ground-truthed (Taylor 1987). Only approximately 25 sites within WCA 3 have been identified based on a physical archaeological investigation. A total of 8 cultural resources within WCA3 have been listed or determined eligible for listing in the National Register of Historic Places (NRHP), including Mack's Fish Camp Historical District.

The southern portion of the project area, south of the L-29 Canal, is located entirely within ENP. ENP has been subject to many archaeological investigations that have identified approximately 156 cultural resources within the project area. Of these resources, 40 have been listed or

determined eligible for listing in the NRHP, including two archaeological districts. A small portion of Ten Thousand Islands Archaeological District is located on the western edge of the project area and the SRS Archaeological District is contained entirely within the project area. The SRS Archaeological District contains no less than 63 archaeological resources, 39 of which are contributing resources to the district (Schwandron 1996). Sites typically found within the SRS are described as earth middens; however, multi-occupation sites such as Tiger Hammock (8DA11) which is associated with Glades II and III and Seminole occupations have also been identified.

### **3.15 AIR QUALITY**

Air monitoring reports are prepared annually by 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<sub>2</sub>), ozone (O<sub>3</sub>), particle pollution (10 microns or less in diameter (PM<sub>10</sub>), and 2.5 microns or less in diameter (PM<sub>2.5</sub>), and sulfur dioxide (SO<sub>2</sub>)) 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. Southeast Florida including Miami-Dade County continues to be classified by the U.S. Environmental Protection Agency (EPA) as an attainment/maintenance area for ozone. Florida remains designated as unclassifiable for PM<sub>10</sub>. Although sufficient data have been collected for attainment determinations, EPA has not considered PM<sub>10</sub> for attainment determinations in Florida yet.

### **3.16 HAZARDOUS, TOXIC OR RADIOACTIVE WASTES**

Along the southern boundary of WCA 3A and WCA 3B there are levees and canals constructed in the 1950s and 1960s that limit vehicle access to the interior. Activity within the WCA is generally limited to fishing, hunting, and birding though there may be some illegal dumping of solid wastes along the perimeter. No soil testing for residual contaminants has been conducted within the WCA 3A and WCA 3B as part of this project since the lands have no history of prior agricultural or industrial use that would cause such contamination.

A search of FDEP petroleum spill and storage sites database done in October of 2014 identified six petroleum storage sites and one spill site along Tamiami Trail between S-333 and S-356. Petroleum storage at Everglades Safari site was closed in 2005; however, a petroleum spill at this site is listed as ongoing as of October 2014. Petroleum storage facilities operated by the SFWMD are located at the S-333 and S-356 structures.

A search of FDEP's databases of contamination sites and petroleum storage facilities identified five spill sites and 15 petroleum storage facilities located along the canal or within the 8.5 SMA. The SFWMD is listed as the permit holder for storage facilities at the S-357 and S-331 pump stations. The spill at the SFWMD's S-331 pump station has been completed. A spill at the General Portland, Inc. facility west of the canal is listed as ongoing. Three non-petroleum cleanup sites are located along the L-31N Canal. Two of the sites are located along the L-31N Canal buffer trail and one is located within the 8.5 SMA.

### 3.17 NOISE

Noise levels are associated with surrounding land use. Within the major natural areas of South Florida, external sources of noise are limited and of low occurrence. Existing sources of noise are limited to vehicular traffic travelling on roads adjacent to and cutting through the project area. Other sources of noise which may occur within these natural areas include air boats, off road vehicles, swamp buggies, motor boats, and occasional air traffic. Sources of noise in rural, areas include noise associated with agricultural production such as the processing and transportation of agricultural produce. Within the rural municipalities and urban areas, sound levels would be expected to be of greater intensity, frequency, and duration. Noise associated with transportation arteries, such as highways, railroads, primary and secondary roads, airports, operations at commercial and industrial facilities etc., inherent in areas of higher population would be significant and probably override those sounds associated with natural emissions.

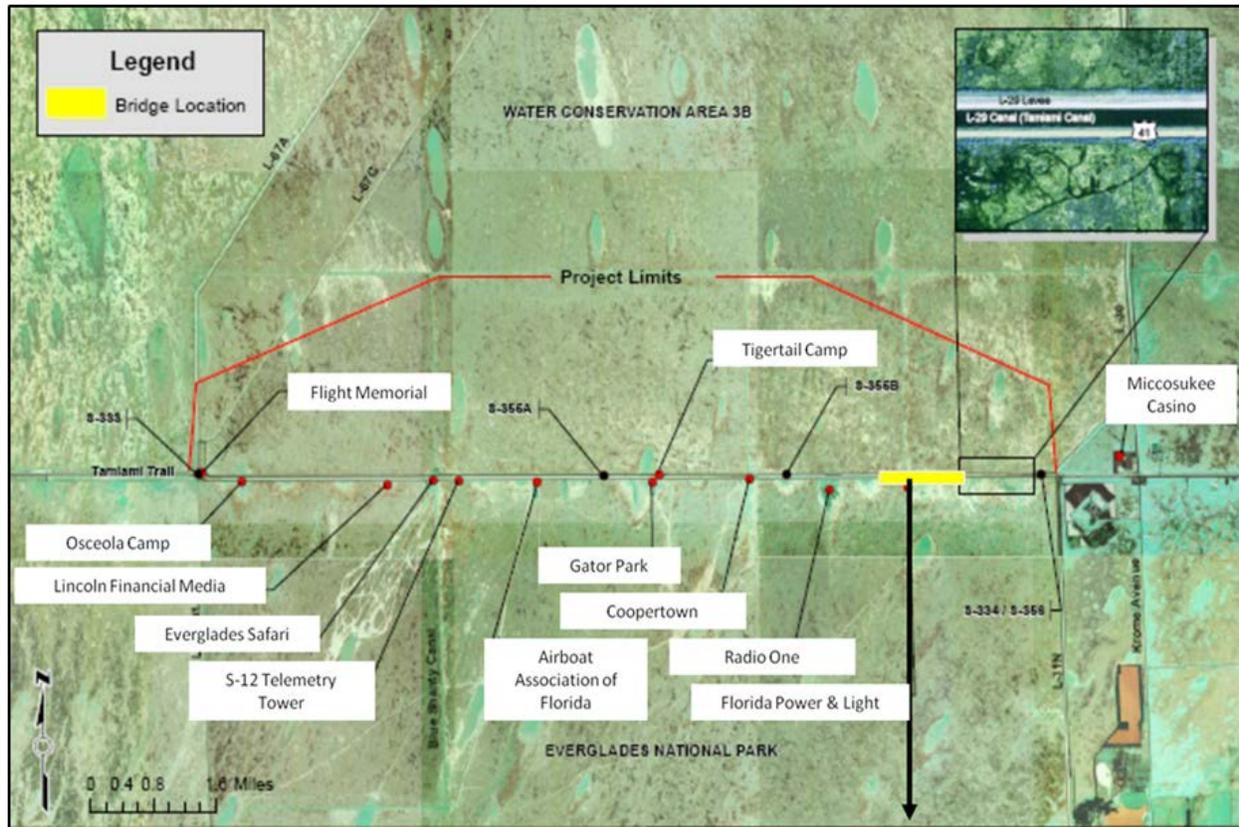
### 3.18 AESTHETICS

The visual characteristics of South Florida can be described according to the three dominant land use categories: natural areas, agricultural lands, and urban areas. The natural areas consist of a variety of upland and wetland ecosystems, including lakes, ponds, vast expanses of marsh and wet prairie, with varying vegetative components. Uplands are often dominated by pine, although other sub-tropical and tropical hardwoods do occur. Overall, the land is extremely flat, with few natural topographic features such as hills or other undulations. Much of the visible topographic features within the natural areas are man-made. Generally, urban development is concentrated along the LEC. Development is typically immediately adjacent to or nearby protected natural areas.

### 3.19 SOCIOECONOMICS

Florida's economy is characterized by strong wholesale and retail trade, government, and service sectors. The economy of South Florida is based on services, agriculture, and tourism. The three counties that comprise the LEC are heavily populated. Much of the land within the area potentially impacted is within ENP and is publicly owned. However, a number of privately owned parcels still exist within this region. Several private entities currently own real estate within the project area adjacent to Tamiami Trail and within ENP (**Figure 9**). Property owners include three airboat concessionaires, the Airboat Association of Florida, Florida Power and Light, Lincoln Financial Media, and Salem Communications. Efforts by the Corps and DOI/ENP to acquire real estate interests are ongoing and also include channel and flowage easements for the Tamiami Trail Bridge and roadway. All required real estate, channel and flowage easements to allow raising of the L-29 Canal maximum operating limit above 7.5 feet, NGVD are expected to be acquired by October of 2017. The Corps has acquired flowage easements for the Airboat Association.

The Miccosukee Indian Tribe of Florida currently lease two areas adjacent to Tamiami Trail (Osceola and Tigertail Camps) and have several businesses adjacent to Tamiami Trail west of S-333 including the Miccosukee Indian Village, Restaurant and airboat concessionaires.



**FIGURE 9. LOCATIONS OF PRIVATELY OWNED REAL ESTATE WITHIN THE PROJECT AREA.**

The 8.5 SMA is located in the East Everglades, approximately 20 miles southwest of Miami, ten miles north of Homestead, and 6.6 miles south of U.S. Highway 41. It is bounded on the east by L-31N, on the west by NESRS (part of ENP), on the north by SW 104th Street, and on the south by SW 168th (Richmond Drive) Street. The 8.5 SMA presently encompasses approximately ten square miles of mixed use development. Approximately 42 percent (2,699 acres) of the 8.5 SMA is classified as wetlands, one percent (65 acres) as uplands, and 57 percent (3,646 acres) as residential and/or agricultural lands based on a Wetland Rapid Assessment Procedure (WRAP) performed for the 2000 GRR/FSEIS (USACE 2000). The eastern region of the 8.5 SMA is dedicated to agricultural and residential land uses (USACE 2012a).

### 3.20 AGRICULTURE

The Miami-Dade County agricultural industry is unique in both the types of commodities produced and the method of cultivation. The majority of agricultural activities in the county are located south of Tamiami Trail and east of ENP. A variety of vegetables, fruits, and ornamentals are grown within this region and include many tropical and subtropical crops, which are grown year-round. The most active growing season is between September and May. Because of the wet and dry rainy seasons in the area, planting times are controlled by the elevation of ground water. Soils in these agricultural areas are rocky soils and marl soils.

### **3.21 RECREATION**

There are many recreational opportunities throughout South Florida. WCA 3 has been used for recreational activities including hunting, fishing, frogging, boating, camping, and off-road vehicle use. Private camps are located throughout WCA 3. A variety of other nature-based recreational opportunities are also provided to the public within WCA 3. These activities include wildlife viewing and nature photography. Hiking and bicycling are also permitted on existing levees within the project area where appropriate. There are also several recreation areas at locations along the boundary of WCA 3. Similar recreational opportunities are provided in ENP.

## 4.0 ENVIRONMENTAL EFFECTS

### 4.1 GENERAL ENVIRONMENTAL EFFECTS

Table 5 includes anticipated changes to the existing environment including direct, indirect, and cumulative effects. Environmental effects are expected to be spatially limited and small in magnitude given the short duration of the Proposed Action. Potential environmental effects of current water management operations (No Action Alternative) are thoroughly evaluated within the MWD Increment 1 Plus EA and FONSI (dated February 16, 2017) and are hereby incorporated by reference. Please refer to the MWD Increment 1 Plus EA and FONSI for additional information.

The proposed action is expected to increase water deliveries from WCA 3A to ENP and Florida Bay for the temporary benefit of natural resources. Potential reductions in high water levels and decreased periods of prolonged flooding is expected to provide temporary benefits to vegetation and fish and wildlife resources, including Federally threatened and endangered species such as the wood stork (*Mycteria americana*) and Everglade snail kite (*Rostrhamus sociabilis plumbeus*). Prolonged periods of flooding eliminates foraging and nesting opportunities for wading birds. Moving water south, through ENP will also have the added ecological benefit of improving salinity conditions of Florida Bay. Potential minor adverse effects to Manatee Bay and Barnes Sound associated with salinity fluctuations are anticipated with from increased S-197 utilization.

Since water levels within the Everglades have historically fluctuated on a seasonal, annual, and interannual basis, it is likely that cultural resources within the project area have been previously exposed to natural hydrological conditions that may be experienced under the current condition. However, continued increasing high water levels observed in the No Action Alternative has the potential for negative impacts on some cultural resources within WCA 3A where high water levels and prolonged inundation periods are expected to continue. Implementation of the Action Alternatives would reduce water levels in WCA 3A and help to control flooding at cultural resources locations. Implementation of the Action Alternatives would increase flows to SRS. Results of the modeling generally indicate higher water levels just south of the L-29 Canal with progressively lower water stages as the flow moves south. While tree islands within SRS and ENP may experience high water levels, general archaeological predictive models indicates that the presence of archaeological sites are indicative of a preference of higher elevations for habitation uses within tree islands. Water levels are project to be lower than maximum water levels that have been experienced in the past as indicated by water level averages experienced under the last ten years of IOP (Everglades Depth Estimation Network [EDEN]). In addition, the temporary nature and short duration of the project would also preclude adverse effects to historic properties within the project area. Therefore, increased water levels during the temporary Action Alternatives is not anticipated to adversely affect historic properties listed or eligible for listing in the NRHP.

There are many recreational opportunities throughout South Florida. WCA 3 has been used for recreational activities including hunting, fishing, frogging, boating, camping, and off-road vehicle use. Other nature-based activities include wildlife viewing and nature photography. Hiking and bicycling are also permitted on existing levees within the project area where appropriate. High water levels are currently limiting access to recreational opportunities within the project area. The FWC has closed access to the WCAs within the project area leading to economic losses within the region and impacts on local businesses.

Potential losses in tree islands as a result of high water levels are expected to occur if the proposed action is not taken. Loss of tree islands has the potential to impact cultural resources and culturally important ceremonies practiced by Native American Tribes within the project area.

**TABLE 5. SUMMARY OF POTENTIAL ENVIRONMENTAL CONSEQUENCES ASSOCIATED WITH IMPLEMENTATION OF THE NO ACTION AND ACTION ALTERNATIVES.**

	Alternative A (No Action)	Alternative C (SDCS; S-152)	Alternative D (S-12A/B, S-343A/B, S-344; SDCS; S-152)
Climate	Implementation of Alternative A would not result in significant impacts to the climate of South Florida.	Implementation of Alternative C would not result in significant impacts to the climate of South Florida.	Implementation of Alternative D would not result in significant impacts to the climate of South Florida.
Geology & Soils	Alternative A is expected to have beneficial effects on geology and soils within ENP due to improvements in hydroperiods.	No additional effects beyond those described for Alternative A.	No additional effects beyond those described for Alternative A.
Land Use	No Effect	No Effect	No Effect
Hydrology	Potential impacts to ENP eastern Panhandle and Manatee Bay and Barnes Sound as a result of expected increases in frequency and duration of low volume discharges from S-197 relative to the 2012 Water Control Plan.	Minor reduction to the duration of high water stages within WCA 3A, associated with S-152 operations. Potential impacts to ENP eastern Panhandle and Manatee Bay and Barnes Sound as a result of expected increases in frequency and duration of low volume discharges from S-197 relative to Alternative A. Indeterminate effects to Taylor Slough anticipated as compared with	Moderate reduction to the duration of high water stages within WCA 3A, associated with S-152 operations and early opening of the S-12A and S-12B regulatory outlets. Potential impacts to ENP eastern Panhandle and Manatee Bay and Barnes Sound as a result of expected increases in frequency and duration of low volume discharges from S-197 relative to Alternative A. Increased benefits to

		Alternative A due to increased flows in these areas, which may exceed typical wet season durations.	Western and Central Shark River Slough as compared with Alternative A due to increased flows in these areas. Effects to Taylor Slough as described for Alternative C.
Regional Water Management	No Effect	Increased capacity relative to Alternative A to reduce stages in WCA 3A due to operational flexibility.	Increased capacity relative to Alternatives A and B to reduce stages in WCA 3A due to operational flexibility.
Flood Control	Risks associated with overtopping of S-12A/B structures. Increased risks to levee integrity within WCA 3A if WCA 3A flood stages exceed the maximum historical observed stage of 12.7 feet NGVD.	Ability to reduce prolonged high stages in WCA 3A while maintaining flood mitigation for 8.5 SMA and flood protection for C-111 South Dade agriculture. Continued progress towards completion of ongoing C-111 South Dade construction contracts, critical infrastructure necessary to achieve long-term objectives to improve hydroperiods in WCA 3A and Shark River Slough.	Ability to reduce prolonged high stages in WCA 3A while maintaining flood mitigation for 8.5 SMA and flood protection for C-111 South Dade agriculture. Continued progress towards completion of ongoing C-111 South Dade construction contracts, critical infrastructure necessary to achieve long-term objectives to improve hydroperiods in WCA 3A and Shark River Slough. Increased benefits to WCA 3A associated within implementation of Alternative D in comparison to Alternative C.

Vegetative Communities	Minor beneficial effects on vegetation within ENP through continued implementation. Potential losses in tree islands as a result of high water levels are expected to occur if the proposed action is not taken.	Minor beneficial effects on wetland vegetation within ENP by increasing flows to Taylor Slough. Beneficial effects to vegetation within WCA 3A, including tree islands through reduction in water elevations.	Minor beneficial effects on wetland vegetation within ENP by increasing flows to Shark River Slough and Taylor Slough. Potential minor adverse effects on CSSS habitat due to early opening of S-12A/B, S-343A/B and S-344 structures by approximately two weeks earlier than scheduled. Beneficial effects to vegetation within WCA 3A above those anticipated under Alternative C, including tree islands through reduction in water elevations.
Fish & Wildlife Resources	Major adverse effects to terrestrial wildlife within WCA 3A due to high stages and limited dry ground for foraging, loafing and resting. High water levels inundate tree islands and other wildlife habitats and if sustained, will cause stress and loss of life particularly for birds and mammals.	Minor beneficial effects on fish and wildlife resources within ENP by increasing flows to Taylor Slough. Benefits to birds and mammals within WCA 3A due to reduction in water elevations, providing dry ground for foraging, loafing and resting.	Minor beneficial effects on wetland vegetation within ENP by increasing flows to Shark River Slough and Taylor Slough. Benefits to birds and mammals within WCA 3A above those anticipated under Alternative C due to further anticipated reductions in water elevations, providing dry ground for foraging, loafing and resting.
Threatened and Endangered Species	Effects determinations for federally threatened and endangered species within the	No additional effects anticipated other than those outlined within Alternative A.	Potential beneficial effects to threatened wood stork and endangered snail kite due to limiting of

	<p>project area are listed in <b>Table 4-1</b> of the MWD Increment 1 Plus EA. Potential negative effects to threatened wood stork and endangered Everglade snail kite due to effects of prolonged high stages on nesting and foraging ability within WCA 3A.</p>	<p>Potential beneficial effects to threatened wood stork and endangered Everglade snail kite due to limiting of prolonged high stages on nesting and foraging ability within WCA 3A.</p> <p>The Corps determined that the Proposed Action may affect, but is not likely to adversely affect, the CSSS, Everglade snail kite or wood stork.</p>	<p>prolonged high stages on nesting and foraging ability within WCA 3A.</p> <p>Potential adverse effects to late season CSSS nesting birds if water stages in CSSS-Ax or CSSS-D exceed those suitable for nesting (~ 17 centimeters).</p> <p>The Corps determined that the Proposed Action may affect, but is not likely to adversely affect, the CSSS, Everglade snail kite or wood stork.</p>
Essential Fish Habitat	No significant adverse effect.	No additional effects beyond those described for Alternative A.	No additional effects beyond those described for Alternative A.
Water Quality	<p>The operation of S-328 allows S-332D flows to directly enter the L-31W which is directly adjacent to adjacent to the ENP, a designated Outstanding Florida Waterway. It is likely that this new flow input to the ENP will be low in phosphorus but there is a potential for nutrient spikes during initial discharges after a dry out period. A water quality monitoring plan has been proposed by</p>	<p>Alternative C does not include use of S-328 structure prior to installation of the L-31W plugs and implementation of an approved water quality monitoring plan, therefore, no adverse effects anticipated.</p> <p>Use of S-152 during this planned temporary deviation is not anticipated to effect water quality within WCA 3B.</p>	<p>Alternative C does not include use of S-328 structure prior to installation of the L-31W plugs and implementation of an approved water quality monitoring plan, therefore, no adverse effects anticipated.</p> <p>Use of S-152 during this planned temporary deviation is not anticipated to effect water quality within WCA 3B.</p>

	SFWMD and approved by the Corps.		
Native Americans	Potential adverse effect on Tribal properties through prolonged high stages within WCA 3A.	Alternative C reduces potential for adverse effects on Tribal properties through reduction of prolonged high stages within WCA 3A.	Relative to Alternative C, Alternative D further reduces potential for adverse effects on Tribal properties through reduction of prolonged high stages within WCA 3A.
Cultural Resources	Potential losses in tree islands as a result of high water levels are expected to occur if the proposed action is not taken. Loss of tree islands has the potential to impact cultural resources and culturally important ceremonies practiced by Native American Tribes within the project area.	Alternative C reduces potential for adverse effects on historic properties through reduction of prolonged high stages within WCA 3A. No adverse effect to historic properties.	Relative to Alternative C, Alternative D further reduces potential for adverse effects on historic properties through reduction of prolonged high stages within WCA 3A. No adverse effect to historic properties.
Air Quality	No Effect	No Effect	No Effect
Hazardous, Toxic and Radioactive Wastes	No Effect	No Effect	No Effect
Noise	No Effect	No Effect	No Effect
Aesthetics	No Effect	No Effect	No Effect
Socioeconomics	Potential minor adverse effects due to FWC closures for recreational hunting within WCA 3A. High water stages pose an immediate threat and impact to valuable natural resources that underpin local economies that surround the Everglades Protection Area.	Implementation of Alternative C would benefit recreation through reduction in high water stages in WCA 3A, thereby reducing duration of FWC closures. Through reduction of stages in WCA 3A, Alternative C would assist to reduce the immediate threat and impact to valuable natural resources that	Implementation of Alternative D would provide additional benefits to recreation relative to Alternative C through further reduction in high water stages in WCA 3A, thereby reducing duration of FWC closures. Through reduction of stages in WCA 3A, Alternative D would further assist to reduce the

		underpin local economies that surround the Everglades Protection Area.	immediate threat and impact to valuable natural resources that underpin local economies that surround the Everglades Protection Area as compared with Alternative B.
Agriculture	No effect due to additional water management operating criteria for features of the SDCS ( <i>i.e.</i> S-197) to mitigate for potential risks to flood protection for areas within South Dade.	No additional effects beyond those described for Alternative A.	No additional effects beyond those described for Alternative A.
Recreation	Recreation in WCA 3A is currently limited due to FWC closures.	Implementation of Alternative D would benefit recreation through reduction in high water stages in WCA 3A, thereby reducing duration of FWC closures.	Implementation of Alternative D would provide additional benefits to recreation relative to Alternative C through further reduction in high water stages in WCA 3A thereby, reducing duration of FWC closures.

## 5.0 LIST OF AGENCIES AND PERSONS CONSULTED

The Corps has been in coordination with other Federal and state agencies, and tribal representatives regarding the proposed action. Parties include the SFWMD, FDEP, U.S. Environmental Protection Agency, USFWS, FWC, ENP, Department of the Interior, Florida Department of Agriculture and Consumer Services, State Historic Preservation Office, Seminole Tribe of Florida, and the Miccosukee Tribe of Indians of Florida. This coordination is a result of the magnitude of Corps efforts underway to implement water management strategies in South Florida. **Appendix B** of this EA includes documentation of all coordination regarding this action.

As part of the ongoing coordination, the Corps developed a series of potential options to reduce stages in WCA 3A and requested Tribal, federal and state agency feedback. **Appendix B** contains a series of options proposed as well as initial feedback from each agency.

## **5.1 MICCOSUKEE TRIBE OF INDIANS OF FLORIDA**

Informal coordination with staff of the Miccosukee Tribe of Indians of Florida (Tribe) was conducted June 16 and June 23, 2017 for notification purposes and to solicit comments regarding the planned temporary deviation and the potential effects of flood waters released from WCA 3A. The Tribe's preference on potential options is highlighted in Table 6. Initial comments included concern for higher stage on new and old Tamiami Trail and subsequent effect upon health and human safety issues. The Tribe also voiced continued concern regarding the CSSS closure periods and the need to stop managing the Everglades for a single species to the detriment of the ecosystem. Consultation with the Tribe's Section 106 representative was conducted via phone on June 23, 2017. Based on the temporary nature of the project and the continued monitoring of tree islands pursuant to the ERTTP Programmatic Agreement, the Miccosukee Tribal Representative concurred with the Corps' determination of no adverse effect to historic properties that are listed or eligible for listing on the National Register of Historic Places.

## **5.2 SEMINOLE TRIBE OF FLORIDA**

Informal coordination with staff of the Seminole Tribe was conducted on February 12, 2016 for notification purposes and to solicit comments regarding the 2016 planned temporary deviation and the potential effects of flood waters released from WCA 3A. Initial comments included the request that Corps consider utilizing S-343, S-344, S-12A and S-12B to assist in the water drawdown. There was concern for Tamiami Trail and coordination with FDOT for the extra water and potential effects. Representative of the Tribe suggested that the old and new Tamiami Trail was never de-mucked prior to construction which may generate an effect if prolonged flooding would occur. There was a concern that Tribal sensitive tree islands would flood in Shark River Slough. For the currently proposed action, a meeting was held with staff from the Tribal Historic Preservation Office (THPO) and the Environmental Resource Management Department to discuss the Proposed Action. Additional consultation pursuant to Section 106 of the National Historic Preservation Act was conducted with the s THPO via phone and email on June 23 and June 26, 2017. No formal comments from the Seminole Tribe have been received regarding the Proposed Action.

## **5.3 U.S. ENVIROMENTAL PROTECTION AGENCY**

The Corps contacted the EPA Region 4 for the purpose of notification and discussion of NEPA (**Appendix B**). The Corps has completed an EA in accordance with ER200-2-2 (Corps policy for NEPA compliance) to address the federal action of the planned temporary deviation to the water control plan. Once the planned temporary deviation is approved at the Corps' South Atlantic Division, the Proposed FONSI will be signed and circulated for public review for a period of 30 days. The Corps may generate a supplemental EA as necessary to discuss and disclose any additional effects to the human environment that may not have been addressed within this EA.

## **5.4 U.S. FISH & WILDLIFE SERVICE**

The USFWS was contacted June 16 and June 23, 2017. In addition, the Corps sent a formal letter requesting early opening of the S-12A, S-12B, S-343A, S-343B and S-344 structures as well as the ability to increase pumping at the S-332D structure on June 22, 2017 (refer to **Appendix B**).

Emergency consultation pursuant to Section 7 of the ESA is on-going with the USFWS under provisions of the 2016 ERTTP BO and in is full compliance with the ESA. The Corps has determined that the Proposed Action may affect, but is not likely to adversely affect, the endangered Cape Sable seaside sparrow, endangered Everglade snail kite and threatened wood stork.

Opening of S-12A, S-12B, S-343A, S-343B and S-344 structures prior to the official opening date of July 15, 2017 and increased pumping at S-332D will not be implemented as part of this planned temporary deviation until emergency ESA consultation has been completed. The Corps agrees to maintain open and cooperative communication with the USFWS during the proposed planned temporary deviation.

### **5.5 FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION**

On June 23, 2017, the FDEP issued an Emergency Final Order in response to high rainfall and flooding in the South Florida region, specifically the Everglades Protection Area that threatens certain stormwater management systems, works and impoundments and poses an imminent or immediate danger to valuable natural resources, the public health, safety or welfare (**Appendix B**). As part of the FDEP Emergency Final Order, FDEP temporarily modified operations of the projects listed in **Section 1.7** and permitted immediate employment of any remedial means deemed necessary to redress the emergency. FDEP waived water quality certification for those activities authorized by this Emergency Final Order.

Pursuant to the Emergency Final Order, the Corps shall continue water quality and hydrologic monitoring of the existing permitted Corps project features, to identify and evaluate water quality and hydrologic Conditions. The monitoring work provides water quality data associated with state water quality standards and the long-term phosphorus concentration limits contained within the Settlement Agreement to the Federal Everglades lawsuit (Case No. 88-1886), and hydrologic data necessary for the adaptive operation of the pump stations to evaluate the effects on wildlife, water supply and flood protection in the C&SF project.

### **5.6 SOUTH FLORIDA WATER MANAGE DISTRICT**

The SFWMD has requested the Proposed Action. The SFWMD has coordinated with stakeholders during the development of the operational strategy (**Appendix A**) and concurs.

### **5.7 STATE OF FLORIDA-STATE HISTORIC PRESERVATION OFFICER**

Coordination with the SHPO was conducted on June 26, 2017 via email and phone on June 26, 2017. Based on the temporary nature of the project, the maintenance of the Site 71/SRS-1 gage restriction, the maintenance of the L-29 stage limit of 7.5-7.8 ft NGVD, and the continued monitoring of tree islands pursuant to the ERTTP Programmatic Agreement, the SHPO concurred with the Corps' determination of no adverse effect to historic properties that are listed or eligible for listing on the National Register of Historic Places pursuant to the regulations contained in 36 CFR 800.12 (**Appendix B**).

## **5.8 FLORIDA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES**

Coordination with the Florida Department of Agriculture and Consumer Services (FDACS) was conducted on June 26, 2017. FDACS appreciates the inclusion of their agency in the high water discussions and operational updates.

## **6.0 CUMULATIVE EFFECTS**

Cumulative effects are defined in 40 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 non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. The primary goal of cumulative effects analysis is to determine the magnitude and significance of the environmental consequences of the Proposed Action in the context of the cumulative effects of other past, present, and future actions. The Proposed Action is expected to mitigate for severe economic losses currently being experienced as a result of high water levels. The general environmental effect of the Proposed Action would be beneficial and any downstream impacts would be of short duration.

In addition to the effects of the Corps' proposed action, SFWMD has proposed modifications to existing operations of the S-199, S-200 and G-737 structures which are part of the C-111 Spreader Canal Western Project. These structures were built and operated under a FDEP and Department of the Army Permit. SFWMD is currently consulting with the Corps, Regulatory Division on their proposed modifications. These operational modifications will further assist to move water through Taylor Slough to Florida Bay and assist to alleviate high water concerns within WCA 3A, if implemented. It is important to note that separate NEPA documentation and ESA consultation will be prepared for the SFWMD proposed modifications.

## **6.1 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES**

An irreversible commitment of resources is one in which the ability to use and/or enjoy the resource is lost forever. One example of an irreversible commitment might be the mining of a mineral resource. An irretrievable commitment of resources is one in which, due to decisions to manage the resource for another purpose, opportunities to use or enjoy the resource as they presently exist are lost for a period of time. An example of an irretrievable loss might be where a type of vegetation is lost due to road construction. The Preferred Alternative consists of an operational change to MWD Increment 1 Plus which is a deviation to the 2012 Water Control Plan and does not include construction of permanent structures or structural modifications to existing C&SF Project features. The Proposed Action would not cause the permanent removal or consumption of any natural resources.

## **6.2 UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS**

Environmental effects for each resource are discussed above. Adverse environmental effects associated with implementing the Preferred Alternative are expected to be temporary based on the short duration of this planned temporary deviation and the generally beneficial nature of this action. Temporary minor adverse impacts have the potential to occur within Manatee Bay and

Barnes Sound due to increases in the frequency, duration, and volume of S-197 discharges; however significant impacts are not expected. Potential environmental effects would be limited in spatial extent to the near shore areas of the southern estuaries. In addition, inundation duration within CSSS-A and CSSS-Ax habitat may be longer than under the No Action Alternative due to the early opening of the S-12A, S-12B, S-343A, S-343B and S-344 structures by approximately 2 weeks. Since the majority of the CSSS habitat within this area is already inundated, there is a potential for an additional up to 2 weeks of inundation based upon the early opening.

### **6.3 CONFLICTS AND CONTROVERSY**

Over the lifetime of the C&SF Project, considerable interest has been generated among local and regional stakeholders. The Corps continually strives to include all interested parties in its decision making process and will continue to consider all issues that arise.

### **6.4 ENVIRONMENTAL COMMITMENTS**

The Corps commits to avoiding, minimizing or mitigating for adverse effects. All practicable means to avoid or minimize environmental effects were incorporated into the Preferred Alternative.

## **7.0 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS**

### **7.1 NATIONAL ENVIRONMENTAL POLICY ACT OF 1969**

Environmental information on the project has been compiled and this EA has been prepared and coordinated for public, state, and Federal agency review. The Proposed Action is in compliance with the National Environmental Policy Act.

### **7.2 ENDANGERED SPECIES ACT OF 1973**

Upon completion of an assessment for species under NMFS purview it was determined that the Proposed Action would have no effect on these species; therefore, consultation with NMFS was not necessary.

The USFWS was contacted June 16 and June 23, 2017 and a formal letter requesting early opening of the S-12A, S-12B, S-343A, S-343B and S-344 structures as well as the ability to increase pumping at the S-332D structure on June 22, 2017 (refer to **Appendix B**). Since USFWS determined jeopardy on the CSSS due to water management actions in the 2016 ERTF BO, the USFWS Vero Beach Ecological Services Office does not have the authority to grant any deviations from the 2016 ERTF BO RPA; therefore this decision was elevated to USFWS Region 4. Reference **Appendix B** for pertinent correspondence. The Proposed Action is being fully coordinated under the Endangered Species Act and will be in full compliance with the Act prior to implementation.

The USFWS was contacted June 16 and June 23, 2017. In addition, the Corps sent a formal letter requesting early opening of the S-12A, S-12B, S-343A, S-343B and S-344 structures as well as the ability to increase pumping at the S-332D structure on June 22, 2017 (refer to **Appendix B**).

Emergency consultation pursuant to Section 7 of the ESA is on-going with the USFWS under provisions of the 2016 ERTTP BO and in is full compliance with the ESA. The Corps has determined that the Proposed Action may affect, but is not likely to adversely affect, the endangered Cape Sable seaside sparrow, endangered Everglade snail kite and threatened wood stork.

Opening of S-12A, S-12B, S-343A, S-343B and S-344 structures prior to the official opening date of July 15, 2017 and increased pumping at S-332D will not be implemented as part of this planned temporary deviation until emergency ESA consultation has been completed. The Corps agrees to maintain open and cooperative communication with the USFWS during the proposed planned temporary deviation. The Proposed Action is being fully coordinated under the Endangered Species Act and will be in full compliance with the Act prior to implementation.

### **7.3 FISH AND WILDLIFE COORDINATION ACT OF 1958, AS AMENDED**

The Proposed Action has been fully coordinated with USFWS and FWC. In response to the requirements of this Act, the Corps has and will continue to maintain continuous coordination with USFWS and FWC. The Proposed Action is in full compliance with the Act.

### **7.4 NATIONAL HISTORIC PRESERVATION ACT OF 1966**

The Proposed Action is in compliance with Section 106 of the National Historic Preservation Act, as amended (PL 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 (PL 93-29), Archeological Resources Protection Act (PL96-95), American Indian Religious Freedom Act (PL 95-341), Native American Graves Protection and Repatriation Act (NAGPRA) (PL 101-601), Executive Order 11593, 13007, and 13175, the Presidential Memo of 1994 on Government to Government Relations and appropriate Florida Statutes. Consultation with the Florida SHPO, appropriate Federally-recognized tribes, and other interested parties has been initiated and is ongoing (Reference **Appendix B**). Pursuant to Part XIV, Deviations of the Everglades Restoration Transition Plan Programmatic Agreement (PA), all PA signatories, including the Advisory Council on Historic Preservation and Everglades National Park, were notified of the Proposed Action and its determination of effects to cultural resources by email on June 26, 2016. The Corps has determined the Proposed Action poses no adverse effect to historic properties eligible or potentially eligible for listing in the NRHP. The Florida SHPO concurred with the Corps determination of no adverse effect in an email dated June 26, 2017. The Miccosukee Tribal Representative concurred with the Corps' determination of no adverse effect via phone on June 23, 2016. The Proposed Action has been coordinated via phone, email, and in-person meeting; however, no formal comments from the Seminole Tribe have been received regarding the Proposed Action. The Proposed Action is in compliance with the goals of this Act.

### **7.5 CLEAN WATER ACT OF 1972**

On June 23, 2017, the FDEP issued an Emergency Final Order in response to high rainfall and flooding in the South Florida region, specifically the Everglades Protection Area that threatens

certain stormwater management systems, works and impoundments and poses an imminent or immediate danger to valuable natural resources, the public health, safety or welfare (**Appendix B**). As part of the FDEP Emergency Final Order, FDEP temporarily modified operations of the projects listed above and permitted immediate employment of any remedial means deemed necessary to redress the emergency. FDEP waived water quality certification for those activities authorized by this Emergency Final Order.

Pursuant to the Emergency Final Order, the Corps shall continue water quality and hydrologic monitoring of the existing permitted Corps project features, to identify and evaluate water quality and hydrologic Conditions. The monitoring work provides water quality data associated with state water quality standards and the long-term phosphorus concentration limits contained within the Settlement Agreement to the Federal Everglades lawsuit (Case No. 88-1886), and hydrologic data necessary for the adaptive operation of the pump stations to evaluate the effects on wildlife, water supply and flood protection in the C&SF project. The Corps is in compliance with this Act.

## **7.6 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.

## **7.7 COASTAL ZONE MANAGEMENT ACT OF 1972**

On June 23, 2017, the FDEP issued an Emergency Final Order in response to high rainfall and flooding in the South Florida region, specifically the Everglades Protection Area that threatens certain stormwater management systems, works and impoundments and poses an imminent or immediate danger to valuable natural resources, the public health, safety or welfare (**Appendix B**). As part of the FDEP Emergency Final Order, FDEP temporarily modified operations of the projects listed above and permitted immediate employment of any remedial means deemed necessary to redress the emergency. FDEP waived water quality certification for those activities authorized by this Emergency Final Order. The Corps 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.

## **7.8 FARMLAND PROTECTION POLICY ACT OF 1981**

Correspondence with USDA-NRCS for Increment 1 occurred on November 21, 2014. Reference **Appendix C** of the MWD Increment 1 EA and FONSI (dated May 27, 2015). The USDA-NRCS had previously determined that there are delineations of Important Farmland Soils (Farmland of Unique Importance) within the project area. Approximately 975 acres of Prime and Unique Farmland are located mainly within the boundaries of ENP. Correspondence related to Increment 1.1 and 1.2 was provided to the USDA-NRCS on November 23, 2016 noting conversion of Prime and Unique Farmland are not anticipated as a result of the Proposed Action. No additional effects on Prime and Unique Farmland are anticipated due to this planned temporary deviation from MWD Increment 1 Plus.

**7.9 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.

**7.10 MARINE MAMMAL PROTECTION ACT OF 1972**

No marine mammals would be harmed, harassed, injured or killed as a result of the Proposed Action. Therefore, the Proposed Action is in compliance with this Act.

**7.11 ESTUARY PROTECTION ACT OF 1968**

No designated estuary would be affected by the Proposed Action.

**7.12 FEDERAL WATER PROJECT RECREATION ACT OF 1965, AS AMENDED**

Recreation and fish and wildlife enhancement have been given full consideration in the Proposed Action.

**7.13 FISHERY CONSERVATION AND MANAGEMENT ACT OF 1976**

No fisheries or other areas under the purview of NMFS would be affected by this action. The Proposed Action is in compliance with the Act.

**7.14 SUBMERGED LANDS ACT OF 1953**

Potential minor adverse impacts associated with salinity fluctuations to Manatee Bay, and Barnes Sound as previously identified in the Increment 1 EA and FONSI (dated May 27, 2015) would be temporary and spatially limited to nearshore areas within the southern estuaries (USACE 2015). Significant effects to fish and wildlife resources and vegetative communities within submerged lands of the State of Florida are not expected. The Proposed Action is in compliance with the Act.

**7.15 COASTAL BARRIER RESOURCES ACT AND COASTAL BARRIER IMPROVEMENT ACT OF 1990**

There are no designated coastal barrier resources in the project area that would be affected by the Proposed Action. These Acts are not applicable.

**7.16 RESOURCE CONSERVATION AND RECOVERY ACT (RCRA), AS AMENDED BY THE HAZARDOUS AND SOLID WASTE AMENDMENTS (HSWA) OF 1984, COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT (CERCLA), TOXIC SUBSTANCES CONTROL ACT (TSCA) OF 1976**

Implementation of the Proposed Action is not expected to result in the discovery of HTRW since there is no excavation or other construction activities associated with this project. 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.

**7.17 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.

**7.18 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.

**7.19 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. The Proposed Action is in compliance with this Act.

**7.20 ANADROMOUS FISH CONSERVATION ACT**

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

**7.21 MIGRATORY BIRD TREATY ACT AND MIGRATORY BIRD CONSERVATION ACT**

Migratory and resident bird species have been observed within the project 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. The Proposed Action is in compliance with these Acts.

**7.22 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.

**7.23 MAGNUSON-STEVENSON FISHERY CONSERVATION AND MANAGEMENT ACT**

No Essential Fish Habitat would be impacted by this action. Therefore the Proposed Action is in compliance with this Act.

**7.24 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.).

### **7.25 E.O. 11988, FLOODPLAIN MANAGEMENT**

This E.O. instructs Federal agencies to avoid development in floodplains to the maximum extent possible. The Proposed Action is an operational change to existing infrastructure; therefore, no construction is proposed. This action is consistent with the intent of this E.O. and is in compliance.

### **7.26 E.O. 12898, ENVIRONMENTAL JUSTICE**

E.O. 12899 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.

### **7.27 E.O. 13089, CORAL REEF PROTECTION**

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

### **7.28 E.O. 13112, INVASIVE SPECIES**

The Proposed Action would have no significant impact on invasive species. The Proposed Action is in compliance with the goals of this E.O.

### **7.29 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.

### **7.30 E.O. 13186, RESPONSIBILITIES OF FEDERAL AGENCIES TO PROTECT MIGRATORY BIRDS**

Migratory and resident bird species have been observed within the project 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 is in compliance with the goals of this E.O.

**8.0 LIST OF PREPARERS****TABLE 6. TABLE OF PREPARERS.**

Name	Organization	Role in EA
Gina Ralph	USACE	Biologist
Dan Crawford	USACE	Hydrologist/Engineer
Lan Do	USACE	Water Manager
Tamela Kinsey	USACE	Water Manager
Savannah Lacy	USACE	Water Manager
Jim Riley	USACE	Water Quality
Meredith Moreno	USACE	Archeologist

## **9.0 PUBLIC INVOLVEMENT**

### **9.1 SCOPING AND EA**

Reference **Section 1.9**.

### **9.2 AGENCY COORDINATION**

The Corps 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 Corps efforts underway to implement water management strategies in South Florida. All agency coordination letters related to the Proposed Action are included in **Appendix B**.

### **9.3 LIST OF RECIPIENTS**

A notice of availability 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 EA and FONSI was also posted the internet at the following address:

<http://www.saj.usace.army.mil/About/DivisionsOffices/Planning/EnvironmentalBranch/EnvironmentalDocuments.aspx#>

<http://www.saj.usace.army.mil/Missions/Environmental/EcosystemRestoration/G3273andS356PumpStationFieldTest.aspx#>

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