

June 2018

---

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

**2018 PLANNED TEMPORARY DEVIATION  
FROM THE 2012 WATER CONTROL PLAN  
FOR WATER CONSERVATION AREA 2A**

**BROWARD AND PALM BEACH COUNTIES,  
FLORIDA**



**U.S. Army Corps  
of Engineers**  
JACKSONVILLE  
DISTRICT

**FINDING OF NO SIGNIFICANT IMPACT**  
**2018 TEMPORARY DEVIATION FROM THE 2012 WATER CONTROL PLAN FOR**  
**WATER CONSERVATION AREA 2A**  
**BROWARD AND PALM BEACH COUNTIES, 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 within the project area are currently governed by the 2012 Water Conservation Areas (WCA), Everglades National Park (ENP) and ENP to South Dade Conveyance System (SDCS) Water Control Plan, and subsequent approved deviations thereto. The U.S. Army Corps of Engineers, Jacksonville District (Corps), is initiating a planned temporary deviation from the 2012 Regulation Schedule for Water Conservation Area 2A (WCA 2A) to extend no later than April 30, 2019 in order to provide relief from high water levels currently being experienced in WCA 3A by reducing total inflows from WCA 2A into WCA 3A. The largest of the WCAs, WCA 3A, is flooding in a manner that inundates tree islands and other wildlife habitat, and if sustained, may cause: loss of birds and mammals dependent on that habitat; economic losses to surrounding communities dependent on natural resources to support outdoor recreation, ecotourism, and related economic benefits; impacts and delays to ongoing construction within the Canal 111 South Dade (C-111 SD) Project Northern Detention Area (NDA) and C-111 SD Southern Detention Area (SDA) which are prerequisites to further increase water deliveries to ENP needed for the restoration of natural hydrological conditions. If the WCA 3A water level 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 environmental risks as the wet season and hurricane season continue due to limited flood storage available with each of the WCAs already above the top of the respective schedules. The intent of the deviation is to reduce flows into WCA 3A through the S-11 structures.

The Corps will coordinate with the South Florida Water Management District (SFWMD) to manage WCA 2A stages by maximizing releases out of WCA 2A to the east for the duration of the deviation. The capacity to accomplish releases east is reduced when there is local rainfall over the east coast canal system, due to the priority to maintain flood protection within the developed areas. This deviation would remain in effect until WCA 3A falls below Zone A of the WCA 3A Regulation Schedule, at which point a recovery period would be initiated to reduce the WCA 2A stage to the pre-deviation regulation schedule (normal operations). The deviation, including the recovery period, shall not extend past April 30, 2019 under this request. The recovery period will include a steady reduction in WCA 2A stage until it reaches the current regulation schedule (11.0-13.0 feet National Geodetic Vertical Datum of 1929 (NGVD)). The rate of reduction will be coordinated with partner agencies through the avenues currently in place to avoid impacts to foraging protected bird species. The deviation will raise the regulation schedule of WCA 2A to accommodate additional storage, therefore reducing inflows into WCA 3A through the S-11 structures. All release guidance will remain unchanged, aside from the higher stage triggers. The Corps will retain operational flexibility to increase flows out of WCA 2A.

The subject planned temporary deviation to the 2012 Regulation Schedule for WCA 2A was coordinated with various Federal and state agencies as well as federally-recognized tribes. All practicable means to avoid and minimize adverse environmental effects are incorporated into the

Proposed Action. Environmental commitments as detailed in the EA will be implemented to minimize impacts.

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:

The Proposed Action is not anticipated to adversely affect water quality and State water quality certification is not necessary. The Florida Department of Environmental Protection (FDEP) issued an Emergency Final Order in response to high rainfall and flooding in the South Florida Region, OGC Number: 18-1066, on June 20, 2018. The Order states that the Corps and SFWMD are hereby authorized to make temporary operational changes in order to minimize detrimental impacts to the environment, to the public, to adjacent properties, and to downstream receiving water. The FDEP Emergency Final Order waives the requirement for state water quality certification for this Federal Action. The OGC Number: 18-1066, Final Emergency Order expires November 30, 2018. The Corps coordinated this deviation with the Florida Department of Environmental Protection (FDEP) on June 14, 2018. The FDEP stated that this deviation is consistent with the Coastal Zone Management Act (CZMA). The Proposed Action is in compliance with the Clean Water Act. The Corps has determined that the Proposed Action is consistent to the maximum extent practicable with the enforceable policies of Florida's Coastal Management Program.

Emergency consultation pursuant to Section 7 of the Endangered Species Act (ESA) of 1973, as amended, is ongoing with the U.S. Fish and Wildlife Service (USFWS) and is in compliance with the ESA. The USFWS was initially contacted on June 11, 2018 and received a species effects assessment on June 18, 2018. The Corps has determined that the Proposed Action may affect, but is not likely to adversely affect, the endangered Everglade snail kite and threatened wood stork. Correspondence was received from USFWS on June 15, 2018 indicating that they support implementation of a WCA 2A deviation to reduce impacts of high water within the WCAs. The Corps agrees to maintain open and cooperative communication with the USFWS during the planned temporary deviation. The Proposed Action is in full compliance with the ESA.

Consultation on the Proposed Action is ongoing 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 planned temporary deviation from the 2012 Regulation Schedule for WCA 2A will have no adverse effect on historic properties eligible, or potentially eligible for listing in the National Register of Historic Places. The Miccosukee Tribe of Indians of Florida, the Seminole Tribe of Florida, and the Seminole Nation of Oklahoma have concurred with the determination of no adverse effect; however, coordination on effects with other interested parties is ongoing.

The Proposed Action will maintain the authorized purposes of the Central and Southern Florida Project, including flood control, water supply for ENP, and municipal, industrial, and agricultural uses, prevention of saltwater intrusion, water supply for ENP, and protection of fish and wildlife.

The Corps completed this EA in accordance with Engineering Regulation 200-2-2 to assess the Federal action of the planned temporary deviation to the current water control plan to address immediate concerns with stages within WCA 3A. The signed Finding of No Significant Impact (FONSI) will be circulated for public review for a period of 15 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 considered within this EA.

The proposed action will help alleviate high water impacts to significant natural resources in WCA 3A, including tree islands, terrestrial wildlife, and federally-listed species. Temporary minor impacts are expected to plant communities and wildlife foraging opportunities in WCA 2A. As the majority of tree islands and plant communities in WCA 2A are degraded due to water quality and previous water management actions (mid-20<sup>th</sup> century), the risks are not as significant in this area as those posed to resources and habitats within WCA 3A.

All applicable laws, executive orders, and regulations were considered in the evaluation of the alternatives. In light 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 quality of human environment; therefore, preparation of an Environmental Impact Statement is not required. This FONSI incorporates by reference all discussions and conclusions contained in the EA enclosed herewith.

KIRK.JASON.ANTHONY.1  
118174956

Digitally signed by KIRK.JASON.ANTHONY.118174956  
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI,  
ou=USA, cn=KIRK.JASON.ANTHONY.118174956  
Date: 2018.06.30 21:32:30 -04'00'

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

30 JUN 18

Date

**ENVIRONMENTAL ASSESSMENT  
ON  
2018 PLANNED TEMPORARY DEVIATION FROM THE REGULATION SCHEDULE  
FOR WATER CONSERVATION AREA 2A  
BROWARD AND PALM BEACH COUNTIES, FLORIDA**

**TABLE OF CONTENTS**

1.0	PROJECT PURPOSE AND NEED .....	1
1.1	Project Authority.....	1
1.2	Project Location .....	1
1.3	Project Need or Opportunity .....	3
1.4	Agency Goal or Objective .....	11
1.5	Related Environmental Documents .....	11
1.6	Decisions to be Made.....	12
1.7	Scoping and Issues .....	12
1.8	Permits, Licenses, and Entitlements .....	12
2.0	ALTERNATIVES.....	13
2.1	Description of Alternatives .....	13
2.2	Issues and Basis for Choice .....	16
2.3	Preferred Alternative.....	18
2.4	Alternatives Eliminated from Detailed Evaluation.....	19
3.0	AFFECTED ENVIRONMENT .....	20
3.1	General Environmental Setting.....	20
3.2	Study Area Land Use .....	21
3.3	Vegetative Communities.....	21
3.4	Fish and Wildlife Resources .....	22
3.5	Threatened and Endangered Species .....	23
3.6	Climate.....	26
3.7	Geology and Soils.....	26
3.8	Hydrology .....	27
3.9	Regional Water Management (Operations) .....	30
3.10	Flood Control .....	30
3.11	Water Quality.....	31
3.12	Air Quality .....	32
3.13	Hazardous, Toxic or Radioactive Wastes .....	33
3.14	Native Americans.....	33
3.15	Cultural Resources .....	36
3.16	Socioeconomics .....	37
3.17	Recreation .....	37
3.18	Noise .....	37
3.19	Aesthetics.....	38
4.0	ENVIRONMENTAL EFFECTS .....	39
4.1	General Environmental Effects.....	39
4.2	Hydrology .....	39
4.3	Vegetation.....	41

4.4	Threatened and Endangered Species .....	44
4.5	State Listed Species .....	48
4.6	Fish and Wildlife Resources .....	48
4.7	Cultural Resources .....	50
4.8	Socio-Economic .....	51
4.9	Aesthetics .....	51
4.10	Recreation .....	51
4.11	Water Quality .....	52
4.12	Hazardous, Toxic, and Radioactive Waste .....	52
4.13	Air Quality .....	52
4.14	Noise .....	53
4.15	Native Americans.....	53
4.16	Cumulative Effects.....	54
4.17	Irreversible and Irrecoverable Commitment of Resources.....	55
4.18	Unavoidable Adverse Environmental Effects.....	55
4.19	Conflicts and Controversy .....	55
4.20	Environmental Commitments .....	55
4.21	Compliance with Environmental Requirements .....	55
5.	LIST OF AGENCIES AND PERSONS CONSULTED .....	61
5.1.	Native American Tribes .....	61
5.2.	U.S. Environmental Protection Agency.....	61
5.3.	U.S. Fish and Wildlife Service .....	61
5.4.	Florida Department of Environmental Protection.....	61
5.5.	South Florida Water Management District.....	62
5.6.	State of Florida-State Historic Preservation Officer .....	62
5.7.	Florida Fish and Wildlife Conservation Commission .....	62
6.	PUBLIC INVOLVEMENT .....	62
6.1.	EA and FONSI.....	62
6.2.	Agency Coordination .....	63
6.3.	List of Recipients .....	63
7.	LIST OF PREPARERS.....	63
8.	REFERENCES .....	64

**APPENDICES**

- Appendix A Operational Strategy
- Appendix B Pertinent Correspondence

**TABLE OF FIGURES**

FIGURE 1.	WATER CONSERVATION AREA LOCATION AND FLOWS .....	2
FIGURE 2.	RELEVANT WATER CONTROL STRUCTURES IN WCA 2 TO THE PROPOSED ACTION .....	3
FIGURE 3.	SOUTH FLORIDA WATER MANAGEMENT DISTRICT RAINFALL MAP (MAY 2, 2018-JUNE 1, 2018).....	5
FIGURE 4.	WCA 1 STAGE HYDROGRAPHS AND EXCEEDANCE QUANTITIES.....	6

---

FIGURE 5. WCA 2A STAGE HYDROGRAPHS, AND EXCEEDANCE QUANTITIES .....	7
FIGURE 6. WCA 3A STAGE HYDROGRAPHS AND EXCEEDANCE QUANTITIES .....	8
FIGURE 7. WCA 3A SFWMD JUNE 2018 DYNAMIC POSITION ANALYSIS .....	9
FIGURE 8. PROPOSED WCA 2A REGULATION SCHEDULE DURING PLANNED TEMPORARY DEVIATION (ALTERNATIVE B).....	14
FIGURE 9. 1970-1988 WCA 2A REGULATION SCHEDULE (ALTERNATIVE C).....	15
FIGURE 10. DEPICTION OF EXTERNAL LEVEES SURROUNDING WCA 2A .....	18
FIGURE 11. MAP OUTLINING THE LOCATION OF TRIBAL RESERVATION, LEASED, AND EASEMENT LANDS .....	35
FIGURE 12. WCA 3A SFWMD MID-JUNE 2018 DYNAMIC POSITION ANALYSIS .....	40
FIGURE 13. RECENT MAP OF 'LIVE' AND 'GHOST' TREE ISLANDS IN WCA 2A (SOURCE AICH <i>ET AL</i> 2014). .....	43

### LIST OF TABLES

TABLE 1. TOTAL PRECIPITATION EXPERIENCED WITHIN C&SF PROJECT ACTION AREA MAY 2, 2018 TO JUNE 1, 2018 .....	4
TABLE 2. WCA STAGES COMPARED TO REGULATION SCHEDULE AS OF JUNE 15, 2018.....	5
TABLE 3. BENEFITS OF PLANNED TEMPORARY DEVIATION.....	10
TABLE 4. FEDERALLY-LISTED SPECIES POTENTIALLY OCCURRING IN THE AREA .....	24
TABLE 5. STATE LISTED SPECIES POTENTIALLY OCCURING IN THE AREA.....	25
TABLE 6. FEDERALLY THREATENED AND ENDANGERED SPECIES WITHIN THE PROJECT AREA AND SPECIES DETERMINATIONS FOR THE PROPOSED ACTION ....	46
TABLE 7. STATE LISTED SPECIES WITHIN THE PROJECT AREA AND SPECIES DETERMINATION FOR THE PROPOSED ACTION .....	48

---

**ENVIRONMENTAL ASSESSMENT  
ON  
2018 PLANNED TEMPORARY DEVIATION FROM THE 2012 WATER  
CONTROL PLAN FOR WATER CONSERVATION AREA 2A  
BROWARD AND PALM BEACH COUNTIES, FLORIDA**

**1.0 PROJECT PURPOSE AND NEED**

**1.1 PROJECT AUTHORITY**

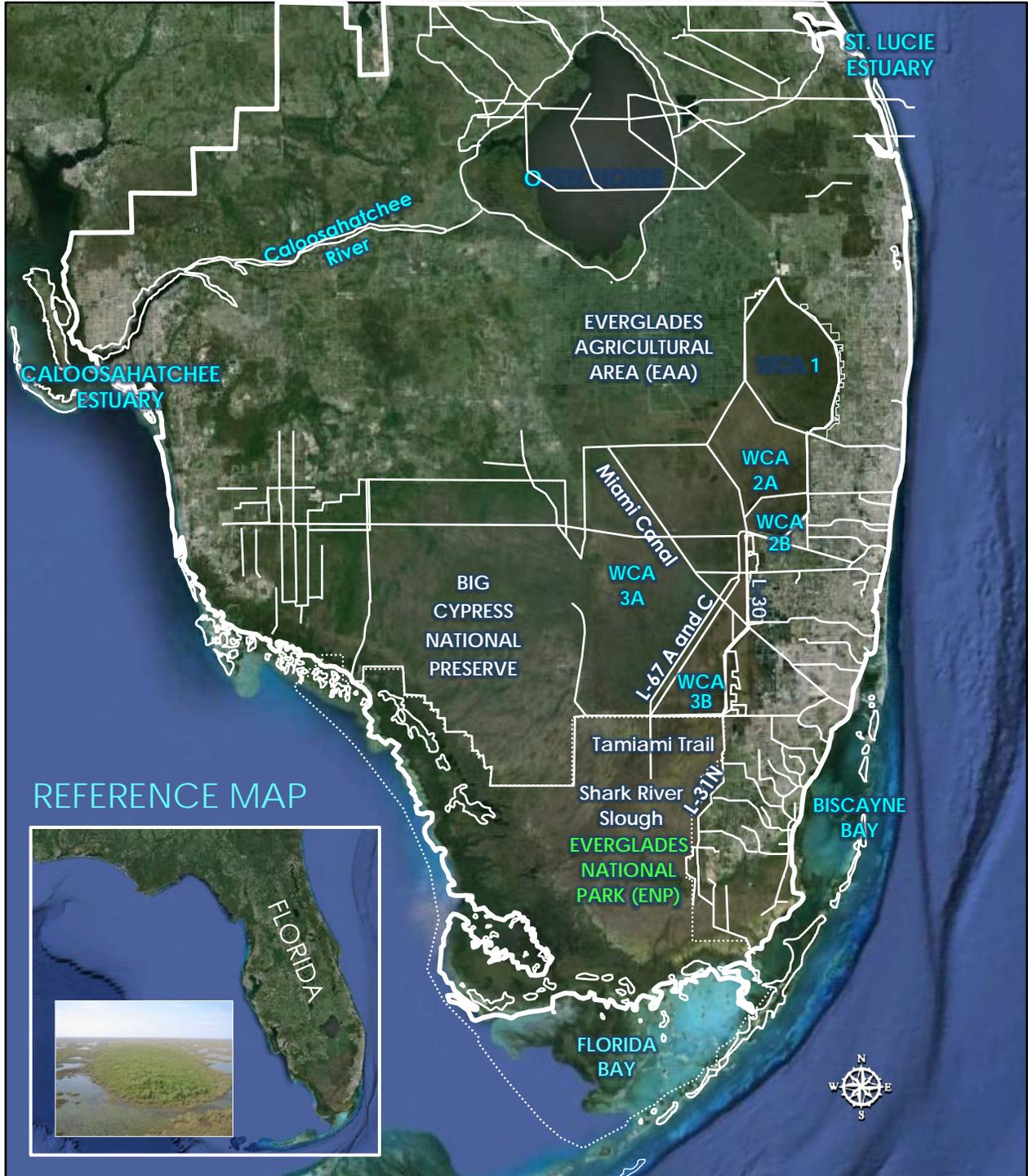
The Central and Southern Florida (C&SF) Project for Flood Control and Other Purposes was initially authorized by the Flood Control Act of 1948, Public Law 80-858. The remaining works of the Comprehensive Plan were authorized by the Flood Control Act of 1954, Public Law 83-780. There have been numerous modifications to the original C&SF Project authority.

**1.2 PROJECT LOCATION**

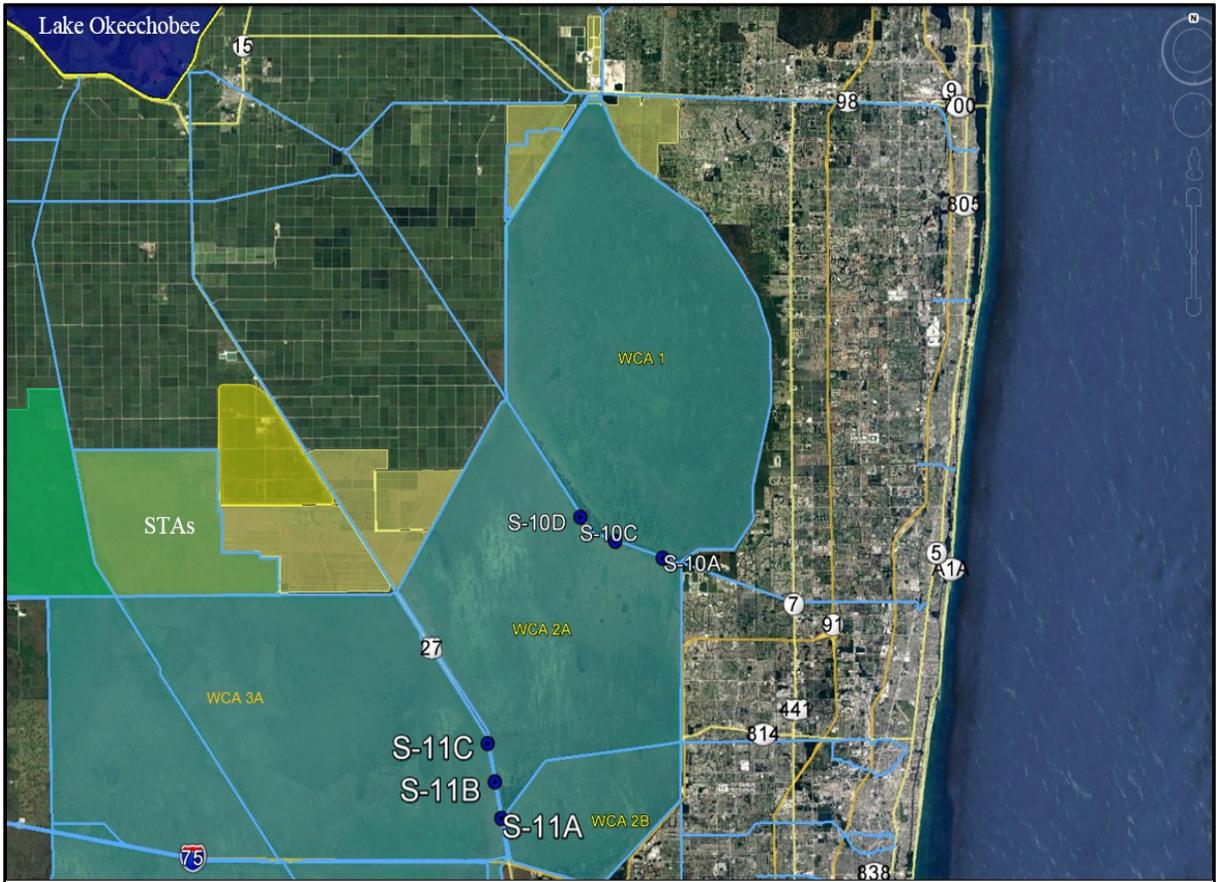
Water Conservation Area (WCA) 2, which is comprised of two areas, 2A and 2B, measures about 25 miles from north to south, and covers an area of 210 square miles (**Figures 1 and 2**). It is separated from the other WCAs by the Hillsborough Canal on the north and the North New River Canal on the south. Ground elevations slope southward about two to three feet in 10 miles, ranging from over 13 feet National Geodetic Vertical Datum of 1929 (NGVD) in the northwest to less than 7 feet NGVD in the south. The area is enclosed by 61 miles of levee, of which approximately 13 miles are common to WCA 1 and 15 miles common to WCA 3. An interior levee across the southern portion of the area reduces water losses due to seepage into an extremely pervious aquifer at the southern end of the pool (WCA 2B) and prevents overtopping of the southern exterior levee by hurricane waves.

Water is passed from this area to WCA 3A via the S-11 structures. In a wet year, the entire area has 330 to 365 days per year inundation. In a dry year, the area is significantly drier with a range of inundation going from 60 to 120 days in northern WCA 2A to 240 to 300 days inundation in southern WCA 2B.

The upper pool, WCA 2A, provides a 173 square mile reservoir for storage of excess water from WCA 1 and the 125 square mile agricultural drainage area of the North New River Canal. Storage in WCA 2A provides water supply to the east coast urban areas of Broward County. Water enters the area from WCA 1 and the Hillsborough Canal on the northeast side and from the North New River Canal on the northwest side. WCA 2A outlet is regulated by Structure 11, which releases water into WCA 3A through three gated spillways (S-11A, S-11B, and S-11C) with a combined design discharge capacity of 16,600 cubic feet per second (cfs).



**FIGURE 1. WATER CONSERVATION AREA LOCATION AND FLOWS**



**FIGURE 2. RELEVANT WATER CONTROL STRUCTURES IN WCA 2 TO THE PROPOSED ACTION**

### 1.3 PROJECT NEED OR OPPORTUNITY

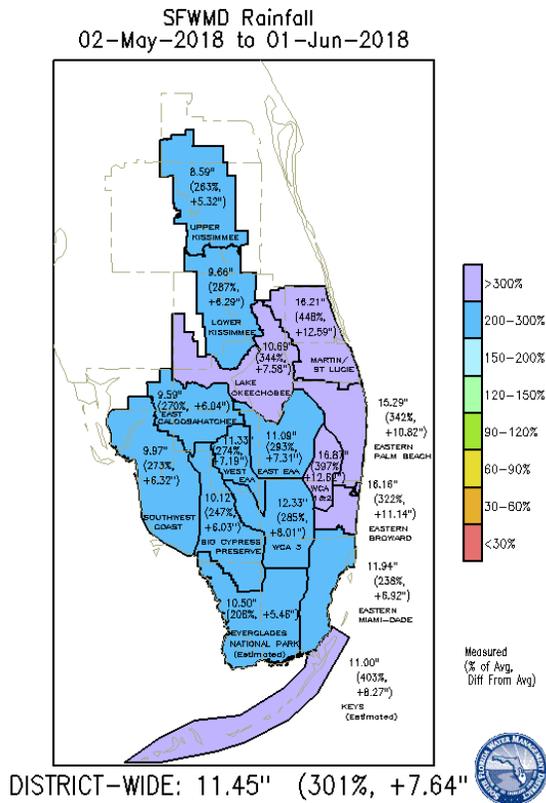
The C&SF Project currently functions and was originally authorized to function as a multi-purpose water management system. The Congressionally-authorized purposes of the C&SF Project include flood control, agricultural irrigation, municipal and industrial water supply, preservation of fish and wildlife, water supply to Everglades National Park (ENP), preservation of ENP, prevention of saltwater intrusion, drainage and water control, groundwater recharge, recreation, and navigation. Operations within the project area are currently governed by the 2012 WCAs, ENP and ENP to South Dade Conveyance System (SDCS) Water Control Plan, and subsequent approved deviations thereto (USACE 2012; USACE 2016; USACE 2017; USACE 2018). These include the Modified Water Deliveries to Everglades National Park (MWD) 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 (USACE 2016) and the 2018: L-29 Canal and G-3273 Constraint Relaxation Including the Northern Detention Area (Revised Operational Strategy Increment 2); hereafter referred to as MWD Increment 2. The Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) for MWD Increment 1 Plus is dated February 16, 2017. The EA and FONSI for MWD Increment 2 is dated February 21, 2018.

The U.S. Army Corps of Engineers, Jacksonville District (Corps) is seeking a planned temporary deviation from the WCA 2A Regulation Schedule in the 2012 Water Control Plan to provide relief from high water stages within WCA 3A to extend no later than April 30, 2019 by reducing total inflows into WCA 3A. The intent of the deviation is to reduce flows into WCA 3A through the S-11 structures. This Proposed Action provides the opportunity to alleviate the effects of high water stages in WCA 3A by holding stages higher in WCA 2A. The Proposed Action would be implemented July 1, 2018.

A series of mid-May storms caused conditions to change very rapidly from very dry to very wet conditions in South Florida, with Lake Okeechobee, the WCAs, and the eastern coast of Florida accumulating most of the rainfall. **Table 1** and **Figure 3** illustrate the widespread period of record rainfall for the month of May for southern Florida, with the area as a whole receiving 301% of the average rainfall. This record area wide rainfall has caused water levels in the three WCAs to rise above their maximum regulation schedules, as shown in **Table 2**. In addition, Lake Okeechobee and the Everglades Agricultural Area (EAA), which sends excess water south into the WCAs when capacity is available, has also received a significant amount of rainfall, further exacerbating the sharp rate of rise in the WCAs in May and June 2018. **Table 2** shows the stage and excess volume of water contained in these areas. There are currently 1.13 million acre-feet of excess water retained within the three primary WCAs, computed based on the volume difference between current water stages and the floor of the respective WCA Regulation Schedules.

**TABLE 1. TOTAL PRECIPITATION EXPERIENCED WITHIN C&SF PROJECT ACTION AREA MAY 2, 2018 TO JUNE 1, 2018**

Area	Precipitation (inches)	% of Average
Lake Okeechobee	10.69 inches	344% (average 3.11 inches)
WCA 1 and WCA 2	16.87 inches	397% (average 4.25 inches)
WCA-3	12.33 inches	285% (average 4.32 inches)



**FIGURE 3. SOUTH FLORIDA WATER MANAGEMENT DISTRICT RAINFALL MAP (MAY 2, 2018-JUNE 1, 2018)**

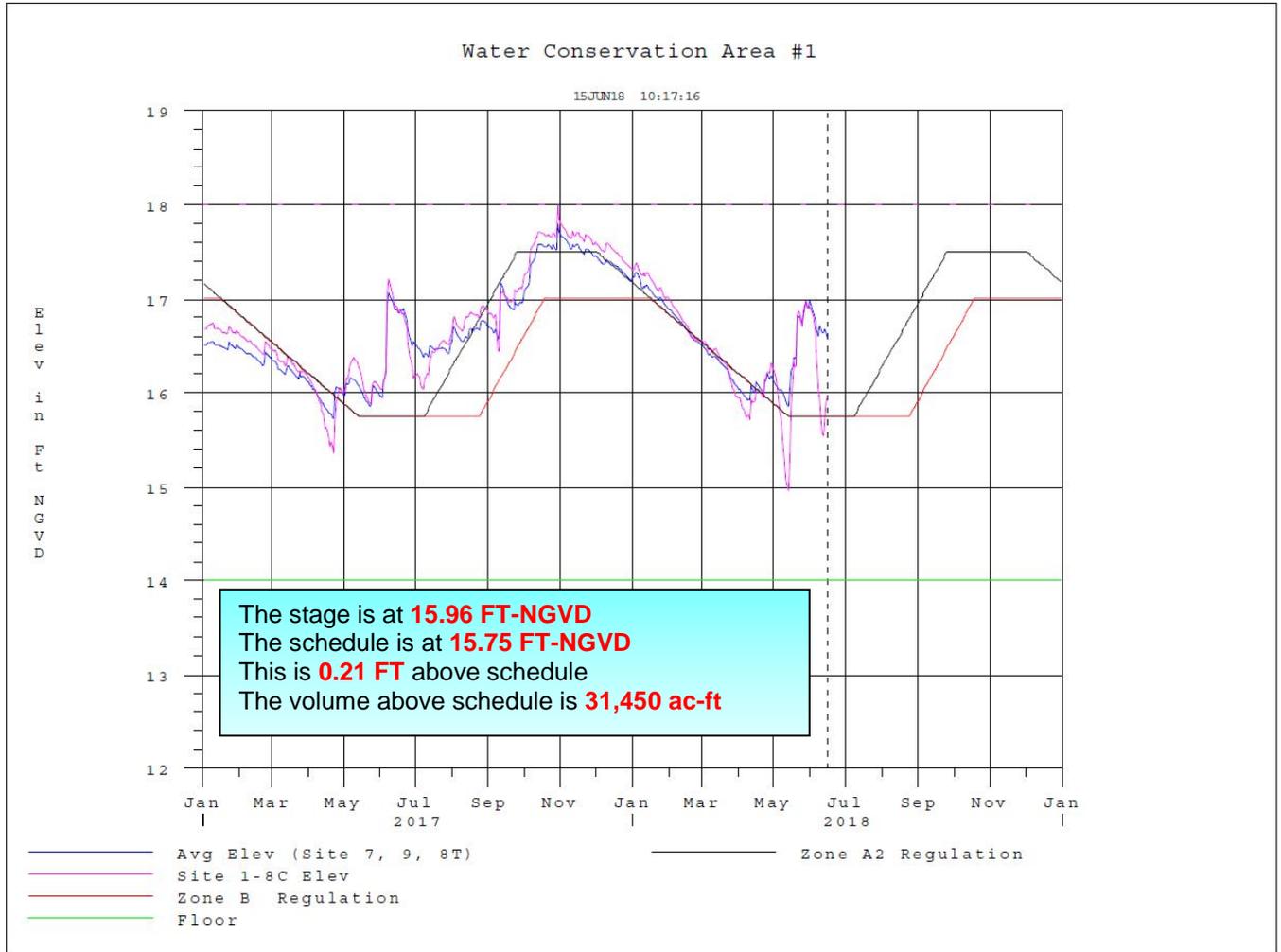
**TABLE 2. WCA STAGES COMPARED TO REGULATION SCHEDULE AS OF JUNE 15, 2018**

Area	Current Stage (feet NGVD)	Regulation Schedule (feet NVGD)	Deviation from Regulation Schedule (feet)	Volume Above Schedule (acre-feet)
WCA 1	15.96	15.75	0.21	31,450
WCA 2A	12.57	11.00	1.57	165,800
WCA 3A	10.84	9.40	1.89 (1.44 feet above Zone A)	933,800

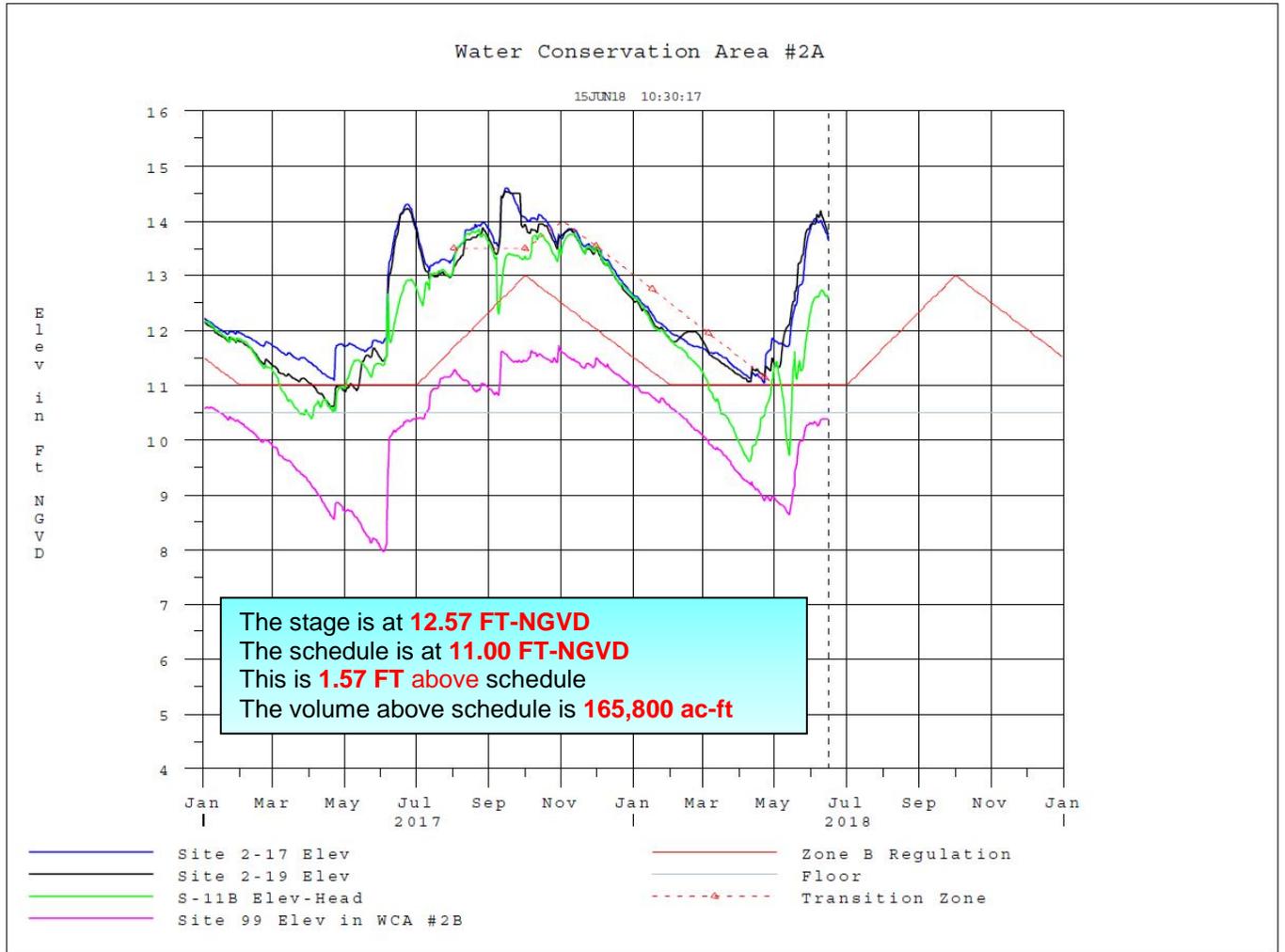
**Total: 1,131,050 acre-feet**

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. All WCAs are above schedule (as seen in **Figures 4-6**) limiting the operational flexibility in the system. WCA 3A is the southernmost storage area in the C&SF Project and has an extremely limited outlet capacity. The WCA 3A stage is currently above the maximum regulation schedule zone as shown in **Figure 6**, with current stages within the upper 10 percent of all years since WCA 3A was first completed in 1962. Exacerbating the high water levels in WCA 3A are the flows out of WCA 2A through the S-11s, which on June 15, 2018 were flowing 4,100 cfs from WCA 2A

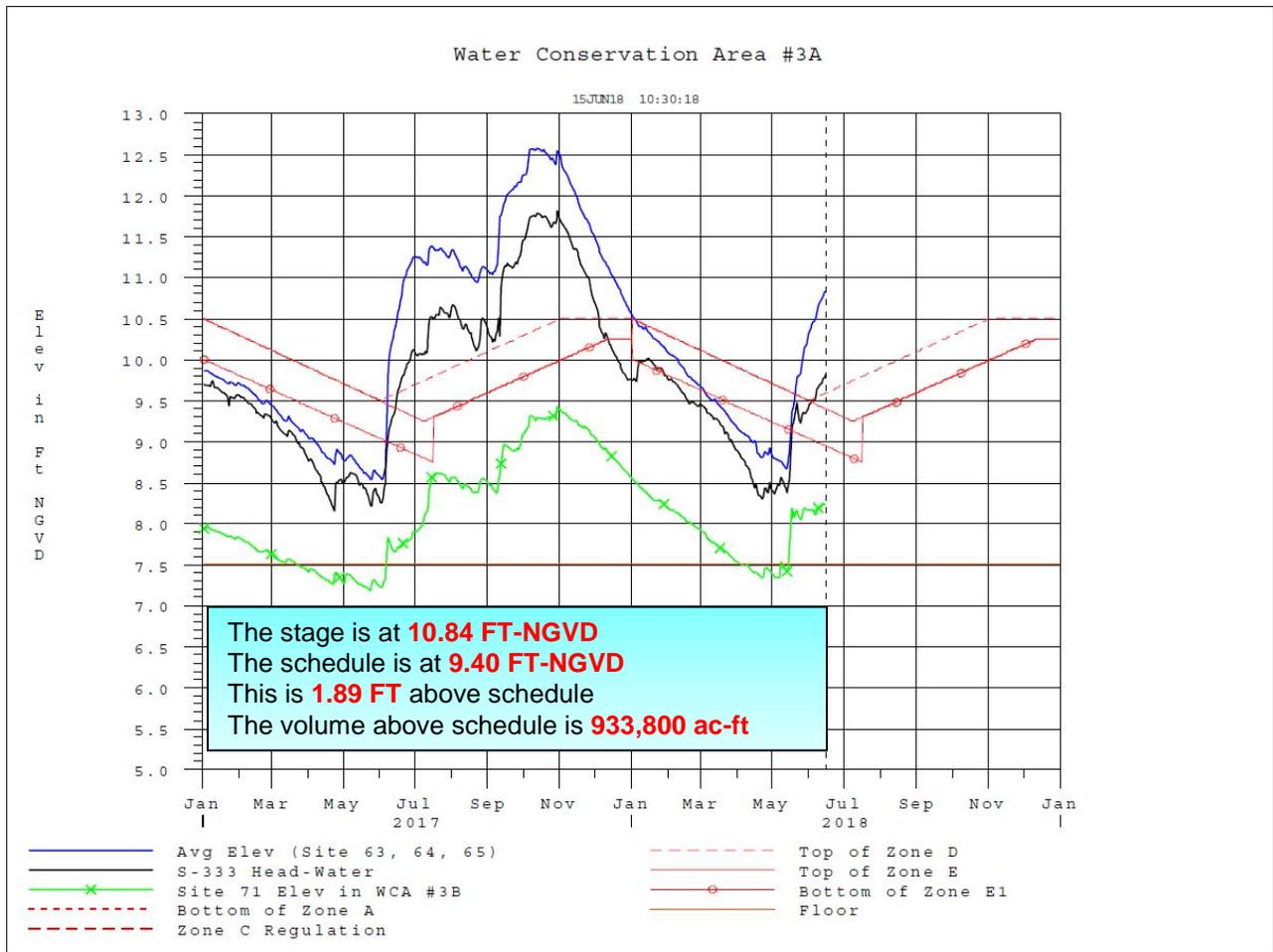
and therefore account for approximately 76 percent of the current measured water control structure inflows into WCA 3A. Since June 1, 2018 the S-11 structures have accounted for approximately 69% of the total inflows.



**FIGURE 4. WCA 1 STAGE HYDROGRAPHS AND EXCEEDANCE QUANTITIES**



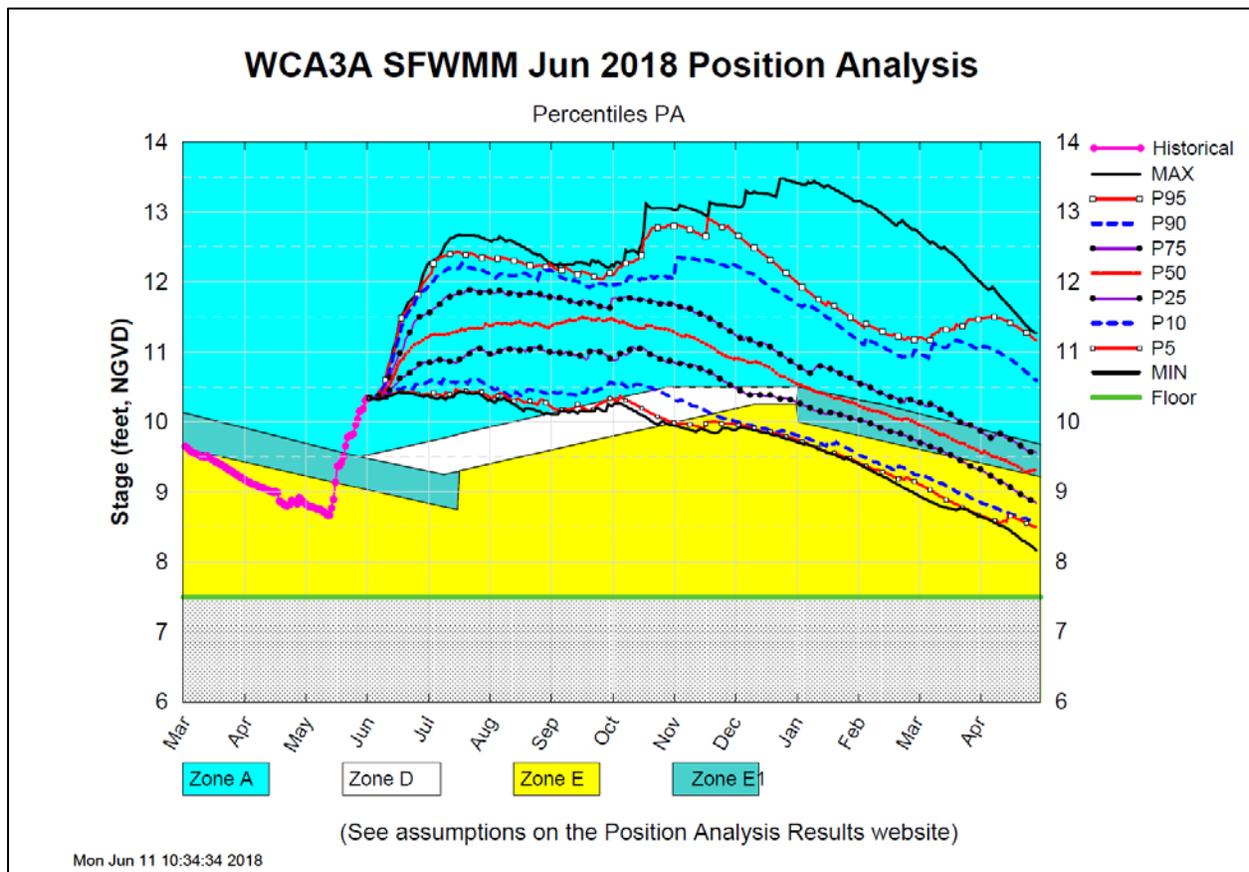
**FIGURE 5. WCA 2A STAGE HYDROGRAPHS AND EXCEEDANCE QUANTITIES**



**FIGURE 6. WCA 3A STAGE HYDROGRAPHS AND EXCEEDANCE QUANTITIES**

The goal of this planned temporary deviation from the 2012 Regulation Schedule for WCA 2A is to provide additional flexibility in managing the current and expected high water levels in WCA 3A. The Proposed Action provides the opportunity to alleviate the effects of high water levels in WCA 3A by holding water at higher levels in WCA 2A. On June 1, 2018, SFWMD conducted a position analysis to forecast future water levels in the WCAs. The SFWMD analysis can be seen in **Figure 7**. These analyses indicate that the water levels in WCA 3A will likely not recede below Zone A until November 2019 at the earliest.

Many areas of South Florida are currently experiencing high water levels, which restricts the ability of water managers to safely move water to mitigate the effects of flooding. If the rate of rise is not mitigated within WCA 3A to limit the prolonged duration of high water conditions, there is potential for these high water levels to pose greater environmental risks as the wet season and hurricane season continue due to the limited flood storage available with each of the WCAs already above the top of the respective schedules. Immediate action is necessary to deviate from water management practices to further reduce inflows into WCA 3A. The Proposed Action provides the opportunity to alleviate the effects of high water levels in WCA 3A by holding stages higher in WCA 2A.



**FIGURE 7. WCA 3A SFWMD JUNE 2018 DYNAMIC POSITION ANALYSIS**

The Corps is maximizing flows out of WCA 3A, subject to existing constraints prescribed under the MWD Increment 1.1 and 1.2 field test, and coordinating with USFWS on options to open structures prior to the July 15, 2016 Everglades Restoration Transition Plan (ERTP) Biological Opinion closure dates for the S-343A, S-343B, S-344, S-12A, and S-12B structures. These actions, if implemented, will further help to reduce the stage in WCA 3A. Additional action should be taken to address the high water elevations in WCA 3A. The Corps, in coordination with the SFWMD, proposes to hold additional water in WCA 2A to reduce inflows into WCA 3A. WCA 2A has sufficient capacity to hold more than the current regulation schedule (the regulation schedule prior to 1988 allowed for these higher water levels) and the Corps is proposing to utilize this capacity to help alleviate conditions in WCA 3A. The proposed schedule can be seen in **Figure 8** in Section 2.1.3. Release guidance out of WCA 2A for Zone A and Zone B will remain unchanged, but the action lines (the zone lines) will be raised such that releases will be required at a higher stage. The proposed action is to utilize capacity in WCA 2A to reduce inflows into WCA 3A by increasing the regulation schedule in WCA 2A to extend no later than April 30, 2019.

The Corps has performed an analysis on reducing flows out of WCA 2A into WCA 3A which would store an additional 152,064 acre-feet in WCA 2A. This water would have otherwise flowed

through the S-11s into WCA 3A. This volume of water amounts to approximately 0.31 feet of stage in WCA 3A (**Table 3**).

**TABLE 3. BENEFITS OF PLANNED TEMPORARY DEVIATION**

<b>Benefit</b>	<b>Description</b>
1.44 feet	Total stage gained in feet in WCA 2A from implementation date to 31 December 2017
152,064 acre-feet	Total acre-feet over WCA 2A
0.31 feet	Total stage reduction in feet equivalent in WCA 3A

If the rate of rise in WCA 3A is not mitigated to limit the duration of high water conditions, there is a potential for high water levels to pose more environmental risks, as well as, risks to public health, safety, welfare, and property in the South Florida region. The 2018 wet season and 2018 hurricane season also present an increased risk to the system due to the limited flood storage available with each of the WCAs already above the top of the respective schedules within the WCAs.

Another water management action that will help alleviate the high water in WCA 3A is to raise the stage (maximum operating canal level) of the L-29 Canal. The current Modified Water Deliveries Increment 2 operational plan includes the ability to raise the L-29 maximum operating limit from 7.5 feet NGVD to 8.5 feet, NGVD once the Canal-111 South Dade (C-111 SD) Project construction features are completed. Completion of the C-111 SD Northern Detention Area (NDA) is scheduled for September 30, 2018 which will allow an incremental transition for the L-29 Canal maximum operating limit from the existing limit of 7.5 feet NGVD up to a maximum of 8.3 feet NGVD. Completion of the C-111 SD Southern Detention Area (SDA) is scheduled for September 30, 2018, which will allow a transition for the L-29 maximum operating limit from 8.3 feet NGVD to 8.5 feet NGVD in accordance with the Increment 2 operational strategy. The L-29 Canal maximum operating limit is subject to downstream constraints which include requirements to operate L-29 Canal water control structures to ensure the stability and safety of the Tamiami Trail highway, in coordination with the Florida Department of Transportation requirements to maintain the Congressionally-authorized level of flood mitigation for the 8.5 SMA.

---

## 1.4 AGENCY GOAL OR OBJECTIVE

The goal of this planned temporary deviation from the 2012 Regulation Schedule for WCA 2A is to provide additional flexibility in managing the current and expected continued high water levels in WCA 3A. The Proposed Action provides the opportunity to alleviate the effects of high water levels in WCA 3A by holding water stages higher in WCA 2A.

## 1.5 RELATED ENVIRONMENTAL DOCUMENTS

The Corps has documented a number of environmental documents relevant to the proposed action:

- *Central and South Florida Interim Regulation Schedule for WCA 2A, June 1989*
- *General Design Memorandum and Environmental Impact Statement, Modified Water Deliveries to Everglades National Park, U.S. Army Corps of Engineers, Jacksonville District, June 1992*
- *General Reevaluation Report and Final Supplemental Environmental Impact Statement, 8.5 Square Mile Area, U.S. Army Corps of Engineers, Jacksonville District, July 2000*
- *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*
- *Biological Opinion, Final Interim Operating Plan (IOP), U.S. Fish and Wildlife Service, Vero Beach, Florida, November 17, 2006.*
- *Draft Environmental Assessment; Design Modifications for the Canal 111 Project Miami-Dade County, Florida, U.S. Army Corps of Engineers, Jacksonville District, June 2007*
- *Draft Environmental Assessment; Proposed Interim Operating Criteria for 8.5 Square Mile Area Project Miami-Dade County, Florida, U.S. Army Corps of Engineers, Jacksonville District, November 2008*
- *Environmental Assessment on Temporary Deviations from the Regulation Schedule for Water Conservation Areas 1 and 2A , March 2008*
- *Revised Draft Environmental Assessment; Proposed Interim Operating Criteria for 8.5 Square Mile Area Project Miami-Dade County, Florida, U.S. Army Corps of Engineers, Jacksonville District, April 2009*
- *Biological Opinion, Everglades Restoration Transition Plan (ERTP), U.S. Fish and Wildlife Service, Vero Beach, Florida, November 17, 2010.*
- *Everglades Restoration Transition Plan (ERTP) Final Environmental Impact Statement, U.S. Army Corps of Engineers, Jacksonville District, October 19, 2012.*
- *Agreement between the Jacksonville District, U.S. Army Corps of Engineers, and the Seminole Tribe of Florida Regarding Proposed Actions that May Adversely Affect American Indian Burial Resources. U.S. Army Corps of Engineers, Jacksonville District, February 2, 2015.*
- *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.*

- *Environmental Assessment and Finding of No Significant Impact, Planned Temporary Deviation to Affect Relief of High Water Levels within Water Conservation Area 3A, Jacksonville District, June 2017.*
- *Environmental Assessment and Finding of No Significant Impact, Planned Temporary Deviation from the 2012 Water Control Plan for Water Conservation Area 2A, U.S. Army Corps of Engineers, Jacksonville District, July 2017.*
- *Environmental Assessment and Finding of No Significant Impact, Emergency Deviation to Affect Relief of High Water Levels within Water Conservation Area 3A and the South Dade Conveyance System Post Hurricane Irma and Planned Deviation to Affect Relief of High Water Levels within Water Conservation Area 3A, U.S. Army Corps of Engineers, Jacksonville District, October 2017.*
- *Environmental Assessment and Finding of No Significant Impact, 2018: L-29 Canal and G-3273 Constraint Relaxation Including the Northern Detention area (Revised Operational Strategy Increment 2), U.S. Army Corps of Engineers, Jacksonville District, February 2018.*

Information contained within the previous National Environmental Policy Act (NEPA) documents listed above, as well as others described later, is incorporated by reference into this EA.

## **1.6 DECISIONS TO BE MADE**

This EA will evaluate whether to implement a temporary deviation schedule for WCA 2A and, if so, evaluate alternatives to accomplish that goal. The adoption of the Preferred Alternative for the Planned Deviation from the 2012 Water Control Plan is the primary decision that must be made. Alternative B has been identified as the Preferred Alternative for the Planned Deviation.

## **1.7 SCOPING AND ISSUES**

Reference **Appendix B** for pertinent correspondence.

## **1.8 PERMITS, LICENSES, AND ENTITLEMENTS**

This EA will be routed through the State of Florida Clearinghouse for Coastal Zone Management Act (CZMA) coordination, and early coordination has been initiated. The Corps has determined the proposed action is consistent to the maximum extent practicable with Florida's Coastal Management Program. The Proposed Action is not anticipated to adversely affect water quality and State water quality certification is not necessary. The Florida Department of Environmental Protection (FDEP) issued an Emergency Final Order in response to high rainfall and flooding in the South Florida Region, OGC Number: 18-1066, on June 20, 2018. The Order states that the Corps and SFWMD are hereby authorized to make temporary operational changes in order to minimize detrimental impacts to the environment, public, adjacent properties, and to downstream receiving water. The FDEP Emergency Final Order waives the requirement for state water quality certification for this Federal Action. The OGC Number: 18-1066, Final Emergency Order expires November 30, 2018.

---

## **2.0 ALTERNATIVES**

### **2.1 DESCRIPTION OF ALTERNATIVES**

Each of the following alternatives described below were considered and evaluated as the temporary Planned Deviation from the WCA 2A Regulation Schedule was developed.

#### **2.1.1 Alternative A – No Action Alternative**

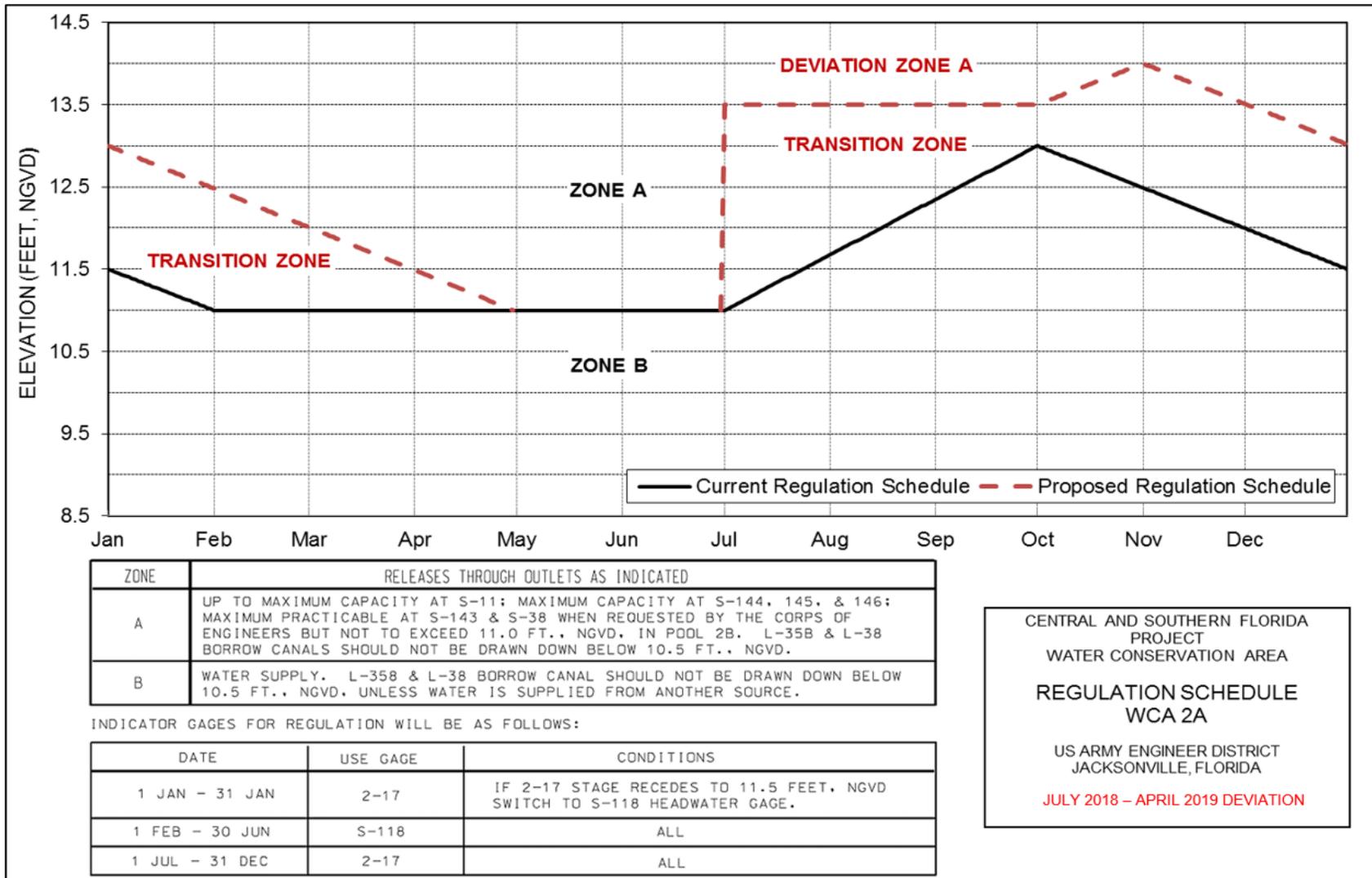
Operations within the project area are currently governed by the 2012 Water Control Plan and subsequent approved deviations thereto (USACE 2012, USACE 2016, USACE 2017, USACE 2018). Alternative A would continue current WCA 2A operations under the 2012 Water Control Plan (USACE 2012). The current regulations schedule and its zones are illustrated in **Figure 8**. Under the current regulation schedule for WCA 2A, the maximum elevation for Zone A is 13.0 feet, NGVD.

#### **2.1.2 Alternative B – Temporary Deviation from 2012 Water Control Plan (Elevation 14.0ft., NGVD)**

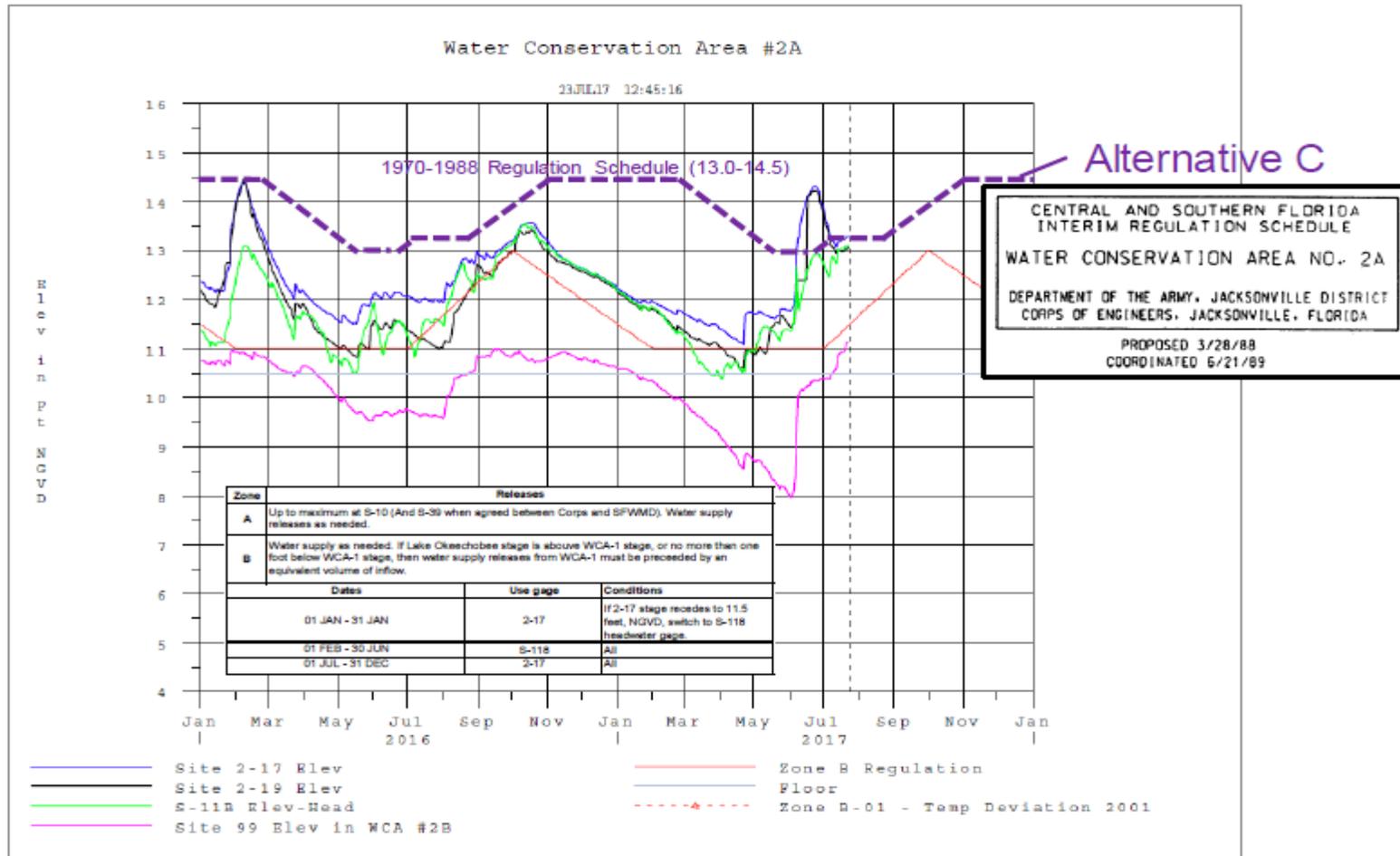
Alternative B would add a temporary deviation Zone A and a transition zone to the current WCA-2A Regulation Schedule with an intent to reduce flows into WCA-3A through the S-11 structures. The Corps will coordinate with the SFWMD to manage WCA 2A stages by maximizing releases out of WCA 2A to the east as practicable while in or above the transition zone of the deviation. The capacity to accomplish releases east is reduced when there is local rainfall over the east coast canal system, due to priority to maintain flood protection within the developed areas. This deviation would remain in effect until WCA 3A falls below Zone A, at which point a recovery period would be initiated to reduce the WCA 2A stage to the pre-deviation regulation schedule (normal operations). The deviation, including the recovery period, shall not extend past April 30, 2019 under this request. The recovery period will include a steady reduction in stage until it reaches the current regulation schedule. The rate of reduction will be coordinated with partner agencies through the avenues currently in place. The deviation will raise the regulation schedule of WCA 2A to accommodate additional storage, therefore reducing inflows into WCA 3A through the S-11 structures. All release guidance will remain unchanged, aside from the higher stage triggers. The proposed schedule can be seen in **Figure 8** in a red dashed line. The current regulation schedule and its zones is shown in black while the proposed schedule and zones are shown in red. The Corps retains operational flexibility to increase flows out of WCA 2A throughout the deviation based on changing system conditions.

#### **2.1.3 Alternative C – Temporary Deviation from 2012 Water Control Plan (1970 to 1988 Regulation Schedule)**

Alternative C would implement the WCA 2A Regulation Schedule that was previously utilized during the years 1970 to 1988 as illustrated within **Figure 9**. The proposed regulation schedule change under Alternative C has been included in this figure for reference, along with the existing Regulation Schedule identified in the No Action Alternative. The 1970-1988 Regulation Schedule for WCA 2A allows a maximum stage elevation of 14.5 ft., NGVD relative to Alternative B which allows a maximum stage elevation of 14.0 feet, NGVD.



**FIGURE 8. PROPOSED WCA 2A REGULATION SCHEDULE DURING PLANNED TEMPORARY DEVIATION (ALTERNATIVE B)**



**FIGURE 9. 1970-1988 WCA 2A REGULATION SCHEDULE (ALTERNATIVE C)**

## 2.2 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 compliance with project constraints. Potential effects on the human environment were also evaluated (**Section 4.0**).

Operations within the project area are currently governed by the 2012 Water Control Plan and subsequent approved deviations thereto (USACE 2012, USACE 2016, USACE 2017, USACE 2018). Alternative A, the No Action Alternative, would maintain operations as identified within the 2012 Water Control Plan. Current operations do not allow sufficient reduction in stages within WCA 3A and additional operational flexibility is required to reduce outflow constraints within WCA 3A given the current and projected future conditions.

Alternative B allows for operational flexibility to hold additional water in WCA 2A, thereby reducing the discharge requirements for the S-11 structures. The S-11 structures are the main inflows for WCA 3A, currently accounting for approximately 76 percent of the measured water control structure inflows. Since the middle of May 2018, WCA 3A remained at a high stage, above the Increment 1 and 2 Action Line which initiates maximum discharges from WCA 3A..

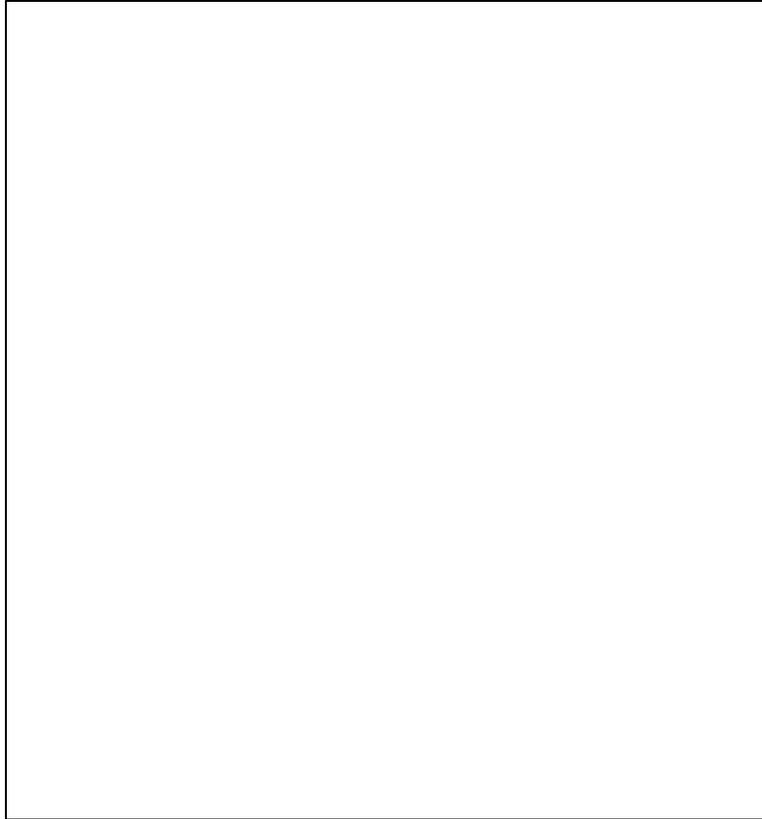
Additional action needs to be taken to expedite and further reduce the inflows into WCA 3A. WCA 2A has sufficient capacity to hold more than the current regulation schedule (the regulation schedule prior to 1988 allowed for these higher water levels) and the Corps is proposing to utilize this to partially alleviate high water conditions in WCA 3A. The Corps has performed an analysis comparing a “do nothing” scenario and implementing the proposed actions. Outflows as of 15 June 2018 from WCA 3A (2,260cfs) and S-11 inflows (4,100 cfs), it will take approximately up to four months to remove the 933,800 acre-ft of excess water currently being held in WCA 3A without any additional net rainfall (rainfall less evapotranspiration). The proposed deviation is estimated to reduce the S-11 flows out of WCA 2A into WCA 3A by approximately 50-60 percent, and Alternative B therefore will reduce the number of days needed to remove the excess water in WCA 3A by one to two weeks based on the volume of water held back in WCA 2A. The Corps is currently releasing the maximum amount of water out of WCA 3A to help mitigate these high water levels, subject to downstream constraints. The reduction in high water days within WCA 3A is preferable as it more quickly alleviates inundation of healthy tree islands and other important resources habitat with in WCA 3A, which are in better condition than those in WCA 2A. The proposed schedule allows for an extra 152,064 acre-feet of storage in WCA 2A, which would have otherwise flowed through the S-11s into WCA 3A. This volume of water amounts to approximately 0.31 feet of stage in WCA 3A which can be held back. Additional analysis of the current and forecasted conditions can be found in **Appendix A**.

The intent of Alternative B is to reduce flows into WCA 3A through the S-11 structures. The Corps will coordinate with the SFWMD to manage WCA 2A stages by maximizing releases out of WCA 2A to the east as practicable for the duration of the deviation while in the Transition Zone. The capacity to accomplish releases east is reduced when there is local rainfall over the east coast canal

system to maintain flood protection within developed areas. If the stages in WCA 2A exceed the proposed deviated regulation schedule and move into the Zone A category due to storm events, releases will be made from the S-11 structures as outlined in the current release guidance.

Furthermore, the planned temporary deviation from the 2012 WCA 2A Regulation Schedule is within the operating bounds of an earlier WCA 2A regulation schedule (1970-1988) that varied between elevations 13.0-14.5 ft., NGVD (included within Alternative C). Alternative B would raise the current Zone B schedule to elevation 13.5 ft., NGVD starting in July 2018 and would raise the peak of the current Zone B schedule from elevation 13.0 ft., NGVD (on 01 October) to elevation 14.0 ft., NGVD (on 01 November).

WCA 2A is bounded by seven levee segments (**Figure 9**). Six of these segments abut to other conservation and stormwater treatment areas and pose no immediate risk to human health and safety. The L-36 protects a highly populated area and is considered part of the East Coast Protective Levee system therefore the Corps, and its non-Federal sponsor (SFWMD), maintain close coordination in a levee inspection and monitoring program that ensures increased frequency of inspections when water levels reach elevation 15.0 feet, NGVD. The SFWMD has also completed rehabilitation measures for L-36. Potential negative effects to the integrity of this levee and subsequent impacts on flood control for adjacent development are not anticipated as a result of the Proposed Action. Following the 2017 deviation for WCA 2A, peak stages within WCA 2A reached approximately 14.5 feet, NGVD following Hurricane Irma in September 2017. In addition, the SFWMD has the operational capability within the water control plan to offset the potential for increased seepage out of WCA 2A by raising water levels in the landside borrow canal. The Corps will continue to coordinate with the SFWMD during the deviation.



**FIGURE 10. DEPICTION OF EXTERNAL LEVEES SURROUNDING WCA 2A**

Alternative C would implement the WCA 2A Regulation Schedule that was previously utilized during the years 1970 to 1988. The 1970-1988 Regulation Schedule for WCA 2A allows a maximum stage elevation of 14.5 feet, NGVD compared to Alternative B which allows a maximum stage elevation of 14.0 feet, NGVD. While Alternative C provides the opportunity to benefit WCA 3A to a greater degree by increasing the potential for storage within WCA 2A, the magnitude of potential negative effects within WCA 2A is greater. Temporary minor impacts are expected to plant communities and wildlife foraging opportunities in WCA 2A with increases in stage associated with both Alternative B and Alternative C.

Based upon the impact analysis conducted within this EA, Alternative B is the Preferred Alternative. This plan is expected to best meet the project purpose and need while minimizing any potential negative impacts. Alternative B best utilizes current capacity and existing structures within the C&SF Project to reduce discharges to WCA 3A from WCA 2A. Immediate action is necessary to deviate from current water management practices for the purposes of alleviating the high water conditions in WCA 3A.

### **2.3 PREFERRED ALTERNATIVE**

Based upon the impact analysis conducted within this EA, Alternative B is the Preferred Alternative. This plan is expected to best meet the objective of this planned temporary deviation, reducing water levels in WCA 3A for flood risk management purposes, while minimizing potential

negative impacts. Please see **Appendix A** for a full description of this alternative. Summary details of the Preferred Alternative are listed below:

- Planned temporary deviation from the 2012 WCA 2A Regulation Schedule to extend no later than April 30, 2019. The deviation will add a temporary deviation Zone A and a transition zone to the current approved (Zone A) regulation schedule of WCA 2A to reduce flows into WCA-3A through the S-11 structures while maximizing releases to the east as practicable
- The Corps will coordinate with the SFWMD to manage the WCA 2A stages by making releases out of WCA 2A to the east for the duration of the deviation. The capacity to accomplish releases east is reduced when there is local rainfall over the east coast canal system.
- The planned temporary deviation would remain in effect until WCA 3A falls below Zone A of the WCA 3A Regulation Schedule, at which point a recovery period would be initiated to reduce the WCA 2A stage to the pre-deviation regulation schedule (normal operations). The deviation, including the recovery period, shall not extend past April 30, 2019, under this request. The recovery period will consider recession rates to avoid and minimize impacts to foraging conditions for the threatened wood stork and other wading birds.
- All release guidance will remain unchanged, aside from the higher stage triggers. Release guidance out of WCA 2A for Zone A and Zone B will remain unchanged, but the action lines (the zone lines) will be raised such that releases will be required at a higher stage. The Corps will retain operational flexibility to increase flows out of WCA 2A.

## **2.4 ALTERNATIVES ELIMINATED FROM DETAILED EVALUATION**

All of the alternatives considered in **Section 2.0**. have been carried through the remainder of the NEPA document for detailed evaluation.

---

### 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 Shark River Slough 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 Shark River Slough are characterized by marl substrates and exposed limestone bedrock. Those wetland areas located to the east of Shark River Slough 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 to the west of WCA 3.

Declines in ecological function of the Everglades have been well documented. In the pre-drainage system, the inundation pattern supported an expansive system of freshwater marshes including long hydroperiod sawgrass “ridges” interspersed with open-water “sloughs”, higher elevation marl prairies on either side of Shark River Slough, and forested wetlands in the Big Cypress marsh. Rainfall and seasonal discharge from Lake Okeechobee resulted in overland surface flows (sheet flow) which helped to maintain the microtopography, directionality, and spatial extent of ridges and sloughs. Accretion of peat soils typical of the ridge and slough landscape required prolonged flooding, characterized by 10 to 12 month annual hydroperiods, and ground water that rarely dropped more than one foot below ground surface (Tropical BioIndustries Inc. 1990). The depths, distributions and duration of surface flooding largely determined the vegetation patterns, as well as the distribution, abundance and seasonal movements, and reproductive dynamics of all of the aquatic and many of the terrestrial animals in the Everglades (Davis and Ogden 1994, Kushlan and Kushlan 1979, Holling, Gunderson and Walters 1994, Walters and Gunderson 1994).

Construction of canals and levees by C&SF project resulted in the creation of artificial impoundments and has altered hydroperiods and depths within the action area. For example, northern WCA 3A has been over drained and its natural hydroperiod shortened while the eastern and southern portion of WCA 3A is primarily affected by high water and prolonged periods of inundation. The result has been substantially altered plant community structures, reduced abundance and diversity of animals and spread of non-native vegetation. The once vast, naturally connected landscape has been cut into a mosaic of various-sized habitat patches. The ridge and slough habitat has become severely degraded in a number of locations and is being replaced with a landscape more uniform in terms of topography and vegetation with less directionality (National Research Council 2012). The canals adjacent to the project area likely serve as an effective barrier to wildlife movement, interfering with or preventing life functions of many native wildlife species.

The remaining portions of the Everglades are stressed and exhibit levels of reduced aquatic function. The overall negative ecological trends in the remaining portions of the Everglades are expected to continue into the future, with additional loss of resources through landscape alterations and degradation of habitat. The effects of the existing infrastructure and future water management practices will continue to cause dry-outs in the natural system. The threat of extreme fires will persist, destroying peat that is necessary for plant growth and water retention. Although, less extreme, soil subsidence will also continue as dry-outs, particularly extreme during periods of

---

drought, contribute to further soil oxidation. Droughts may increase in frequency and intensity as a result of climate change as well. Unnatural shorter or longer hydroperiods will likely continue to cause detriment to remaining tree islands.

### **3.2 STUDY AREA LAND USE**

The existing land use within the study area varies widely from agricultural to high-density multifamily 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 2 and WCA 3, which are located north of ENP, are part of the Everglades Complex of Wildlife Management Areas managed by the Florida Fish and Wildlife Conservation Commission (FWC).

### **3.3 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 subtidal 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.

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. Water lilies (*Nymphaea alba*) were originally widespread in sloughs throughout many areas of WCA 3A (McVoy, et al. 2011). Reduced freshwater inflow and drainage by the Miami Canal have overdrained the northern portion of WCA 3A, 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 with large areas of shrubs and monotypic cattail. Northern WCA 3A lacks the diversity of communities that exists in southern WCA 3A. In southern WCA 3A, Wood and Tanner (1990) documented the trend toward deep water lily dominated sloughs due to impoundment. In approximately 1991, the hydrology of southern WCA 3A shifted to the deeper water and extended hydroperiods of the new, wet hydrologic era resulting in a northward shift in slough vegetation communities within the WCA 3A impoundment (Zweig and Kitchens 2008).

---

Typical Everglades vegetation, including tree islands, wet prairies, sawgrass marshes, and aquatic sloughs also occur throughout 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 predominated 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.

### 3.4 FISH AND WILDLIFE RESOURCES

Aquatic macroinvertebrates 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 macroinvertebrates 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 macroinvertebrates. 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). The density and distribution of marsh fish populations fluctuate with seasonal changes in water levels. Populations of marsh fishes increase during extended periods of continuous flooding during the wet season. As marsh surface waters recede during the dry season, marsh fishes become concentrated in areas that hold water through the dry season. Concentrated dry season assemblages of marsh fishes are more susceptible to predation and provide an important food source for wading birds (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 gryllio*), 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 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 alligator was historically most abundant in the peripheral Everglades marshes and freshwater mangrove habitats, but is now most abundant in canals and the deeper slough habitats of the central Everglades. Drainage of peripheral wetlands and increasing salinity in mangrove wetlands as a result of decreased freshwater flows has limited the occurrence of alligators in these habitats (Mazzotti and Brandt 1994).

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 (*Plegadis falcinellus*), 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). The number of wading birds nesting in the Everglades has decreased by approximately 90 percent, and the distribution of breeding birds has shifted away from ENP into the WCAs (Bancroft, et al. 1994). The WCAs support fewer numbers of breeding pairs with relatively lower reproductive success (USACE 1999). Water management practices and wetland losses are believed to be the primary cause of the declines (Bancroft, et al. 1994).

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*).

### **3.5 THREATENED AND ENDANGERED SPECIES**

#### **3.5.1 Federally Protected Species**

The Corps has coordinated with the USFWS, as appropriate. Federally listed threatened and endangered species are either known to exist or potentially exist within the project area and, subsequently, may be affected by the proposed project. Many of these species have been previously affected by habitat impacts resulting from wetland drainage, alteration of hydroperiod, wildfire, and water quality degradation. A number of candidate animal and plant species are also known to exist or potentially exist within the project area. **Table 4** details federally-listed species and critical habitat potentially occurring in the vicinity.

**TABLE 4. FEDERALLY-LISTED SPECIES POTENTIALLY OCCURRING IN THE AREA**

<b>Common Name</b>	<b>Scientific Name</b>	<b>Status</b>
<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>		
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
Eastern indigo snake	<i>Drymarchon corais couperi</i>	T
Gopher tortoise	<i>Gopherus polyphemus</i>	C
<b>Invertebrates</b>		
Bartram's hairstreak butterfly	<i>Strymon acis bartrami</i>	E, CH
Florida leafwing butterfly	<i>Anaea troglodyta floralis</i>	E, CH
Miami blue butterfly	<i>Cyclargus thomasi bethunebakeri</i>	E
Schaus swallowtail butterfly	<i>Heraclides aristodemus ponceanus</i>	E
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
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>	T
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
Florida pineland crabgrass	<i>Digitaria pauciflora</i>	T
Pineland sandmat	<i>Chaemaesyce floridana</i>	T
Florida prairie clover	<i>Dalea carthagenesis</i> <i>floridana</i>	E

E = Endangered; T=Threatened; CH=Critical Habitat; PT = Proposed Threatened; PE = Proposed Endangered

### 3.5.2 State Listed Species

The action area provides habitat for several state listed species as listed in **Table 5**.

**TABLE 5. STATE LISTED SPECIES POTENTIALLY OCCURRING IN THE AREA**

Common Name	Scientific Name	Status
<b>Mammals</b>		
Everglades mink	<i>Mustela vison evergladensis</i>	T
<b>Birds</b>		
Florida sandhill crane	<i>Antigone Canadensis pratensis</i>	T
American oystercatcher	<i>Haematopus palliates</i>	T
Black skimmer	<i>Rynchops niger</i>	T
Least tern	<i>Sterna antillarum</i>	T
White-crowned pigeon	<i>Columba leucocephalus</i>	T
Little blue heron	<i>Egretta caerulea</i>	T
Tricolored heron	<i>Egretta tricolor</i>	T
Reddish egret	<i>Egretta rufescens</i>	T
Roseate spoonbill	<i>Ajaja</i>	T
Southeastern American kestrel	<i>Falco sparverius Paulus</i>	T
<b>Reptiles</b>		

Rim rock crowned snake	<i>Tantilla oolitica</i>	T
<b>Plants</b>		
Pine-pink orchid	<i>Bletia purpurea</i>	T
Lattace vein fern	<i>Thelypteris reticulate</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

T: threatened; E: endangered

### 3.6 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.

### 3.7 GEOLOGY AND SOILS

The geology and soils of South Florida represent many of the opportunities, constraints, and impacts of regional water management. The plants, while the mineral content probably results from the deposition of fine sediment during overflows from Lake Okeechobee. Okeelanta peaty muck consists of finely fibrous, well-decomposed organic matter over a layer of black plastic muck; it usually overlies hard limestone. Everglades' peaty muck contains somewhat less mineral matter than Okeelanta peaty muck. The surface layer rests on brown, fibrous peat, and it usually lacks the subsurface layer of black plastic muck. Everglades' peat, the most extensive of the organic soils, is formed mostly from partially decayed sawgrass. The upper 12 inches is a nearly black, finely fibrous peat which contains approximately 10% mineral soil. The subsoil is brown, fibrous peat which rests on the underlying rock, sand, or marl. A fifth type of organic soil, which is not extensive in the area, is Loxahatchee peat. It is a brown, spongy peat, composed of the remains of water lilies, water grasses, and other aquatic plants. Ordinarily, the area occupied by Loxahatchee peat is covered by water most of the year.

The discontinuous and locally productive water-bearing units of the surficial aquifer include the Biscayne aquifer, the undifferentiated surficial aquifer, the coastal aquifer of Palm Beach and Martin counties, and the shallow aquifer of South Florida. Practically all municipal and irrigation water is obtained from the intermediate aquifer system. The intermediate aquifer system consists

---

of beds of sand, sandy limestone, limestone, and dolostone that dip and thicken to the south and southwest. In much of South Florida, the intermediate aquifer system represents a confining unit that separates the surficial aquifer system from the Floridan aquifer system. The Floridan aquifer system is divided by a middle confining unit into the Upper and Lower Floridan aquifers. In the LEC, the Upper Floridan aquifer is being considered for storage of potable water in an aquifer storage and recovery program. In the Lower Floridan aquifer, there are zones of cavernous limestones and dolostones with high transmissivities. However, because these zones contain saline water, they are not used as a drinking water supply and are used primarily for injection of treated effluent wastewater.

### **3.8 HYDROLOGY**

The major characteristics of South Florida's hydrology are: (1) local rainfall, (2) evapotranspiration, (3) canals, levees and water control structures, (4) flat topography, and (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 to the south. 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 water, precluding the occurrence of historic Everglades flow patterns. The C&SF Project infrastructure 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.

#### **3.8.1 Water Conservation Area 1**

WCA 1, also known as the Arthur B. Marshall Loxahatchee National Wildlife Refuge (LNWR), is approximately 21 miles long from north to south and comprises an area of approximately 221 square miles. The West Palm Beach Canal lies at the extreme northern boundary, and on the south, the Hillsboro Canal separates WCA 1 from WCA 2A. Ground elevations slope approximately five feet in ten miles, both to the north and to the south from the west center of the area, varying from over 16 feet in the northwest to less than 12 feet NGVD in the south. The area, which is enclosed by approximately 58 miles of levee, approximately 13 miles of which are common to WCA 2A, provides storage for excess rainfall runoff from areas that drain to EAA canals, the West Palm

---

Beach Canal (230 square miles) and the Hillsboro Canal (146 square miles). In addition, WCA 1 may receive water from Lake Okeechobee under certain conditions. Discharges from WCA 1 to meet water supply demands can occur to the West Palm Beach Canal, Hillsboro Canal, and the canal infrastructure east of WCA 1, in accordance with the WCA 1 Regulation Schedule (USACE 1996). The WCA 1 Regulation Schedule also defines when excess water in WCA 1 can be discharged to WCA 2A and to tide via the Hillsboro Canal. Due to its limited discharge capacity and its relatively small size compared to the watershed from which it receives water, consecutive rainfall events have the potential to quickly utilize storage within WCA 1, resulting in discharges from WCA 1 to WCA 2A via the S-10 structures.

### **3.8.2 Water Conservation Areas 2A and 2B**

Covering an area of 210 square miles, WCA 2 is comprised of two areas, 2A and 2B, and measures approximately 25 miles from north to south. WCA 2A is separated from the other WCAs by the Hillsboro Canal to the north and the North New River Canal to the south. Ground elevations slope southward approximately two to three feet in ten miles, ranging from over 13 feet NGVD in northwest WCA 3A to less than 7 feet NGVD in southeast WCA 3B. The area is enclosed by approximately 61 miles of levees, of which approximately 13 miles are common to WCA 1 and 15 miles to WCA 3.

The upper pool, WCA 2A, provides an area of approximately 173 square miles for storage of excess water from WCA 1 and a portion of the EAA (125 square miles) which drains to the North New River Canal. Water supply to the east coast urban areas of Broward County is provided by WCA 2A, in accordance with the WCA 2A Regulation Schedule (USACE 1996). Due to its limited discharge capacity and its relatively small size compared to the watershed from which it receives water, consecutive rainfall events have the potential to quickly utilize storage within WCA 2, resulting in discharges from WCA 2A to WCA 3A via the S-11 structures.

Ground elevations in WCA 2B range from 9.5 feet NGVD in the northern portions to seven feet NGVD in the southern portions of the area. The area experiences a high seepage rate, which does not allow for the long-term storage of water, and as a result, water is not typically released from WCA 2B.

### **3.8.3 Water Conservation Area 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. Effective since November 2017, the S-152 culvert structure can be used to deliver water from WCA 3A to WCA 3B when the WCA 3B stage is less than 8.5 feet NGVD and water quality criteria listed in the operational plan for the Decommissioned Physical Model (DPM) are satisfied. 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.

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

#### **3.9.1 Greater Everglades**

The C&SF Project has numerous water management structures consisting of culverts, spillways, and pump stations that have specified operating criteria for managing or regulating water levels for Congressionally-authorized project purposes. 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 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.

#### **3.10 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 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 regulation schedules for the WCAs contain instructions and guidance on how project spillways are to be operated to maintain water levels in the WCAs. The regulation schedules represent the seasonal and monthly limits of storage which guides project regulation for the authorized purposes. In general, the schedules vary from high stages in the late fall and winter to low stages at the beginning of the wet season. These regulation schedules must take into account various, and often conflicting, project purposes.

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 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 ENP-SDCS provides a way to deliver water to areas of south 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.

### **3.11 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. The northern WCAs are fed from the lake as well as runoff from the EAA. Water quality impairment within the study area can generally be attributed to nutrients and bioavailable forms of mercury. A short discussion of each of these water pollutants is provided below followed by a geographically referenced review of water quality within the study area.

#### **3.11.1 Nutrients**

Nutrients such as phosphorous and nitrogen compounds are a concern in the estuaries, WCAs, ENP, and Lake Okeechobee since they result in an imbalance of flora and fauna. Excess nutrients come primarily from agricultural fertilizers; the decomposition of the peat soils in the area also

---

contributes to excess phosphorus in the system. Phosphorus is the nutrient of concern for Lake Okeechobee, the WCAs, and ENP; nitrogen is generally considered to be the nutrient of concern for the marine waters of South Florida. Within the remnant Everglades, the background phosphorus concentration in surface waters is between 0.004 mg/l and 0.006 mg/l TP. At the northern end of WCA 3, inflow TP concentrations exceed 0.020 mg/l resulting in undesirable changes to soil composition and vegetation coverage. Soil phosphorus concentrations in pristine areas of ENP are on the order of 100 to 200 milligrams per kilogram (mg/kg) while in impacted areas of the WCAs near canals, soil phosphorus concentrations exceed 500 mg/kg (Craft and Richardson 2007). The discharge of elevated concentrations of TP into the WCAs has resulted in sufficient soil phosphorus concentrations (< 650 mg/kg) to support cattail invasion into formerly sawgrass and bulrush dominated areas. An example of the impact of nutrient discharges is evident from the expansion of cattails south of the S-10 inflow gates to WCA 2A. Recovery from these high soil concentrations will take decades if not longer.

Nitrogen is generally not considered to be a problem within the Everglades landscape. The concentration of total nitrogen (TN) varies from about 2.2 mg/l in WCA 1 to around 0.85 mg/L in pristine areas of ENP. Lake Okeechobee TN concentration is presently around 1.7 mg/l. In the Caloosahatchee and St. Lucie estuaries and portions of Florida Bay, excess nutrients coupled with high temperatures, low salinity and stagnant water conditions cause algal blooms and depressed oxygen conditions. The Caloosahatchee and St. Lucie Estuaries are generally considered to be nitrogen limited with inorganic forms of nitrogen such as nitrate causing the most harm. The concentration of nitrogen in the discharges from the C-43 and C-44 canals into the northern estuaries is approximately 1.5 mg/l with approximately 0.5 mg/l provided by the highly bioavailable inorganic forms such as nitrate and nitrite. The average concentration of total nitrogen into Florida Bay is around 1.0 mg/l with very little provided as nitrate and nitrite.

### **3.11.2 Mercury**

Mercury in the system is primarily delivered by atmospheric deposition. Methylated mercury is the most poisonous form of mercury and is thought to result from sulfate reducing bacteria in anoxic sediments. Presence of sulfur (agricultural soil amendment) and total organic carbon are considered to be factors in enhancing mercury methylation. This proposed action is not expected to change the methylation rate in WCA 2A as this temporary deviation will have no impact on sulfur loading, TOC loading or atmospheric deposition.

## **3.12 AIR QUALITY**

Legal limitations on pollutant concentration levels allowed to occur in the ambient air, or air quality standards, have been established by the USEPA and the FDEP for six criteria 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>). Primary sources of air pollution in South Florida are related to transportation, stationary fuel combustion sources, and solid waste disposal. In 2011, Florida continued to be in attainment for all criteria pollutants, except for the lead nonattainment area in Hillsborough County as noted in the FDEP 2011 Air Monitoring Report). Air monitoring reports are prepared annually by FDEP to inform the public of the air pollutant levels throughout the State of Florida. The report summarizes the results of monitoring that has been conducted to measure outdoor concentrations

---

of those pollutants for which the USEPA and the State of Florida's Environmental Protection program have established ambient air quality standards. All areas within the state are designated with respect to each of the six pollutants 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. Maintenance areas must maintain some of the non-attainment area plans to stay in compliance with the standards.

Southeast Florida including Miami-Dade, Broward, and Palm Beach Counties continue to be classified by the USEPA as attainment/maintenance areas for ozone. Although EPA has no current PM<sub>10</sub> standard in force, Florida was in compliance with the previous EPA standard.

### **3.13 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.

### **3.14 NATIVE AMERICANS**

There are two federally recognized tribes (the Miccosukee Tribe of Indians of Florida and the Seminole Tribe of Florida) that are located near the project area (**Figure 11**). 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 is adjacent to the Miccosukee Tribe's Alligator Alley Reservation which spans portions of WCA 3A, and both tribes have leases and easements within WCA 3.

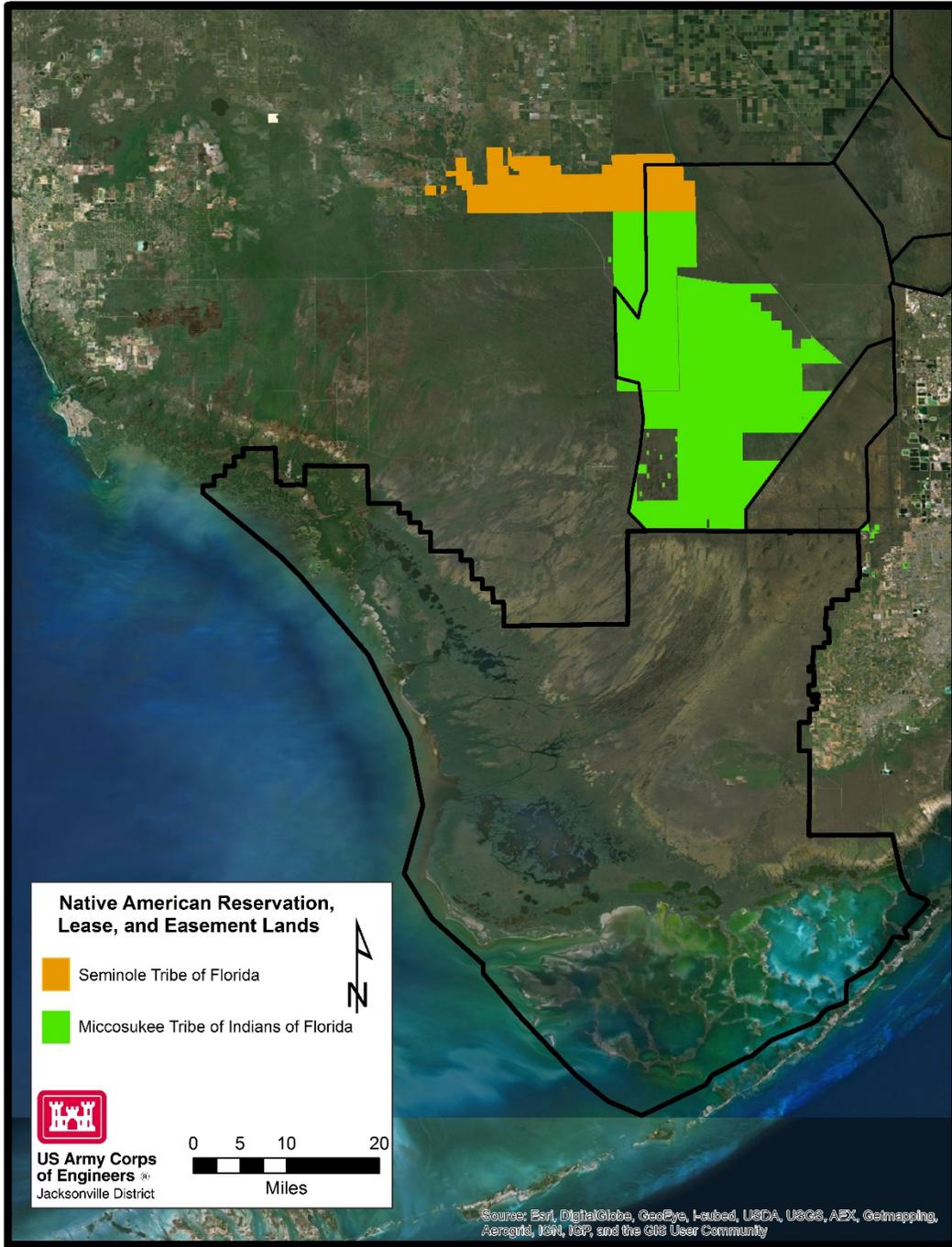
The Miccosukee Tribe of Indians of Florida and Seminole Tribe of Florida have a long history of living within region. Both tribes moved into the region during the eighteenth and nineteenth centuries from Georgia and Alabama. Fleeing the U.S. Army and the forced relocation policies of the Indian Removal 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 11. MAP OUTLINING THE LOCATION OF TRIBAL RESERVATION, LEASED, AND EASEMENT LANDS**

---

### 3.15 CULTURAL RESOURCES

Within the larger area of South Florida, evidence of Paleo-Indian (14,500-11,500 years before present) habitation has also been recorded (i.e. Warm Mineral Springs (8SO18) and Little Salt Spring (8SO79), and is suggested at the Cutler Fossil site (8DA2001). The beginning of the Holocene is identified as the start of the Archaic Period (11,500-2,500 years before present) of prehistory. During the Paleo-Indian period, sea level is estimated to have been over 300 feet lower than present.

The Archaic period spans approximately from 11,500-2,500 years before present and is typically divided into three separate periods: Early (11,500-8,000 years before present), Middle (8,000-5000 years before present), and Late periods (5,000-2,500 years before present). Each Archaic sub-period is identified by a different serration of projectile points. Additionally the Late Archaic is associated with the presence of fiber tempered pottery. The beginning of the Early Archaic coincides with the start of the Holocene epoch. During this period, Florida experienced a rise in sea level and a consequent loss of many of the coastal areas. The sea level stabilized near the current level about between 6,000 and 5,000 BP. There are indications that the sea level has fluctuated up to two meters above and below the current level over the last 5,000 years.

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 1500s-1700s. Many of the tree islands through this region sites associated to the Glades period. This period has been broken down into successive stages starting with Glades I, which dates from 500 B.C. to 750 A.D., Glades Period II dating from 750 to 1200 A.D., and Glades Period III dating from 1200 A.D. to European contact in the 1500s. The hallmark of Glades Period sites is the presence of sand tempered pottery. The separate periods are distinguished by temporally diagnostic decorations. It should be noted that recent investigations have resulted in the recovery of sand tempered pottery in association with Lake Archaic sediments and fiber tempered pottery. 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 (Milanich 1994).

After European contact, Native American populations in the region continuously declined and remained at low levels until Miccosukee and Seminole 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 South Florida 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. A single cultural resources assessment has been conducted within WCA 2. This report, entitled *Primary Cultural Resource Assessment of the Everglades Wildlife Management Area, Conservation Areas 2A, 2B, 3A North, 3A South and 3b*, was conducted by Robert Taylor in 1988. No cultural resources were identified

---

in WCA 2A as a result of this survey, and no other previously identified cultural resources are known to exist within WCA 2. However, due to the historic presence of tree islands and the identification of archaeological sites within the adjacent Water Conservation Areas that have been subject to more intensive cultural resources surveys, there is a high likelihood that archaeological deposits dating from the Glades periods through the historic Seminole period existing within WCA 2.

### **3.16 SOCIOECONOMICS**

Florida's economy is characterized by strong wholesale and retail trade, government, and service sectors. The 2010 population estimates for each of the Lower East Coast (LEC) Planning Area counties are as follows: Palm Beach County (1,340,134 residents), Broward County (1,748,066 residents), and Miami-Dade County (2,496,435 residents). The economy of South Florida is based on services, agriculture, and tourism. Florida's warm weather and extensive coastline attract vacationers and other visitors and help make the state a significant retirement destination. The three counties that comprise the LEC (Palm Beach, Broward, and Dade) are heavily populated, and it is estimated that over 6.9 million people will reside in this region by the year 2050.

### **3.17 RECREATION**

There are many recreational opportunities through South Florida. The WCAs have been used for recreational activities including hunting, fishing, frogging, boating, camping, and off-road vehicle use. A variety of other nature-based recreational opportunities are also provided within the WCAs. 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.

### **3.18 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. There is no significant noise generating land users within these areas. Existing sources of noise are limited to the 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. Sound levels are typically in the range of 85 to 105 decibels (dB) for motorboats and air boats, respectively. Wilderness ambient sound levels are typically in the range of 35 dB and should not be an issue for wildlife.

Rural areas have typical noise levels in the range of 35 to 55 dB. Sources of noise in rural, areas include noise associated with agricultural production such as the processing and transportation of agricultural produce. The use of farm equipment such as tractors, plows, and the use of irrigation facilities would be expected to be the dominant background noise.

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 etc., inherent in areas of higher population would be significant and probably override those sounds associated with natural emissions. Other sources of noise might be expected to include noise from everyday social and human communication and

---

activity, operations of construction and landscaping equipment, and operations at commercial and industrial facilities. In general, urban emissions would not be expected to exceed 60 dB, but may attain 90 dB or greater in busier urban areas or near to frequently used, high volume transportation arteries.

### **3.19 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 such as fig, gumbo limbo, and cypress 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, including canals and levees. Additional man-made features include pump stations, navigation locks, secondary and primary roads, highways, electrical wires, communication towers, occasional buildings, borrow pits and other features which may or may not detract from the regional aesthetic. Visual aesthetics when possible from a high perspective such atop a levee, offer pleasant and unspoiled perspectives of Everglades' marsh with numerous birds and other wildlife. Agricultural lands are cultivated for citrus, sugarcane, vegetables, sod, and greenhouse/nursery. Generally, urban development is concentrated along the LEC from Palm Beach County to Dade County. Major cities are visually congested with residential communities, major transportation arteries (i.e. heavily used roads and highways), and intensively developed commercial and industrial facilities. Visual aesthetics are marginal. Development is typically immediately adjacent to or nearby protected natural areas.

---

## **4.0 ENVIRONMENTAL EFFECTS**

### **4.1 GENERAL ENVIRONMENTAL 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 prior NEPA documentation listed in **Section 1.5** and are hereby incorporated by reference.

### **4.2 HYDROLOGY**

#### **4.2.1 Alternative A - No Action Alternative**

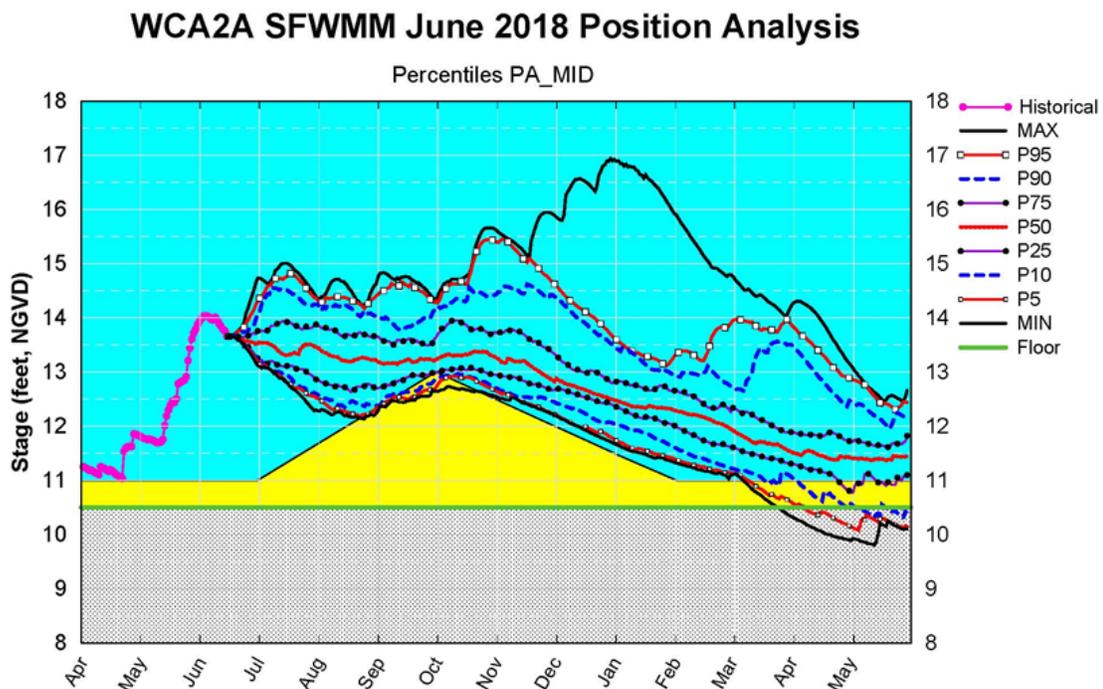
Based on consideration of the current 2012 Water Control Plan operations for WCA 2A (current discharges are approximately 5,000 cfs, with 4,500 cfs from the S-11s and 500 cfs to tide) and historic hydrologic conditions observed for WCA, SFWMD Position Analysis model simulations for mid-June (Figure 7) were used to predict the duration of WCA 2A stage levels above the maximum of the current 2012 WCA 2A Regulation Schedule (13.0 feet, NGVD) through the period of the proposed planned deviation for normal to moderately wet hydrologic conditions. WCA 2A stages have been steadily rising to above 13.0 feet, NGVD for approximately 6 weeks since the mid May rainfall events began. Under normal hydrologic conditions (50th percentile of historical net inflow conditions for WCA 2A), the No Action Alternative would be expected to require 4-5 more months to lower the current WCA 2A stages below 13.0 feet, NGVD. For moderately wet hydrologic conditions (75th percentile), the No Action Alternative would be expected to require 5-6 more months to lower the current WCA 2A stages below 13.0 feet, NGVD. For the No Action Alternative, WCA 2A stages would not be expected to exceed 14.0 feet, NGVD under normal to moderately wet hydrologic conditions. Moderately dry hydrologic conditions, which are not presently predicted for the remainder of the 2018 wet season, would reduce the indicated potential durations above 13.0 feet, NGVD.

With continued operation of WCA 2A in accordance with the 2012 Water Control Plan, the SFWMD Position Analysis forecast indicates that WCA 3A will remain above the top zone of the Regulation Schedule (Zone A) from May 2017 through December 2018 (7-8 months) under normal hydrologic conditions, and from May 2017 through March 2018 (10-11 months).

Position Analysis is a special form of risk analysis evaluated from the "present position" of the system. This evaluation is accomplished by estimating the probability distribution function of variables related to the water resources system, conditional on the current or a specified state of the system. SFWMD produces quantile graphics for several significant water bodies, canals and gauge locations within the C&SF Project Area. The lines can also be called "iso-percentile lines". These graphics represent a statistical summary of the simulated stages for a given location. They provide the probability of the stage being below a given value, for every day of the year, based on a current initial stage and the rainfall regime experienced by that feature each year for the 41-year simulation period (1965-2005), running 365 days from initialization. For instance, for all the stages shown on the 80% line, the probability of being below that stage is 80%, while the probability of being above is 20%. The 50th percentile is the median stage each day, thus half the years on that day were above that value and half were below. One shouldn't expect that a given iso-percentile line comes from a single simulated year. They are usually formed with values coming from

different years. This provides a useful probabilistic indication of where the stage level could go. It is reasonable to accept that above-average rainfall at a given location will lead to higher than median stages in that area, but there is no one-to-one relationship between rainfall and the stage values. Other factors are involved, not least of which is the management criteria for moving water through the system.

Future rainfall forecasts for the remainder of the 2018 wet season cannot be predicted with any degree of certainty, and these predictions are contingent on the assumption of no significant rainfall events within either WCA 3A or the contributing watershed basins (including the EAA and the Big Cypress National Preserve) that cause more than a 1 foot rise in WCA 3A stages. An increase in the WCA 3A stage by this magnitude would likely result in a significant reduction or complete cessation of discharges from WCA 2A into WCA 3A.



(See assumptions on the Position Analysis Results website)

Sun Jun 17 15:33:30 2018

**FIGURE 12. WCA 3A SFWMD MID-JUNE 2018 DYNAMIC POSITION ANALYSIS**

**4.2.2 Alternative B – Temporary Deviation from 2012 Water Control Plan: Elevation 14.0ft., NGVD (Preferred Alternative)**

If the deviation criteria identified for Alternative B is implemented, the discharge rate from WCA 2A to WCA 3A via the S-11s would be significantly reduced by 50 to 60 percent. This reduction

---

would maintain stages within WCA 2A tracking within +/-0.25 feet of the Deviation Zone A Regulation Schedule line (stage range from 13.5 to 14.0 feet NGVD; refer to Figure 11) given normal to moderately wet hydrologic conditions for the remainder of the 2018 calendar year. Under normal hydrologic conditions, Alternative B would be expected to require 7-8 more months to lower the current WCA 2A stages below 13.0 feet, NGVD, or approximately 3 months longer than the No Action Alternative. For moderately wet hydrologic conditions (75th percentile), Alternative B would be expected to require 8-9 more months to lower the current WCA 2A stages below 13.0 feet, NGVD, or approximately 3 months longer than the No Action Alternative. For Alternative B, WCA 2A stages would be expected to exceed 14.0 feet, NGVD for less than 1 month under normal to moderately wet hydrologic conditions.

As further detailed in Section 2.2, the proposed deviation is estimated to reduce the S-11 flows out of WCA 2A into WCA 3A by approximately 50-60 percent. Based on these computations, Alternative B therefore will reduce the number of days needed to remove the excess water and lower the WCA 3A stage below the top zone of the Regulation Schedule by one to two weeks based on the volume of water held back in WCA 2A.

Future rainfall forecasts for the remainder of the 2018 wet season cannot be predicted with any degree of certainty, and these predictions are contingent on the assumption of no significant rainfall events within either WCA 3A or the contributing watershed basins (including the EAA and the Big Cypress National Preserve) that cause more than a 1 foot rise in WCA 3A stages. An increase in the WCA 3A stage by this magnitude would likely result in a further reduction or complete cessation of discharges from WCA 2A into WCA 3A.

Compared to the No Action Alternative, the reduced inflows to WCA 3A under Alternative B are expected to lower the stages within WCA 3A by 0.31 feet for normal to moderately wet hydrologic conditions.

#### **4.2.3. Alternative C – Temporary Deviation from 2012 Water Control Plan (1970 to 1988 Regulation Schedule)**

Alternative C would implement the WCA 2A Regulation Schedule that was previously utilized during the years 1970 to 1988. The 1970-1988 Regulation Schedule for WCA 2A allows a maximum stage elevation of 14.5 feet, NGVD 29 relative to Alternative B which allows a maximum stage elevation of 14.0 feet, NGVD. Potential increased stages and prolonged high water durations within WCA 2A would be of greater magnitude under Alternative C.

### **4.3 VEGETATION**

#### **4.3.1 Alternative A - No Action Alternative**

The continued implementation of the No Action Alternative has the potential for negative impacts to occur on vegetation primarily within WCA 3A where high water levels and prolonged inundation periods are expected to continue. Prolonged periods of inundation are of particular concern for tree islands within WCA 3A. Tree island performance measures strive to keep high water peaks less than 10.8 feet NGVD, and strive to reach water levels less than 10.3 feet NGVD by December 31. Extended ponding of deep water, most notably within southern WCA 3A, has resulted in a lack of seedling establishment on tree islands due to stress from prolonged inundation

---

(McKelvin, Hook and Rozelle 1998). According to Wu et al. (2002), when water depths on tree islands exceed one foot for greater than 120 days, even the most water tolerant species are affected. Therefore, due to current conditions causing higher stages in WCA 3A, negative effects can be anticipated.

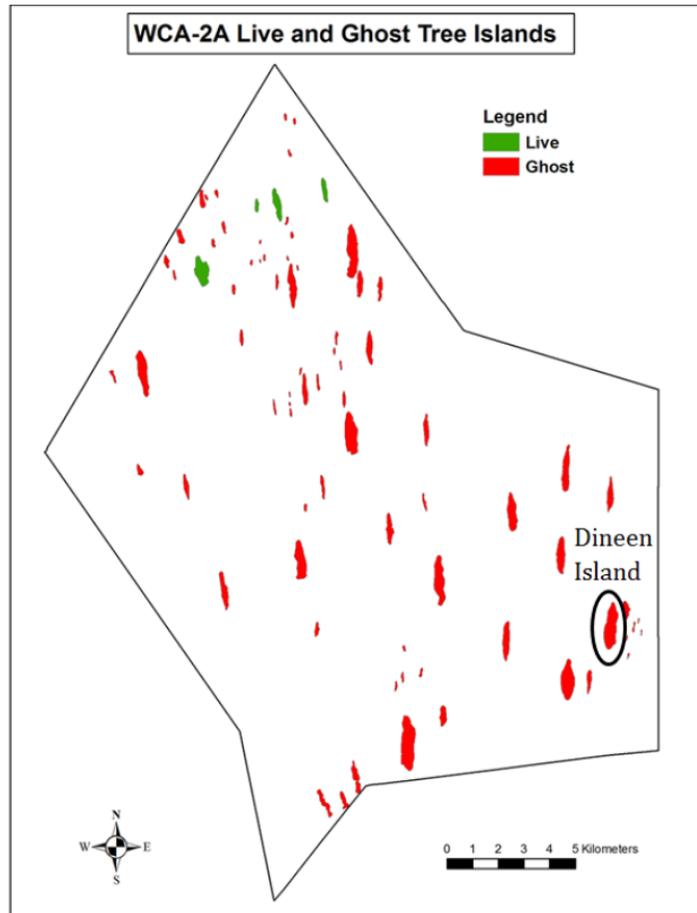
Water levels within WCA 2A are currently above the maximum regulation schedule. Current conditions are not anticipated to change with implementation of the No Action Alternative. Moderately dry hydrologic conditions are not currently predicted for the remainder of the 2018 wet season. Temporary minor impacts to vegetation communities within WCA 2A are expected to be less relative to Alternatives B and C as the No Action Alternative allows discharges to WCA 3A through the S-11s consistent with the 2012 WCA 2A Regulation Schedule.

#### **4.3.2 Alternative B – Temporary Deviation from 2012 Water Control Plan: Elevation 14.0ft., NGVD (Preferred Alternative).**

Vegetative communities within WCA 3A are expected to benefit with implementation of Alternative B. A potential decrease in high water levels in WCA 3A may provide an overall net benefit for tree islands currently experiencing prolonged periods of inundation. Alternative B will hold water levels slightly higher within WCA 2A (up to 1.5 feet higher) relative to the No Action Alternative. If the deviation criteria identified for Alternative B is implemented, the discharge rate from WCA 2A to WCA 3A via the S-11s would be significantly reduced by 50 to 60 percent. This reduction would maintain stages within WCA 2A tracking within +/-0.25 feet of the Deviation Zone A Regulation Schedule line (stage range from 13.5 to 14.0 feet NGVD; refer to **Figure 11**) given normal to moderately wet hydrologic conditions for the remainder of the 2018 calendar year. Under normal hydrologic conditions, Alternative B would be expected to require 7-8 more months to lower the current WCA 2A stages below 13.0 feet, NGVD, or approximately 3 months longer than the No Action Alternative. For moderately wet hydrologic conditions (75th percentile), Alternative B would be expected to require 8-9 more months to lower the current WCA 2A stages below 13.0 feet, NGVD, or approximately 3 months longer than the No Action Alternative. For Alternative B, WCA 2A stages would be expected to exceed 14.0 feet, NGVD for less than 1 month under normal to moderately wet hydrologic conditions.

Tree islands in WCA 2A have been significantly degraded due to water management practices initiated as a result of regional water management practices. Tree islands within WCA 2A have experienced greater impacts than those in most of the Everglades ecosystem due to the extreme drying and fire events of the late 1800s through the early 1900, followed by high water levels induced by the C&SF Project. Tree island patterning still exists in WCA 2A as illustrated in **Figure 13**; however, the majority of observed patterning is formed by sawgrass rather than trees (Aich *et al* 2014). Many of the islands have disappeared completely from the landscape due to high water levels and are now known as “ghost” islands. Over 95% of tree islands in WCA 2A have disappeared (Gu and Eew 2009). Alternative B would have the potential to inundate tree islands within WCA 2A; conversely, Alternative B would also have the potential to offset high water conditions in WCA 3A, possibly bringing some relief to the flooded habitats in the southern portion of WCA 3A. Lowering of water levels within WCA 3A would aid in reducing future tree island degradation due to prolonged inundation. Elevation differences between the marsh and

adjacent tree islands in WCA 2A is greatest in southern WCA 2A and decreases in islands in the north. It is anticipated that water levels will not be any higher than what has been experienced in recent history under Alternative B; therefore remaining tree islands within WCA 2A are anticipated to experience water levels within WCA 2A similar to prior operations including the same deviation that was performed last year.



**FIGURE 13. RECENT MAP OF 'LIVE' AND 'GHOST' TREE ISLANDS IN WCA 2A (SOURCE AICH ET AL 2014).**

#### **4.3.3 Alternative C – Temporary Deviation from 2012 Water Control Plan (1970 to 1988 Regulation Schedule)**

Alternative C would implement the WCA 2A Regulation Schedule that was previously utilized during the years 1970 to 1988. The 1970-1988 Regulation Schedule for WCA 2A allows a maximum stage elevation of 14.5 feet, NGVD relative to Alternative B which allows a maximum stage elevation of 14.0 feet, NGVD. While Alternative C provides the opportunity to benefit WCA 3A to a greater degree by increasing the potential for storage within WCA 2A; the magnitude of potential negative effects within WCA 2A is greater. Temporary minor impacts are expected to plant communities in WCA 2A within increases in stage. Potential effects to vegetation communities within WCA 2A would be of greater magnitude under Alternative C.

---

#### 4.4 THREATENED AND ENDANGERED SPECIES

Effects determinations for federally threatened and endangered species within the project area are listed within TABLE 5. These determinations are based on the short duration of the planned temporary deviation and the generally beneficial nature of the action.

In the WCAs, the Everglade snail kite forages and nests primarily in WCA 3A, followed by WCA 2B and WCA 1. Nesting and foraging potential is limited in WCA 2A due to the limited number of tree islands (SFWMD, 2016). Under normal hydrologic conditions, Alternative B would be expected to require 7-8 more months to lower the current WCA 2A stages below 13.0 feet, NGVD, or approximately 3 months longer than the No Action Alternative. For moderately wet hydrologic conditions (75th percentile), the Alternative B would be expected to require 8-9 more months to lower the current WCA 2A stages below 13.0 feet, NGVD, or approximately 3 months longer than the No Action Alternative. For Alternative B, WCA 2A stages would be expected to exceed 14.0 feet, NGVD for less than 1 month under normal to moderately wet hydrologic conditions. Appropriate recession rates for wildlife species will be used to guide operations when transitioning back to the 2012 Water Control Plan schedule no later than April 30, 2019. Even more important, this action will reduce S-11 inflows into WCA 3A to lower high water stages within WCA 3A, which will provide a beneficial effect to snail kites.

Cattau et al. (2008) identified prolonged high water levels as an adverse effect on the Everglade snail kite. High water levels during the wet season are important in maintaining quality wet prairie and emergent slough habitat (FWS 2010). However, high water levels and extended hydroperiods have resulted in vegetation shifts within WCA 3A, degrading snail kite critical habitat. The extended flooding from September to January resulting either from weather conditions, the Interim Operating Plan (IOP) (governed WCA 3A operations from 2002 through 2012), or both, appears to be shifting plant communities from wet prairies to open water sloughs (Zweig 2008; Zweig and Kitchens 2008). These shifts from one vegetation type to another may occur in a relatively short time frame (1 to 4 years) following hydrological alteration (Armentano et al. 2006; Zweig 2008; Zweig and Kitchens 2008; Sah et al. 2008).

This vegetation transition directly affects snail kites in several ways, most importantly by reducing the amount of suitable foraging and nesting habitat, and reducing prey abundance and availability. Wetter conditions reduce the amount of woody vegetation within the area upon which snail kites rely for nesting and perch hunting. In addition, prolonged hydroperiods reduce habitat structure in the form of emergent vegetation, which is critical for apple snail aerial respiration and egg deposition (Turner 1996; Darby et al. 1999). Drying events are essential in maintaining the mosaic of vegetation types needed by a variety of wetland fauna (Sklar et al. 2002), including the snail kite (FWS 2010) and its primary food source, the apple snail (Karunaratne et al. 2006; Darby et al. 2008). However, little annual variation in water depths has occurred within WCA 3A since 1993, virtually eliminating the drying events necessary to maintain this mosaic. This is particularly apparent in southwestern WCA 3A, which has experienced excessive ponding in recent years.

Prey availability has also been affected by the vegetation transition. Apple snails tend to avoid areas where water depths are greater than 50 centimeters (Darby et al. 2002). Avoidance of deeper depths may be related to the type and density of vegetation in deeper water areas, food availability or energy requirements for aerial respiration (van der Walk et al. 1994; Turner 1996; Darby 1998;

---

Darby et al. 2002). Water-lily sloughs support lower apple snail densities as compared with wet prairies (Karunaratne et al. 2006). Limited food quality and lack of emergent vegetation in the sloughs may account for the lower densities. Research indicates that apple snails depend upon periphyton for food (Rich 1990; Browder et al. 1994; Sharfstein and Steinman 2001), which may be limited within deeper water environments. Karunaratne et al. (2006) observed little or no submerged macrophytes and epiphytic periphyton in the sloughs they studied in WCA 3A. In contrast, species commonly encountered within wet prairie habitat (e.g. *Eleocharis spp.*, *Rhynchospora tracyi*, *Sagittaria spp.*), along with sawgrass that grows within the ecotones between the two vegetative communities, support abundant populations of epiphytic periphyton (Wetzel 1983; Browder et al. 1994; Karunaratne et al. 2006). Apple snails also depend upon emergent vegetation for aerial respiration and oviposition. A reduction in the number of available emergent stems for egg deposition would also contribute to the observed lower snail densities within sloughs. Drying events are needed to maintain the emergent plant species characteristic of typical apple snail and snail kite habitat (Wood and Tanner 1990; Davis et al. 1997). As shown by Darby et al. (2008), apple snails can survive these events and it is the timing and duration of the dry down event that are critical determinants of apple snail survival and recruitment.

Additional duration of high water stages in WCA 2A under the temporary deviation may affect but is not likely to affect Everglade snail kite foraging and nesting. Reduction of high water stages within WCA 3A under the temporary deviation will provide a beneficial effect to snail kites. Based upon the facts as outlined above, the Corps concludes that the temporary deviation may affect, but is not likely to adversely affect, Everglade snail kite in these two areas and its designated critical habitat.

Wood storks forage and nest throughout the WCAs. Elevated stages within WCA 2A may adversely affect forage availability and vegetation upon which wood storks rely for nesting and foraging. However, reduction of high water stages within WCA 3A will provide a beneficial effect to wood storks.

Researchers have shown that wood storks forage most efficiently and effectively in habitats where prey densities are high, the water shallow and canopy open enough to hunt successfully (Ogden et al. 1978; Browder 1984; Coulter 1987). Wood stork prey availability is dependent on a composite variable consisting of density (number or biomass per square meter) and the vulnerability of the prey items to capture (Gawlik 2002). For wood storks, prey vulnerability appears to be largely controlled by physical access to the foraging site, water depth, the density of submerged vegetation, and the species-specific characteristics of the prey. For example, fish populations may be very dense, but not available (vulnerable) because the water depth is too great (greater than 30 centimeters) for storks or the tree canopy at the site is too dense for wood storks to land.

Gawlik (2002) characterized wood storks as "searchers" that employ a foraging strategy of seeking out areas of high density prey and optimal (shallow) water depths, and abandoning foraging sites when prey density begins to decrease below a particular efficiency threshold, but while prey was still sufficiently available that other wading bird species were still foraging in large numbers (Gawlik 2002). Wood stork choice of foraging sites was significantly related to both prey density and water depth (Gawlik 2002). Because of this strategy, wood stork foraging opportunities are more constrained than many of the other wading bird species (Gawlik 2002).

Prolonged high water depths within WCA 2A will promote a longer period of fish production but will reduce prey availability for foraging until later in the nesting season as the schedule transitions back to the 2012 Water Control Plan. This has the potential to adversely affect wood stork foraging opportunities in WCA 2A until water levels approach 30 centimeters or lower. Prolonged high water depths within WCA 3A have the ability to adversely affect wood stork foraging opportunities as well. However, holding water in WCA 2A will reduce high water stages within WCA 3A and will provide a beneficial effect to wood storks. In addition, appropriate recession rates for wildlife species will be used to guide operations when transitioning back to the 2012 Water Control Plan schedule no later than April 30, 2019 in an effort to minimize adverse effects on wood stork foraging.

Based upon the facts as outlined the Corps concludes that the temporary deviation may affect, but is not likely to adversely affect, the wood stork.

**TABLE 6. FEDERALLY THREATENED AND ENDANGERED SPECIES WITHIN THE PROJECT AREA AND SPECIES DETERMINATIONS FOR THE PROPOSED ACTION**

Common Name	Scientific Name	Status	May Affect, Likely to Adversely Effect	May Affect, Not Likely to Adversely Effect	No Effect
<b>Mammals</b>					
Florida panther	<i>Puma concolor coryi</i>	E			X
Florida manatee	<i>Trichechus manatus latirostris</i>	E, CH			X
Florida bonneted bat	<i>Eumops floridanus</i>	E			X
<b>Birds</b>					
Everglade snail kite	<i>Rostrhamus sociabilis plumbeus</i>	E, CH		X	
Piping plover	<i>Charadrius melodus</i>	T			X
Red-cockaded woodpecker	<i>Picoides borealis</i>	E			X
Roseate tern	<i>Sterna dougallii</i>	T			X
Wood stork	<i>Mycteria Americana</i>	T		X	
<b>Reptiles</b>					
American Alligator	<i>Alligator mississippiensis</i>	T, SA			X
Eastern indigo snake	<i>Drymarchon corais couperi</i>	T			X
Gopher tortoise	<i>Gopherus polyphemus</i>	C			X

<b>Invertebrates</b>					
Bartram's hairstreak butterfly	<i>Strymon acis bartrami</i>	E, CH			X
Florida leafwing butterfly	<i>Anaea troglodyta floridalis</i>	E, CH			X
Miami blue butterfly	<i>Cyclargus thomasi bethunebakeri</i>	E			X
Schaus swallowtail butterfly	<i>Heraclides aristodemus ponceanus</i>	E			X
Stock Island tree snail	<i>Orthalicus reses</i> (not incl. <i>nesodryas</i> )	T			X
<b>Plants</b>					
Crenulate lead plant	<i>Amorpha crenulata</i>	E			X
Deltoid spurge	<i>Chamaesyce deltoidea</i> spp. <i>deltoidea</i>	E			X
Garber's spurge	<i>Chamaesyce garberi</i>	T			X
Okeechobee gourd	<i>Cucurbita okeechobeensis</i> ssp. <i>okeechobeensis</i>	E			X
Small's milkpea	<i>Galactia smallii</i>	E			X
Tiny polygala	<i>Polygala smallii</i>	E			X
Big pine partridge pea	<i>Chamaecrista</i>	E			X
Blodgett's silverbush	<i>Argythamnia blodgettii</i>	T			X
Cape Sable thoroughwort	<i>Chromolaena frustrata</i>	E, CH			X
Carter's small-flowered flax	<i>Linum carteri</i> var. <i>carteri</i>	E, CH			X
Everglades bully Everglades bully	<i>Sideroxylon reclinatum</i> spp. <i>austrofloridense</i>	T			X
Florida brickell-bush	<i>Brickellia mosieri</i>	E, CH			X
Florida bristle fern	<i>Trichomanes punctatum</i> spp. <i>floridanum</i>	E			X
Florida semaphore	<i>Consolea corallicola</i>	E, CH			X
Sand flax	<i>Linum arenicola</i>	E			X
Florida pineland crabgrass	<i>Digitaria pauciflora</i>	T			X
Pineland sandmat	<i>Chaemaesyce floridana</i>	T			X
Florida prairie clover	<i>Dalea carthagenesis</i>	E			X

Endangered; T=Threatened; CH=Critical Habitat; PT = Proposed Threatened; PE = Proposed Endangered

#### 4.5 STATE LISTED SPECIES

Implementation of the Proposed Action would not result in significant impacts to state listed species. State listed species determinations are provide in TABLE 6. Impacts to state listed species would be similar to those outline for fish and wildlife resources in **Section 4.4**.

**TABLE 7. STATE LISTED SPECIES WITHIN THE PROJECT AREA AND SPECIES DETERMINATION FOR THE PROPOSED ACTION**

Common Name	Scientific Name	Status	May Affect, Likely to Adversely Effect	May Affect, Not Likely to Adversely Effect	No Effect
Mammals					
Florida black bear	<i>Ursus americanus floridanus</i>	T			X
Everglades mink	<i>Mustela vison evergladensis</i>	T			X
Florida mouse	<i>Podomys floridanus</i>	SC			X
Florida mastiff bat	<i>Eumops glaucinus floridanus</i>	E			X
Birds					
Piping plover	<i>Charadrius melodus</i>	T			X
Snowy plover	<i>Charadrius alexandrinus</i>	T			X

#### 4.6 FISH AND WILDLIFE RESOURCES

##### 4.6.1 Alternative A – No Action Alternative

The continued implementation of the No Action Alternative has the potential for negative impacts to occur on fish and wildlife resources primarily within WCA 3A where high water levels and prolonged inundation periods are expected to continue. Prolonged inundation periods are of particular concern for mammals dependent on upland habitat, particularly for deer populations within northern WCA 3A that utilize tree islands for refugia. Potential effects to terrestrial wildlife within WCA 3A are due to high stages and limited fry ground for foraging, loafing and resting. High water levels inundate tree islands and other wildlife habitats and if sustained will continue to cause stress and loss of life particularly for birds and mammals.

---

Water levels within WCA 2A are currently above the maximum regulation schedule. Current conditions are not anticipated to change with implementation of the No Action Alternative. Moderately dry hydrologic conditions are not currently predicted for the remainder of the 2018 wet season. Temporary minor impacts to fish and wildlife resources within WCA 2A are expected to be less relative to Alternatives B and C as the No Action Alternative allows discharges to WCA 3A through the S-11s consistent with the 2012 WCA 2A Regulation Schedule.

#### **4.6.2 Alternative B – Temporary Deviation from 2012 Water Control Plan: Elevation 14.0ft., NGVD (Preferred Alternative)**

Fish and wildlife resources within WCA 3A are expected to benefit with implementation of Alternative B. A potential decrease in high water levels and prolonged periods of inundation in WCA 3A may provide an overall net benefit for wading bird foraging suitability and nesting opportunities. Alternative B is expected to reduce adverse impacts to tree islands and their associated wildlife in WCA 3A. Actions to reduce water levels can lessen the detrimental long-term effects that prolonged inundation have on the foraging and nesting habitats of both avian and terrestrial wildlife.

Alternative B will hold water levels slightly higher within WCA 2A (up to 2.0 feet higher) relative to the No Action Alternative. Appropriate recession rates for wildlife species will be used to guide operations when transitioning back to the 2012 Water Control Plan scheduled no later than April 30, 2019. The Proposed Action will reduce S-11 inflows into WCA 3A to lower high water stages within WCA 3A, which will provide a beneficial effect to fish and wildlife resources. Increased water levels within WCA 2A may adversely affect forage availability and vegetation upon which wading birds rely for nesting and foraging. However, reduction of high water stages within WCA 3A will provide a beneficial effect to these species.

If the deviation criteria identified for Alternative B is implemented, the discharge rate from WCA 2A to WCA 3A via the S-11s would be significantly reduced by 50 to 60 percent. This reduction would maintain stages within WCA 2A tracking within +/-0.25 feet of the Deviation Zone A Regulation Schedule line (stage range from 13.5 to 14.0 feet NGVD; refer to **Figure 11**) given normal to moderately wet hydrologic conditions for the remainder of the 2018 calendar year. Under normal hydrologic conditions, Alternative B would be expected to require 7-8 more months to lower the current WCA 2A stages below 13.0 feet, NGVD, or approximately 3 months longer than the No Action Alternative. For moderately wet hydrologic conditions (75th percentile), Alternative B would be expected to require 8-9 more months to lower the current WCA 2A stages below 13.0 feet, NGVD, or approximately 3 months longer than the No Action Alternative. For Alternative B, WCA 2A stages would be expected to exceed 14.0 feet, NGVD for less than 1 month under normal to moderately wet hydrologic conditions.

#### **4.6.3 Alternative C – Temporary Deviation from 2012 Water Control Plan (1970 to 1988 Regulation Schedule)**

Alternative C would implement the WCA 2A Regulation Schedule that was previously utilized during the years 1970 to 1988. The 1970-1988 Regulation Schedule for WCA 2A allows a maximum stage elevation of 14.5 feet, NGVD 29 relative to Alternative B which allows a maximum stage elevation of 14.0 feet, NGVD. While Alternative C provides the opportunity to

---

benefit WCA 3A to a greater degree by increasing the potential for storage within WCA 2A; the magnitude of potential negative effects within WCA 2A is greater. Temporary minor impacts are expected to wildlife foraging opportunities in WCA 2A with increases in stage. Potential effects to fish and wildlife resources within WCA 2A would be of greater magnitude under Alternative C.

## **4.7 CULTURAL RESOURCES**

As part of consideration of effects, the Corps has been actively consulting with interested parties in conjunction with its obligation under Section 106 of the National Historic Preservation Act (NHPA) and consideration given under the NEPA. Consultation has been initiated and is ongoing between the Corps, the State Historic Preservation Officer (SHPO), and the appropriate Federally-recognized tribes. Letters requesting concurrence of the Corp's determination of effects were sent to the SHPO, Miccosukee Tribe of Indians of Florida, the Seminole Tribe of Florida, the Seminole Nation of Oklahoma, and the Thlopthlocco Tribal Town on June 19, 2018 (**Appendix B**). The Seminole Nation of Oklahoma, the Seminole Tribe of Florida, and the Miccosukee Tribe of Indians of Florida concurred with the Corps' determination of no adverse effect. Consultation is ongoing and will be finalized prior to implementation of the proposed action.

### **4.7.1 Alternative A-No Action Alternative**

Water levels within the Everglades have historically fluctuated on a seasonal, annual, and interannual basis; therefore, it is likely that cultural resources within the Water Conservation Areas have been previously exposed to natural hydrological conditions that may be experienced under the current condition. Based on the fluctuation of water levels that historic properties have been exposed to during recent history, the No Action Alternative would have no adverse effect to cultural resources listed or eligible for listing in the National Register of Historic Places (NRHP).

### **4.7.2 Alternative B – Temporary Deviation from 2012 Water Control Plan: Elevation 14.0ft., NGVD (Preferred Alternative)**

Alternative B will hold water levels slightly higher within WCA 2A relative to the No Action Alternative. Although no previously identified cultural resources exist within WCA 2A, should unidentified historic properties be located within the area of potential effects, these properties would experience similar water levels to those proposed approximately once a year. Due to temporary nature and short duration of the project, and based on the recurrent condition of water levels that cultural resources have been exposed to since the late 1950's, the Corps has determined that the proposed temporary deviation will have no adverse effects on historic properties listed or eligible for listing in the NRHP.

### **4.7.3 Alternative C – Temporary Deviation from 2012 Water Control Plan (1970 to 1988 Regulation Schedule)**

Alternative C water levels are not expected to exceed those historically experienced under the prior regulation schedule. Due to the temporary nature and short duration of the project and based on the recurrent condition of water levels that cultural resources have been exposed to since the late 1950's, the Corps has determined that Alternative C will have no adverse effects on historic properties listed or eligible for listing in the NRHP

---

## **4.8 SOCIO-ECONOMIC**

Socioeconomics within the project area would not be expected to change from current conditions with implementation of the No Action Alternative. Due to high water conditions and subsequent wildlife and habitat concerns, FWC special regulations have been in effect since June 11, 2018, restricting public access within the Everglades and Francis S. Taylor, Holey Land and Rotenberger Wildlife Management areas. Impacts of recreation within the project area would remain with continued implementation of the No Action Alternative. Reductions in high water levels in WCA 3A under Alternatives B and C would help to lessen potential impacts to recreation and reduce duration of FWC closures. Through reduction of water levels in WCA 3A, Alternative B would assist to reduce the immediate threat and impact to valuable natural resources within WCA 3A that underpin local economies surrounding the Everglades Protection Area and are dependent on outdoor recreational opportunities, ecotourism and economic benefits.

Alternative C would implement the WCA 2A Regulation Schedule that was previously utilized during the years 1970 to 1988. The 1970-1988 Regulation Schedule for WCA 2A allows a maximum stage elevation of 14.5 feet, NGVD relative to Alternative B which allows a maximum stage elevation of 14.0 feet, NGVD. While Alternative C provides the opportunity to benefit WCA 3A to a greater degree by increasing the potential for storage within WCA 2A; the magnitude of potential negative effects within WCA 2A is greater. Temporary minor impacts are expected to plant communities and wildlife foraging opportunities in WCA 2A within increases in stage.

## **4.9 AESTHETICS**

Aesthetics within the project area would not be expected to change from current conditions with implementation of the No Action alternative. Alternatives B and C consists of an operational change to the 2012 WCA 2A Regulation Schedule and does not include construction of permanent structures or structural modifications to existing C&SF Project features. As such, the existing landscape profile would not be altered. Any change in water levels, if achieved, is not likely to be noticeable by an observer.

## **4.10 RECREATION**

High water levels are currently limiting access to recreational opportunities (hunting, fishing, frogging, boating, camping, and off-road vehicle use etc.) within the WCAs. Due to high water conditions and subsequent wildlife and habitat concerns, FWC special regulations have been in effect since June 11, 2018, restricting public access within the Everglades and Francis S. Taylor, Holey Land and Rotenberger Wildlife Management areas. Impacts of recreation within the project area would remain with continued implementation of the No Action Alternative. Reductions in high water levels in WCA 3A under Alternatives B and C would help to lessen potential impacts to recreation and reduce duration of FWC closures.

Alternative C would implement the WCA 2A Regulation Schedule that was previously utilized during the years 1970 to 1988. The 1970-1988 Regulation Schedule for WCA 2A allows a maximum stage elevation of 14.5 feet, NGVD relative to Alternative B which allows a maximum stage elevation of 14.0 feet, NGVD. While Alternative C provides the opportunity to benefit WCA 3A to a greater degree by increasing the potential for storage within WCA 2A; the magnitude of potential negative effects within WCA 2A is greater. Temporary minor impacts are expected to plant communities and wildlife foraging opportunities in WCA 2A within increases in stage.

---

## **4.11 WATER QUALITY**

### **4.11.1 Alternative A – No Action**

For the no action alternative there are no changes expected to current water quality condition resulting from continuing with the same regulation schedule. The WCA 2A will continue to uptake nutrients by biologic action, settling, and mechanical means (particulates captured in vegetation/periphyton mass) at the same rate it currently does. No changes will result to the mercury methylation rate as a result of the no action alternative.

### **4.11.2 Alternative B – Temporary Deviation from 2012 Water Control Plan: Elevation 14.0 feet, NGVD (Preferred Alternative)**

No changes are expected from this alternative in volume or content of nutrients in the water delivered to WCA will result in no change to WCA 2 inflow nutrient loading. Longer retention time in WCA 2A (expected from this alternative) will result in greater reduction (settling) of the particulate fraction of total phosphorus in the water column. This will result in a slight increase in sediment nutrient deposition for a given volume of water within WCA 2 and a slight decrease in the water column nutrient particulate content in the water exiting WCA 2 (reduction in nutrient load leaving WCA 2). For water routed out of the EAA or Lake Okeechobee, the particulate fraction of the water column nutrients is relatively high as compared to the water being routed through the STA's. In summary a greater retention time for the water in WCA 2 will result in larger portion of the water column nutrient particulate fraction of the nutrients being deposited in WCA 2. A very slight reduction in the average dissolved oxygen content of the WCA surface water may result from the higher depths resulting from this deviation. No changes to mercury methylation rate is expected from the slightly higher stages and slightly longer retention times that will result from this alternative.

### **4.11.3. Alternative C – Temporary Deviation from 2012 Water Control Plan (1970 to 1988 Regulation Schedule)**

Alternative C water quality effects assumptions are the same as Alternative B, except that there will be a slightly higher reduction (settling) of the particulate fraction of total phosphorus in the water column, a slightly increased quantity of sediment nutrient deposition, and slightly decreased water column nutrient particulate content in water exiting WCA 2. This all assumes a slightly higher retention time per unit volume as compared to alternative B.

## **4.12 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE**

Implementation of the No Action Alternative, Alternative B and C would not result in the discovery of HTRW since there is no excavation or other construction activities associated with the temporary planned deviation. The project has a very low risk for increased mobilization of existing HTRW where it might exist within the study area as the expected stage elevations are similar and lower to what has been experienced in past operations of WCA 2A. No changes in HTRW issues are anticipated for the No Action or Alternative C.

## **4.13 AIR QUALITY**

Air quality within the project area would not be expected to change from current conditions with implementation of the No Action Alternative and Alternative B and C. Alternatives B and C

---

consists of an operational change to the 2012 WCA 2A Regulation Schedule and does not include construction of permanent structures or structural modifications to existing C&SF Project features. No construction is proposed. Increased air emissions are not expected as a result of utilization of water management infrastructure associated with Alternative B. No air quality issues are anticipated under the No Action or the Action Alternatives.

#### **4.14 NOISE**

Noise levels within the project area would not be expected to change from current conditions with implementation of the No Action Alternative and Alternatives B and C. Alternatives B and C consists of an operational change to the 2012 WCA 2A Regulation Schedule and does not include construction of permanent structures or structural modifications to existing C&SF Project features. No construction is proposed. No noise impacts are anticipated under the No Action or the Action Alternatives.

#### **4.15 NATIVE AMERICANS**

The Miccosukee Tribe of Indians of Florida and the Seminole Tribe of Florida rely upon the Everglades in its natural state to support their cultural, subsistence, and commercial activities. While the tribes' reservation lands are not located within WCA 2, portions of the Miccosukee Tribe's Alligator Alley Reservation are located downstream from WCA 2 in WCA 3A. In addition, both tribes hold easements and leases from the State of Florida over large portions of the WCA 3A. Subsistence activities for members of the Miccosukee Tribe of Indians of Florida and the Seminole Tribe of Florida include gathering of materials, hunting, trapping, frogging, and fishing, while both tribes rely on commercial use of the area by providing recreational and tourism facilities within the Everglades. The Miccosukee Tribe of Indians of Florida have expressed their continued desire for the S-12 structures to remain open year-round. As part of the consideration of effects, consultation with the appropriate federally recognized tribes was initiated on June 19, 2018 and is ongoing. The Seminole Nation of Oklahoma, the Seminole Tribe of Florida, and the Miccosukee Tribe of Indians of Florida concurred with the Corps' determination of no adverse effect (**Appendix B**).

##### **4.15.1 Alternative A – No Action**

The continued implementation of the No Action Alternative has the potential for negative impacts to occur on fish and wildlife resources primarily within WCA 3A where high water levels and prolonged inundation periods are expected to continue. Previous consultations with the Miccosukee Tribe of Indians of Florida and the Seminole Tribe of Florida have indicated that tree islands within WCA 3 are utilized for the tribes' hunting, fishing, trapping, foraging, and frogging rights within Federal reservation lands, and lands owned and leased by the tribes. The Miccosukee Tribe of Indians of Florida have continuously expressed concern with high water levels in WCA 3A where many tribal members live and utilize culturally sensitive areas. High water impacts to tree islands in WCA 3A as a result of implementation of the No Action Alternative may directly affect lands owned and leased by the Miccosukee Tribe of Indians of Florida and the Seminole Tribe of Florida.

---

#### **4.15.2 Alternative B – Temporary Deviation from 2012 Water Control Plan: Elevation 14.0ft., NGVD (Preferred Alternative)**

Fish, wildlife, and vegetative resources within WCA 3A are expected to benefit with implementation of Alternative B. A potential decrease in high water levels in WCA 3A may provide an overall net benefit for tree islands which Miccosukee Tribe of Indians of Florida and the Seminole Tribe of Florida utilize for cultural purposes, as well as hunting, fishing, trapping, foraging, frogging. Alternative B will hold water levels slightly higher within WCA 2A relative to the No Action Alternative. Tree islands in WCA 2A have been significantly degraded due to water management practices initiated as a result of regional water management practices. Tree islands within WCA 2A have experienced greater impacts than those in most of the Everglades ecosystem due to the extreme drying and fire events of the late 1800s through the early 1900, followed by high water levels induced by the C&SF Project. Many of the islands have disappeared completely from the landscape due to high water levels and are now known as “ghost” islands. Over 95% of tree islands in WCA 2A have disappeared (Gu and Eew 2009). As such, WCA 2A is utilized less than WCA 3A, where Federal reservation lands, and lands owned and leased by the tribes are located. Based on the benefits provided to WCA 3A and the recurrent condition of water levels that WCA 2A has experienced in the recent history, implementation of Alternative B is not likely to impact Tribal resources.

#### **4.15.3 Alternative C – Temporary Deviation from 2012 Water Control Plan (1970 to 1988 Regulation Schedule)**

Alternative C would provide greater benefits to fish, wildlife, and vegetative resources within WCA 3A and greater reduction to WCA 3A high water durations that negatively affect tree islands that are used by Miccosukee Tribe of Indians of Florida and the Seminole Tribe of Florida for cultural purposes. The resources in WCA 2A would experience higher water for longer compared to Alternative B, but would not be any higher than experienced under prior regulation schedules. Similar to Alternative B, Alternative C is not likely to impact Tribal resources.

#### **4.16 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. The Proposed Action and prior schedule deviation may act in conjunction to reduce high water levels in WCA 3A and maintain levee integrity in the event of a storm or continued high water conditions. Current conditions require preemptive action to ensure water levels do not reach human and health and safety due to levee risk in the C&SF system.

---

#### **4.17 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 Proposed Action consists of an operational change to the 2012 WCA 2A Regulation Schedule 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. This is a short duration planned deviation only.

#### **4.18 UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS**

Environmental effects for each resource are discussed above. Adverse environmental effects associated with implementing the Proposed Action are expected to be temporary based on the short duration of the planned temporary deviation and the generally beneficial nature of this action. Temporary minor impacts are expected to plant communities and wildlife foraging opportunities in WCA 2A. The majority of tree islands and plant communities in WCA 2A are degraded due to water quality and water management actions in mid-20<sup>th</sup> century in contrast to WCA 3A resources which are in better condition. The Proposed Action will help alleviate high water impacts to significant natural resources in WCA 3A.

#### **4.19 CONFLICTS AND CONTROVERSY**

Over the lifetime of the C&SF Project, considerable interest has been generated among local and regional stakeholders. Most issues which would cause conflicts or controversy were intentionally excluded from this deviation. This EA is addressing only temporary operational changes to the 2012 Water Control Operations Plan for structures associated with WCA 2A. There are remaining concerns regarding flood protection to the east, but they will be minimized by the temporary nature of this planned deviation and continued close coordination between the Corps and its non-Federal sponsor (SFWMD) through the previously-established levee inspection and monitoring program. The Corps continually strives to include all interested parties in its decision making process and will continue to consider all issues that arise.

#### **4.20 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 Proposed Action.

#### **4.21 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS**

##### **4.21.1 National Environmental Policy Act of 1969. 42 U.S.C. §4321 *et seq.***

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 NEPA.

---

#### **4.21.2 Endangered Species Act of 1973, 16 U.S.C. §1531 *et seq.***

Consultation with National Marine Fisheries Service was not necessary, as no species under their purview are expected to be affected. Emergency consultation pursuant to Section 7 of the Endangered Species Act (ESA) of 1973, as amended, is on-going with the USFWS, and the Proposed Action is in compliance with the ESA. The USFWS was initially contacted on June 11, 2018, and received a species effects assessment on June 19, 2018. Correspondence was received from the USFWS on June 15, 2018 indicating that the Service supports the Corps on ways to reduce impacts of high water within the WCAs, including the 2018 WCA 2A Planned Temporary Deviation. The Corps agrees to maintain open and cooperative communication with the USFWS during the planned temporary deviation. The Proposed Action is in full compliance with the ESA.

#### **4.21.3. Fish and Wildlife Coordination Act of 1958, as amended, 16 U.S.C. §§661-665; 665a; 666; 666a-666c**

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.

#### **4.21.4. National Historic Preservation Act of 1966 (INTER ALIA)**

The Proposed Action is in compliance with Section 106 of the National Historic Preservation Act, as amended. 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, Archeological Resources Protection Act, American Indian Religious Freedom Act, 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 was initiated on June 19, 2018. The Seminole Nation of Oklahoma, the Seminole Tribe of Florida, and the Miccosukee Tribe of Indians of Florida concurred with the Corps' determination of no adverse effect. Coordination on effects with other interested parties and the appropriate federally recognized tribes is ongoing and will be finalized prior to implementation of the proposed action. The proposed action will be in compliance with the goals of this Act upon completion of coordination as stated above.

#### **4.21.5. Clean Water Act of 1972, 33 U.S.C. §1251 *et seq.***

The Proposed Action is not anticipated to adversely affect water quality and State water quality certification is not necessary. The Florida Department of Environmental Protection (FDEP) issued an Emergency Final Order in response to high rainfall and flooding in the South Florida Region, OGC No.: 18-1066, on June 20, 2018. The Order states that the Corps and SFWMD are hereby authorized to make temporary operational changes in order to minimize detrimental impacts to the environment, to the public, to adjacent properties, and to downstream receiving water. The FDEP Emergency Final Order waives the requirement for state water quality certification for this Federal Action. The OGC No.: 18-1066, Final Emergency Order expires November 30, 2018. The Proposed Action is in compliance with the goals of this Act.

---

**4.21.6 Clean Air Act of 1972, 42 U.S.C. §7401 *et seq.***

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

**4.21.7. Coastal Zone Management Act of 1972, 16 U.S.C. §1451 *et seq.***

The Corps has determined and FDEP concurred on June 20, 2018, that the Proposed Action is consistent to the maximum extent practicable with Florida's approved Coastal Management Program.

**4.21.8. Farmland Protection Policy Act of 1981, 7 U.S.C. §4201 *et seq.***

No prime or unique farmland would be impacted by implementation of the Proposed Action. This Act is not applicable.

**4.21.9. Wild and Scenic River Act of 1968, 28 U.S.C. §1271 *et seq.***

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

**4.21.10. Marine Mammal Protection Act of 1972, 16 U.S.C. §§1261-1407**

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.

**4.21.11. Estuary Protection Act of 1968, 16 U.S.C. §§1221-26**

No designated estuary would be affected by project activities. This act is not applicable.

**4.21.12. Federal Water Project Recreation Act of 1965, as amended, 16 U.S.C. §4601-12 *et seq.***

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

**4.21.13. Fishery Conservation and Management Act of 1976, 16 U.S.C. §§1801-1882**

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.

**4.21.14. Submerged Lands Act of 1953, 43 U.S.C. § 1301 *et seq.***

The project would not occur on submerged lands of the State of Florida. The Proposed Action is in compliance with the Act.

---

**4.21.15. Coastal Barrier Resources Act and Coastal Barrier Improvement Act of 1990, 16 U.S.C. §3501 *et seq.***

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

**4.21.16. Resource Conservation and Recovery Act (RCRA), As Amended by the Hazardous and Solid Waste Amendments (HSWA) of 1984, 42 U.S.C. §6901 *et seq.*, Comprehensive Environmental Response Compensation and Liability Act (CERCLA), 42 U.S.C. §9601 *et seq.*, Toxic Substances Control Act (TSCA) of 1976, 15 U.S.C. §2601 *et seq.***

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.

**4.21.17. Rivers and Harbors Act of 1899, 33 U.S.C. §400 *et seq.***

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

**4.21.18. Safe Drinking Water Act of 1974, As Amended, 42 U.S.C. §§300f-300j**

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

**4.21.19. Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, 42 U.S.C. §4601 *et seq.***

Acquisition of real estate is not required for the Proposed Action. The Proposed Action is in compliance with this Act.

**4.21.20. Anadromous Fish Conservation Act, 16 U.S.C. §§757A-757G**

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

**4.21.21. Migratory Bird Treaty Act, 16 U.S.C. §§703-712, and Migratory Bird Conservation Act, 16 U.S.C. §§715-715d, 715e, 715f-715r**

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.

---

**4.21.22. Marine Protection, Research and Sanctuaries Act, 33 U.S.C. §1401, *et seq.***

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

**4.21.23. Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. §801 *et seq.***

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

**4.21.24. E.O. 11990, Protection of Wetlands**

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

**4.21.25. 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 a deviation to an operational construct; therefore, no construction is proposed within this action. The Proposed Action is consistent with the intent of this E.O. and in compliance.

**4.21.26. E.O. 12898, Environmental Justice**

E.O. 12989 provides that each federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority or low income populations. The project would not result in disproportionately high and adverse human health or environmental effects on minority populations and low-income populations. The Proposed Action is in compliance with this E.O.

**4.21.27. E.O. 13089, Coral Reef Protection**

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

**4.21.28. 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.

**4.21.29. E.O. 13045, Protection of Children**

E.O. 13045, requires each Federal agency to “identify and assess environmental risk and safety risks [that] may disproportionately affect children” and ensure that its “policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks.” This action has no environmental safety risks that may disproportionately affect children. The Proposed Action is in compliance.

---

**4.21.30. 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 expected to benefit migratory birds by improving habitat in WCA 3A and increasing availability of forage species (amphibians, fish, aquatic and invertebrates) for wading birds. The Proposed Action is in compliance with the goals of this E.O.

---

## **5. 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 (USEPA), USFWS, FWC, State Historic Preservation Office, Seminole Tribe of Florida, Seminole Nation of Oklahoma, and the Miccosukee Tribe of Indians of Florida. This coordination is a result 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.

### **5.1. NATIVE AMERICAN TRIBES**

As part of the consideration of effects, consultation with the appropriate federally recognized tribes was initiated on June 19, 2018 and is ongoing (refer to Appendix B). The Miccosukee Tribal Representative verbally concurred with the Corps' determination of no adverse effect to historic properties that are listed or eligible for listing in the NRHP. The Seminole Nation of Florida and the Seminole Nation of Oklahoma also concurred with the Corps' determination of no adverse effect. Consultation with other interested, federally-recognized tribes is ongoing and will be finalized prior to implementation of the proposed action.

### **5.2. U.S. ENVIRONMENTAL PROTECTION AGENCY**

The Corps contacted the EPA Region 4 for the purpose of notification and discussion of NEPA (refer to **Appendix B**). The Corps completed an EA in accordance with ER 200-2-2 (Corps Policy for NEPA compliance) to address the federal action of the planned temporary deviation to the 2012 WCA 2A Regulation Schedule. 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. EPA staff were contacted on June 19, 2018. EPA acknowledged receipt of the Corps notification via correspondence on June 20, 2018, indicating an appreciation of the early coordination and noted that the EA will be reviewed by their agency once available.

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

Emergency consultation pursuant to Section 7 of the ESA of 1973, as amended, is on-going with the USFWS and is in compliance with the ESA. The USFWS was initially contacted on June 11, 2018 and received a species effects assessment on. The Corps has determined that the Proposed Action may affect, but is not likely to adversely affect, the endangered Everglade snail kite and threatened wood stork. Correspondence was received from the USFWS indicating that the Service supports the WCA 2A Planned Temporary Deviation. The Corps agrees to maintain open and cooperative communication with the USFWS during the planned temporary deviation. The Proposed Action is in full compliance with the ESA.

### **5.4. FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION**

The Proposed Action is not anticipated to adversely affect water quality and State water quality certification is not necessary. The Florida Department of Environmental Protection (FDEP) issued an Emergency Final Order in response to high rainfall and flooding in the South Florida Region,

---

OGC Number: 18-1066, on June 20, 2018. The Order states that the Corps and SFWMD are hereby authorized to make temporary operational changes in order to minimize detrimental impacts to the environment, to the public, to adjacent properties, and to downstream receiving water. The FDEP Emergency Final Order waives the requirement for state water quality certification for this Federal Action. The OGC Number: 18-1066, Final Emergency Order expires November 30, 2018. The Proposed Action is in compliance with the Clean Water Act.

### **5.5. SOUTH FLORIDA WATER MANAGEMENT DISTRICT**

The Corps has coordinated the proposed action with the SFWMD. The SFWMD has reviewed the Proposed Action and supports its immediate implementation as stated in correspondence dated June 14, 2018. The SFWMD support includes the understanding that the planned temporary deviation is limited to raising the bottom of Zone A of the 2012 WCA 2A Regulation Schedule while leaving other operational criteria unchanged. Support was provided based on the exceptional high water levels currently in WCA 3A and the following factors; (1) WCA 3A water level is high with four months remaining in the wet season along with peak tropical activity; (2) in 1980, the original schedule for WCA 2A for which the levees were designed, was lowered by reducing the peak stage 1.5 feet from 14.5 feet NGVD to 13.0 feet NGVD; and (3) the discharges from WCA 1 are expected to be moderated by use of existing capacities. The existing discharge capacity of S-39 will be used to discharge excess water from WCA 1 to the extent downstream conditions allow, and the attenuation capacity and storage volume provided by the recently completed L-8 Flowage Equalization Basin will slow the rate of inflow into WCA 1 and facilitate additional discharge to tide through the C-51 Canal.

### **5.6. STATE OF FLORIDA-STATE HISTORIC PRESERVATION OFFICER**

As part of the consideration of effects, consultation with the Florida State Historic Preservation Officer was initiated on June 19, 2018 and received concurrence on June 29, 2018 (refer to **Appendix B**).

### **5.7. FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION**

The FWC was contacted on June 18, 2018 (refer to **Appendix B**). Correspondence in response to the notification of the planned temporary deviation to the 2012 WCA 2A Regulation Schedule has not been received to date; however verbal support was provided to Corps staff members by a FWC representative.

## **6. PUBLIC INVOLVEMENT**

### **6.1. EA AND FONSI**

The Corps has completed an EA to address the federal action of the planned temporary deviation to the 2012 WCA 2A Regulation Schedule. This EA and FONSI is now being circulated for public review for a period of 15 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. Any supplemental EA and FONSI will also be made available to the public by notice of availability.

---

## 6.2. AGENCY COORDINATION

The Corps is in continuous coordination with other Federal and state resource agencies, business organizations, environmental organizations, and private citizens groups. 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**. Reference **Section 6.0**.

## 6.3. 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#>

## 7. LIST OF PREPARERS

Name	Organization	Role in EA
Sharon Tyson	USACE	Biologist
Savannah Lacy	USACE	Water Manager
Allison Journa	USACE	Water Manager
Gina Paduano Ralph	USACE	Biologist
Meredith Moreno	USACE	Archeologist
Melissa Nasuti	USACE	Biologist
Jim Riley	USACE	Water Quality
Dan Crawford	USACE	Hydrology

## 8. REFERENCES

- Aich, S., S.M.L. Ewe, B. Gu and T.W. Dreschel. 2014. An evaluation of peat loss from an Everglades tree island, Florida, USA. In *Mires and Peat*, Vol 14, Article 02.
- Bancroft, G.T., A.M. Strong, R.J. Sawicki, W. Hoffman, and S.D. Jewell. "Relationships Among Wading Bird Foraging Patterns, Colony Locations, and Hydrology in the Everglades." In *Everglades: The Ecosystem and its Restoration*, by S.M. Davis and J.C. Ogden, 615-657. Delray Beach, Florida, USA: St. Lucie Press, 1994.
- Craft, C.B., and C. Richardson. "Soil Characteristics of the Everglades Peatland." In *The Everglades Experiments*, by Richardson, 59. Springer 2008, 2007.
- Davis, S.M., and J.C. Ogden. *Everglades: the Ecosystem and its Restoration*. Delray Beach, Florida, USA: St. Lucie Press, 1997.
- Davis, S.M., and J.C. Ogden. "Towards Ecosystem Restoration." In *Everglades: The Ecosystem and Its Restoration*, by S.M. Davis and J.C. Ogden, 769-796. Delray Beach, Florida, USA: St. Lucie Press, 1994.
- Davis, S.M., L.H. Gunderson, W.A. Park, J.R. Richardson, and J.E. Mattson. "Landscape Dimension, Composition and Functioning in a Changing Everglades Ecosystem." In *Everglades: The Ecosystem and its Restoration*, by S.M. Davis and J.C. Ogden, 419-444. Delray Beach, Florida, USA: St. Lucie Press, 1994.
- Gu, B. and Ewe S. 2009. Survey of Living and Ghost Tree Islands in Water Conservation Area 2A: Assessment of Island Microtopography, soil bulk Density, and Vegetation Patterns. South Florida Water Management District.
- FDEP. *Bureau of Air Monitoring and Mobile Sources Air Monitoring Report*. Division of Air Management, 2010.
- Holling, C.S., L.H. Gunderson, and C.J. Walters. "The Structure and Dynamics of the Everglades System: Guidelines for Ecosystem Restoration." In *Everglades: The Ecosystem and Its Restoration*, by S.M. Davis and J.C. Ogden, 741-756. Delray Beach, Florida, USA: St. Lucie Press, 1994.
- Kushlan, J.A., and M.S. Kushlan. "Observations on Crayfish in the Everglades, Florida." *Crustaceana* Supplement, No. 5, Studies on Decapoda (Biology, Ecology, Morphology, and Systematics) (1979): 155-120.
- Mazzotti, F.J., and L.A. Brandt. "Ecology of the American Alligator in a Seasonally Fluctuating Environment." In *Everglades: The Ecosystem and its Restoration*, by S.M. Davis and J.C. Ogden, 485-505. Delray Beach, Florida, USA: St. Lucie Press, 1994.
- McVoy, C., W.P. Said, J. Obeysekera, J. VanArman, and T.W. Dreschel. *Landscapes and Hydrology of the Predrainage Everglades*. Gainesville, Florida, USA: South Florida Water Management District, University Press of Florida, 2011.
- Milanich, J.T. *Archeology of Precolumbian Florida*. University of Florida Press, 1994.
- National Research Council. "Progress Toward Restoring the Everglades: The Fourth Biennial Review." 2012.

- Sklar, F., and A. van der Valk. "Tree Islands of the Everglades: an Overview." In *Tree Islands of the Everglades*, by F. Sklar and A. Van der Valk, 1-18. Dordrecht, Netherlands: Kluwer Academic Publishers, 2002.
- Thomas, T.M. "A Detailed Analysis of Climatological and Hydrological Records of South Florida with Reference to Man's Influence upon Ecosystem Evolution." In *Environments of South Florida: Present and Past, Memoir No. 2*, by P.J. Gleason, 81-122. Coral Gables, Florida, USA, 1974.
- Tropical BioIndustries Inc. *Hydroperiod Conditions of Key Environmental Indicators of Everglades National Park and Adjacent East Everglades Area as a Guide to Selection of an Optimum Water Plan for Everglades National Park, Florida*. Jacksonville Florida, USA: Final Report for Contract from U.S. Army Corps of Engineers, Jacksonville District, 1990.
- USACE. "Central and South Florida Project, Modified Water Deliveries to Everglades National Park, Florida: 8.5 Square Mile Area." General Reevaluation Report, Jacksonville, Florida, USA, 2000.
- USACE. *Central and South Florida Project: Water Control Plan for Water Conservation Areas, Everglades National Park, and ENP-South Dade Conveyance System*. Jacksonville, Florida, USA: Jacksonville District, 2012.
- USACE. *Central and Southern Florida Project Comprehensive Review Study, Final Integrated Feasibility Report and Programmatic Environmental Impact Statement*. Jacksonville, Florida, USA: Jacksonville District, 1999.
- USACE. *Everglades Restoration Transition Plan Final Environmental Impact Statement*. Jacksonville, Florida, USA: Jacksonville District, 2012.
- USACE. *Interim Operational Plan for the Protection of the Cape Sable Seaside Sparrow*. Final Supplemental Environmental Impact Statement, Jacksonville, Florida, USA: Jacksonville District, 2006.
- USEPA. *Guidance for Implementing the January 2001 Methylmercury Water Quality Criterion*. Office of Science and Technology, 2010.
- USFWS. *South Florida Multi-Species Recovery Plan*. Atlanta, Georgia, USA: Southeast Region, 1999.
- Walters, C.L, and L.H. Gunderson. "A Screening of Water Policy Alternatives for Ecological Restoration in the Everglades." In *Everglades: The Ecosystem and Its Restoration*, by S.M. Davis and J.C. Ogden, 757-767. Delray Beach, Florida, USA: St. Lucie Press, 1994.
- Wetzel, P.R., et al. "Biogeochemical Processes on Tree Islands in the Greater Everglades: Initiating a New Paradigm." *Critical Reviews in Environmental Science and Technology* 41, no. 6 (2011): 670-701.
- Wetzel, P.R., et al. "Heterogeneity of Phosphorus Distribution in a Patterned Landscape, the Florida Everglades." *Plant Ecology* 200 (2009): 89-90.
- Wood, J.M., and G.W. Tanner. "Graminoid Community Composition and Structure within Four Everglades Management Areas." *Wetlands* 10, no. 2 (1990): 127-149.

Zweig, C.L, and W.M. Kitchens. "Effects of Landscape Gradients on Wetland Vegetation Communities: Information for Large-Scale Restoration." *Wetlands* 28, no. 4 (2008): 1086-1096.