ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT

CENTRAL EVERGLADES PLANNING PROJECT SOUTH: INTERIM OPERATIONS

Broward and Miami-Dade Counties, Florida

US Army Corps of Engineers ®
Jacksonville District

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DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, JACKSONVILLE DISTRICT
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FINDING OF NO SIGNIFICANT IMPACT
CENTRAL EVERGLADES PLANNING PROJECT SOUTH: INTERIM OPERATIONS
Broward and Miami-Dade Counties, Florida

The U.S. Army Corps of Engineers, Jacksonville District (Corps) has conducted an environmental analysis, in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended, on the interim operations plan for the Central Everglades Planning Project (CEPP) South features, Broward and Miami-Dade Counties. The CEPP was authorized by Section 1401(4)1 of the Water Resources Development Act (WRDA) of 2016, Public Law 114-322. Section 1308(a) of the WRDA of 2018, Public Law 115-217, authorized the project for ecosystem restoration, Central and Southern Florida, Everglades Agricultural Area, Florida, which changes operational flows but does not interfere with CEPP South implementation (or CEPP North or the seepage cutoff wall that is part of CEPP New Water). Due to the size and complexity of CEPP, project implementation will involve the integration of multi-year construction through individual project partnership agreements (PPAs) or amendments to existing PPAs between the Corps and the South Florida Water Management District (SFWMD). The Corps completed a Validation Report (formerly referred to as a Limited Reevaluation Report) for CEPP South in response to requirements specified in the 2014 CEPP Chief's Report on May 31, 2019. The CEPP South Validation Report confirmed the South phase project components, construction sequencing, and project dependencies as identified in the 2014 CEPP Final Project Implementation Report and Environmental Impact Statement (PIR/EIS) are still valid and justified based on any changed conditions since the project was authorized in 2016. The specific features of the 2016 CEPP Authorized Plan to be implemented in the CEPP South phase include conveyance features that function to deliver and re-distribute existing water and the additional water that will be provided by the combined Everglades Agricultural Area (EAA) and CEPP project components from WCA 3A to WCA 3B, ENP and Florida Bay. Construction of features in CEPP South were identified to prepare the system for the future additional inflows from Lake Okeechobee by providing the necessary additional outlet capacity from WCA 3A. Components included in the first construction contract for CEPP South include: (1) the L-67A gated culverts (S-631, S-632, S-633); (2) an interim 3,000 foot levee gap on the L-67C; (3) spoil pile removal along the northwestern side of the L-67A canal; and (4) backfilling a portion of an east-west agricultural ditch in WCA 3B in the Blue Shanty Flowway. The Corps plans to proceed with advertisement and award of the first construction contract for CEPP South in July and September 2020, respectively. The CEPP South Environmental Assessment (EA) dated July 2020, addresses interim operations of features associated with CEPP South Contract 1 to include the installation and operation of temporary pumps adjacent to the L-29 canal in the Blue Shanty Flowway due to phased construction of CEPP South features in Broward and Miami-Dade counties, Florida.

The EA, incorporated herein by reference, evaluated various alternatives to achieve identified project objectives and constraints, including compliance with the 2014 CEPP Chief's Report and Savings Clause requirements in the study area. A description of the preferred alternative is provided below:

- Operations in the study area are currently governed by the 2012 Water Control Plan and approved deviations, thereto (Modified Water Deliveries [MWD] Increment 2 Field Test). NEPA documentation for Increment 2 was completed on February 21, 2018. The Corps is recommending revisions to the 2014 CEPP and EAA Draft Project Operating Manual (DPOM) to define interim operations of CEPP South Contract 1 features. With the anticipated award of the first construction contract for CEPP South in September 2020, and based on the estimated construction contract duration of 2-3 years, the proposed Combined Operational Plan (COP) is expected to govern regional water management operations for the Water Conservation Areas (WCAs), Everglades National Park (ENP), and the ENP-South Dade (SDCS) when CEPP South Contract 1 features are operational. A Final Environmental Impact Statement (EIS) and Water Control Plan for the COP was published in the Federal Register (Volume 85, Number 39901) on July 2, 2020. Implementation of the COP would result in a change to the 2012 Water Control Plan. The Record of Decision (ROD) is expected in August of 2020. As such, the 2020 CEPP and EAA Reservoir DPOM utilizes operations described in the 2020 COP Final EIS, as defined in Appendix A (COP Water Control Plan), to define operating criteria for existing infrastructure within the C&SF water management system. Approval of the COP ROD is a prerequisite for implementation of the 2020 CEPP and EAA Reservoir DPOM.

- Operation of CEPP South infrastructure (S-631, S-632, S-633) will be operated subject to the operational constraints identified under the COP, and in the same manner as prescribed for the S-152 structure under Phase 2 of the Decomp Physical Model (DPM) field test. The 2020 CEPP and EAA Reservoir DPOM assumes a maximum combined release total of S-631, S-632, and S-633, and the existing S-152 of 750 cfs, which is the current S-152 maximum discharge capacity. S-631, S-632, and S-633 will adhere to the same headwater and tailwater constraints of S-152 as established under the operating criteria per Phase 2 of the DPM Field Test. The inclusion of S-152 as part of the 2020 CEPP and EAA Reservoir DPOM is subject to additional requirements prescribed in the DPOM.

- Due to the phased construction schedule currently anticipated for the CEPP South features prior to the construction of the Blue Shanty Levee (L-67D) and degrade of the 4.3 miles of the L-29 levee between L-67A and the intersection of the L-67D with the L-29 levee, the Corps will install temporary pumps adjacent to the L-29 canal as an interim measure to enhance and redirect flow south towards the L-29 canal. Two sets of temporary pumps, rated at combined 100 cfs at each location will be installed on the L-29 levee by the Corps, or the South Florida

Water Management District (SFWMD). Downstream of the temporary pumps is L-29 canal. Pumping will cease when L-29 canal stages reach 8.5 feet, NGVD per the COP or in response to other relevant L-29 operational limitations prescribed under the COP.

- Interim operations of features associated with CEPP South Contract 1 defined in the 2020 CEPP and EAA Reservoir DPOM are anticipated to be in place until at least 2024 (South Florida Ecosystem Restoration Integrated Delivery Schedule completion date for the S-355W gated spillway in the L-29 canal), and could extend through 2027, or until such time that an update to the interim operations is warranted.

In addition to a "no action" plan (referred to as CEPP South Baseline 2027 (CSB 2027)), two action alternatives were evaluated in detail in the environmental effects section of the EA. The alternatives included the preferred alternative (Alternative B4 (ALTB4)) described above and a second action alternative (Alternative B2 (ALTB2)). ALTB2 and ALTB4 included variations of operations to define discharges along the L-67A canal and Tamiami Trail. Each alternative was limited to the existing regional water budget used for CSB2027 based on existing authorized projects assumed in place by 2027.

Hydrologic modeling was conducted to support a quantitative assessment of the Savings Clause requirements for the CEPP South features. The Savings Clause analyses, described in Section 601(h)(5) of WRDA 2000 protects existing legal sources of water supply and ensures that CERP implementation does not reduce the level of service for flood protection that was in place at the time of enactment of WRDA 2000. ALTB4 achieves compliance with Savings Clause requirements.

ALTB4 is expected to best meet the objectives and constraints identified in the EA. Implementation of interim operations defined in the 2020 CEPP and EAA Reservoir DPOM would allow benefits to be achieved by setting the stage for restoration of sheet flow in the Blue Shanty Flowway.

For all alternatives, the potential effects were evaluated, as appropriate. An evaluation of potential environmental effects can be found in Section 4 of the EA. A summary assessment of the potential effects of the preferred plan are listed in Table 1.

Table 1: Summary of Potential Effects of the Preferred Plan

	Insignificant effects	Insignificant effects as a result of mitigation*	Resource unaffected by action
Aesthetics	☒	☐	☐
Air quality	☒	☐	☐
Aquatic resources/wetlands	☒	☐	☐
Invasive species	☒	☐	☐
Fish and wildlife habitat	☒	☐	☐
Threatened/Endangered species/critical habitat	☒	☐	☐
Historic properties	☒	☐	☐
Other cultural resources	☒	☐	☐
Floodplains	☒	☐	☐
Hazardous, toxic & radioactive waste	☐	☐	☒
Hydrology	☒	☐	☐
Land use	☐	☐	☒
Navigation	☐	☐	☒
Noise levels	☒	☐	☐
Public infrastructure	☐	☐	☒
Socioeconomics	☒	☐	☐
Environmental justice	☒	☐	☐
Soils	☒	☐	☐
Tribal trust resources*	☒	☐	☐
Water quality	☒	☐	☐
Climate change	☐	☐	☒

All practicable and appropriate means to avoid or minimize adverse environmental effects were analyzed and incorporated into the preferred plan. Best management practices (BMPs) as detailed in the EA will be implemented, if appropriate, to minimize impacts. The Corps commits to avoiding and minimizing adverse effects during installation of the temporary pumps. A list of minimization measures can be found in Section 4 of the EA. No compensatory mitigation is required as part of the preferred plan.

The EA has been prepared and has been coordinated for public, state, and Federal agency review. All comments submitted during the public review period have been responded to in the final EA.

Pursuant to Section 7 of the Endangered Species Act of 1973, as amended, the Corps determined that the preferred plan may affect but is not likely to adversely affect the following federally listed species: Florida panther, Florida manatee and its designated critical habitat, Florida bonneted bat, Cape Sable seaside sparrow and its designated critical habitat, Everglade snail kite and its designated critical habitat, American alligator, American crocodile and its designated critical habitat, and the Eastern indigo snake. The Corps has determined that the proposed action will have no effect on any other federally listed species or their designated critical habitat. Concurrence on the above species effect determinations was received from the U.S. Fish and Wildlife Service (USFWS) on June 5, 2020.

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

Water quality certification pursuant to Section 401 of the Clean Water Act will be obtained from the State of Florida prior to construction and will include interim operations. Full compliance with this Act will be evaluated upon the issuance of water quality certification by the State of Florida. All water quality conditions in the water quality certification will be implemented in order to avoid or minimize adverse impacts to water quality.

A determination of consistency with the State of Florida Coastal Zone Management program (FCZMP) pursuant to the Coastal Zone Management Act of 1972 is found in Appendix B of this EA. The Corps has coordinated a consistency determination pursuant to the Coastal Zone Management Act of 1972 through the circulation of the draft EA. The Corps has determined that the proposed action is consistent to the maximum extent practicable with the enforceable policies of Florida's approved Coastal Zone Management Program. In correspondence dated June 24, 2020, the Florida State Clearinghouse indicated that the state had no objections to the project and therefore it is consistent with the FCMP.

Consultation for the proposed action has been initiated with the Florida State Historic Preservation Officer (SHPO) and the appropriate Federally recognized Tribes in accordance with the National Historic Preservation Act and consideration given under the NEPA. The Corps has determined that the proposed action will have no adverse effect on historic properties eligible or potentially eligible for listing in the National Register of Historic Places and consulted on this finding via letter on May 1, 2020. The Florida State Historic Preservation Officer concurred with this finding on May 28, 2020.

Technical and environmental criteria have been used in the formulation of alternative plans. All applicable laws, executive orders, regulations, and local government plans were considered in evaluation of alternatives. Based on this report, the reviews by other Federal, State and local agencies, Tribes, input of the public, and the review by my staff, it is my determination that the preferred plan would not cause significant adverse effects on the quality of the human environment; therefore, preparation of an Environmental Impact Statement is not required.

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Date

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

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Broward, Miami Dade, and Monroe Counties

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1 PROJECT PURPOSE AND NEED

1.1 Project Authority

The Central Everglades Planning Project (CEPP) was authorized by Section 1401(4)1 of the Water Resources Development Act (WRDA) of 2016, Public Law 114-322. Section 1308(a) of the WRDA of 2018, Public Law 115-217, authorized the project for ecosystem restoration, Central and Southern Florida, Everglades Agricultural Area (EAA), Florida, which changes operational flows but does not interfere with CEPP South implementation (or CEPP North or the seepage cutoff wall that is part of CEPP New Water).

The 2014 CEPP Final Project Implementation Report and Environmental Impact Statement (PIR/EIS) contained a Draft Project Operating Manual (DPOM). Refinements to the operating criteria in the DPOM were envisioned to be made as additional project design details, data, operational experience, and/or general information is gained during implementation phases. Paragraph 16.b(3) of the 2014 CEPP Chief's Report states that the PIR will be updated as appropriate as revisions are made to Water Control Plans and Project Operating Manuals (POMs) for each phase, and that compliance with all legal requirements are met for each phase. The Corps is recommending revisions to the 2014 CEPP and EAA Reservoir DPOM consistent with established Comprehensive Everglades Restoration Plan (CERP) procedures (Draft Guidance Memoranda 5) that provides specific guidance for the preparation of operating manuals as part of the framework for assuring that benefits of the CERP are achieved This EA addresses the interim operations of features associated with CEPP South Contract 1 to include the installation and operation of temporary pumps adjacent to the L-29 canal as an interim measure to enhance and redirect flow south towards the L-29 canal in the Blue Shanty Flowway during the phased construction of CEPP South features. Reference **Section 1.4** and **Section 2.2.** Approval authority for 2020 CEPP and EAA Reservoir DPOM resides with the Corps' South Atlantic Division (SAD) Commander per Engineering Regulation (ER) 1110-2-240. The responsibility may be delegated to the Jacksonville District Commander. The installation and operation of the L-29 temporary pumps are considered a CEPP South construction activity.

1.2 Project Location

The project area for CEPP identified in the 2014 CEPP Final PIR/EIS (Corps 2014) encompasses the Northern Estuaries (St. Lucie River and Indian River Lagoon and the Caloosahatchee River and Estuary), Lake Okeechobee, a portion of the EAA, the Water Conservation Areas (WCAs), Everglades National Park (ENP), the Southern Estuaries (Florida Bay and Biscayne Bay), and the Lower East Coast (LEC) (**Figure 1-1**). The CEPP included features broken into three phases. This Environmental Assessment (EA) addresses interim operations of features associated with CEPP South Contract 1 that include conveyance features that function to redistribute the existing water from WCA 3A into WCA 3B and eastern ENP. Reference the red circle in **Figure 1-1** that delineates the area potentially affected by implementation of the proposed action. **Figure 1-2** and **Figure 1-3** illustrate components of the CEPP recommended plan identified to be included in CEPP South from the 2014 CEPP Final PIR/EIS (USACE 2014) as discussed in **Section 1.3**.

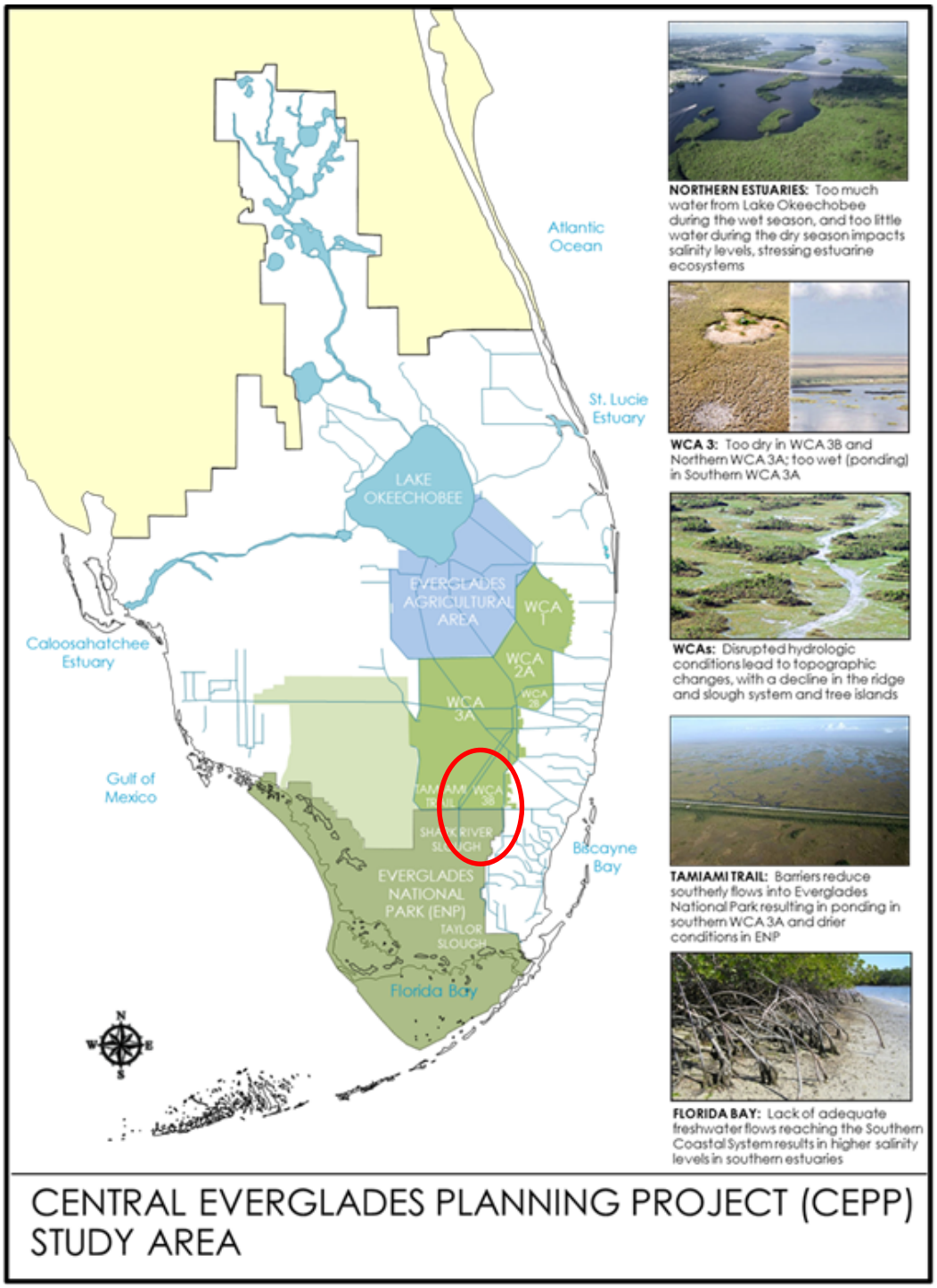


Figure 1-1. Map of CEPP project area.

1.3 Project Background

1.3.1 Central Everglades Planning Project (CEPP)

The purpose of CEPP as identified in the 2014 CEPP Final PIR/EIS is to improve the quantity, quality, timing and distribution of water flows to the Northern Estuaries (St. Lucie and Caloosahatchee), central Everglades (WCA 3 and ENP), and Florida Bay while increasing water supply for municipal and agricultural users (USACE 2014). Due to the size and complexity of CEPP, project implementation will involve phases of multi-year construction through individual project partnership agreements (PPAs) or amendments to existing PPAs between the U.S. Army Corps of Engineers (Corps) and the South Florida Water Management District (SFWMD). Phased implementation efforts maximize the opportunity to realize incremental restoration benefits by initially building features that utilize existing water in the system that meets state water quality standards. The 2014 CEPP Final PIR/EIS is available at: https://www.saj.usace.army.mil/Missions/Environmental/Ecosystem-Restoration/Central-Everglades-Planning-Project/.

Components of the CEPP recommended plan were grouped into three separate implementation phases within the 2014 CEPP Final PIR/EIS based upon the spatial distribution of the recommended plan features and the locations within the CEPP project area where separable hydrologic environmental benefits would accrue. As described in the 2014 CEPP Final PIR/EIS, these groupings included project features in northern WCA 3A (CEPP North), project features in southern WCA 3A, WCA 3B and ENP (CEPP South), and project features that provide new water and required seepage management that benefits the entirety of the project area (CEPP New Water). In section 1308(a) of the WRDA of 2018, Congress authorized the project for ecosystem restoration, Central and Southern Florida, Everglades Agricultural Area, Florida (CERP EAA), in accordance with section 601 of the WRDA of 2000, as recommended in the addendum to the CEPP Post Authorization Change Report, Feasibility Study and Draft EIS dated May 2018, with such modifications as the Secretary of the Army considers appropriate. This project for ecosystem restoration would convert the 14,000-acre CEPP A-2 Flow Equalization Basin (FEB) into a 10,500-acre storage reservoir and would include a 6,500-acre Stormwater Treatment Area (STA). **Table 1-1** illustrates the recommended plan features identified within the 2014 CEPP Final PIR/EIS (USACE 2014), as modified by WRDA 2018. Reference Section 6 of the 2014 CEPP Final PIR/EIS for a complete description of project dependencies including Comprehensive Everglades Restoration Plan (CERP) and non-CERP projects that must be constructed and operating before implementation of the associated CEPP features (USACE 2014).

Table 1-1. CEPP and CERP EAA features by implementation phase.

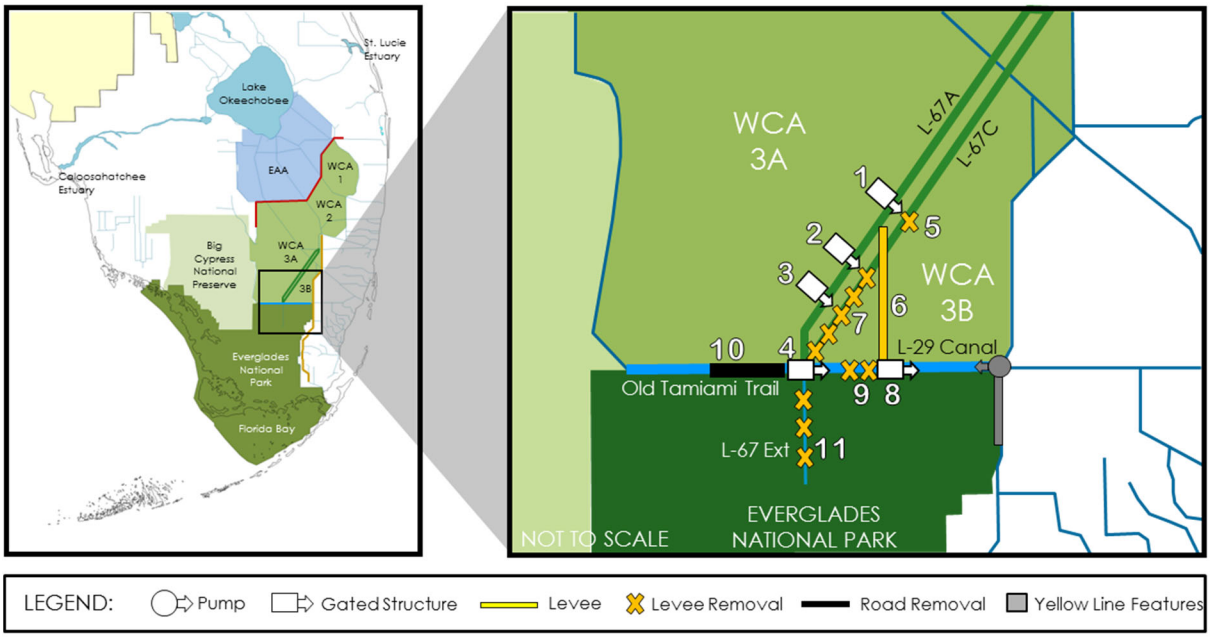
Project	Features
CEPP North	• L-6 Diversion
	• S-8 Pump Modifications
	• L-4 Levee Degrade and Pump Station
	• L-5 Canal Improvements
	• Miami Canal Backfill
CEPP South	• L-67 A Structure North
	• One L-67 C Gap (6,000 feet)
	• Increase S-356 to 1,000 cfs
	• Increase S-333*
	• L-29 Gated Spillway
	• L-67 A Structures 2 and 3 South

Project	Features
	• L-67 A Spoil Pile Removal
	• Remove L-67 C Levee Segment
	• Remove L-67 Extension Levee
	• 8.5 Mile Blue Shanty Levee
	• Remove L-29 Levee Segment
	• Backfill L-67 Canal Extension
	• Remove Old Tamiami Trail*
CEPP New Water	• Seepage Barrier L-31 N
CERP EAA	• A-2 Reservoir and A-2 STA
	• Miami Canal and North New River Canal Improvements

* Action currently being constructed by the SFWMD

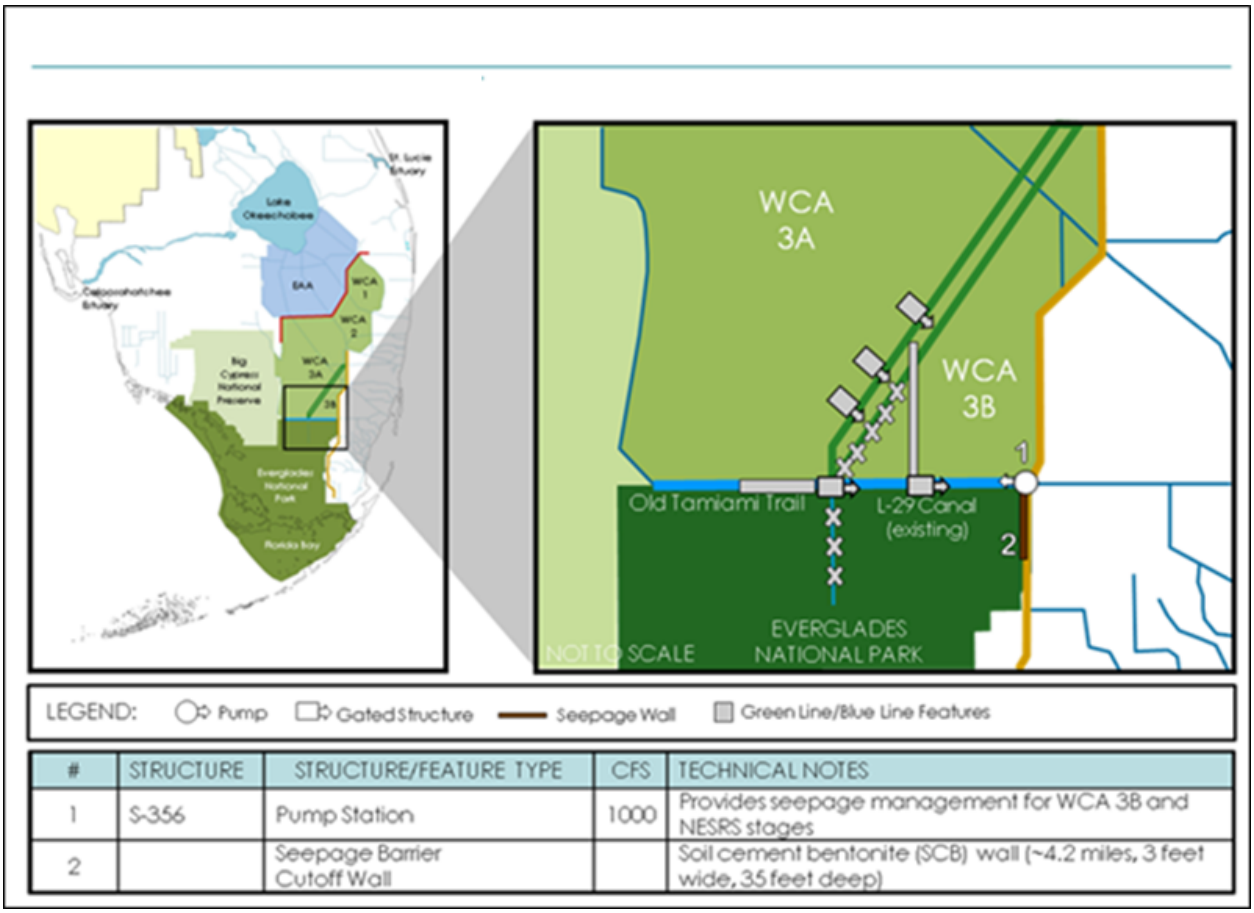
The Corps has completed a Validation Report (formerly referred to as a Limited Reevaluation Report) for CEPP South in response to requirements specified in paragraph 15 of the 2014 CEPP Chief's Report. The CEPP South Validation Report has confirmed project components, construction sequencing, and project dependencies as identified in the 2014 CEPP Final PIR/EIS (Corps 2014). The CEPP South Validation Report was approved by the Corps' South Atlantic Division (SAD) on May 31, 2019. Construction of CEPP features in CEPP South will prepare the system for the future additional inflows from Lake Okeechobee by providing the necessary additional outlet capacity from WCA 3A. The specific features of the CEPP recommended plan to be implemented in CEPP South include conveyance features that function to deliver and re-distribute existing water from WCA 3A to WCA 3B, and ENP through NESRS. **Figure 1-2** and **Figure 1-3** illustrates components of the CEPP recommended plan identified to be included in CEPP South from the 2014 CEPP Final PIR/EIS (USACE 2014).

CEPP South includes construction of a new Blue Shanty levee (L-67D) extending from Tamiami Trail northward to the L-67A levee. The Blue Shanty levee will divide WCA 3B into two subunits, a large eastern unit (3B-E) and a smaller western unit, the Blue Shanty Flowway (3B-W). The Blue Shanty levee is the most efficient means to restore continuous southerly sheet flow through a practicable section of WCA 3B and alleviates concerns over effects on tree islands by maintaining lower water depths and stages in WCA 3B-E. The width of the 3B-W Flowway is aligned to the width of the downstream 2.3-Mile Tamiami Trail Next Steps (TTNS) Bridges, by the Department of the Interior (DOI), optimizing the effectiveness of both the Flowway and bridge. In the western unit, CEPP South includes the construction of two new gated control structures (S-632 and S-633) on the L-67A, removal of the L-67C and L-29 levees within the Flowway, and construction of a divide structure in the L-29 canal to enable continuous sheet flow of water to be delivered from WCA 3A through WCA 3B to ENP. A gated control structure (S-631) will also be constructed on L-67A, outside the Flowway, to improve the hydroperiod of the eastern unit of WCA 3B. Complete backfill and degrade of 5.5 miles of the L-67 Extension canal and levee will occur to facilitate additional deliveries of water from WCA 3A directly to ENP. In order to mitigate seepage from WCA 3B and NESRS, a new 1,000 cubic feet per second (cfs) S-356 pump station will be constructed to replace the existing temporary 500 cfs S-356 pump station.



#	STRUCTURE	STRUCTURE/FEATURE TYPE	CFS	TECHNICAL NOTES
1	S-631	Gated Culvert	500	Delivers water from WCA 3A to 3B, east of L-67D Levee
2	S-632	Gated Culvert	500	Delivers water from WCA 3A to 3B, west of L-67D Levee
3	S-633	Gated Culvert	500	Delivers water from WCA 3A to 3B, west of L-67D Levee
4	S-333 (N)	Gated Spillway w/new canal	1150	Delivers water from L-67A Canal to L-29 Canal; supplements existing S-333 gated spillway
5		L-67C Levee Removal Gap		Gap, ~ 6000 feet (corresponding to S-631)
6	L-67D	Blue Shanty Levee		Levee, ~ 8.5 miles, connecting from L-67A to L-29 (6 feet high, 14-foot crest width, 3:1 side slopes)
7		L-67C Levee Removal		Complete removal of ~ 8 miles from New Blue Shanty Levee (L-67D)south to intersection of L-67A/L-67C; L-67C canal is not backfilled
8	S-355W	Gated Spillway	1230	Maintains water deliveries to eastern L-29 Canal
9		Levee Removal (L-29)		Removal of ~ 4.3 miles between L-67A and Blue Shanty Levee intersection with L-29 Levee
10		Removal of remnants of Old Tamiami Trail roadway		Removal of ~ 6 miles of roadway west of L-67 Extension
11		L-67 Extension Levee Removal and Canal Backfill)		Complete removal of ~ 5.5 miles of remaining L-67 Extension, including S-346 culvert

Figure 1-2. CEPP recommended plan southern distribution and conveyance features and location (USACE 2014).



#	STRUCTURE	STRUCTURE/FEATURE TYPE	CFS	TECHNICAL NOTES
1	S-356	Pump Station	1000	Provides seepage management for WCA 3B and NESRS stages
2		Seepage Barrier Cutoff Wall		Soil cement bentonite (SCB) wall (~4.2 miles, 3 feet wide, 35 feet deep)

Figure 1-3. CEPP recommended plan seepage management features and location (USACE 2014).

A portion of the features identified within CEPP South in the 2014 CEPP Final PIR/EIS are currently being pursued and constructed by the SFWMD and the NPS. These include increased outlet capacity of the S-333 structure (S-333N) at the terminus of the L-67A canal and removal of Old Tamiami Trail between the ENP Tram Road and the L-67 Extension levee to facilitate additional deliveries of water from WCA 3A directly to ENP. The Tram Road is located approximately 0.25 miles east of Shark Valley Loop Road. The SFWMD initiated a request to the Corps by letter dated October 25, 2017 for the design of the S-333 spillway modification feature of the CEPP (i.e. S-333N). The SFWMD requested the Corps to participate in the review of the SFWMD's design initiated in November of 2017. S-333N final design underwent a 33 U.S.C. § 408 (Section 408) review that was completed in June of 2018. Pursuant to Section 408, the Corps may grant permission for another party to alter a Civil Works project if the proposed alteration will not be injurious to the public interest and will not impair the usefulness of the Civil Works project. After the Corps granted a Section 408 permission, the SFWMD awarded construction of S-333N in September 2018 with the goal of completing construction in June 2020.

In compliance with the National Environmental Policy Act (NEPA), the NPS, in cooperation with the Corps, prepared the Old Tamiami Trail Modifications EA that evaluated proposed modifications to the original 5.7-mile segment of Old Tamiami Trail located along the northern boundary of ENP (NPS 2018). The EA tiered off and incorporated by reference the 2014 CEPP Final PIR/EIS. The purpose of the removal of Old Tamiami Trail is to enhance sheet flow from WCA 3A into the Shark River Slough via the S-12C and S-12D

water control structures. Based on the analysis presented in the EA, the proposed action selected by the NPS includes removal of 5.45 miles of the roadbed. The construction contract for removal of Old Tamiami Trail (between Shark Valley Loop Road and L-67 Extension Levee) was awarded in December of 2019 with the Notice to Proceed (NTP) issued by the SFWMD in January 2020. Final completion is scheduled for January 2022. As part of the removal of Old Tamiami Trail, and after working with the Miccosukee Tribe of Indians of Florida to provide requested fill, the SFWMD is currently proceeding with backfilling up to 0.5 miles at the southernmost terminus of the L-67 Extension canal (adjacent to the levee terminus) using excess fill resulting from de-construction of Old Tamiami Trail or from construction of CEPP South features. The 2014 CEPP Final PIR/EIS included complete backfill and degrade of 5.5 miles of the L-67 Extension canal and levee. Reference **Figure 2-2** for the location of the backfill.

CEPP South Features are further described below:

- S-333N – The new S-333 gated spillway has a design capacity of 1,150 cfs, to deliver water from the L-67A canal to the L-29 borrow canal. S-333N is being constructed just north of the existing S-333 structure, bringing the combined design capacity of both structures to 2,500 cfs. With full implementation of CEPP, including completion of the Tamiami Trail Next Steps (TTNS) Bridging and Road Raising, S-333N is proposed to have a tail water constraint at 9.7 feet, NGVD. The combination of the S-333 structures; along with the S-631, S-632, and S-633 described below; will supersede the S-12s in being the primary discharge point for WCA 3A.
- S-631 - The structure will be a gated culvert with a design capacity of 500 cfs. S-631 will be located in L67A to deliver water from WCA 3A to WCA 3B, east of the L-67D levee. Approximately 1,500 feet of spoil (three spoil piles, approximately 6.8 acres) along the northwestern side of the L-67A canal located directly north of this structure will be removed to facilitate sheet flow connectivity with the WCA 3A marsh.
- S-632 - The structure will be a gated culvert with a design capacity of 500 cfs. S-632 will be located in L-67A to deliver water from WCA 3A to WCA 3B, within the WCA 3B Flowway. Approximately 1,500 feet of spoil (three spoil piles, approximately 7.6 acres) along the northwestern side of the L-67A canal located directly north of this structure will be removed to facilitate sheet flow connectivity with the WCA 3A marsh.
- S-633 - The structure will be a gated culvert with a design capacity of 500 cfs. S-633 will be located in L-67A to deliver water from WCA 3A to WCA 3B, within the WCA 3B Flowway.
- L-67D Blue Shanty Levee - The L-67D levee will connect L-67A to L-29 and serve as the eastern perimeter levee for the WCA 3B Flowway. It will run from due north from the L-29 levee, starting approximately 4.3 miles east of S-333/S-333N. The total length will be approximately 8.5 miles. The crest width would be 14 feet, the height would be 6 feet, and the side slopes would be 3:1.
- L-67C levee (Separates WCA 3A from WCA 3B, parallel to the L-67A levee) - Approximately 8 miles of the L-67C levee, west of the proposed L-67D levee, will be removed from the area north of Tamiami Trail within the WCA 3B Flowway. The adjacent canal would not be backfilled. North of the new L-67D levee, an approximate 6,000 feet gap will be created to distribute discharges from S-631 to eastern WCA 3B. The levee removal and gapping will allow a more natural flow of water from WCA 3A to WCA 3B, and the WCA 3B Flowway would provide a direct hydrologic connection to ENP.

- L-67 Extension levee (Located in ENP, south of S-333/S-333N) – Up to the entire remaining length of the L-67 Extension levee (5.5 miles) will be removed and the adjacent borrow canal will be backfilled (5.5 miles). This will allow a more natural flow of water and provide a direct hydrologic connection between NESRS and Western Shark River Slough (WSS). The extent of removal of this levee and the adjacent canal backfill may be predicated on a number of factors, to include the effects on the discharge capability of the S-12 spillways, and other operational limitations which may affect discharges from WCA 3A to NESRS following the completion of the C-111 Northern Detention Area (NDA), the 8.5 Square Mile Area (SMA) Flood Mitigation Project, and L-31N seepage management. The construction of C-111 NDA and 8.5 SMA are now complete. Further details will be determined during the Preconstruction, Engineering and Design Phase (PED).
- S-355W - The S-355W structure will be a gated spillway located in line with the L-29 canal at the southern extent of the proposed L-67D levee, with a design capacity of 1,230 cfs. The purpose of the S-355W will be to convey water from the L-29 canal within the Blue Shanty Flowway, eastward towards the existing S-334 spillway to provide assistance in meeting ENP ecological objectives.
- L-29 levee (Southern boundary of WCA 3B, east of S-333/S-333N) - Approximately 4.3 miles of the L-29 levee, west of the new L-67D levee, will be removed. This will allow water to move through the WCA 3B Flowway.
- S-356 (New) - The new S-356 pump station will replace the current temporary pump station and have a design capacity of 1,000 cfs to provide seepage return to ENP. It will be located in the vicinity of the existing temporary pump station. This pump station will be able to concurrently handle the discharges from S-335 and the seepage into L-31N (from S-335 to G-211) without requiring discharges to tide. With full implementation of CEPP, including completion of the TTNS Bridging and Road Raising (refer to **Table 1-1**), S-356 is proposed to have a tail water constraint at 9.7 feet (ft.), National Geodetic Vertical Datum (NGVD) of 1929 along the eastern segment of the L-29 canal. Due to the design of the existing S-356 pump station being temporary in nature and the need for an increased capacity from 500 cfs to 1,000 cfs to provide increased seepage management capability, the existing S-356 pump station would be removed and replaced. Since periodic operation of the existing S-356 pump station will be required under the Modified Water Deliveries to ENP (MWD) Project, Increment 2 Field Test and the future Combined Operational Plan (COP), the construction sequencing for CEPP South includes flexibility for uninterrupted operation of the existing S-356 pump station or functionally-equivalent temporary pump capacity.
- Old Tamiami Trail – Up to 5.45 miles of the Old Tamiami Trail Road are being degraded, from the L-67 Extension levee extending west to the ENP Shark Valley Tram Road, providing increased wetland acreage and increased discharge capability from the S-12C and S-12D structures.

Components proposed for inclusion in the first construction contract and anticipated future CEPP South contracts are as follows:

- CEPP South Contract 1 (Fiscal Year (FY) 20 Award): L-67A gated culverts (S-631, S-632, S-633), L-67C Interim 3,000 foot levee gap South of S-633, L-67A spoil pile removal, and backfill of the east-west agricultural ditch (approximately 1.36 miles).
- CEPP South Contract 2 (FY22 Award): New 1,000 cfs S-356 pump station
- CEPP South Contract 3b (FY23 Award): New 1,230 cfs S-355W gated spillway in L-29 canal

- CEPP South Contract 5 (FY24 Award): L-67C levee removal, L-67D levee construction, L-67C 6,000 foot levee gap south of S-631 CEPP South Contract 6 (FY25 Award): L-29 levee removal and L-67 extension removal and backfill
- CEPP South Contract 3a is being pursued by the SFWMD as noted above and includes construction of S-333N (1, 150 cfs).
- CEPP South Contract 14 is being pursued by the SFWMD for removal of Old Tamiami Trail

1.3.2 DECOMP Physical Model (DPM)

The WCA 3 DECOMP Project is a component of CERP. The Corps and the SFWMD entered into a design agreement dated May 12, 2000 and amended on July 29, 2004, and August 13, 2009, for the purposes of conducting activities related to planning, engineering and design of CERP projects. The DECOMP Physical Model (DPM) was conducted pursuant to that agreement as a design effort to gather information to formulate decompartmentalization of WCA 3 and inform the design of CERP features (USACE 2010). The DPM is designed to provide information regarding the ecological benefits of sheetflow restoration and the effects of levee removal and canal backfill on the ridge and slough landscape.

The DPM is a limited duration, fully controlled field test conducted along a 3,000 foot stretch of the L-67A and L-67C levees and canals in WCA 3A and WCA 3B. The project provides for the temporary installation of 10, 60-inch culverts (collectively called S-152) with a combined designed discharge capacity of 750 cfs installed along a stretch of the L-67A levee. Three 1,000-foot backfill treatments (no backfill, partial backfill and complete backfill) are located within the L-67C canal, approximately 9,000 feet south, southeast of the S-152 structure on the L-67A levee. The L-67C levee is gapped for 3,000 feet, directly east of the backfill treatments, to allow the flow from WCA 3A to pass through the culverts, through the "pocket", across the backfill treatments and into WCA 3B. S-152 may discharge up to 750 cfs until either DPM objective(s) are met or S-152 is closed subject to operational constraints. When WCA 3B stages (at gauges SRS-1 and/or Site_71) equal or exceed 8.5 feet National Geodetic Vertical Datum of 1929 (NGVD), S-152 releases may be reduced or discontinued. Operational criteria to limit high phosphorous concentrations in the surface water entering WCA 3B were also developed to inform operations of S-152.

The April 13, 2010 DPM EA and Finding of No Significant Impact (FONSI) anticipated operational testing of S-152 to begin in early 2011 and continue until late 2014 (USACE 2010). Construction of the DPM was delayed by one year. Operational testing began on November 5, 2013. A July 8, 2015 DPM Supplemental FONSI was prepared to document NEPA compliance for the purposes of proposing a third and fourth year of testing in 2015 and 2016 (USACE 2015). The Corps proposed a fifth year of testing in 2017, with the potential for additional years of testing through the year 2021 in order to gain information to further address scientific, hydrologic, and water management uncertainties that require clarification prior to the design of decompartmentalization features within WCA 3, included in CERP. A Supplemental EA and FONSI were completed on November 9, 2017. Operations of the structure was approved by the Corps' SAD on November 8, 2017, through December 31, 2021. NEPA documentation prepared to support construction and operation of the DPM stated that the physical features of the DPM are temporary and are expected to be removed at the end of the field test. The project site would be returned to original conditions at the conclusion of the test. By the end of the operational testing period (December 31, 2021), the Corps' SAD stated that the Jacksonville District should be prepared to either: remove the structure from and restore the L-67A and L-67C levees as documented in the prior NEPA documentation or have an approved document that incorporates these features into the C&SF project. The latter would also include

updating Volume 4 of the Master Water Control Manual (or SOM for the WCAs, ENP, and South Dade Conveyance System (SDCS)), whichever is in effect at the time, with the final operating plan for S-152. This would require making all necessary improvements to the structure to make it a permanent facility.

The 2019 CEPP South Validation Report discussed the use of S-152 as it relates to CEPP. The CEPP recommended plan identified in the 2014 CEPP Final PIR/EIS included three, 500 cfs gated culverts (S-631, S-632, and S-633) on the L-67A levee to deliver water from WCA 3A to WCA 3B, as discussed in **Section 1.3.1**. Additional testing of the DPM was identified in the 2014 CEPP Adaptive Management and Monitoring Plan (AMMP) to address an identified uncertainty by answering the question "Will the full suite of CEPP recommended plan structures be required in WCA 3B to create the Blue Shanty Flowway?" and to inform and aid in future PED efforts for CEPP. Based on the information collected to date, the DPM does not impact or change any of the CEPP South features that were recommended in the 2014 CEPP Final PIR/EIS (USACE 2019). The 2019 CEPP South Validation Report recognized that there may be an opportunity during the CEPP PED design to leave the DPM in place, instead of decommissioning it, if the additional flow (750 cfs) is determined to be beneficial to restoring the Everglades. S-152 is located to the west of the Blue Shanty levee and north of S-632 and south of S-631. Use of S-152 could allow for additional operational flexibility in the operations of these CEPP South structures.

The Corps applied for and received a renewal permit (Comprehensive Everglades Restoration Permit (CERPRA) Permit Number 0304879-007) on November 30, 2016 for the DPM and modified the permit in 2018 (CERPRA Permit Number 0304879-008) to include year-round operations. Additionally, the SFWMD obtained a CERPRA permit for interim operations and testing of the DPM on February 8, 2019 (CERPRA Permit Number 0369865-001) that expires on February 8, 2024. Removal of the physical features of the DPM (S-152, backfill treatments in the L-67C canal, and L-67C 3,000 foot levee gap) are anticipated to be revisited based on the conclusions from the DPM.

S-152 will be operated through December 31, 2021 as a cost-shared effort under the above reference design agreement for the purposes of conducting activities related to planning, engineering and design of CERP projects. After that time, should SFWMD choose to pursue continued operation of the structure separate from the CEPP, SFWMD would first be required to obtain a Section 408 permission from the Corps. The Jacksonville District, is currently coordinating with the Corps' SAD to determine the appropriate path forward for the potential inclusion of S-152 as an authorized feature of the CEPP. At this time, operation of the DPM will terminate on December 31, 2021. The Corps would prepare supplemental NEPA documentation, as applicable. Reference the operational strategy in the 2017 Supplemental EA and FONSI for complete details on operation of S-152.

1.4 Project Need or Opportunity

This EA considers potential direct, indirect, and cumulative effects from interim operations of features associated with CEPP South Contract 1 defined in the 2020 CEPP and EAA Reservoir Draft DPOM (**Appendix A**) that include conveyance features which function to redistribute the existing water from WCA 3A into WCA 3B and eastern ENP. Due to the phased construction of CEPP South features, which includes completion of the S-631, S-632, and S-633 gated culverts on the L-67A levee and a single corresponding L-67C interim gap, prior to the construction of the Blue Shanty Levee (L-67D) and degrade of the 4.3 miles of the L-29 levee between L-67A and the intersection of the L-67D with the L-29 levee, as part of the interim operations described in the DPOM, the Corps proposes to install temporary pumps adjacent to the L-29 canal as an interim measure to enhance and redirect flow south towards the L-29 canal.

This EA is informed by additional hydrologic modeling that the Corps has completed during the CEPP Preconstruction, Engineering, and Design (PED) phase. The hydrologic modeling was conducted in an effort to optimize operation of the CEPP South features and develop the 2020 CEPP and EAA Reservoir DPOM to maximize interim ecological benefits subject to system-wide CERP constraints to avoid impacts to flood risk management and water supply. Additionally, the 2014 CEPP Final PIR/EIS Engineering Appendix (Section A.8.4) identified a requirement for the Corps to conduct further technical investigations and additional hydrologic/hydraulic modeling with a higher resolution model for the 8.5 SMA operations. The hydrologic modeling was also conducted to support a quantitative assessment of the Savings Clause requirements for the CEPP South features. As envisioned by paragraph 16.b(3) of the 2014 CEPP Chief's Report, "[t]he PIR will be updated as appropriate as revisions are made to Water Control Plans and Project Operating Manuals for each phase."

The Savings Clause analyses, described in Section 601(h)(5) of WRDA 2000, protects existing legal sources of water supply and ensures that CERP implementation does not reduce the level of service for flood protection that was in place at the time of enactment of WRDA 2000. Section 385.36 of the Programmatic Regulations for the CERP (33 CFR Part 385) requires that CERP PIRs determine if existing legal sources of water will be eliminated or transferred as a result of CERP project implementation. If implementation of a CERP project is expected to result in an elimination or transfer of an existing legal source of water, the PIR shall include an implementation plan that ensures a new source of water of comparable quantity and quality is available to replace the source that is being transferred or eliminated.

Analyses conducted in the 2014 CEPP Final PIR/EIS (reference Appendix B) demonstrated fulfillment of WRDA 2000 Savings Clause requirements (Section 601(h)(5)(B)); however, due to risks and uncertainties associated with CEPP, the implementation time, and the dependences of CEPP on other CERP and non-CERP projects, stakeholders expressed concern with regard to the recommended plan satisfying the planning requirements necessary for preparation of a PIR to implement CERP components, including the "Savings Clause" analyses. Section 6.8.3 (Project Assurances and Savings Clause Incremental Analysis during CEPP Implementation) of the 2014 CEPP Final PIR/EIS therefore acknowledged that the Corps and the SFWMD would undertake updated project assurances and Savings Clause analyses, if necessary, for the implementation phases that are selected to be included in a PPA or amendment thereto, prior to entering into the PPA or PPA amendment for CEPP.

The 2014 CEPP Final PIR/EIS anticipated that implementation of CEPP would occur over many years, with the project constructed in three distinct, sequential phases (CEPP South/CEPP North to be completed first and second, in interchangeable order, followed by CEPP New Water) that are considered separable elements with inter-related project features grouped to provide incremental hydrologic and ecological benefits. The 2014 CEPP Final PIR/EIS acknowledged a number of non-CEPP projects which must be in place before implementing any CEPP features and other certain non-CEPP projects which must be integrated into the sequencing of CEPP implementation to avoid unintended adverse consequences. While these project dependencies remain principally unchanged from the 2014 CEPP Final PIR/EIS, consideration of other factors including funding availability, cost-share balance between the Federal government and non-Federal sponsor, and the integration of projects that are being constructed by other agencies, have resulted in identification of alternate viable options for the implementation of CEPP component groupings. The need for this sequencing flexibility was identified in the 2014 CEPP Final PIR/EIS as essential to successful CEPP implementation given the uncertainties associated with the lengthy implementation period and the inevitable improvement in scientific knowledge about the functioning of the greater Everglades that will occur as planned CERP and non-CERP projects are completed. The 2014

CEPP Final PIR/EIS further acknowledged that the Corps and the SFWMD will incorporate the CEPP recommended plan and other CERP projects awaiting authorization into the south Florida Ecosystem Restoration Programs' Integrated Delivery Schedule (IDS) through a public engagement process. The current CEPP sequencing plan from the October 2019 IDS update describes construction of CEPP South, CEPP North, and CEPP New Water components through a series of concurrent construction contracts during FY2019 through FY2027, which will result in advancing construction and realization of critical ecosystem benefits from the CEPP. The Corps plans to proceed with advertisement and award of the first construction contract for CEPP South in July and September 2020, respectively. A signed PPA is required to award the first construction contract for CEPP South.

Furthermore, as noted above, paragraph 16.b(3) of the 2014 CEPP Chief's Report states that the PIR will be updated as appropriate as revisions are made to Water Control Plans and POMs for each phase, and that compliance with all legal requirements are met for each phase. The 2014 CEPP Final PIR/EIS contained a DPOM that included operating criteria based on the hydrologic modeling assumptions at that time and generally discussed the transitions to operations during the construction phase, the OTMP, and the long-term O&M phase. The 2014 CEPP DPOM assumed completion of all CEPP components, accounting for the additional "new water" inflows to WCA 2 and WCA 3A, and did not otherwise prescribe operations for the incremental construction of CEPP features over many years. Modifications and/or revisions to the 2014 CEPP DPOM were expected to occur, as appropriate during subsequent implementation phases. Development of the DPOM was described as an iterative process that was expected to continue throughout the life of the project. The DPOM was expected to be updated at periodic intervals during the detailed design phase, construction phase, and OTMP of the project. Refinements to the operating criteria in the DPOM were envisioned to be made as additional project design details, data, operational experience, and/or general information is gained during implementation phases.

As of the time of this EA, operations in the project area are currently determined by the 2012 Water Control Plan for the WCAs, ENP, and ENP to South Dade Conveyance System (SDCS_ (i.e. Everglades Restoration Transition Plan (ERTP 2012)) and approved deviations, thereto (MWD Increment 2 Field Test). A Notice of Availability (NOA) of the Final EIS for the Combined Operational Plan (COP) was published in the Federal Register (Volume 85, Number 39901) on July 2, 2020. Implementation of the COP will result in a change to the 2012 Water Control Plan for the WCAs, ENP, and ENP to South Dade Conveyance System (SDCS). The Record of Decision (ROD) for the COP is expected in August of 2020. The Corps is recommending revisions to the 2014 CEPP DPOM to define interim operations of features associated with CEPP South Contract 1. With the anticipated award of the first construction contract for CEPP South in September 2020, and based on the estimated construction contract duration of 2-3 years, the COP is expected to govern regional water management operations for the WCAs, ENP, and the ENP-SDCS when the features associated with CEPP South Contract 1 are operational. Interim operations defined in the 2020 CEPP and EAA Reservoir DPOM are anticipated to be in place until at least 2024 (IDS completion date for the S-355W gated spillway in the L-29 canal) and could extend approximately through 2027, or until such time that an update to the interim operations is warranted.

A change to the 2012 Water Control Plan (or to the COP SOM) to incorporate permanent operations for all CEPP South components is not being pursued at this time, based on evaluation of the initial CEPP South, PED-phase hydrologic modeling results described within this EA. A permanent update to the 2020 Water Control Plan (COP) and associated NEPA will be pursued in the future pending consideration of: (1) new information from completion of the Lake Okeechobee System Operating Manual (LOSOM) EIS and Water

Control Plan anticipated in October 2022, which may provide a moderate increase in inflows to WCA 3A; (2) new information gained from implementation of the 2020 Water Control Plan (COP) and supporting COP AMMP; (3) construction of features associated with the Department of Interiors (DOI's) TTNS Bridging and Road Raising Features anticipated for completion in late 2024, which will enable raising the L-29 canal maximum operating stage limit above 8.5 feet NGVD; and (4) construction and implementation of CERP, including CEPP North and the EAA Reservoir and A-2 STA, components identified in the IDS for the South Florida Ecosystem Restoration Program.

This EA also includes information on design refinements included in CEPP South to improve flow conveyance in the Blue Shanty Flowway. These include: (1) backfill of an east-west agricultural ditch in the Blue Shanty Flowway to improve southerly flow conveyance to the L-29 canal and to move water through the Tamiami Trail bridges; and (2) active vegetation management in the Blue Shanty Flowway to reconnect historic sloughs. Active vegetation management of historic sloughs, combined with backfill of the east-west agricultural ditch and adjacent spoil pile removal, is expected to increase the areal extent of sheetflow in the Blue Shanty Flowway and redirect more flow toward the natural orientation (south) of the landscape, rather than to the east. Environmental effects of the above mentioned design refinements (i.e. backfill of the east-west agricultural ditch and active vegetation management) and CEPP South Contract 1 features are the same scope and size as identified in the 2014 CEPP Final PIR/EIS. Therefore, potential effects associated with their construction remain within the range identified in the prior NEPA document. Information pertaining to the construction and installation of the design refinements and CEPP South Contract 1 features (e.g. construction footprint (acres)) is mentioned in this EA for reference. These design refinements and features will function to redistribute the existing water from WCA 3A into WCA 3B and eastern ENP.

1.5 Agency Goals and Objectives

Specific CEPP objectives were identified in the 2014 CEPP Final PIR/EIS to address the central part of the southern Florida ecosystem to improve the quantity, quality, timing, and distribution of water flows to the central Everglades, including WCA 3 and ENP (USACE 2014). The six CEPP objectives identified in the 2014 CEPP Final PIR/EIS were built upon the overall CERP goals and objectives in order to provide the needed linkages between the projects. CERP included goals for enhancing economic values and social wellbeing with specific objectives towards improving other project purposes of the C&SF project, including agricultural, municipal, and industrial water supply (USACE 2014).

CEPP South will include conveyance features that function to redistribute the existing water from WCA 3A into WCA 3B and eastern ENP. Implementation of interim operations defined in the 2020 CEPP and EAA Reservoir DPOM (**Appendix A**) to include the installation and operation of temporary pumps, would allow benefits to be achieved by setting the stage for restoration of sheet flow in the Blue Shanty Flowway. Implementation of the proposed action would begin to achieve objectives to improve seasonal hydroperiods and water depths to support wetland vegetation and fish and wildlife resources in the Everglades system consistent with those identified in the 2014 CEPP Final PIR/EIS. Reference **Table 1-2**.

Table 1-2. Objectives of CEPP. Goals and objectives for CERP are also included in the table because CEPP is a component of CERP.

CERP Goal: Enhance Ecological Values	
CERP Objective	**CEPP Objective**
Increase the total spatial extent of natural areas	No corresponding CEPP objective; consider this objective in future increments
Improve habitat and functional quality	Restore seasonal hydroperiods and freshwater distribution to support a natural mosaic of wetland and upland habitat in the Everglades System
	Improve sheetflow patterns and surface water depths and durations in the Everglades system in order to reduce soil subsidence, the frequency of damaging peat fires, the decline of tree islands, and salt water intrusion
	Reduce high volume discharges from Lake Okeechobee to improve the quality of oyster and SAV habitat in the northern estuaries
Improve native plant and animal species abundance and diversity	Reduce water loss out of the natural system to promote appropriate dry season recession rates for wildlife utilization
	Restore more natural water level responses to rainfall to promote plant and animal diversity and habitat function
CERP Goal: Enhance Economic Values and Social Well Being	
Increase availability of fresh water (agricultural/municipal & industrial)	Increase availability of water supply
Reduce flood damages (agricultural/urban)	No corresponding CEPP objective; consider this objective in future increments
Provide recreational and navigation opportunities	Provide recreational opportunities
Protect cultural and archeological resources and values	Protect cultural and archeological resources and values

1.6 Constraints

Project constraints were recognized to ensure that the proposed project would not reduce the level of service for flood protection, protect existing legal users, and meet applicable water quality standards for the natural system. In accordance with Section 601(h)(5) of WRDA 2000, the following are constraints identified in the 2014 CEPP Final PIR/EIS for CEPP implementation:

- Avoid reduction in the existing level of service for flood protection caused by Plan implementation
- Provide replacement sources of water of comparable quantity and quality for existing legal sources that could experience water supply reductions caused by Plan implementation
- Meet applicable Water Quality Standards

Constraints identified for CEPP South remain consistent with those identified in the 2014 CEPP Final PIR/EIS (USACE 2014).

1.7 Related Environmental Documents

The Corps has a number of environmental documents relevant to the proposed action. Information contained within the documents listed below are incorporated by reference into this EA. This EA supplements the NEPA analyses conducted in the 2014 CEPP Final PIR/EIS.

- Comprehensive Review Study of the Central and Southern Florida Project, Comprehensive Everglades Restoration Plan Final Integrated Feasibility Report and Programmatic Environmental Impact Statement , U.S. Army Corps of Engineers, Jacksonville District 1999
- Installation, Testing and Monitoring of a Physical Model for the Water Conservation Area 3 Decompartmentalization and Sheet Flow Enhancement Project Final Environmental Assessment and Design Test Documentation Report, U.S. Army Corps of Engineers, Jacksonville District, April 2010.
- Supplemental Finding of No Significant Impact Installation, Testing and Monitoring of a Physical Model for the Water Conservation Area 3 Decompartmentalization and Sheet Flow Enhancement Project, U.S. Army Corps of Engineers, Jacksonville District, July 2015.
- Supplemental Finding of No Significant Impact Installation, Testing and Monitoring of a Physical Model for the Water Conservation Area 3 Decompartmentalization and Sheet Flow Enhancement Project: Phase 2, U.S. Army Corps of Engineers, Jacksonville District, November 2017.
- Central Everglades Planning Project Final Integrated Project Implementation Report and Environmental Impact Statement, U.S. Army Corps of Engineers, Jacksonville District, December 2014.
- Central Everglades Planning Project South Validation Report, U.S. Army Corps of Engineers, Jacksonville District, May 2019
- Central and Southern Florida, Everglades Agricultural Area, Final Environmental Impact Statement, U.S. Army Corps of Engineers, Jacksonville District, May 2020.
- Combined Operational Plan Final Environmental Impact Statement, U.S. Army Corps of Engineers, Jacksonville District, July 2020.

1.8 Decisions to be Made

The no action alternative and other reasonable alternatives are studied in detail to determine the preferred alternative. The Corps has determined whether a FONSI or an EIS is warranted based on consideration of this EA and comments received during public review. The primary decision to be made is whether or not to approve an interim operations plan as proposed in the 2020 CEPP and EAA Reservoir DPOM (**Appendix A**). Under the preferred alternative (Alternative B4 (ALTB4)) and as described in the DPOM, the Corps proposes to implement interim operations of features associated with CEPP South Contract 1, and install and operate temporary pumps adjacent to the L-29 canal as an interim measure to enhance and redirect flow south towards the L-29 canal in the Blue Shanty Flowway. The pumps will help achieve project objectives during the phased construction of CEPP South features. Reference **Section 1.5** for information on agency goals and objectives and **Section 2** for information on alternatives considered.

1.9 Scoping and Issues

Reference Section 7 and Appendix C of the 2014 CEPP Final PIR/EIS (USACE 2014) for pertinent correspondence related to the CEPP. A NEPA scoping letter was not solicited for this action. A meeting was held on February 11, 2020 to notify Federal, State, and local agencies, affected Indian Tribes, and other interested stakeholders on planning efforts as they relate to CEPP South. A government to government consultation meeting was held with the Miccosukee Tribe of Indians of Florida on July 1, 2020, and with the Seminole Tribe of Florida on July 14, 2020. The Miccosukee Tribe requested slight

changes in culvert locations to avoid impacting a site of cultural significance to the Tribe. At this time there is no known conflict or controversy associated with implementation of the proposed action. **Appendix D.3** contains pertinent correspondence related to release of the draft EA, including a comment response matrix (**Table D.3-1**) to address comments received from public review.

1.10 Permits, Licenses and Entitlements

The Corps has coordinated a consistency determination pursuant to the Coastal Zone Management Act (CZMA) through the circulation of the draft EA. The Corps has determined that the proposed action is consistent to the maximum extent practicable with the enforceable policies of the Florida Coastal Zone Management Program (CZMP). Reference **Appendix B** for a Florida CZMP federal consistency determination. In correspondence dated June 24, 2020, the Florida State Clearinghouse indicated that the state had no objections to the project and therefore it is consistent with the FCMP. Final concurrence of consistency with the CZMP will be determined during environmental permitting processes, as applicable. All required permits and/or modifications to existing permits will be acquired prior to implementation of the proposed action.

On April 24, 2020, the Corps applied for a Comprehensive Everglades Restoration Plan Regulation Act (CERPRA) permit from the State of Florida, the issuance of which (final permit anticipated by September 2020 contract award) will constitute the granting of water quality certification under the Clean Water Act and concurrence with the CZMP for the features associated with CEPP South Contract 1. The permit (Permit No. 0387130-001) would authorize: construction and interim operation of the S-631, S-632, and S-633 structures in L-67A; L-67A spoil pile removal adjacent to S-631 and S-632; a 3000 foot interim gap in L-67C; backfilling of up to 0.5 miles of the L-67 Extension Canal, and backfilling of approximately 1.36 miles of the east-west agricultural ditch; the installation of temporary pumps to move water across the L-29 levee; and active vegetation management to restore hydrologic connectivity of remnant sloughs downstream of the new L-67A structures.

CERPRA Permit Number 03048979-002 was obtained by the Corps for the DPM on January 9, 2011. The permit authorized construction and operational testing in accordance with the Interim Operations Monitoring Plan and was scheduled to expire on January 9, 2017. The Corps applied for and received a renewal permit (CERPRA Permit Number 0304879-007) on November 30, 2016 for the DPM and modified the permit in 2018 (CERPRA Permit Number 0304879-008) in include year-round operations. Additionally, the SFWMD obtained a CERPRA permit for interim operations and testing of the DPM on February 8, 2019 (CERPRA Permit Number 0369865-001—expires on February 8, 2024).

As part of the DPM field test, a large-scale active management study was initiated to reconnect sloughs (up to 2 km from S-152) that have been encroached by sawgrass. The objectives of this study were to evaluate the degree to which active management can increase the spatial extent of sheetflow and slough habitats, and to redirect flow south, in alignment with historic landscape patterning, rather than east (preliminary results provided in Sklar, 2020). Active management was performed through application of herbicide along pathways connecting remnant sloughs connected to the DPM structure and corresponding L67-C gap. Application of herbicides to areas within WCA 3B is authorized by a Florida Fish and Wildlife Conservation Commission (FWC) aquatic permit and a National Pollutant Discharge Elimination System (NPDES) permit. Active vegetation management is being proposed as part of CEPP South. Reference **Section 2**. Only U.S. Environmental Protection Agency (EPA) approved herbicides authorized for application in an aquatic environment will be used for vegetation management. Herbicide

application for CEPP South will be conducted by a properly qualified applicator in a manner consistent with the approved application instructions. Herbicide application within WCA 3B is closely coordinated with the FWC, the agency primarily responsible for managing the WCA 3B resources. The appropriate permits will be obtained prior to beginning any herbicide applications for active vegetation management being pursued under CEPP South.

2 ALTERNATIVES

2.1 Hydrologic Modeling Conducted in Support of Interim Operations of CEPP South

Due to the recognition of the risks and uncertainties of the CEPP as identified in the 2014 Final PIR/EIS (refer to Section 6.10 of the 2014 Final CEPP PIR/EIS), the CEPP Chief of Engineers' report (Paragraph 16.b(3)) reiterates that "prior to implementation of each phase of the project, additional detailed information pertaining to that phase will be developed. The Corps will ensure that all legal requirements are met for each phase and compliance will be maintained throughout the entirety of CEPP implementation." To address this requirement, the 2019 CEPP South Validation Report committed to conduct additional hydrologic modeling prior to construction during the CEPP South PED phase to support a quantitative assessment of the Savings Clause requirements for the CEPP South features.

WRDA 2000 requires the inclusion of "Project-Specific Assurances" and "Savings Clause" analyses within each CERP PIR. "Project-Specific Assurances" ensure that the water needed for the natural system to achieve CERP restoration goals that is provided by the CERP project is identified and subsequently protected from other potentially competing uses. The "Savings Clause" protects existing legal sources of water supply, such as water for municipal and agricultural uses, and ensures that CERP implementation does not reduce the level of service for flood protection. Refer to Annex B of the 2014 CEPP Final PIR/EIS for complete documentation of the Project Assurances and Savings Clause analysis for the CEPP recommended plan, responsive to the requirements of WRDA 2000.

The purpose of the Savings Clause analyses is to determine whether there will be an elimination or transfer of existing legal sources of water or reduction to the level of service of flood protection as a result of the project. Specifically, Section 601(h)(5) of WRDA 2000, entitled "Savings Clause", requires an analysis of each CERP project's effects on legal sources of water that were in existence on the date of enactment of WRDA 2000 (i.e., December 2000), effects on levels of service of flood protection in existence on the date of enactment of WRDA 2000, and effects on the Seminole Tribe of Florida Water Supply Compact with the State of Florida and South Florida Water Management District (SFWMD). Section 385.37 of the Programmatic Regulations requires that PIRs include an analysis to demonstrate that implementation of the CERP project will not reduce the levels of service for flood protection that existed on the date of enactment of WRDA 2000 (December 2000) and are in accordance with applicable law. Where appropriate and consistent with restoration of the natural system, opportunities to provide additional flood protection shall be considered. The conditions that existed on the date of enactment of WRDA 2000 are included in the Pre-CERP Baseline.

Hydrologic modeling has been conducted during the CEPP PED phase to support a quantitative assessment of the Savings Clause requirements for the CEPP South features. The DPOM contained in the 2014 CEPP Final PIR/EIS details an initial draft operational plan for the full complement of CEPP project features, accounting for the additional "new water" inflows to WCA 2 and WCA 3A, and does not otherwise prescribe operations for the incremental construction of CEPP features over the implementation period of several years. The purpose and scope of the hydrologic modeling for the 2020 CEPP South DPOM update was to optimize operation of the CEPP South features (as confirmed by the 2019 CEPP South Validation Report) to maximize interim ecological benefits subject to system-wide CERP constraints to avoid impacts to flood risk management and water supply, through re-distributing the existing water from WCA 3A into WCA 3B and eastern ENP. Additionally, the 2014 CEPP Final PIR/EIS Engineering Appendix

(Section A.8.4) identified a requirement for the Corps to conduct further technical investigations and additional hydrologic/hydraulic modeling with a higher resolution model for the 8.5 SMA operations. The CEPP South hydrologic modeling did not evaluate any changes to the general locations or design capacities of the CEPP South features as identified in the 2014 CEPP Final PIR/EIS (refer to **Table 1-1** and **Figure 1-1** and **Figure 1-2**).

Hydrologic modeling for CEPP South included application of the Regional Simulation Model (RSM), including the following sub-regional RSM applications: RSM Basins model for Lake Okeechobee, the Northern Estuaries, and the EAA (RSM-BN); RSM for the Everglades and Lower East Coast (RSM-GL); and the Miami-Dade Regional Simulation Model (MD-RSM) to support the flood risk management assessments for the 8.5 Square Mile Area (SMA) and the South Dade Basin. The RSM modeling suite includes a set of applications with unique capabilities to represent south Florida hydrology and water management operations, and the model has been advocated by the Corps as the preferred hydrologic modeling tool to evaluate future changes to the Water Control Plan for the WCAs, ENP, and the SDCS that encompasses the CEPP South project area. The RSM-BN is applied north of the L-4/L-5/L-6 (the CEPP formulation redline) for Lake Okeechobee, the EAA, and the Northern Estuaries, in order to provide boundary conditions for the RSM-GL; the RSM-GL is applied within the WCAs, ENP, and the Lower East Coast Service Areas (LECSAs), collectively encompassing the locations for the CEPP South features; and the newly-developed MD-RSM is applied principally within WCA 3B, ENP, and the LECSAs, including to support the requisite CEPP assessments for the 8.5 SMA. The RSM-BN and RSM-GL sub-regional models were also leveraged during development of the 2014 CEPP Final PIR/EIS. Consistent with the Savings Clause evaluations conducted for the 2014 CEPP Final PIR/EIS (refer to Annex B), the CEPP South Savings Clause assessment leverages the RSM-GL to conduct an assessment of primary/secondary canal stages and other representative Lower East Coast (LEC) reference locations east of the East Coast Protection Levee (ECPL) for a range of alternatives in order to demonstrate potential impacts to the level of service for flood risk management within the period of record. The MD-RSM was used to evaluate the flood mitigation constraints for the 8.5 SMA, in accordance with pre-established constraints under the MWD project and the COP. Long-term RSM-GL water supply performance metrics within the LEC Service Areas are also reviewed, in accordance with requirements of the Savings Clause, to either ensure no reductions in quantity or quality of existing legal sources of water supply with CERP implementation, or identify a new source of comparable quantity and quality to replace any reduced water supply.

In addition, as a pre-processor for the RSM modeling, the iModel optimization tool was used to aid with development of CEPP South structure operations to achieve optimal timing and spatial distribution of flows to achieve progress towards the CEPP ecological performance objectives. The iModel is an inverse modeling tool that reverses the process of a traditional model. A traditional model predicts a system's response (e.g., stage) to the system's input (e.g., inflows, outflows). The iModel computes a system's required input (e.g., inflows, outflows) to achieve a system's desired response (e.g., stage). The iModel domain includes WCA 3A, WCA 3B and ENP, as well as WCAs 1 and 2. Considering the importance of seepage dynamics, water supply and flood risk management, the iModel boundary also includes the headwater of structures along the L-30, L-31N, and C-111 canals. The iModel was also used as a complementary tool for the RSM modeling during the 2014 CEPP Final PIR/EIS.

iModel targets developed during the 2018-2019 hydrologic modeling in support of the COP served as the starting point for CEPP South interim operational planning. Consistent with the 2020 COP Final EIS, target time series developed for CEPP South were products of natural system models (NSM and NSRSM) reviewed and modified by scientists through interagency discussions. A summary of the iModel and the

tool application for the COP is provided in the Appendix H (Hydraulics and Hydrology) of the 2020 COP Final EIS. Appendix E.2 (Supporting Information) of the 2020 COP Final EIS presents the targets (stage hydrographs) utilized within WCA 3 and ENP for purposes of informing Everglades Rain Driven Operations (ERDO). The 2020 COP Final EIS can be accessed at the following link: www.saj.usace.army.mil/COP.

The interagency project team for the COP prioritized stage targets at 24 marsh locations in WCA 3A, WCA 3B and ENP (including SRS and Taylor Slough), with the targets largely based on Restoration, Coordination and Verification (RECOVER) efforts and consistent with previous planning efforts including the development of the 2014 CEPP PIR/EIS. Target locations for CEPP South were consistent with the 2020 COP Final EIS; however, five additional locations were added in consultation with the CEPP South interagency ecological sub-team based on information gained during the COP modeling evaluations and in consideration of the anticipated hydrologic changes with full CEPP implementation: (1) in the Blue Shanty Flowway (RSM-GL Cell ID2066); (2) in WCA 3B east of the Blue Shanty Levee (RSM-GL Cell ID3237 and 3B SHARK); (3) and in ENP in central SRS (ENP-CR2 and ENP-NP) (**Figure 2-1**). For the COP, iModel targets in WCA 3B were developed at gauge 3BSite_71. CEPP South developed additional targets both within and east of the Blue Shanty Flowway due to the use of added operational flexibility with S-631, S-632, and S-633. CEPP South also developed additional targets in central SRS based on concerns expressed by stakeholders on the performance of the Tamiami Trail Flow Formula (TTFF) in COP (ALT Q+) during regional droughts in the WCAs, ENP, and Florida Bay. Inclusion of additional targets (ENP-CR2 and ENP-NP) in central SRS were proposed in an effort to pull more water into the southern portion of central SRS.

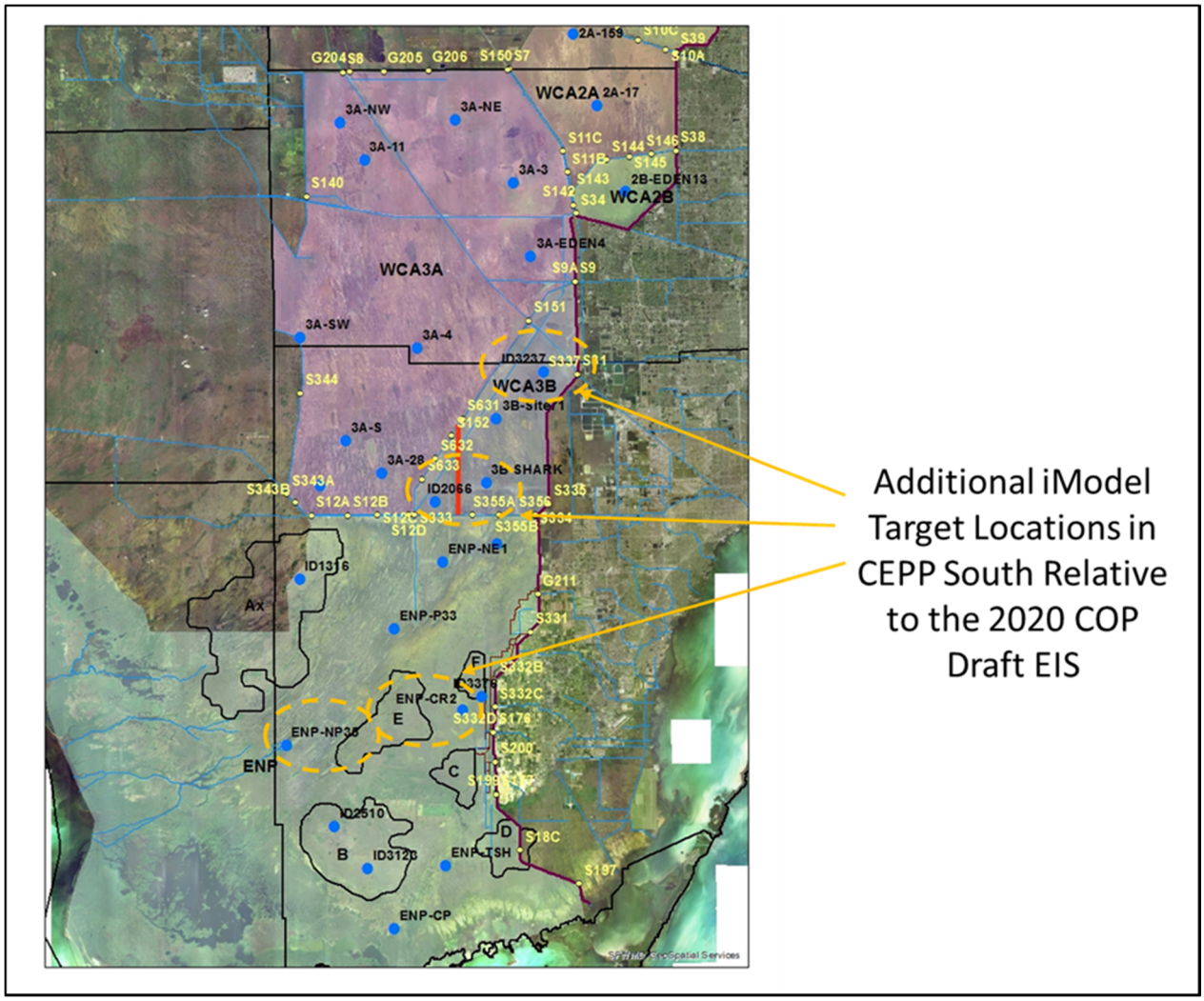


Figure 2-1. Additional iModel target locations for CEPP South planning efforts. Blue dots represent the location of iModel targets common to both CEPP South and the COP.

The 2003 CERP Programmatic Regulations required the development of six guidance memoranda jointly by the Corps and SFWMD in consultation with others. The Draft Guidance Memoranda dated July 2007 provide additional information for the Corps and the SFWMD to complete the analyses initially described in Section 601 of WRDA 2000. During the preliminary planning phases of the 2014 CEPP project, based on consideration of the expedited schedule, the Corps and SFWMD advocated using efficiencies learned from the processes of developing prior PIRs, including prior CERP project methodologies for the technical analyses described in Draft Guidance Memoranda 3 (Savings Clause Requirements) and Draft Guidance Memoranda 4 (Identifying Water Made Available for the Natural System and for Other Water-Related Needs). The Corps and the SFWMD selected available tools appropriate to the CEPP project scale to conduct the necessary analyses for the 2014 CEPP Final PIR/EIS. Consistent with the approach outlined in Draft Guidance Memoranda 3, the Corps and the SFWMD considered the following guidance to address the effects of intervening non-CERP activities:

- Savings Clause analysis only applies to changes from date of enactment of WRDA 2000 that result from “Implementation of the Plan”;

• Intervening non-CERP activities are changes wholly outside of CERP – e.g., LORS 2008; Modified Waters Deliveries to Everglades National Park (MWD) and C-111 South Dade, including the COP; IOP; ERTP; Everglades Construction Project (ECP), including Restoration Strategies, etc.;

• Savings Clause does not require CERP to make up for reductions in quantity or quality of existing legal sources or levels of service for flood protection caused by intervening non-CERP activities, but CERP cannot cause further reductions;

• Savings Clause does not prohibit CERP from reducing quantity or quality of existing legal sources or levels of service for flood protection increased by intervening non-CERP activities, but CERP cannot reduce those increases below those in place on the date of enactment of WRDA 2000.

To determine whether it is the CEPP or other intervening CERP or non-CERP activities that are affecting the existing legal sources or levels of service for flood protection, where effects are observed, Draft Guidance Memoranda 3 prescribes a series of comparisons that can be made between the appropriate base conditions and with project conditions. This evaluation approach was followed during development of Annex B of the 2014 CEPP Final PIR/EIS. The original Pre-CERP Baseline, which was not used for the CEPP analyses in the 2014 CEPP Final PIR/EIS, does not include the intervening non-CERP activities and does not reflect revised circumstances under which the project was formulated and expected to be implemented.

The MWD and C-111 South Dade Projects are part of the foundation projects for CERP. The ROD and implementation of the COP for the completed features of the MWD and C-111 South Dade projects is expected in August of 2020. As such, the COP is expected to define operations for water management infrastructure in the project area and serve as the baseline for initial water management operations in the CEPP South project area. Consistent with the evaluation methodology established during CEPP development, implementation of the COP will represent an intervening non-CERP project, and the COP performance for both FRM and water supply will become established as the appropriate base condition from which to evaluate the requirements of the CERP Savings Clause.

With the anticipated award of the first construction contract for CEPP South in September 2020, and based on the estimated construction contract duration of 2-3 years, the COP is expected to govern regional water management operations for the WCAs, ENP, and the ENP-SDCS when the CEPP South Contract 1 features are operational. The COP was therefore the baseline assumption for the No Action (CEPP South Baseline 2027, or CSB2027) and action alternatives for interim CEPP South operational planning as described in **Section 2.3** below.

2.2 CEPP South Design Refinements and L-29 Canal Temporary Pumps

2.2.1 Backfill of East-West Agricultural Ditch and Active Vegetation Management

The following design refinements for CEPP South to improve flow conveyance in the Blue Shanty Flowway are included in each of the action alternatives (Alternative B1 (ALTB1), Alternative B2 (ALTB2), Alternative B3 (ALTB3), and Alternative B4 (ALTB4) described in **Section 2.3**.

- *Complete Backfill of East-West Agricultural Ditch and Spoil Pile Removal* – An agricultural ditch in the Blue Shanty Flowway will be filled to improve southerly flow conveyance to the L-29 canal and to move water through the Tamiami Trail bridges. Reference

- **Figure** 2-2 for the location of the approximate 4.0 mile (21,120 feet) east-west agricultural ditch to be backfilled under ALTB1, ALTB2, and ALTB3. Approximately 1.36 miles (7,151 feet) is expected to be backfilled under CEPP South Contract 1 (ALTB4), supporting sheetflow from S-633 through the interim L-67C gap prior to completion of the Blue Shanty Levee (L-67D) and degrade of the 4.3 miles of the L-29 levee between L-67A and the intersection of the L-67D with the L-29 levee. The agricultural ditch appears to have been excavated, with the excavated material being cast on the north and south sides of the ditch. Vegetation has been naturally established on each of these material piles.

  To fill the ditch, tracked equipment would push the excavated material into the ditch, filling the ditch. Vegetation would be cleared and removed from the site prior to pushing the excavated material into the ditch, and additional suitable backfill material will be provided from other CEPP South Contract 1 excavations associated with the L-67A gated culverts, L-67A spoil pile degrade, and/or the L-67C interim gap. Utilization of the CEPP South Contract 1 excavation material for backfill provides construction and implementation efficiencies, including: reduced CEPP total project construction costs for hauling and double-handling of excavated material; minimization of potential temporary wetland impacts for other proximal stockpile locations (e.g. along L-67A or L-67C levees), including associated permit considerations; and provision of site access from both the L-67A and L-67C levee during CEPP South Contract 1 construction. The tracked equipment would work in a 50-foot width centered on the existing ditch centerline. The material on the ditch would be compacted so that the material in the ditch is lower than the surrounding grade by 6-inches. Excavated muck material would be placed so that the material in the ditch is equal with the surrounding grade. Approximately 81 acres of existing wetlands (assumes entire 4.0 mile ditch) in WCA 3B would be impacted by construction during backfilling of the east west agricultural ditch under ALTB1, ALTB2, and ALTB3. Approximately 24.9 acres of existing wetlands would be impacted during backfilling of the 1.36 miles under CEPP South Contract 1 (ALTB4).

  Material for the backfill will be provided from Contract 1 excavations associated with the L-67A gated culverts, L-67A spoil pile degrade, and/or the L-67C interim gap. Utilization of a portion of the Contract 1 excavation material for backfill provides construction and implementation efficiencies, including: reduced CEPP total project construction costs for hauling and double-handling of excavated material; minimization of potential temporary wetland impacts for other proximal stockpile locations (e.g. along L-67A or L-67C levees), including associated permit considerations; and provision of site access from both the L-67A and L-67C Levee during Contract 1 construction.

- *Active Vegetation Management* – Active vegetation management in the Blue Shanty Flowway will be conducted to enhance flow by reconnecting historic sloughs. Historic sloughs in WCA 3B have been encroached with sawgrass due to changes in hydrology. Active vegetation management of these sloughs, combined with backfill of the east-west remnant agricultural ditch and spoil pile removal, is expected to increase the areal extent of sheetflow in the Blue Shanty Flowway, and to redirect more flow toward the natural orientation (south) of the landscape, rather than to the east. Active vegetation management will be accomplished through the use of herbicides (glyphosate). The potential location for active vegetation management within the Blue Shanty Flowway, which is the same for ALTB1, ALTB2, ALTB3, and ALTB4, is depicted in **Figure 2-3** in light green, consisting of 1,003 acres.

2.2.2 L-29 Canal Temporary Pumps

The Corps is recommending to install temporary pumps on the L-29 canal in ALTB4 as described below. Temporary pumps are not included in ALTB1, ALTB2, and ALTB3, as these alternatives assume the full build out of CEPP South features consistent with the phased implementation and construction sequencing approach identified in the 2014 CEPP Final PIR/EIS [L-67A gated culverts (S-631, S-632, S-633); Blue Shanty Flowway; S-355W; L-67C levee removal; L-29 levee removal; L-67 extension removal; Blue Shanty levee; S-356 expansion to 1000cfs; and S-333 increased capacity to 2500 cfs] as described in **Table 2-1**.

Temporary pumps are included in the proposed 2020 CEPP and EAA Reservoir DPOM (**Appendix A**) and would be operated during phased construction of CEPP South. A separate action alternative similar to ALTB4 without temporary pumps was not included in this EA. Potential environmental effects of the temporary pumps are described in **Section 4**, under each resource where appropriate. ALTB4 only includes those features associated with CEPP South Contract 1 (S-631, S-632, S-633, L-67C Interim Levee Gap), in addition to the design refinements described in **Section 2.2.1**.

- *L-29 Canal Temporary Pumps* – Due to the phased construction schedule currently anticipated for the CEPP South features, which includes completion of the S-631, S-632, and S-633 gated culverts on the L-67A levee and a single corresponding L-67C interim gap, prior to the construction of the Blue Shanty Levee (L-67D) and degrade of the 4.3 miles of the L-29 levee between L-67A and the intersection of the L-67D with the L-29 levee, the Corps is recommending temporary pumps. The proposed temporary pumps would be utilized as an interim measure to enhance and redirect flow south towards the L-29 canal (rather than to the east), complementing the active vegetation management within the Blue Shanty Flowway and initiating transition of the Blue Shanty Flowway towards the CEPP planned end state. The DPM Science Team has also endorsed the installation of temporary pumps. The L-29 temporary pumps would be installed when the first gated culvert (S-633) and/or associated Blue Shanty Flowway features (agricultural ditch backfill and L-67C interim gap) are complete and ready to operate, to include the period of OTMP. The temporary pumps would be operated in accordance with the proposed DPOM until they are removed in advance of the L-29 levee segment removal. The use of temporary pumps at the L-29 levee would move water across the levee and into the L-29 canal.

  During the 2016 and 2018 water management deviations for WCA 3A high water conditions, the SFWMD similarly deployed temporary pumps at the S-355B structure to allow for releases from WCA 3B flows that were added from WCA 3A by expanded use of the S-152 structure. The temporary pumps would be installed across the L-29 levee between L-67A and the CEPP South L-67D. Since the location is west of S-355A (which has a similar upstream collection canal as S-355B), additional pump collection sumps may need to be installed immediately adjacent and north of the L-29 levee at the one or two selected optimal temporary pump locations. Sumps to facilitate discharge from a marsh area can be prone to high nutrient concentrations as water levels recede, and, therefore, consideration of local effects on nutrient concentrations will be considered when evaluating water quality monitoring methods at the temporary pumps. When the pumps are removed in advance of the L-29 levee segment removal, the sump excavations will be returned to the pre-installation condition. Based on the use of temporary pumps during the 2017 and 2018 deviations, it is expected that no more than two sumps (100 cfs each) at approximately 25-50 feet length by 12-25 feet width is expected. Approximately 0.05 acres of the existing wetlands in WCA 3B would be impacted by construction of the pumps (assumes two pumps). Two sets of temporary pumps, rated at combined 100 cfs at each location, are expected

to be placed at the intersection of historic sloughs being treated as part of the active vegetation management discussed above, and the L-29 canal. Potential locations for the temporary pumps, selected in coordination with the DPM Science Team, are identified in **Figure 2-3** as S-152-AMI-P2, S-632-AMI-P2, and S-633-AMI-P2. Three potential locations have been identified; however only two sets of temporary pumps are expected to be installed.

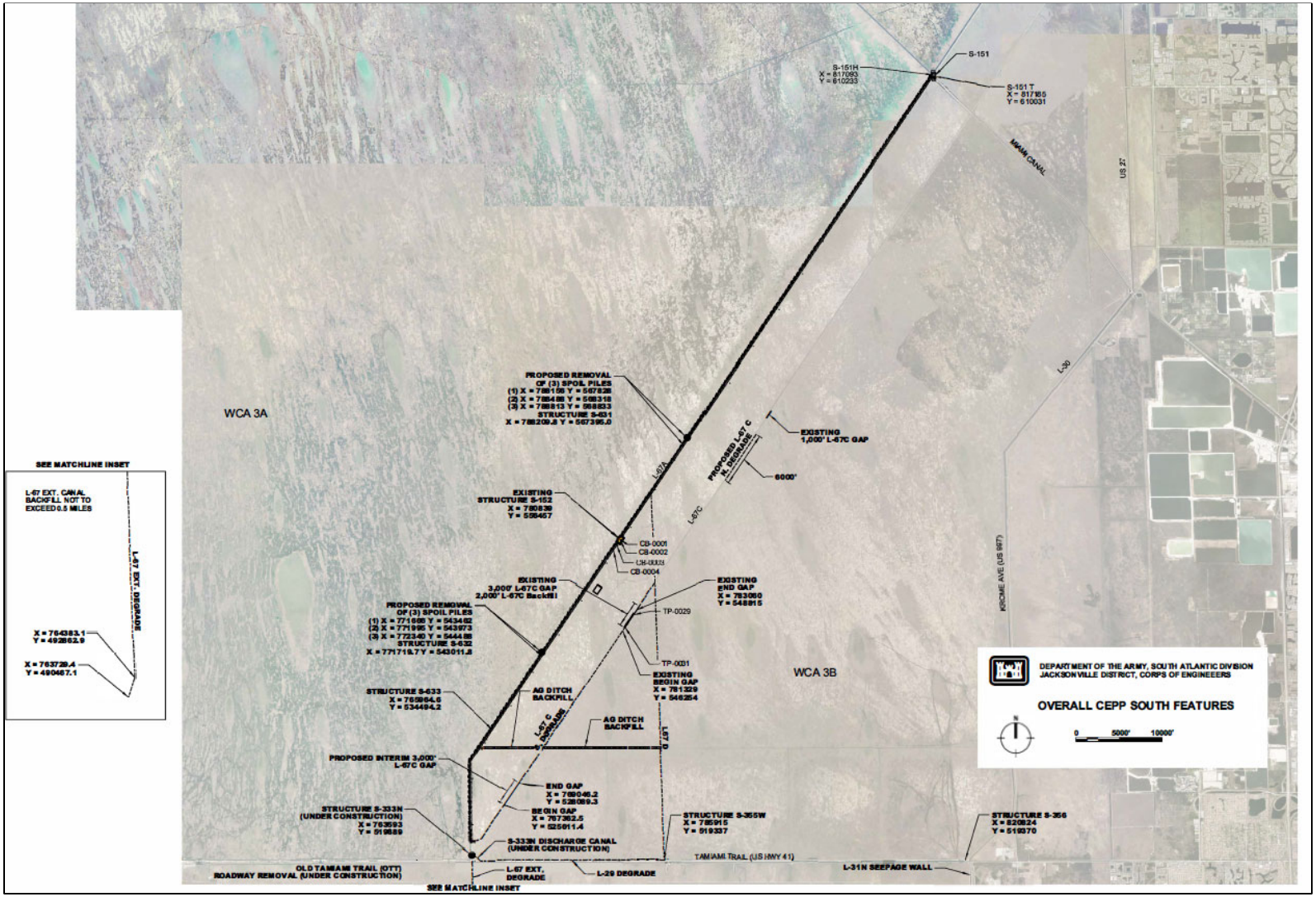


Figure 2-2. CEPP South southern distribution and conveyance features and location (USACE 2014).

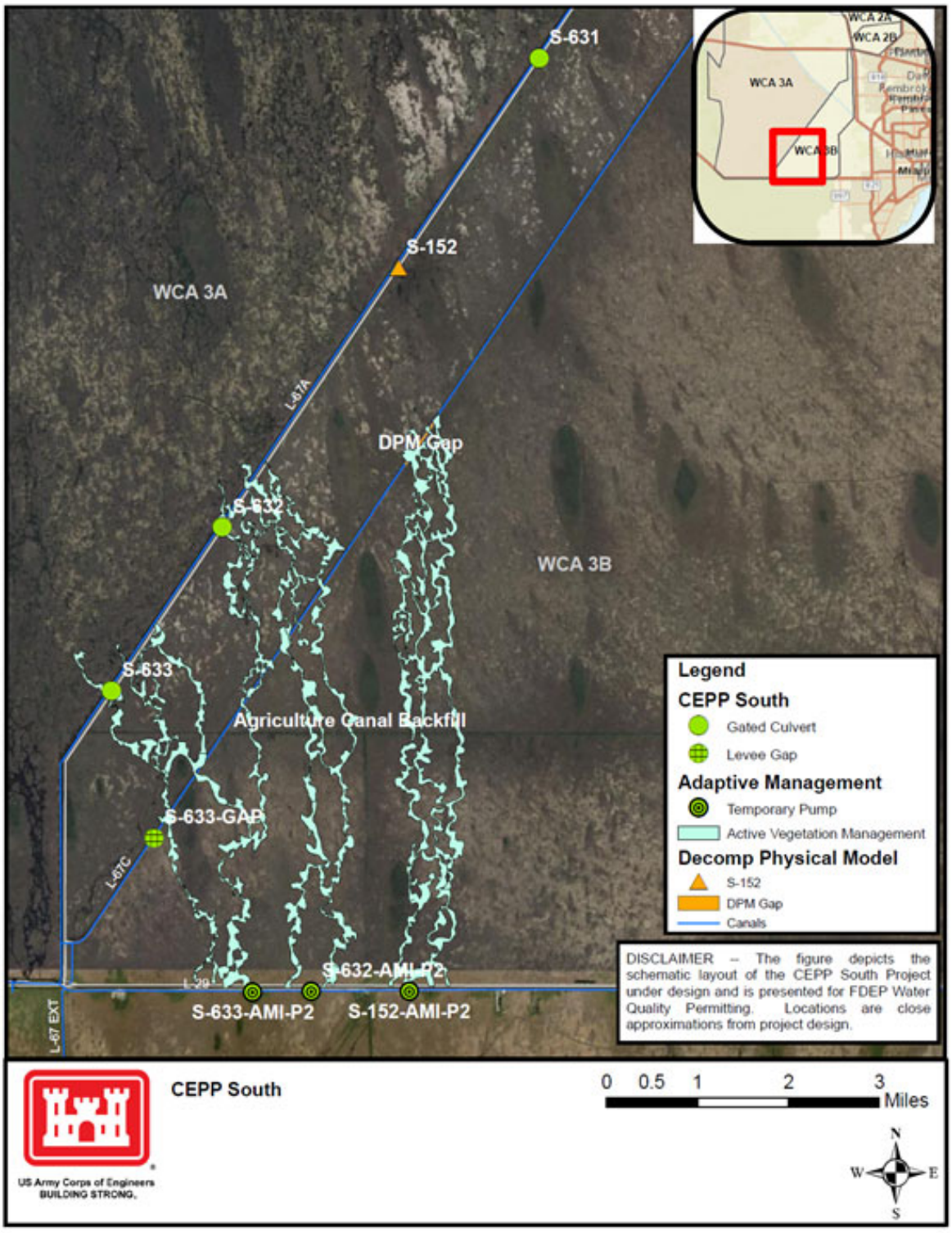


Figure 2-3. Location of active marsh improvement in the Blue Shanty Flowway in WCA 3B under ALTB2, ALTB3, and ALTB4. Also shown is the potential location of temporary pumps located north of the L-29 canal under ALTB4. Note, the location of the 3,000 foot interim gap depicted in this figure represents the central point of the gap.

2.3 Description of Alternatives

The following provides a description of the No Action (CEPP South Baseline 2027 (CSB2027)) and action alternatives for interim CEPP South operational planning. **Table 2-1** provides an overview of key infrastructure and operational assumptions for each of the alternatives. Similar to the alternative formulation constraint applied for the COP, the action alternatives are each limited to the existing regional water budget used for the no action alternative based on existing authorized projects in place by 2027, including approximately 760,000 acre-feet of average annual inflows to WCA 3A from Lake Okeechobee and the Everglades Agricultural Area (EAA). The alternatives included three variations of operations to define discharges along the L-67A canal and Tamiami Trail.

Formulation efforts included one alternative scenario, ALTB1, which represented CEPP South infrastructure operations consistent with that identified in the 2014 CEPP Final PIR/EIS and associated DPOM; unlike the existing water budget limitation assumed for ALTB1, the original 2014 CEPP Final PIR/EIS operations were developed with consideration of an expanded regional water budget provided by the 2014 CEPP PIR/EIS New Water infrastructure. Two additional alternative scenarios, ALTB2 and ALTB3 were developed based on new optimization modeling for the CEPP South infrastructure using the iModel to balance across system-wide ecological stage-based performance targets identified by the project team within the WCAs and ENP, as discussed in **Section 2.1**. ALTB4 was formulated to represent the partial implementation of CEPP South features associated with Contract 1, to facilitate assessment of the stand-alone operations of these features without the remainder of CEPP South planned future construction. These alternatives were evaluated relative to the no action alternative (CSB2027) intended to represent infrastructure and operations within the C&SF project that are assumed to be fully functional prior to construction completion of the full suite of CEPP South features in 2027, including other CERP components.

The NEPA requires that the lead federal agency define a no action alternative, or the conditions that will exist in an analysis year if a proposed action is not implemented. Under Corps planning principles, the no action alternative is referred to as the future without project condition. ALTB1 was not defined as the no action alternative as the COP represents an intervening non-CERP project as discussed in Section 2.1. The COP is expected to govern regional water management operations for the WCAs, ENP, and the ENP-SDCS in August 2020 upon approval of the ROD. As discussed in **Section 2.3.2**, ALTB1 utilized rainfall driven operations (RDO) in the 2014 CEPP Final PIR/EIS. RDO have been further refined through planning efforts for the COP which developed the TTFF that prescribes the volume of flow through S-333/S-333N and the S-12s.The additional information derived from both the variable modeling and statistical approaches investigated during development of the COP and COP Adaptive Management commitment will necessarily be integrated in CEPP RDO development. Thus CSB2027 (the identified no action alternative) is the only appropriate no action alternative. CSB2027 assumes that the CEPP South features are not constructed and therefore not operational. Inclusion of ALTB1 as an alternative enables a back-comparison to the 2014 CEPP Final PIR/EIS.

All alternatives, including the no action alternative, include an assumed constraint to limit the maximum operating stage within the L-29 canal to 8.5 feet, NGVD with the annual 90 day constraint for water stages above 8.3 feet, NGVD. Inclusion of this constraint, which was included in the 2020 COP Final EIS Water Control Plan evaluations, is a requirement of the 2008 Tamiami Trail Modifications Relocation Agreement between the Florida Department of Transportation (FDOT) and the Corps, which set forth operational constraints for the L-29 canal reach between S-333 and S-334 for inclusion in future operational planning studies as minimum protective standards necessary to ensure the safety and stability of the roadway sub

base infrastructure along this segment of Tamiami Trail (U.S. Highway 41). Although the Tamiami Trail Phase 2 Roadway Modification project is anticipated for completion by late 2024 (in advance of the other assumed conditions for CSB2027), the COP hydrologic modeling and analysis demonstrated that operational planning efforts which remove this constraint will result in increased wet season deliveries to NESRS and reduced water availability for the ensuing dry season. In order to reduce the risk that operations of the CEPP South features under COP may result in low water conditions in WCA 3A, the 90-day constraint for the L-29 canal was retained for hydrologic modeling of CSB2027 and the action alternatives evaluated within this EA. The COP Water Control Plan includes the capability to further extend and/or remove the 90-day cumulative duration criteria for operating the L-29 canal above 8.3 feet NGVD (referenced as the FDOT roadway constraint), while continuing to adhere to the maximum operating stage limit of 8.5 feet NGVD. However, implementation of this change under COP would not occur without: (1) written approval from FDOT to remove the L-29 canal constraint identified in Appendix A (Water Control Plan), based on a joint evaluation of monitoring data by the USACE and the FDOT (this data evaluation is ongoing with the MWD Increment 2 Field Test); (2) demonstration of the capability of the completed MWD Project components to maintain flood mitigation requirements for the 8.5 SMA under the raised L-29 canal maximum operating limit of up to 8.5 feet, NGVD; and (3) consideration of increased low-water stages within WCA 3A, including along the western L-29 canal between S-12A and S-333. If the requirements to remove the 90-day duration limit are able to be removed under COP, this change would be retained for any of the future CEPP South alternatives considered within this EA (including the CSB2027). When a permanent update to the 2020 Water Control Plan (COP) is pursued in the future, pending further certainty regarding the schedule for implementation of upstream operational changes that will supply additional inflows south to WCA 3A, this assumption will be updated, as appropriate, for hydrologic modeling in support of operational planning.

ALTB1, ALTB2, and ALTB3, assume the full build out of CEPP South features (L-67A gated culverts (S-631, S-632, S-633); Blue Shanty Flowway; S-355W; L-67C levee removal; L-29 levee removal; L-67 extension removal; Blue Shanty Levee; S-356 expansion to 1000cfs; and S-333 increased capacity to 2500 cfs) as described in **Table 2-1**. Operations for S-631, S-632, and S-633 under these alternatives were assumed to not be limited by the S-152 water quality operational constraints included in CSB2027, consistent with the assumptions in the 2014 CEPP Final PIR/EIS under full CEPP implementation. ALTB4 only includes those features associated with CEPP South Contract 1 (S-631, S-632, S-633, and L-67C Interim Levee Gap) and the L-29 temporary pumps. ALTB4 utilizes operations from the 2020 COP Final EIS, as defined in the Appendix A (COP Water Control Plan), to define operating criteria for the partial implementation of CEPP South features and other existing infrastructure within the C&SF water management system (including S-152) for the WCAs, ENP, and ENP to SDCS, consistent with CSB2027 and the other action alternatives. However, ALTB4 was not explicitly modeled as part of the hydrologic modeling conducted during the CEPP PED phase to support a quantitative assessment of the Savings Clause requirements for the CEPP South features because the protocols envisioned to guide operation of the available features assumed in ALTB4 (S-631, S-632, S-633, S-152, and the L-29 temporary pumps) would not be effectively represented using the prescriptive decision-making approach needed for the regional modeling tools. Without the ability to conduct an independent, quantitative assessment through reliance on hydrologic modeling, the operational criteria for ALTB4 were methodically developed to maintain near equivalency with the regional water volume distribution between WCA 3A, WCA 3B, and ENP established under the COP to ensure hydrologic similarity to the CSB2027 base condition that was modeled.

Three operational alternatives (ALTB1, ALTB2, and ALTB3) were modeled with CEPP South infrastructure to support the quantitative assessment of the Savings Clause requirements, starting from the CSB2027 modeled base condition. Because the performance of ALTB4 closely resembles CSB2027 in terms of

potential hydrologic effects in WCA 3A, WCA 3B, ENP, and the LECSAs, unique modeling of ALTB4 was determined to be unnecessary, and the hydrologic modeling outcomes from CSB2027 were utilized to support the quantitative Savings Clause assessment of ALTB4.

2.3.1 ALTA (No Action Alternative): CSB2027

The CSB2027 included the following assumptions referenced in **Table 2-1**:

- For WCA 3 and ENP, CSB2027 was operationally consistent with the 2020 COP Final EIS which includes the Tamiami Trail Flow Formula (TTFF) that prescribes the volume of flow through the S-333/S-333N and the S-12s and includes an L-29 canal maximum operating limit of 8.5 feet, NGVD for up to 90 days per water year.
- Construction and operation of CERP authorized projects projected to be completed by 2027, as identified in the October 2019 South Florida Ecosystem Restoration IDS, to include: (1) the Broward County Water Preserve Area (BCWPAs) C-11 Reservoir; (2) Caloosahatchee River (C-43) West Basin Storage Reservoir; (3) Indian River Lagoon C-44 Reservoir/STA and C-23/C-24 Reservoir North.

CSB2027 did not include the CEPP South or CEPP North features, nor did it include components authorized in Section 1308(a) of the WRDA of 2018, namely an EAA Reservoir and STA that may provide future planned increases to the WCA inflows of approximately 370,000 acre feet per year on average. The baseline assumptions table for CSB2027 can be found in **Appendix E**.

CSB2027 includes the current authorized Regulation Schedules for Lake Okeechobee, WCA 1, and WCA 2. Lake Okeechobee operations for CSB2027 are assumed governed by the 2008 Lake Okeechobee Regulation Schedule (2008 LORS) and the average annual water quality treatment capacity of the SFWMD STAs for Lake Okeechobee inflows prescribed within the 2012 SFWMD Restoration Strategies (RS) Regional Water Quality Plan of approximately 60,000 acre-feet (RS provided for water quality treatment of 100 percent of the EAA basin runoff). Although the Corps is currently in the planning phase for a new Lake Okeechobee Regulation Schedule (LOSOM), which is expected to be implemented in late 2022, no information is presently available regarding potential increased flow volumes towards WCA 2 and WCA 3A that may result from LOSOM.

Compared to the COP water budget, which also assumed operations under 2008 LORS and the 2012 RS water quality treatment capacity assumptions, the addition of the C-43 West Basin Storage Reservoir and the Indian River Lagoon C-44 Reservoir/STA, and the EAA Reservoir A-2 STA do not result in a notable alteration to the WCA 3A water budget amount of approximately 760,000 acre-feet of average annual inflows to WCA 3A from Lake Okeechobee and the EAA. Components of the SFWMD RS Water Quality Plan which are located within the Central Flowpath, including the A-1 FEB, STA-2, and STA-3/4, are represented in the RSM-GL. Although the SFWMD RS Water Quality Plan will be fully constructed by 2025, components from the Eastern Flowpath and Western Flowpath are not currently represented in the RSM-GL; these features will not significantly alter the available water budget for WCA 3A inflows. Inclusion of the BCWPAs C-11 Reservoir results in no significant change to the average annual inflows from the S-9 pump station to WCA 3A, compared to the COP water budget.

WCA 1 and WCA 2A operations are respectively governed under the 1995 and 1989 Regulation Schedules, also consistent with the assumptions used for the formulation of the COP.

S-152 is operated subject to the operational constraints identified under the COP, and in the same manner as prescribed for under Phase 2 of the DPM Field Test. Consistent with previous RSM-GL modeling representations of the S-152 operations, CSB2027 does not simulate local hydraulics between L-67A and L-67C and rather assumes that the S-152 discharges are "jumped" across the L-67 "pocket" directly into WCA 3B.

CSB2027 also includes minor updates to the RSM-GL simulation of the COP recommended plan (ALT Q+), in order to more accurately simulate the following operational criteria to maintain the hydraulic ridge along eastern ENP and to provide water to Taylor Slough, resultant from the COP water management sub-team's coordinated interagency efforts to translate the operational intent and operational priorities established in the 2020 COP Final EIS: (1) WCA 3A water deliveries of up to 200 cfs when the average stage at WCA 3A Site 62 and Site 63 gauges is greater than 9.80 feet, NGVD (not previously modeled during the COP); and (2) S-335 deliveries when S-335 headwater stages are below 6.5 feet, NGVD during the period from 01 August to 14 February (up to 400 cfs when headwater stages are between 6.0-6.5 feet, NGVD; up to 200 cfs when headwater stages are between 5.3-6.0 feet, NGVD) (collectively modeled as up to 400 cfs during the COP).

2.3.2 Alternative B1 (ALTB1)

ALTB1 utilized RDO in the 2014 CEPP Final PIR/EIS, which were informed by iModel optimization from the CEPP formulation efforts during 2012. Inclusion of this alternative enables a back-comparison to the 2014 CEPP Final PIR/EIS, although caveated that the PIR included an expanded WCA 3A water budget due to the CEPP "New Water" features that are not assumed for ALT B1. The operations at Tamiami Trail are mechanistically the same as CEPP ALT4R2 (i.e. recommended plan in 2014 CEPP Final PIR/EIS) with transformed iModel flows (CEPP ALT4R2 inputs) being used to replace the Rainfall Plan target of the 2012 WCA 3A Regulation Schedule (adopted as part of the 2012 Everglades Restoration Transition Plan (ERTP)) as well as to set targets for S-631, S-632 and S-633. Since authorization of the CEPP ALT4R2 recommended plan was uncertain when the original hydrologic modeling was conducted, the 2014 CEPP DPOM included an explicit recognition that the RDO operations (similar to those proposed in the 1999 CERP recommended Plan) were conceptual in nature with variables such as target stages not yet developed for actual implementation.

In the 2014 CEPP DPOM, WCA 3A outflows were assumed to be operated in accordance with Rainfall Plan; however the DPOM noted that the Rainfall Plan would be revised with two distinct components: (1) a regulatory component operated in accordance with the WCA 3A Regulation Schedule per the 2012 Water Control Plan, and (2) an environmental rainfall component that consists of RDO. Unlike regulation schedule-based operations, the RDO component would estimate inflows and outflows in response to weekly rainfall and potential evapotranspiration (PET), so that the weekly stage at target locations approach the corresponding weekly restoration targets. The 2014 CEPP DPOM recognized that transitioning to RDO would likely be a lengthy and complex process for the Corps, but a necessary step to achieve the proposed restoration objectives within WCA 3A and ENP. The process for making this transition was not fully developed in the DPOM, but it envisioned that RDO would be phased in gradually as CEPP components become operational. The 2014 CEPP DPOM also noted that RDO operations may also be considered during future operational planning studies prior to CEPP, as appropriate, and this development effort was subsequently realized with development of the TTFF proposed with the COP.

Based on the modeling of the 2014 CEPP Final PIR/EIS recommended plan, the flow targets for deliveries through WCA 3B were distributed as 40% through S-631, 35% through S-632, and 25% through S-633.

Discharges from WCA 3A were primarily made through these structures and secondarily through the S-12 structures, depending upon operational constraints and the overall hydrologic conditions in ENP, WCA 3A and WCA 3B.

Consistent with the 2014 CEPP Final PIR/EIS modeling approach, regulatory and RDO flows targeted for discharges at S-12A and S-12B were redirected to the Blue Shanty Flowway if capacity was available. While S-333 and S-333N are independently modeled, their combined operational intent is the same as the expanded S-333 in CEPP ALT4R2 modeling with S-333 having initial priority.

S-152 is not operated in the hydrologic modeling simulations in order to limit to maximum structural inflows from WCA 3A to WCA 3B to 1,000 cfs as prescribed in the CEPP 2014 Final PIR/EIS.

For each of the CEPP South action alternatives, the RSM-GL model has been updated to simulate local hydraulics between L-67A and L-67C, with retention of the L-67C canal (L-67C canal backfill was not a component of the 2014 CEPP Final PIR/EIS) and removal of the L-67C levee segments as specified for CEPP South (L-67C levee gap length of 6,000 feet downstream of S-631; complete removal of the L-67C levee within the interior of the CEPP Blue Shanty Flowway). Since the local hydraulics between L-67A and L-67C are not simulated for the CSB2027, which assumes that the S-152 discharges are "jumped" across the L-67 "pocket" directly into WCA 3B, the RSM-GL hydroperiod difference and stage difference maps will indicate drier conditions within the L-67 pocket when comparing ALTB1 to CSB2027.

2.3.3 Alternative B2 (ALTB2)

ALTB2 utilized the COP operations including the WCA 3A Regulation Schedule and TTFF, but spatially distributed the target flow to both the Blue Shanty Flowway (via S-632 and S-633) and to Tamiami Trail (via S-333, S-333N and the S-12s). S-631 was operated similar to the existing S-152, consistent with the S-152 operations in CSB2027.

Target flows for the TTFF were calculated the same as in the 2020 COP Final EIS but were spatially distributed as follows:

- 1st Priority = 25% of the TTFF target volume was sent to S-632 subject to structure capacity
- 2nd Priority = 25% of the TTFF target volume was sent to S-633 subject to structure capacity
- The remaining TTFF target volume was sent to S-333, S-333N, S-12D, S-12C, and then to S-12B and S-12A, consistent with the priority initially established in the 2014 CEPP DPOM; however, S-12A and S-12B were only operated while in Zone A of the WCA 3A Regulation Schedule.

S-152 is not operated in the hydrologic modeling simulations in order to limit to maximum structural inflows from WCA 3A to WCA 3B to 1,000 cfs as prescribed in the CEPP 2014 Final PIR/EIS.

2.3.4 Alternative B3 (ALTB3)

ALTB3 utilized the CEPP-like RDO similar to ALTB1 but used the COP approach to iModel optimization informed by the updated CEPP South targets, including five additional stage target locations that were added based on information gained during the COP modeling evaluations and in consideration of the anticipated hydrologic changes with full CEPP implementation. The operations of ALTB3 are identical to the modeling approach used for the 2014 CEPP Final PIR/EIS ALT4R2 and ALTB1, except that the S-631, S-

632, S-633, and S-12s iModel flows were generated from CEPP South iModel application instead of the original CEPP targets from the 2014 CEPP Final PIR/EIS.

S-152 is not operated in the hydrologic modeling simulations in order to limit to maximum structural inflows from WCA 3A to WCA 3B to 1,000 cfs as prescribed in the CEPP 2014 Final PIR/EIS.

2.3.5 Alternative B4 (ALTB4)

The CEPP South Contract 1 conveyance features will be constructed and operational prior to the construction of the CEPP South Blue Shanty Levee (L-67D) and prior to the CEPP South degrade of 4.3 miles of the L-29 levee between L-67A and the intersection of the L-67D with the L-29 levee. Operation of the CEPP South Contract 1 conveyance features may also be limited for the near-term to the existing WCA 3A water budget, unless the proposed 2022 Lake Okeechobee Regulation Schedule (LOSOM) expands capacity for treated inflows which supplements the existing water budget evaluated for the COP and measurably unchanged with CSB2027.

ALTB4 utilizes operations described in the 2020 COP Final EIS, as defined in Appendix A (COP Water Control Plan), to define operating criteria for existing infrastructure within the C&SF water management system for the WCAs, ENP, and ENP to SDCS. Operation of CEPP South infrastructure (S-631, S-632, S-633) will be operated subject to the operational constraints identified under the COP, and in the same manner as prescribed for the S-152 structure under Phase 2 of the DPM Field Test

For the interim operation condition for CEPP South under ALTB4, the CEPP South structures (S-631, S-632, and S-633) would be operated consistent with S-152 to maintain a water budget distribution between WCA 3A, WCA 3B, and ENP consistent with the CSB2027 (also similar to the 2020 COP Final EIS) and associated similar hydroperiod and hydropattern effects. S-631, S-632, S-633, and S-152 would collectively only be able to pass the equivalent volume currently allowed by the design capacity of S-152 which is 750 cfs (design flows may not be realized due to limited head differential and/or limited downstream marsh connectivity) to minimize the potential for over draining northern WCA 3A until additional CEPP features are constructed, or other upstream operational changes are implemented that will supply additional inflows south to WCA 3A. S-631, S-632, and S-633 structures, along with S-152, would be operated within the current limits of the S-152 operating permit (CERPRA Permit Number 0304879-002) for total phosphorus (TP) concentration. The WCA 3B inflow structures would be closed when projected TP is expected to be greater than 10 parts per billion (ppb).

ALTB4 includes L-29 temporary pumps (200 cfs combined design capacity) which serve as an interim measure to enhance and redirect flow south towards the L-29 canal (rather than to the east), complementing the active vegetation management within the Blue Shanty Flowway and initiating transition of the Blue Shanty Flowway towards the CEPP planned end state, as described in **Section 2.2** of the EA. Flow monitoring conducted for the DPM and documented in the 2020 SFWMD South Florida Environmental Report (Appendix 6-1) indicate that approximately one-third of the total flow volume across the DPM L-67C gap was from wetland sheetflow through the upstream marsh, with the remaining two-thirds contributed from the unblocked extensions of the L-67C Canal. Surface water fluxes from S-632 and/or S-633 culverts located within the planned Blue Shanty Flowway will be limited to a maximum of 750 cfs (the 750 cfs limit also includes S-152 and S-631), and the portion of surface water fluxes towards the L-29 temporary pumps will be further reduced by easterly topographic and hydraulic head gradients within WCA 3B (prior to construction of the L-67D Levee), retention of the DPM L-67C gap during the CEPP interim operations (limiting southerly flows from upstream in central WCA 3B), and the southern L-67C

Canal re-directing a portion of the flows reaching the L-67C interim gap further south within the pocket (only one 3000 foot gap of L-67C Levee is removed with Contract 1). The L-29 temporary pumps are temporary features with temporary wetland impacts, construction/installation costs, and operational fuel costs, such that the pump capacity for ALTB4 interim operations is limited to the southerly flow volume reasonably anticipated to reach the L-29 levee based on consideration of the available hydrologic information, including effects from the planned active vegetation management. L-29 temporary pump capacity of 200 cfs has also been successfully deployed by SFWMD during the State of Florida WCA High Water Emergency events during 2016 and 2018 at S-355B, while ensuring continued access along the L-29 levee.

The proposed interim operations for S-631, S-632, and S-633 while the remaining CEPP project features are under construction are described as follows:

a. A maximum combined release total of S-631, S-632, and S-633, and the existing S-152 is limited to 750 cfs, which is the current S-152 maximum discharge capacity. Any combinations of these four structures could be used to meet the DPM objectives or as recommended by the integrated DPM Science Team and CEPP Adaptive Management (AM) Team as long as it doesn't exceed the maximum discharge capacity of S-152 under the same hydraulic head conditions. The inclusion of S-152 as part of the 2020 CEPP and EAA Reservoir DPOM is subject to the following requirements:
    1. S-152 may not be operated concurrently with operation of S-631, S-632, or S-633 without completion of either (a) a Corps' decision document that incorporates the S-152 gated culvert into the C&SF Project; or (b) SFWMD's request for and the Corps' grant of a Section 408 permission for SFWMD to continued S-152 operations. The DPM Phase 2 Operational Strategy will otherwise expire on December 31, 2021, as per the terms of the November 8, 2017 SAD approval memo. Reference **Section 1.3.2**.
    2. Inclusion of S-152 releases in the combined flow accounting is contingent on either the Corps issuing a decision document that incorporates the S-152 gated culvert into the C&SF Project or the SFWMD requesting and the Corps granting a Section 408 permission for its continued operation, per item a.1.

b. All three new structures will adhere to the same headwater and tail water constraints of S-152, as established under the operating criteria per DPM Phase 2:
    1. May be operated when L-67A canal stage at Site 3A-69W (located on L-67A canal, approximately 1.25 miles north of S-631; USGS Site ID: 255300080370001) exceeds 7.5 feet NGVD.
    2. Closed when WCA-3B at Site 71 or SRS-1 stage equals or exceeds 8.5 feet, NGVD.
    3. Releases may be reduced or discontinued when S-355A and S-355B are closed due to L-29 borrow canal stage constraints.
    4. Releases may be reduced or discontinued when water quality constraint criteria per the FDEP Permit are exceeded. The Corps and the State will use all available relevant data and supporting information to inform operational planning and decision making, document decisions made, and evaluate the resulting information from those decisions to avoid adverse impacts to water quality where practicable and consistent with the purposes of the C&SF Project.

c. S-631 and S-152 releases are assumed to principally flow through the existing DPM 3,000 foot gap in L-67C and S-632 and S-633 releases are assumed to flow through a new, interim 3,000 foot gap in L-67C located about 1.5 miles southeast of S-633.

d. Two sets of temporary pumps, rated at combined 100 cfs at each location, will be installed on the L-29 levee by the SFWMD or the Corps. Operating objectives and criteria of the temporary pumps will be determined by the integrated DPM Science Team and CEPP AM team while observing downstream constraints. The L-29 temporary pumps would be installed when the first gated culvert (S-633) and/or associated Blue Shanty Flowway features (agricultural ditch backfill and L-67C interim gap) are complete and ready to operate, to include the period of OTMP. The temporary pumps would be operated until they are removed in advance of the CEPP South L-29 levee segment removal. The use of temporary pumps at the L-29 levee would move water across the levee and into the L-29 canal. Downstream of the temporary pumps is L-29 canal and the pumping will cease when L-29 canal stages reach 8.5 feet, NGVD per the COP Water Control Plan, or in response to other relevant L-29 operational limitations prescribed under the COP for protection of the Tamiami Trail Roadway and/or the 8.5 SMA. The L-29 temporary pump capacity will be limited to one-half of the combined inflow to WCA 3B from S-631, S-632, S-633, and S-152, and all pumps will be turned off when combined inflows at these structures are less than 100 cfs. In addition, the combined flow of the temporary pump releases into L-29 will be counted as part of the TTFF (COP) target flow accounting for inflows to ENP from WCA 3A.

e. The operation of S-152 will continue to adhere to the operational objectives and constraints of the DPM Phase 2 operational strategy until it expires on December 31, 2021, unless or until the S-152 gated culvert is either incorporated into the C&SF project or SFWMD requests and the Corps grants a Section 408 permission for SFWMD to continue S-152 operations. The operations of S-152 will adhere to the operational objectives and constraints of the 2020 CEPP and EAA Reservoir DPOM if the S-152 gated culvert is incorporated into the C&SF project.

f. The interim operations of S-631, S-632, and S-633 will adhere to operational objectives and constraints of the COP Water Control Plan, in addition to the specific constraints identified above.

The primary purpose of continued operations of the DPM and interim operations for S-631, S-632, S-633, and the L-29 temporary pumps is to: (a) support continued scientific tests and scientific data collection related to the ecological effects of backfilling canals and modifying levees, consistent with the DPM Phase 2 Field Test, while maintaining the COP project objectives and providing enhanced sheetflow within WCA 3B; and (b) to inform future operational planning for the CEPP South components, consistent with the Adaptive Management Plan included in the 2014 CEPP Final PIR/EIS. The scientific tests, including utilization of the new CEPP South features, will continue to be carefully designed in coordination between the DPM Science Team and the CEPP AM team, to ensure that test results are of significant value to future Everglades' restoration efforts. The integrated DPM Science Team and CEPP AM team will be comprised of scientists and hydrologists from the Corps, SFWMD, Miccosukee Tribe of Indians of Florida, FWC, U.S. Geological Survey (USGS), USFWS, and ENP, representing a continuation of the established DPM coordination process. The interagency coordination process will continue to be refined concurrent with the construction of the S-631, S-632, S-633, and associated CEPP South Contract 1 features, with the construction

schedule presently anticipated to extend through at least the end of Fiscal Year 2022. Based on review of the data and conditions, and consideration of the operational constraints, the integrated DPM Science Team and CEPP AM team will exchange information relevant to the optimal time and duration for interim operations in order to meet project objectives. The DPM Science Team and CEPP AM Team will coordinate with the Corps Water Management Section staff regarding gate operations of S-152, S-631, S-632, S-633, and the L-29 temporary pumps.

Table 2-1. CEPP South Alternative Operational Assumptions and Descriptions.

Components and Operational Assumptions for WCA 3A, WCA 3B, ENP and SDCS	ALTA1: CEPP Existing Condition Baseline 2027 [CSB2027])	ALTB1: CEPP South Only Variation 1	ALTB2: CEPP South Only Variation 2	ALTB3: CEPP South Only Variation 3	ALTB4: CEPP South Only Variation 4
CERP Components					
Lake Okeechobee Regulation Schedule 2008 with average annual Regulatory flows south limited to ~60 thousand acre feet per year	X	X	X	X	X
CERP: Broward County Water Preserve Area C-11 Reservoir: Forecast Completion by 2025	X	X	X	X	X
CERP: Caloosahatchee River (C-43) West Basin Storage Reservoir	X	X	X	X	X
CERP: Indian River Lagoon South (C-44 Reservoir/STA, C-23/C-24 North Reservoir): Forecast complete by 2027	X	X	X	X	X
SFWMD Restoration Strategies	X	X	X	X	X
CEPP Components and Operations					
CEPP South (L-67A Gated Culverts; Blue Shanty Flowway, including L-67C Levee degrade and L-29 levee segment removal); S-355W; L-67 Extension Levee Removed with Canal backfill)		X	X	X	

Components and Operational Assumptions for WCA 3A, WCA 3B, ENP and SDCS	ALTA1: CEPP Existing Condition Baseline 2027 [CSB2027])	ALTB1: CEPP South Only Variation 1	ALTB2: CEPP South Only Variation 2	ALTB3: CEPP South Only Variation 3	ALTB4: CEPP South Only Variation 4
CEPP South (L-67A Gated Culverts and L-67C interim gap)					X
CEPP South Design Refinements (backfill of the east-west agricultural ditch and active vegetation management). Note approximately 4.0 miles (21,120 feet) of the east-west agricultural ditch is to be backfilled under ALTB2 and ALTB3. Approximately 1.36 miles (7,151 feet) is expected to be backfilled under CEPP South Contract 1 (ALTB4).		x	X	x	x
L-29 Temporary Pumps (200 cfs capacity)					X
S-356 Current 500 cfs	X				
CEPP South S-356 Expansion to 1000 cfs		X	X	X	
2019 Combined Operational Plan Preferred Plan ALT Q+ (Tamiami Trail Flow Formula)	X		X		X
2012 Water Control Plan with CEPP Everglades Rain Driven Operations (ERDO) using translated iModel targets		X		X	
Regional Water Management Operations: WCA 3A Outlet Structures					
COP Preferred Plan ALT Q+: S-12A/B, S-343A/B seasonal	X	X	X	X	X

Components and Operational Assumptions for WCA 3A, WCA 3B, ENP and SDCS	ALTA1: CEPP Existing Condition Baseline 2027 [CSB2027])	ALTB1: CEPP South Only Variation 1	ALTB2: CEPP South Only Variation 2	ALTB3: CEPP South Only Variation 3	ALTB4: CEPP South Only Variation 4
closure periods; no S-344 closure period and S-344 open in Zone A of WCA 3A Regulation Schedule					
S-152 Decomp Physical Model (S-152 operations were modeled for CSB2027 only; for ALTB1, ALTB2, and ALTB3, S-152 provides operational flexibility to complement S-632 and S-633, though S-152 operations were not modeled)	X	X	X	X	X
S-333 Increased capacity (2500 cfs) per SFWMD July 16 FDEP permit	X				X
S-333 Increased capacity (2500 cfs) per 2014 CEPP Final PIR/EIS		X	X	X	
Western ENP Operational Criteria					
Old Tamiami Trail Canal Plug at ENP Tram Road (2012 approval) (assumed constructed by 2026)	X	X	X	X	X
L-29 Canal Maximum Operating Stage Limit					
MWD Completion 8.5 feet, NGVD, (DOI Tamiami Trail Next Steps Phase 2 road raising complete 2024) with 90 day FDOT limit	X	X	X	X	X
1.0 Mile MWD Eastern Bridge feet, NGVD	X	X	X	X	X

Components and Operational Assumptions for WCA 3A, WCA 3B, ENP and SDCS	ALTA1: CEPP Existing Condition Baseline 2027 [CSB2027])	ALTB1: CEPP South Only Variation 1	ALTB2: CEPP South Only Variation 2	ALTB3: CEPP South Only Variation 3	ALTB4: CEPP South Only Variation 4
2.3 Mile DOI Tamiami Trail Next Steps Phase 1 Western Bridges (DOI Completion 2019)	X	X	X	X	X
Miami-Dade Limestone Partner's Association (MDLPA) Seepage Reduction Barrier					
5.0 miles completed by MDLPA in 2016 (SFWMD/Corps) data evaluations in progress (note: CEPP New Water proposed a 4 mile seepage reduction barrier in this same location)	X	X	X	X	X
C-111 South Dade and MWD 8.5 SMA Construction Completion					
8.5 SMA: C-358 connection to C-357 (100 cfs)	X	X	X	X	X
NDA connected to 8.5 SMA: S-357 up to 575 cfs	X	X	X	X	X
L-31W Canal Plugs	X	X	X	X	X
South Dade Conveyance System (SDCS) Canals' Operational Criteria (L-30, L-31N, C-111)					
2020 COP Final EIS Revised S-332D Seasonal Closure dates	X	X	X	X	X
2020 COP Final EIS Taylor Slough Supplemental Deliveries (fully represented in RSM-GL modeling)	X	X	X	X	X
2020 COP Final EIS (Biscayne Bay/Sensitivity Run 4)	X	X	X	X	X
SFWMD C-111 Spreader Canal Project (not part of Corps' Water Control Plan)					

Components and Operational Assumptions for WCA 3A, WCA 3B, ENP and SDCS	ALTA1: CEPP Existing Condition Baseline 2027 [CSB2027])	ALTB1: CEPP South Only Variation 1	ALTB2: CEPP South Only Variation 2	ALTB3: CEPP South Only Variation 3	ALTB4: CEPP South Only Variation 4
S-200/S-199 Pump Capacity at 300 cfs (SFWMD completing expansion in 2018)	X	X	X	X	X
S-200/S-199 CSSS Restrictions per 10 cm depth criteria at R3110 and EVER4 (USFWS Biological Opinion for C-111 Spreader Canal Western PIR)	X	X	X	X	X
G-737 Gated Culvert (SFWMD completed 2017)	X	X	X	X	X

2.4 Issues and Basis for Choice

The alternatives described in **Section 2.3** were formulated, considered, and evaluated based on achievement of project objectives (**Section 1.5**) and compliance with project constraints (**Section 1.6**). **Section 2.4.1** and **Section 2.4.2** briefly describe hydrologic modeling conducted during the CEPP PED phase was used to support a quantitative assessment of the Savings Clause requirements for the CEPP South features per paragraph 16.b(3) of the 2014 CEPP Chief's Report. **Section 2.4.3** briefly describes the rationale for selection of the preferred alternative (ALTB4), which includes consideration of adherence to Savings Clause requirements, in addition to consideration of potential environmental effects resulting from changes in water levels in WCA 3 and ENP, and resulting effects on the human environment as referenced in **Section 4.**

2.4.1 Water Supply

Section 385.36 of the Programmatic Regulations requires that CERP PIRs include a determination of existing legal sources of water that are to be eliminated or transferred as a result of CERP project implementation. If implementation of a CERP project is expected to result in an elimination or transfer of an existing legal source of water, the PIR shall include an implementation plan that ensures a new source of water of comparable quantity and quality is available to replace the source that is being transferred or eliminated.

The majority of water supply demands for existing legal users in the South Dade area is met with groundwater from the Biscayne aquifer. The RSM-GL model is a fully integrated surface and groundwater model whose conceptualization for this application was limited to the surficial aquifer only, and thus does not provide water levels below the Biscayne Aquifer. Because recharge to the Biscayne aquifer is directly affected by canal stages during the dry season, changes in canal stages can be used to predict impacts to the underlying Biscayne aquifer as a result of the modeled alternatives. A prolonged reduction in canal stages will affect groundwater levels, which could result in movement of saline water into the Biscayne aquifer, causing harmful impacts to water supply well fields (e.g., Florida Keys Aqueduct Authority) during drought conditions. Maintaining canal stage elevations for water supply and prevention of saline water intrusion are essential purposes of the C&SF project that must be maintained throughout CERP implementation.

Section 4.5.2 provides a discussion of water supply performance for CSB2027 and each of the action alternatives with respect to canal stages near public water supply well fields. A limited discussion is provided for each of the action alternatives within this section as this EA evaluates adherence to CERP Savings Clause requirements. To analyze the potential elimination or transfer of existing legal sources, with respect to water supply, affected basins or users within the project area were evaluated. Canal stage duration curves derived from the modeled alternatives were examined to determine if prolonged reductions in canal stages would affect saline water intrusion or water supply. Model results indicated that canal stage elevations would fall below the maintenance stage elevations sooner and for an increased duration (increase in number of days, not events) under ALTB1 (approximately 1-2% increase) and ALTB3 (approximately 3-4% increase) compared to CSB2027. Model results also indicated that canal stage elevations would fall below the maintenance stage elevations sooner and for slight increased duration (less than 1% increase) for ALTB2, as compared to CSB2027; however, based on the analysis, ALTB2 has a minor effect to water supply performance, with fewer potential effects compared to ALTB1 and ALTB3, in

the absence of increased inflows to WCA 3A that are a component of the authorized 2014 CEPP Final PIR/EIS recommended plan.

Section 4.5.2 also provides a discussion of water supply performance for CSB2027 and each of the action alternatives with respect to potential effects to agricultural or urban water supply for the LECSAs. A comparison of regional groundwater stage difference maps comparing the action alternatives and CSB2027 was used to identify where systemic groundwater reductions may occur. ALTB1 shows the least overall change for the LECSAs (no change from CSB2027 for 1989 dry year). ALTB2 shows the least change in WCA 3A (0.1 to 0.25 feet lower than CSB2027 for both 1989 and 2001 dry years). ALTB3 showed a reduction in water levels in the southern portion of WCA 2 (0.1 to 0.25 feet lower for 1989 dry year) and the largest improvement in northeast ENP (0.1 to 1.0 foot higher than CSB2027 for 1989 dry year). For north central ENP, ALTB2 and ALTB3 show improved regional water levels (ranging from 0.1 to 1 foot higher than CSB2027 for both 1989 and 2001 dry years). Overall, ALTB2 showed the least amount of reduction in stages in WCA 3 and in northeast ENP (0.1 to 0.25 feet lower than CSB2027 for 1989 dry year), an improvement in north central ENP (for both 1989 and 2001 dry years) and no change in WCA 2 and LECSAs 1 and 2 (for both dry years).

ALTB4 would maintain water supply performance of CSB2027 through operations which maintain the COP quantity of deliveries from WCA 3A to both WCA 3B and ENP, avoiding further reductions to WCA 3A water levels prior to increased inflows to WCA 3A.

2.4.2 Flood Risk Management

Section 385.37 of the Programmatic Regulations requires that CERP PIRs include an analysis of the project's impacts on levels of service for flood protection that existed on the date of enactment of WRDA 2000 (December 2000) and in accordance with applicable law. Where appropriate and consistent with restoration of the natural system, opportunities to provide additional flood protection shall be considered.

Section 4.5.1 provides a discussion of FRM performance for CSB2027 and each of the action alternatives. A limited discussion is provided for each of the action alternatives within this section as this EA evaluates adherence to CERP Savings Clause requirements. The FRM evaluation was focused principally on the urban and agricultural basins east of the WCAs and ENP (east of the East Coast Protective Levee), including LECSA 2 (Broward County), LECSA 3 (Miami-Dade County), and 8.5 SMA. The summary of regional performance differences for the LECSAs and WCA 3A includes quantitative comparisons between the CSB2027 and the action alternatives based on RSM-GL. Since each of the alternatives retain the COP operational criteria for the SDCS, and since no increased flow volumes into WCA 3A are included in the hydrologic modeling, each of the alternatives maintains the CSB2027 FRM performance throughout the SDCS south of Tamiami Trail. Each of the action alternatives indicate a minor increase in L-30 Canal stages during extreme wet hydrologic conditions.

8.5 SMA FRM performance was evaluated using the MD-RSM, since the RSM-GL model resolution is too coarse around the 8.5 SMA to evaluate localized effects from operations. All of the simulated CEPP South alternatives evaluated in this EA demonstrate adherence to the 1983 Base Condition constraint for 8.5 SMA flood mitigation. While this conclusion would allow implementation of additional inflows through the Blue Shanty Flowway and eastern ENP with the full CEPP South build-out (ALTB1, ALTB2, and ALTB3), the assumption must be reiterated that the modeling evaluations conducted in support of this EA rely on the existing inflows to WCA 3A and do not account for increased future inflows that will be needed to

achieve the full ecological benefits of CEPP that were identified in the 2014 Final CEPP PIR/EIS. While it is notable that peak stages observed within the western portion of the 8.5 SMA were reduced, in part, due to the effects attributable to the CEPP South degrade of the L-67 Extension levee (as assumed under ALTB1, ALTB2, and ALTB3), the ultimate length of the L-67 Extension levee (and adjacent canal backfill) that will be removed with CEPP South implementation remains under evaluation as part of the Corps' Baseline and Modification Modeling (BAMM) WCA flood routing study and CEPP PED evaluations. If BAMM subsequently determines that only a partial length of the remaining L-67 Extension levee is able to be degraded due to concerns with WCA 3A levee safety criteria, then the observed peak stage reductions in the western portion of the 8.5 SMA would be diminished. Continued 8.5 SMA flood mitigation needs to be demonstrated for the increased future inflows that CEPP envisioned prior to removal of the L-29 levee segment within the Blue Shanty Flowway and prior to development of the permanent Water Control Plan for CEPP South. Additional agency and public coordination efforts, including review of future hydrologic modeling outcomes, will be conducted to inform development of the permanent update to the Water Control Plan for the WCAs, ENP, and SDCS to incorporate the full complement of CEPP South components, with completion of this Water Control Plan update presently anticipated for 2024.

The hydrologic effects of ALTB4 will generally match CSB2027 for WCA 3A, ENP NESRS, ENP WSS, and all LECSAs. The additional utilization of S-631, S-632, and/or S-633 will provide increased operational flexibility to enhance the spatial distribution of inflows into WCA 3B, including within the Blue Shanty Flowway footprint. With no additional inflow volume or changed timing for inflows to NESRS, compared to CSB2027, ALTB4 would maintain adherence to the 8.5 SMA flood mitigation constraint. Furthermore, with no proposed changes to the SDCS operations (prescribed by the COP), the FRM performance provided by the SDCS primary canal network (L-30, L-31N, C-111) would be maintained under ALTB4.

2.4.3 Summary

Based on the existing water budget that was assumed for the hydrologic modeling, ALTB1, ALTB2, ALTB3, and ALTB4 met FRM constraints; however uncertainty exists with respect to ALTB1 and ALTB3 meeting water supply constraints.

ALTB1 and ALTB3 were eliminated from detailed evaluation in **Section 4** based on their expected performance with respect to water supply, as reflected in the modeling simulations, these alternatives would promote increased deliveries to ENP with no additional inflows to WCA 3A.

Furthermore, ALTB1 utilized RDO used in the 2014 CEPP Final PIR/EIS, which were informed by iModel optimization from the CEPP formulation efforts during 2012. RDO have been further developed through planning efforts for the COP, as documented in the 2020 COP Final EIS.

ALTB3 was identified as the environmentally preferred alternative based on the magnitude of flows into NESRS and resulting increase in stages in portions of central SRS (**Figure 4-20; Appendix E Annex 2 Figure 75** and **Figure 78**); however this alternative also decreased water levels in portions of WCA 3A to the greatest extent, relative to ATLB1 and ALTB2. While the interagency project team that supported the hydrologic modeling for CEPP South identified potential improvements to the COP targets for ALTB3 (i.e. modified iModel targets to pull more water into the southern portion of central SRS) based on concerns expressed by stakeholders on the performance of the TTFF, since implementation of the COP has yet to occur, it remains to be determined whether these concerns are ultimately realized in COP. The 2020 COP Final EIS outlines through its COP AMMP a structured approach as to how monitoring data and continued

modeling/statistical investigations may inform implementation of the COP and/or potential future revisions to the TTFF. With the existing water budget and consideration of ecosystem restoration targets, the COP formulation and hydrologic modeling balanced the conveyance from WCA 3A to ENP (computed through the TTFF) to achieve restoration objectives and adhere to project constraints. The 2020 COP Final EIS identified potential unavoidable adverse effects that may occur as a result of implementation of the COP preferred plan, including: (1) increased risk to accessibility of tree islands for cultural and religious practices by the Miccosukee Tribe during extremely dry periods; (2) increased risk to recreational access in WCA 3 during extremely dry periods (3) increased risk to soils (oxidation) in WCA 3 due to reduced water levels; and (4) increased risk to wading bird colonies in northern WCA 3A (reduction in nest success and juvenile survival due to rapid recession rates). Objectives identified in the 2014 CEPP Final PIR/EIS and referenced in **Section 1.5** include (but are not limited to) restoration of seasonal hydroperiods and freshwater distribution to support a natural mosaic of wetland and upland habitat; improvement of sheetflow patterns and surface water depths and durations to reduce soil subsidence, and restoration of more natural water level responses to promote plant and animal diversity and habitat function in the Everglades system. Given consideration of potential adverse effects in WCA 3A identified in the 2020 COP Final EIS, it is premature to pursue ALTB3 at this this time, as implementation of ALTB3 may further exacerbate the above identified risks in WCA 3A. Pending further certainty regarding the schedule for implementation of upstream operational changes that will supply additional inflows south to WCA 3A, as well as quantification of the volume and seasonal distribution of these additional inflows, ALTB4 has been identified as the preferred plan for interim operations for features associated with CEPP South Contract 1 based on the above information and consideration of outcomes from evaluations conducted in the 2020 COP Final EIS. Interim operations of the features associated with CEPP South Contract 1 as defined in the 2020 CEPP and EAA Reservoir DPOM (**Appendix A**) would be constrained based on the existing WCA 3A water budget in order to minimize the potential for over draining WCA 3A. For the interim operation condition for CEPP South under ALTB4, the CEPP South structures (S-631, S-632, and/or S-633) would be operated consistent with S-152 to maintain a water budget distribution between WCA 3A, WCA 3B, and ENP consistent with the CSB2027 (also similar to the 2020 COP Final EIS) and associated similar hydroperiod and hydropattern effects. Implementation of interim operations as defined in the 2020 CEPP and EAA Reservoir DPOM (**Appendix A**) would allow benefits to be achieved by setting the stage for restoration of sheetflow in the Blue Shanty Flowway. Implementation of ALTB4 would begin to achieve objectives to improve seasonal hydroperiods and water depths to support wetland vegetation and fish and wildlife resources in the Everglades system consistent with those identified in the 2014 CEPP Final PIR/EIS. Reference **1.5**.

If ALTB1 and ALTB3 were selected as the basis for development of interim operations for the 2020 CEPP South DPOM, which may be revisited in the future, extensive effort would be needed to develop operational rules similar to the COP TTFF in coordination with the CERP Interagency Modeling Center. The ongoing effort to update the Water Control Plan for the WCAs, ENP, and ENP-SDCS (i.e. 2020 COP Final EIS) required approximately 2 years of extensive interagency and public coordination, and a similar level of effort would be reasonably anticipated if ALTB1 and ALTB3 were selected.

The next update to the 2020 CEPP and EAA Reservoir DPOM will occur during future design efforts for CEPP South features prior to their implementation. The preliminary assessments for ALTB2 within this EA will be used to establish a starting point for the future hydrologic modeling that will support a permanent update to the Water Control Plan. Updated iModel targets developed for ALTB3 (reference **Section 2.1**) will also be carried forward through future CEPP operational planning. Similar to the initial hydrologic modeling conducted in support of this EA, further hydrologic modeling will continue to be conducted at periodic intervals during the PED Phase for CEPP South to support quantitative assessments of the Savings

Clause requirements for the CEPP features, and this assessment will be utilized to develop the DPOM for CEPP South features and any required environmental compliance documentation. Consistent with established CERP procedures (Draft Guidance Memoranda 5), CEPP South operations will be integrated with other CERP (if applicable) and non-CERP project features within Volume 4 of the System Operating Manual (SOM), in order to achieve the authorized purposes of the C&SF project and the individual CERP projects.

Implementation of the no action alternative would not achieve the objectives identified in the 2014 CEPP Final PIR/EIS to improve the quantity, quality, timing, and distribution of water flows to the central Everglades, including WCA 3 and ENP. Reference **Section 1.5**.

2.5 Alternatives Eliminated from Detailed Evaluation

ALTB1 and ALTB3 were eliminated from detailed evaluation for the reasons outlined in **Section 2.4**. ALTB2 and ALTB4 were carried forward with the no action alternative through the environmental effects analysis in **Section 4**.

2.6 Preferred Alternative

Based upon the impact analysis conducted within this EA, ALTB4 is the preferred alternative. This plan is expected to best meet the objectives and constraints identified in **Sections 1.5** and **Section 1.6**. The interim operations for S-631, S-632, S-633, S-152 and the L-29 temporary pumps will be governed by the criteria specified in Section 20.0 (Interim Operations During Construction) of the 2020 CEPP and EAA Reservoir DPOM (version 2) that accompanies this EA (**Appendix A**). Approval of the COP ROD, which is anticipated in August 2020, is a prerequisite for implementation of the 2020 CEPP and EAA Reservoir DPOM.

3 AFFECTED ENVIRONMENT

This section describes the relevant resources of the project area that would may be affected by the alternatives described in **Section 2** and evaluated in **Section 4**. A complete description of the affected environment can be found in the 2014 CEPP Final PIR/EIS and Chief's Report (USACE 2014). The 2014 CEPP Final PIR/EIS is available at: https://www.saj.usace.army.mil/Missions/Environmental/Ecosystem-Restoration/Central-Everglades-Planning-Project/. Current water management operations are further described in the 2020 COP Final EIS (USACE 2020). The 2020 COP EIS is available at: www.saj.usace.army.mil/COP. Information contained within the above mentioned NEPA documents are incorporated into this document be reference. The following link also provides an overview of Central and Southern Florida (C&SF) project infrastructure (pump stations, gated culverts, etc.) referenced throughout this section: https://www.sfwmd.gov/document/facility-and-infrastructure-map-overview.

3.1 General Environmental Setting

The current extent of the Greater Everglades wetlands includes a mosaic of interconnected freshwater wetlands and estuaries located primarily south of the EAA. A ridge and slough system of patterned, freshwater peat lands extends throughout the WCAs into SRS in ENP. The ridge and slough wetlands drain into tidal rivers that flow through mangrove estuaries into the Gulf of Mexico. Higher elevation wetlands that flank either side of SRS are characterized by marl substrates and exposed limestone bedrock. Those wetland areas located to the east of SRS include the drainage basin for Taylor Slough, which flows through mangrove forests into northeast Florida Bay. The Everglades wetlands merge with the forested wetlands of BCNP to the west of WCA 3. CEPP South will include conveyance features that function to deliver and re-distribute existing water from WCA 3A to WCA 3B and NESRS of ENP which is the area of potential effect focused on in this EA. Reference **Figure 1-1** and **Figure 1-2**. Declines in ecological function of the Everglades have been well documented. Construction of canals and levees by the C&SF project has resulted in the creation of artificial impoundments and has altered hydroperiods and depths within the project area. The result has been substantially altered plant community structures, reduced abundance and diversity of animals, and spread of non-native vegetation.

3.2 Climate

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

3.3 Geology and Soils

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

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

3.4 Study Area Land Use

CEPP South will include conveyance features that function to deliver and re-distribute existing water from WCA 3A to WCA 3B and NESRS of ENP. WCA 3, located directly north of ENP, is part of the Everglades Complex of Wildlife Management Areas (EWMA) which are managed by the Florida Fish and Wildlife Conservation Commission (FWC). WCA 3 is often used as a location for a variety of cultural practices by the Miccosukee Tribe of Florida and provides abundant recreational opportunities. Several airboat concessionaires are setup along the Tamiami Trail along the southern border of WCA 3.

3.5 Hydrology

The major characteristics of south Florida's hydrology are: (1) local rainfall; (2) evapotranspiration; (3) canals and water control structures; (4) flat topography; 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 and ENP located south of Tamiami Trail. The WCAs provide detention storage for water from Lake Okeechobee, the EAA, and parts of the east coast region. Detention of water helps prevent floodwaters from inundating the east coast urban areas; provides water supply and detention for east coast urban and agricultural areas and ENP; improves the water supply for east coast communities by recharging underground freshwater aquifers; reduces seepage; and provides control for saltwater intrusion in coastal aquifers. While the WCAs may reduce the severity of the drainage of the Everglades caused by the major canal systems, thus reducing impacts to fish and wildlife caused by the major drainage systems, the levees surrounding the WCAs still function to impound the Everglades, precluding the historic flow patterns. The C&SF project infrastructure, combined with operational constraints, makes it difficult to provide natural

timing, volume, and distribution. In wet periods, water is impounded in the WCAs and then discharged to ENP or coastal canals for eventual release to tide. During dry periods, water can flow through the canals to coastal areas and bypass the ENP wetlands.

3.5.1 Water Conservation Areas 3A and 3B

The largest WCA is WCA 3, which is divided into two parts, 3A and 3B (refer to **Figure 3-1**). It is approximately 40 miles long from north to south and covers approximately 915 square miles. 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 lower east coast, as well as the SDCS. 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.

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 start of the dry season (November and December) during wet years. 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 WCA 3A Regulation Schedule. Overall, water stage decreases from northwest to southeast within WCA 3, consistent with the general direction of surface water flow and prevailing topography within WCA 3. Water depth is typically between one to two and a half feet, with the shallower waters in the higher elevation northwestern portion of WCA 3. Water stages and depths in WCA 3B are typically much lower than water stages and depths in WCA 3A, due to limited surface water inflows into WCA 3B and the reduction of seepage from WCA 3A to WCA 3B consistent with the design purpose of the L-67A and L-67C levees. Water levels in WCA 3B are affected by seepage losses to the east towards the L-30 borrow canal and seepage losses to the south towards the L-29 canal.

Water supply deliveries from the C&SF project to coastal canals are utilized to recharge coastal well fields and to prevent saltwater intrusion into the Biscayne aquifer. When coastal 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 (WCAs and Lake Okeechobee). 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 groundwater system within the project 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 (for example, the L-37, L-33, and L-30 Canals), but to a lesser degree than the groundwater levels in coastal Miami-Dade County are influenced by the SDCS coastal canal network. The Biscayne aquifer and surface water canals are hydraulically connected and therefore groundwater levels are influenced by changes in surface water canal levels. 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.

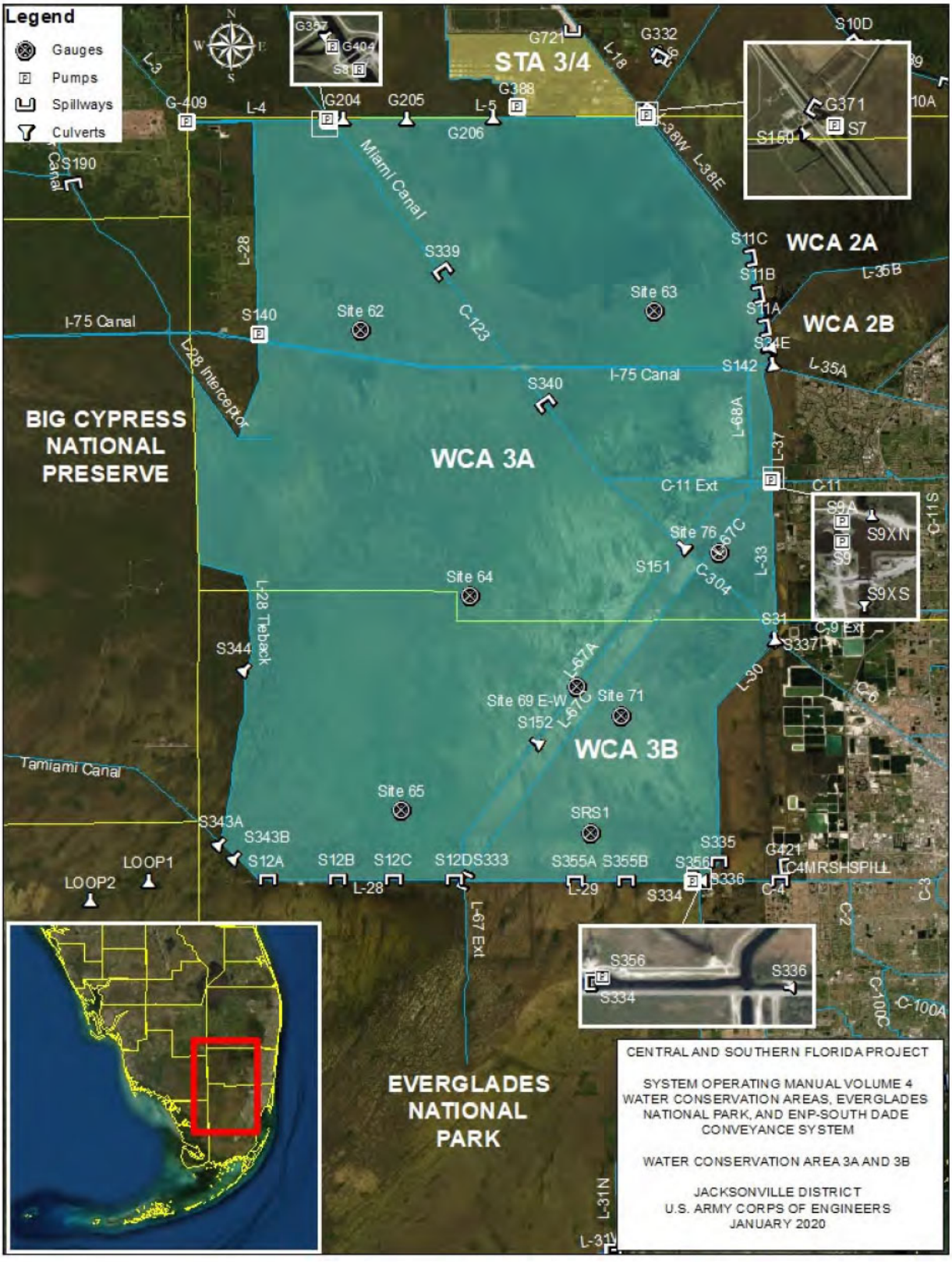


Figure 3-1. WCA 3A and WCA 3B Water Control Features

3.5.2 Everglades National Park

Northeast Shark River Slough (NESRS) is a complex area located in the northeast corner of ENP (refer to **Figure 3-2**). It is currently the northern terminus of SRS, which is aligned from the northeast to southwest across ENP. Tamiami Trail is the northern boundary, the L-31N canal the eastern boundary, and the L-67 Extension canal the western boundary of the NESRS. Prior to construction and operation of the C&SF project, NESRS would have been characterized as wet most of the year, but regional developments have reduced freshwater flow through the region. The consequence of reduced flows has been increased severity of seasonal drought and corresponding ecological risks of fire and soil loss. In addition, if historic levels are not maintained through the end of the wet season, significant reductions in surface water can occur during the dry season, below historic dry season levels.

Water enters NESRS primarily from WCA 3A via S-333 (with conditional inflows from S-333N), and then to the L-29 canal and subsequent passage through several sets of culverts, the one mile eastern Tamiami Trail bridge (completed as part of the MWD project in 2013), and the 2.3 mile western Tamiami Trail bridge (completed as part of the Department of Interior (DOI) Tamiami Trail Next Steps project in early 2019) under Tamiami Trail. S-355A and S-355B may also be used to deliver water from WCA 3B to the L-29 canal for subsequent passage through the bridge openings and culverts to NESRS, under conditions with a positive head between WCA 3B and the L-29 canal. Weekly WCA 3A water management release decisions are coordinated with ENP. Eastern portions of ENP are also influenced by the system of canals and structures that provide flood control and water supply for the LEC urban and agricultural areas.

Western SRS located to the west of L-67 Extension levee and bounded on the north by Tamiami Trail, is primarily influenced by rainfall and water management operations at the S-12 structures (A, B, C and D).

The Rocky Glades and Taylor Slough is in the southeast quadrant of ENP. The area through the Rocky Glades and Taylor Slough is higher in elevation compared to ground levels north, south, or west. Because of this characteristic, the area is normally drier than other areas in the ENP. The Rocky Glades and Taylor Slough are somewhat like an island or a peninsula extending from the canals into the ENP. The Rocky Glades form a slightly elevated plateau that gently slopes both south, towards Taylor Slough, and west towards Shark Slough. The flow at Taylor Slough includes contributions from the S-332D Detention Area and flow-way, southerly flow within the remnant L-31W canal (including significant seepage inflows from the S-332D Detention Area), and drainage from the adjacent ENP wetlands. During high water conditions, the Taylor Slough basin receives inflow from Shark Slough to the north, as the main Everglades flow-way spills across the Rocky Glades.

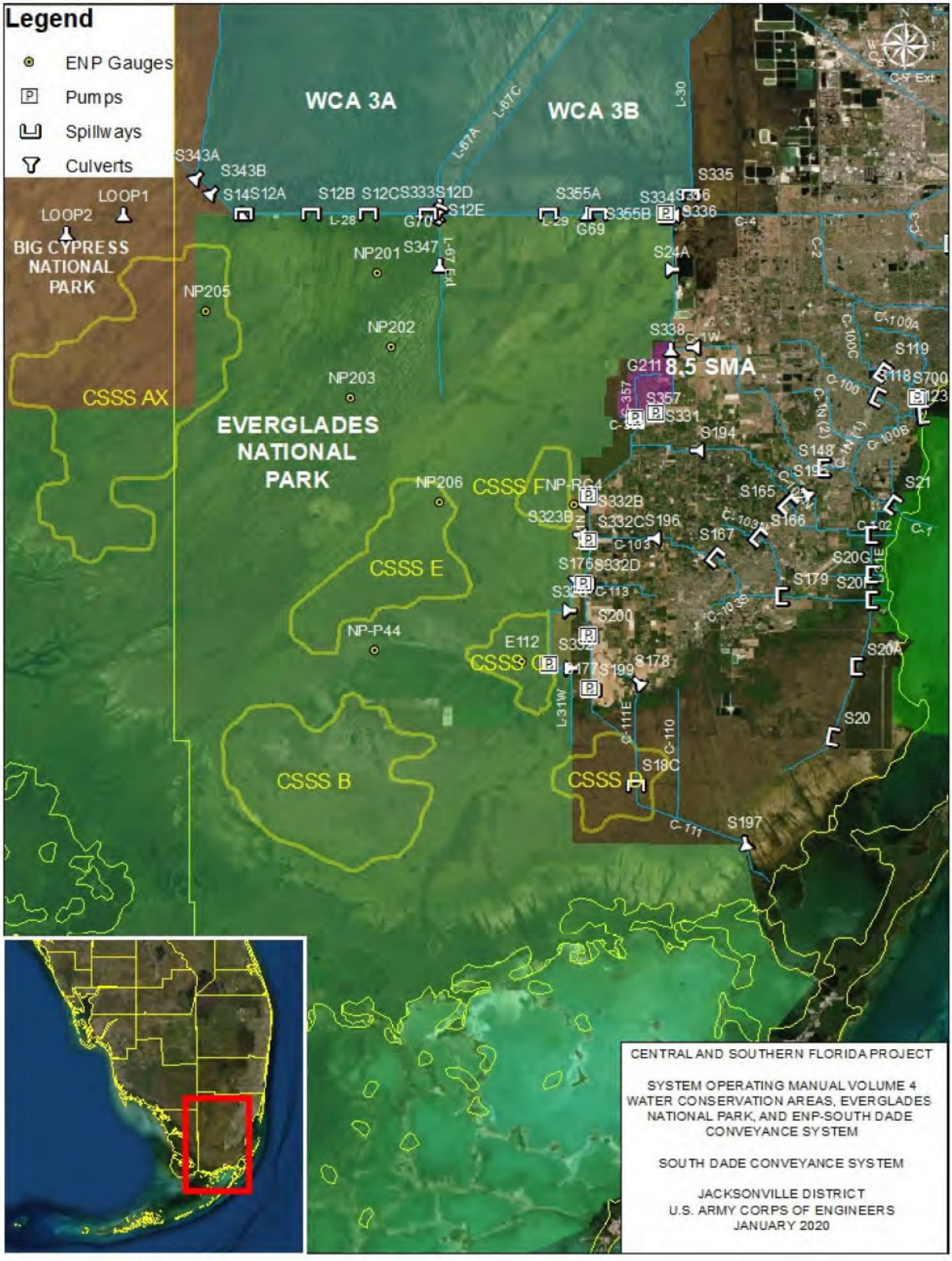


Figure 3-2. ENP and South Dade Conveyance System Water Control Features

3.5.3 Lower East Coast Area

The Lower East Coast (LEC) area is located to the east of the L-31N, L-31W, and C-111 canals. Under current water management operations, specified canal water levels/ranges are meant to provide flood protection, water supply, and prevention of saltwater intrusion for the LEC. Water supply deliveries from the C&SF Regional System to the LEC can be provided from WCA 3A and Lake Okeechobee according to their respective regulation schedules. In wet conditions, the excess water from the LEC is discharged to tide.

3.5.4 8.5 Square Mile Area

The 8.5 SMA is a primarily residential area adjacent to, but west of, the L-31N canal. The 8.5 SMA, which is also known as the Las Palmas community, is bordered on both the west and north by NESRS. In 2000, the Corps prepared the MWD General-Reevaluation Report/Supplemental Environmental Impact Statement (GRR/SEIS) to assist in the selection of a recommended plan for providing flood mitigation to the 8.5 SMA while allowing for restoration of the NESRS as authorized by the MWD project. Consistent with the 1992 MWD General Design Memorandum (GDM) analysis, it was a requirement of the reevaluation to analyze alternatives that provided no increase in flooding above and beyond what existed prior to the authorization of the MWD project. As a result of the Corps implementing the 8.5 SMA flood mitigation project, the Las Palmas community has water management infrastructure consisting of a perimeter levee, a seepage collection canal, a pump station (S-357), and a southern detention area meant to collectively provide flood mitigation as part of the MWD project (USACE 2000). An additional seepage collection canal along Richmond Drive (C-358) has been operational since April 2016 to manage water stages within the southwest corner of the 8.5 SMA. The gated water control structure (S-357N) at the junction of the C-358 and C-357 canals was completed in February 2018, which replaced the temporary by-pass culverts used during the first two years of the MWD Incremental Field Tests to maintain C-358 canal stages.

The 2020 Draft COP EIS technical evaluations of the COP recommended plan, ALT Q+, concluded that the 8.5 SMA Congressionally authorized Flood Mitigation constraint compliance is achieved for all interior 8.5 SMA locations, consistent with the methodology applied for the 2000 GRR. The COP EIS further determined that annual operations of the L-29 canal up to 8.5 feet, NGVD (Sensitivity Run SRQ1 in the COP EIS) did not demonstrate compliance with the complete suite of established 8.5 SMA flood mitigation constraint metrics for all interior locations, with 2-3% of the 8.5 SMA Protected Area indicates an temporary increase in peak stage (up to 0.5 ft.) and these locations receiving no significant reduction in inundation duration. The COP analysis determined that these operations may be partially or fully implementable if the 8.5 SMA effectiveness is both underestimated in the COP modeling and the L-29 canal FDOT constraints are revised or later removed (e.g. TTNS). To this end, the proposed COP Water Control Plan will incorporate real-time monitoring in an effort to further increase the frequency and duration of L-29 canal operations above 8.25 feet, NGVD, while continuing to balance system-wide performance and maintaining compliance with constraints. However, these conclusions from the COP support the necessity for continued in-depth evaluations of 8.5 SMA flood mitigation during the development of future CERP operational plans.

Throughout CERP implementation, the 8.5 SMA features must continue to provide mitigation for the increased water levels that will occur once the CERP projects, including CEPP South, are fully implemented and the associated CERP additional water flows are delivered to ENP. The 8.5 SMA flood mitigation features do not work independently, as full mitigation is dependent on both the MWD 8.5 SMA features

and the C-111 South Dade project features. The completed MWD and C-111 South Dade projects work together to provide the authorized 8.5 SMA flood mitigation, as demonstrated in the 2020 COP Final EIS through the completed implementation of MWD including raising of the L-29 canal maximum operating limit up to 8.5 feet, NGVD. The hydraulic connection between the 8.5 SMA and the NDA creates an interdependency between MWD and C-111 South Dade project operations which affects the flood mitigation performance for the MWD 8.5 SMA components, the flood protection performance of the C-111 South Dade project components, and the hydrologic/ecological benefits for both the COP and future CERP projects.

Development of the COP utilized regional hydrologic modeling in order to balance the ecological restoration objectives of the MWD and C-111 South Dade projects while demonstrating compliance with the project constraints, which include requirements to maintain seepage mitigation for the project in the 8.5 SMA, and to maintain the level of flood damage reduction authorized in the 1994 C-111 GRR recommended plan. The results from the COP analyses were used in the 2020 COP EIS to update the flood mitigation analysis for the 2000 8.5 SMA GRR and to update the flood risk management analysis from the 1994 C-111 South Dade GRR, which did not originally identify inter-basin transfer of water from the MWD 8.5 SMA to the C-111 South Dade project lands. The evaluation metrics for the closeout of the MWD Project under the COP will continue to be applied to verify adherence to the 8.5 SMA flood mitigation constraint during CERP implementation.

3.5.5 Florida Bay

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

3.6 Regional Water Management Operations

The C&SF project contains multiple water bodies created by the existing C&SF levee infrastructure and implementation of the water management operating criteria, including WCA 1, WCA 2, and WCA 3. Associated with the inflow to and discharge from the water bodies is an infrastructure of structures and canals that are managed by the implementation of water management operating criteria that can include specified water levels or ranges. The WCA 3A Interim Regulation Schedule, which was implemented with the 2012 Water Control Plan update for the Master Water Control Manual for the WCAs, ENP, and the SDCS (ERTP), is a compilation of water management operating criteria, guidelines, rule curves, and specifications that govern storage and release functions. The MWD Incremental Field Tests, including the current Increment 2 Field Test, have been implemented as temporary, planned deviations to the ERTP. Operational criteria which are not specifically changed by the operational strategy for the Increment 2 Field Test remain governed by the ERTP. 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. Current regional water management operations are defined by the 2012 Water Control Plan for the WCAs, ENP, and ENP to SDCS (USACE 2012) and the MWD Increment 2 Field test (USACE 2018). The proposed COP Water Control Plan is anticipated to supersede the 2012 Water Control Plan in August 2020.

Water deliveries to eastern ENP (NESRS) are controlled by the stage in L-29 canal (refer to **Figure 3-2**), as pressure from the water within the canal (hydraulic head), is required to force water through the Tamiami Trail culverts and the bridge openings into ENP. As the L-29 canal stage increases, more water is forced beneath the road through 14 remaining sets of culverts (40 total culverts, three culverts per set in most locations), the one mile bridge, and the 2.3 mile western bridge spans. The MWD Tamiami Trail Modifications (TTM) project, which was completed in December 2013, included construction of the one mile bridge and Tamiami Trail roadway reconstruction/resurfacing to allow for the maximum operating stage in the L-29 canal to be raised from 7.5 feet to a maximum of 8.5 feet, NGVD. The L-29 canal inflow structures (S-333, S-355A/B, and S-356) are currently operated with the intention of limiting event durations with L-29 canal stages above 8.5 feet, NGVD to a target maximum duration of 72 hours. Once the stage in the L-29 canal reaches a stage of 8.5 feet, NGVD, input from all structures that discharge into the canal (S-333, S-355A/B, and S-356) shall be stopped until the level in the L-29 canal recedes below 8.5 feet, NGVD. For each water year (May through April), the L-29 canal inflow structures is currently managed to limit the duration of L-29 canal stages near 8.5 feet (as measured at the S-333 TW), NGVD to 90 cumulative days or to a maximum of 90 consecutive days. The number of either cumulative or consecutive days in each period (only one period per water year) is measured when L-29 stages exceed 8.3 feet, NGVD. Continued L-29 structure inflows which result in consecutive durations with L-29 canal stages at 8.5 feet, NGVD for longer than 90 days require written approval from the FDOT. The L-29 stage is maintained at or below 8.5 feet, NGVD by ceasing inflow into L-29 when the L-29 stage rises above 8.5 feet, NGVD. Event driven criteria is followed in accordance with Table 1 of the Increment 2 operational strategy and the future COP Water Control Plan, based on consideration of the Quantitative Precipitation Forecast (QPF). Continued L-29 structure inflows which result in consecutive durations with L-29 canal stages above 8.3 feet for longer than 90 days requires written approval from the FDOT, given evaluation of the monitoring data by FDOT in coordination with the Corps.

Independent of the COP and CEPP South, as Phase 2 of the Tamiami Trail Next Steps Project, the DOI is partnering with the State of Florida to re-construct the non-bridged roadway sections and to install additional bridges along the remaining portions of the Tamiami Trail roadway between S-333 and S-334 (L-29 canal reach) to accommodate the design high water stage of 9.7 feet, NGVD that is planned for full implementation of the CERP. Design efforts are ongoing concurrent with the CEPP South operational planning, and construction completion is currently anticipated by late 2024. Completion of the roadway modifications would allow for written approval from the FDOT to remove the L-29 canal constraint identified in Appendix A (Water Control Plan), independent of the joint evaluation of monitoring data for the existing roadway by the Corps and the FDOT under the MWD Increment 2 Field Test and following the implementation of the COP implementation. Although the Tamiami Trail Phase 2 Roadway Modification project is anticipated for completion by late 2024 (in advance of the other assumed conditions for the 2027 no action alternative), the COP hydrologic modeling and analysis demonstrated that operational planning efforts which remove this constraint will result in increased wet season deliveries NESRS and reduced water availability for the ensuing dry season. Based on the potential unavoidable adverse effects that may occur as a result of the COP preferred plan, including increased risk of low-water conditions in WCA 3A, the 90-day constraint for the L-29 canal was retained for the CEPP South action alternatives

evaluated within this report. When a permanent update to the 2020 Water Control Plan (COP) is pursued in the future, pending further certainty regarding the schedule for implementation of upstream operational changes that will supply additional inflows south to WCA 3A, this assumption will be removed for hydrologic modeling in support of operational planning.

3.7 Flood Risk Management

Water management and flood control is achieved in south Florida through a variety of canals, levees, pumping stations, and control structures within the WCAs, ENP, and SDCS. The WCAs provide a detention reservoir for rainfall over the WCAs, excess water from the EAA and parts of the east coast region, and for flood discharge from Lake Okeechobee to tide. The WCAs provide levees to prevent the Everglades floodwaters from inundating the east coast urban areas; provide a water supply for the east coast areas and ENP; improve water supply for east coast communities by recharging underground freshwater aquifers reduce seepage; ameliorate salt-water intrusion in coastal well fields; and provide mixed quality habitat for fish and wildlife in the Everglades.

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

3.8 Water Supply

The majority of water supply demands for existing legal users in the South Dade area are met with groundwater from the Biscayne aquifer. The top of the Biscayne aquifer in this area is at land surface and is directly recharged by rainfall and seepage from ENP to the west. The modeling tool used for this operational plan (RSM-GL) is primarily a surface water model and does not provide water levels (stages) below the shallow water table. Because recharge to the Biscayne aquifer is directly affected by canal stages during the dry season, changes in canal stages can be used to predict impacts to the underlying Biscayne aquifer as a result of the modeled alternatives. A prolonged reduction in canal stages will affect groundwater levels, which could result in movement of saline water into the Biscayne aquifer, causing harmful impacts to water supply well fields during drought conditions. Maintaining canal stage elevations for water supply and prevention of saline water intrusion are essential purposes of the C&SF project that must be maintained throughout CERP implementation.

3.9 Vegetative Communities

The Everglades landscape is dominated by a complex of freshwater wetland communities that includes open water sloughs and marshes, dense grass- and sedge-dominated marshes, forested islands, and wet

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

3.10 Fish and Wildlife Communities

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

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

Within the Greater Everglades, numerous sport and larger predatory fishes occur in sloughs and in deeper canals. Common species include largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), redear sunfish *(Lepomis microlophus*), black crappie (*Pomoxis nigromaculatus*), Florida gar (*Lepisosteus platyrhincus*), yellow bullhead (*Ameiurus natilis*), and bowfin (*Amia calva*) (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 (*Pseudobranchus striatus*), two-toed amphiuma (*Amphiuma means*), pig frog *(Lithobates grylio*), southern leopard frog (*Rana sphenocephala*), Florida cricket frog (*Acris gryllus*), southern chorus frog (*Pseudacris nigrita*), squirrel tree frog (*Hyla squirella*), and green tree frog (*Hyla cinerea*) (USACE 1999). Amphibians also represent an important forage base for wading birds, alligators, and larger predatory fishes (USACE 1999).

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

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

Mammals that are well adapted to the aquatic and wetland conditions of the freshwater marsh complex include the marsh rice rat (Oryzomys palustris), 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*).

3.11 Threatened and Endangered Species

3.11.1 Federally Listed Species

The Corps has coordinated with the United States Fish and Wildlife Service (USFWS) in accordance with Section 7 of the Endangered Species Act (ESA), to determine federally listed threatened and endangered species that are either known to occur or are likely to occur within the project area. Reference **Table 4-13**. Further details on the life history of each species can be found in the Biological Assessment (BA) in **Appendix D.1** and related ESA correspondence. **Figure 3-3** provides the location of federally listed threatened and endangered species with the potential to occur within the project area.

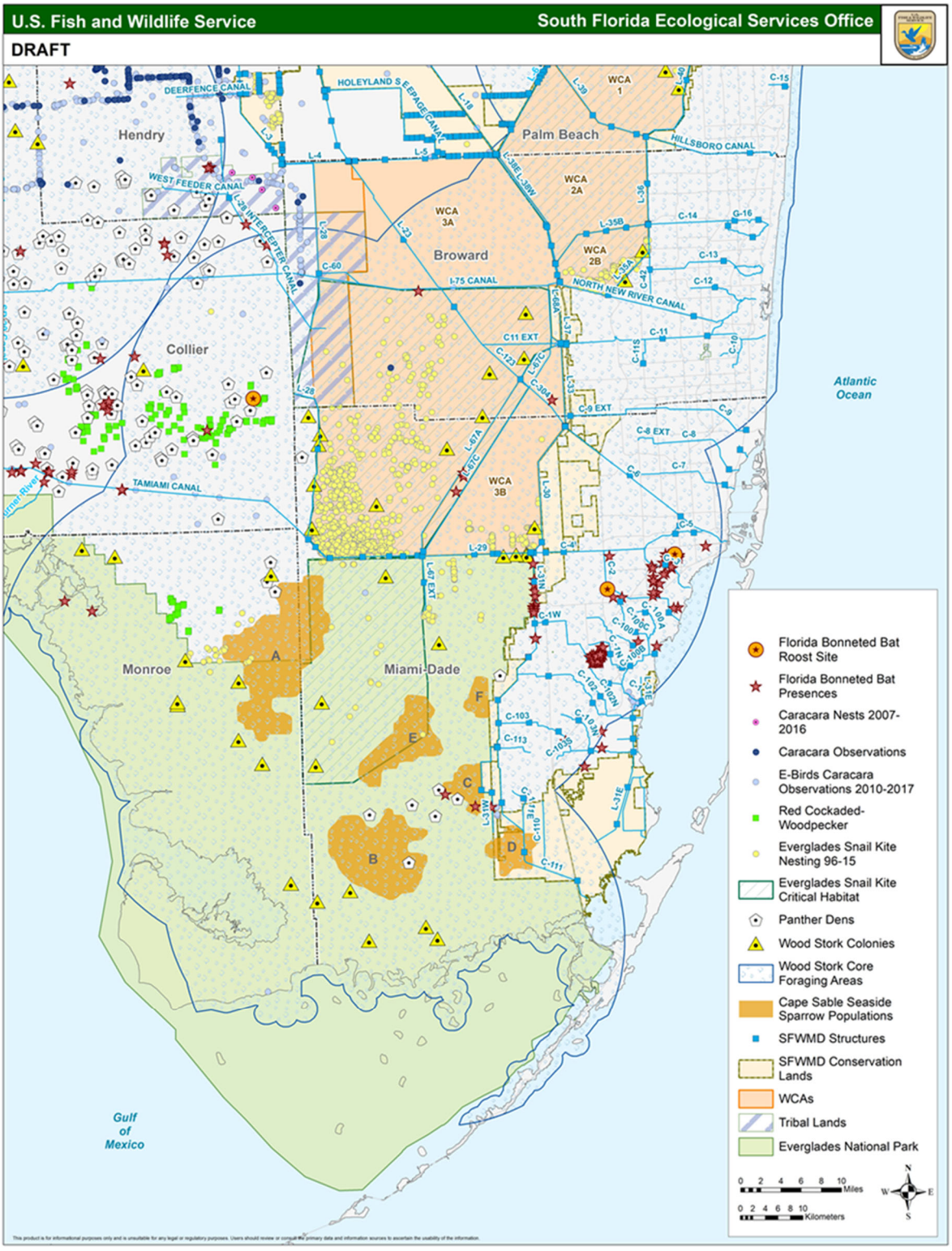


Figure 3-3. Location of federally threatened and endangered species in south Florida.

3.11.2 State Listed Species

The project area provides habitat for several state listed species (**Table 3-1**). State listed species with the potential to occur in the project area were determined on a review of species and their ranges from the FWC Florida's Imperiled Species Management Plan dated 2016–2026 (FWC 2016).

Table 3-1. State listed species within the project area (T: Threatened)

Common Name	Scientific Name	Status
Mammals	-	-
Everglades mink	*Mustela vison evergladensis*	T
Birds	-	-
Black skimmer	*Rynchops niger*	T
Least tern	*Sterna antillarium*	T
White-crowned pigeon	*Patagioenas leucocephalus*	T
Little blue heron	*Egretta caerulea*	T
Tricolored heron	*Egretta tricolor*	T
Reddish egret	*Egretta rufescens*	T
Roseate spoonbill	*Platalea ajaja*	T
Florida sandhill crane	*Antigone canadensis pratensis*	T
Southeastern American kestrel	*Falco sparverius paulus*	T

3.12 Essential Fish Habitat

The NMFS Southeast Region's Habitat Conservation Division (HCD) implements the Essential Fish Habitat (EFH) program in the coastal states from North Carolina south through Texas, as well as the territories of Puerto Rico and the U.S. Virgin Islands. One of the principal authorities for protecting and conserving marine fishery habitats is the EFH provisions of the Magnuson–Stevens Fishery Conservation and Management Act. The Magnuson-Stevens Act, defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity." 16 U.S.C. § 1802 (10). The Magnuson-Steven's Act created regional fishery management councils to advise the NMFS on fishery management issues. Three regional fishery management councils exist within the area encompassed by the NMFS Southeast Region: (1) Gulf of Mexico; (2) South Atlantic and (3) Caribbean. The southern estuaries contain EFH for corals; coral reef and live bottom habitat; red drum (*Sciaenops ocellatus*); penaeid shrimps; spiny lobster (*Panulirus argus*); other coastal migratory pelagic species and the snapper-grouper complex. EFH in the southern estuaries is comprised of seagrasses, estuarine mangroves, intertidal flats, the estuarine water column, live/hard bottoms, and coral reefs.

3.13 Water Quality

Water quality in the project area is significantly influenced by development, landscape modifications, and water management infrastructure. The northern WCAs are fed from Lake Okeechobee as well as runoff from the EAA. Typically under normal conditions all water from Lake Okeechobee and the EAA is routed through the STAs. The STAs were constructed to reduce total phosphorus from surface water runoff primarily from the EAA basin, but can also treat water released from Lake Okeechobee. Water quality delivered to the WCA's from Lake Okeechobee/EAA source water treated by the STAs has significantly improved (i.e., lower nutrient loading/concentrations) over the past 27 years (SFER, 2020). Water quality

impairment within the project area can generally be attributed to nutrients and bioavailable forms of mercury. Since bypass of the STAs have been essentially eliminated (except under extreme environmental conditions), the water quality of the project area is primarily influenced by legacy nutrient loading (i.e., previous nutrient loading delivered to the project area which remains in the project soils and can leach out for many years), untreated discharges from the S-9, and weather conditions/rainfall patterns. Dry-out conditions in the marsh/urban areas served by the S-9 and within the WCAs followed by high rainfall events are associated with release of oxidized nutrients into the water column from peat, sediments, and vegetation.

Water quality within WCA 3 is largely controlled by Lake Okeechobee and the EAA to the north, untreated discharges from the S-9 from the east, Mullet slough and the L-28 interceptor to the west, and urban and agricultural development southeast of ENP. Except for receiving water released from Lake Okeechobee and run-off from the EAA, WCA 3 (i.e., WCA 3A and WCA 3B) has been an impounded (surrounded by levees) rain driven system since the 1960s. Inflows into WCA 3B from WCA 3A via the L-67A canal have only occurred through a brief testing period in the late 1990s and more recently with the DPM project. Soils in WCA 3B have notably limited nutrient enrichment compared to WCA 3A due to the impoundment condition and limited exchange of water between the two compartments that has maintained relatively low nutrient concentrations in WCA 3B. Hydrology within WCA 3B has been extensively disrupted by impounding the area and dissecting WCA 3B from WCA 3A. Peat oxidation and subsidence has occurred in WCA 3B due to increased dry-outs caused by the existence of agricultural canals from pre-C&SF activities and lower water levels compared to WCA 3A.

The Corps does not control the quality of the water which enters or exits the system. Instead, the primary authority for managing the nutrient levels and overall quality of the water entering the project area and surrounding watersheds is the State of Florida. As such, the Corps relies upon the appropriate state agencies to determine the quality of the water and to ensure the water meets acceptable state water quality standards. In managing its projects, the Corps routinely coordinates with the FDEP, the State of Florida Department of Health (FDOH), the U.S. Department of Health & Human Services (HHS) (e.g., Agency for Toxic Substances and Disease Registry), U.S. Geological Survey (USGS), and the U.S. Environmental Protection Agency (USEPA).

Nutrients such as phosphorus and nitrogen compounds are a concern in the WCAs and ENP since they result in an imbalance of flora and fauna. To address nutrient discharges the FDEP has recently established surface water quality numeric nutrient criteria for most Florida water bodies and developed Maximum Daily Loads (TMDLs) for many watersheds with excessive nutrient pollution. Additional information on the status and implementation of TMDLs within the project area can be found at http://www.dep.state.fl.us/water/tmdl/. Within the Everglades Protection Area (EPA), phosphorus concentrations are regulated by Florida Administrative Code Rule 62-302.540, “Water Quality Standards for Phosphorous Within the Everglades Protection Area.” In addition, STA discharges must comply with the terms of the applicable National Pollution Discharge Elimination (NPDES) permit and meet water quality based effluent limitation requirements. The State is subject to a Consent Decree entered in United States v. South Florida Water Management District, et. Al., Case (No. 88-1886-CIV-Morneo (S.D. FLA., which established, among other things, long-term water quality limits for water entering ENP). WCA 2 and WCA 3 are Class III waters with additional phosphorus constraints not applicable to other Class III waters. According to Florida Administrative Code Rule 62-302.540, “[t]he numeric phosphorus criterion for Class III waters in the EPA shall be a long-term geometric mean of 10 ppb, but shall not be lower than the natural conditions of the EPA, and shall take into account spatial and temporal variability. Achievement of the criterion shall be determined by the methods in this subsection. Exceedances of the provisions of this

subsection shall not be considered deviations from the criterion if they are attributable to the full range of natural spatial and temporal variability, statistical variability inherent in sampling and testing procedures or higher natural background conditions."

TP is the primary nutrient of concern within WCA 3 and NESRS. SRS compliance for Water Year (WY) 2019 (October 1, 2018-September 30, 2019) was calculated using two methods, Method 1 and Method 2. Method 1 considers flows at the S-12, S-333, S-355A, S-355B, and S-334 structures, while Method 2 also considers flow at S-356 in addition to the Method 1 structures. SRS exceeded compliance limits using both methods in WY 2019 with annual Flow Weighted Mean Concentration (FWMC) of 10.4 parts per billion (ppb) for Method 1 and 9.6 ppb for Method 2. The WY 2019 long-term limit for SRS for Method 1 was 9.8 ppb and for Method 2 was 9.3 ppb. SRS was in compliance for WY 2018.

Sulfur reducing bacteria (SRB) is considered one of the primary drivers of mercury methylation within the Everglades system. The COP, which is anticipated to replace the 2012 Water Control Plan in August 2020, is expected to increase and slightly shift methyl mercury production within the Everglades system due to the additional water volumes expected to be delivered to NESRS. The shift in the distribution of water deliveries as well as additional sulfate loading may result in a shift of mercury concentrations in fish related to SRB activity within the Everglades system. Atmospheric mercury deposition was off its mid-1990s high, which is thought to be the cause of the reduction in bio-accumulated mercury observed in fish over this time period, it is likely that future methylation and bioaccumulation that occurs after the implementation of the COP will not exceed the peak concentrations seen 20 or so years ago unless atmospheric loading increases. Mercury methylation patterns are tracked by collection and analysis of fish tissue by the ENP and the State of Florida.

3.14 Hazardous, Toxic or Radioactive Waste

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 in WCA 3A and WCA 3B as part of this project since the lands have no history of prior agricultural or industrial use that would cause such contamination. A Phase I Ecological Site Assessment was completed on April 22, 2020 for Contract 1 features along the L-67A and L-67C levees and the east-west agricultural ditch. The Phase 1 assessment revealed no evidence of Recognized Environmental Concerns located in the project area.

A search of the FDEP petroleum spill and petroleum storage sites database done in April 2020 identified four active petroleum storage sites and two petroleum spill cleanup sites along Tamiami Trail between S-333 and S-356. Petroleum storage facilities include Everglades Safari Park, WAXY Transmitter Tower south of Tamiami Trail, and at the S-333 and S-356 structures operated by the SFWMD. Petroleum spill cleanup sites include Everglades Safari Park and the S-356 structure.

3.15 Air Quality

Air monitoring reports are prepared annually by the FDEP to inform the public of the air pollutant levels throughout the State of Florida. All areas within the state are designated with respect to each of the six pollutants (carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), particle pollution (10 microns or less in diameter (PM_{10}), and 2.5 microns or less in diameter ($PM_{2.5}$), and sulfur dioxide (SO_2)) as attainment (i.e., in compliance with the standards); non-attainment (i.e., not in compliance with the

standards); or unclassifiable (i.e., insufficient data to classify). Attainment areas can be further classified as maintenance areas. Maintenance areas are areas previously classified as non-attainment which have successfully reduced air pollutant concentrations to below the standard. Southeast Florida including Miami-Dade County continues to be classified by the USEPA as an attainment/maintenance area for ozone and ozone has been gradually decreasing in the state since the late 1990s. Data collected by the state of Florida for the USEPA particle pollution standards for PM_{10}, and PM2.5 has never had a monitor with a design value exceeding either standard and $PM_{2.5}$ and PM_{10} levels are showing a decreasing trend across the state (Florida's Ozone and Particulate Matter Air Quality Trends (FDEP Website "Florida Ozone PM Trends" last modified August 22, 2019)).

3.16 Noise

Noise levels are associated with surrounding land use. Within the major natural areas of south Florida, external sources of noise are limited and of low occurrence. Existing sources of noise are limited to vehicular traffic travelling on roads adjacent to and cutting through the project area. Other sources of noise which may occur within these natural areas include airboats, off-road vehicles, swamp buggies, motor boats, occasional air traffic, and noise associated with operation of C&SF water management infrastructure (pump stations). Enclosure of the pump station equipment and use of hospital grade mufflers are used when pump stations are proximate to either residential or commercial (hotels etc.) areas to help reduce sound levels Sources of noise in rural areas include noise associated with agricultural production such as the processing and transportation of agricultural produce. Within the rural municipalities and urban areas, sound levels would be expected to be of greater intensity, frequency, and duration. Noise associated with transportation arteries, such as highways, railroads, primary and secondary roads, airports, operations at commercial and industrial facilities etc., inherent in areas of higher population would be significant and probably override those sounds associated with natural emissions.

3.17 Aesthetics

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

3.18 Native Americans

There are two federally recognized tribes [Miccosukee Tribe of Indians of Florida (Miccosukee Tribe) and the Seminole Tribe of Florida (STOF)] that are located within and adjacent to the project area (**Figure 3-4**). Both tribes maintain a strong connection to the project area through continued use and regard the indigenous populations of Florida as their ancestors. The project area includes a large segment of the Miccosukee Tribe's Alligator Alley Reservation which spans portions of WCA 3A, the Tamiami Trail Reservation Area which consists of three parcels of land used for commercial services, and the Miccosukee Reserved Area which is the center of the Miccosukee Indian population. In addition, both tribes have

leases and easements within WCA 3A and have historically recognized rights within ENP that stems from the Native Americans who lived within the ENP boundary prior to the Park's creation.

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

As early as 1894, the Federal governmental and later the State of Florida started to acquire lands within the Big Cypress area. However, initial attempts to relocate tribal members to these areas failed as there were simply no incentives to abandon traditionally occupied areas in favor of the new lands (Weisman 1999). "The Indian New Deal changed that, and for the first time, services, programs, and land were brought together…at Big Cypress" (Weisman 1999:125). In the 1930s, the Federal Government started to bring services to the various Seminole groups. Some of the groups relocated and started to receive Federal aid, while some groups resisted government intrusion into their lives and remained in various traditional areas that now included sites along Tamiami Trail (Weisman 1999). Throughout the next two decades the Federal Government instituted various aid programs to assist the Native American groups living within the reservations until the early 1950s. In the early 1950s, the Federal Government's policies radically changed, as it was felt that native groups should now join "mainstream society" and that Federal aid should come to an end (Weisman 1999:131). Being faced with a reduction in support and possible termination of recognition as a group by the government, various Native American groups on these reservations began to organize and form their own tribal governments to assist in the protection of their interests. In 1957, the STOF 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 Tribe 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 STOF 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 STOF has a lease within the northwestern portion of WCA 3A.

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.

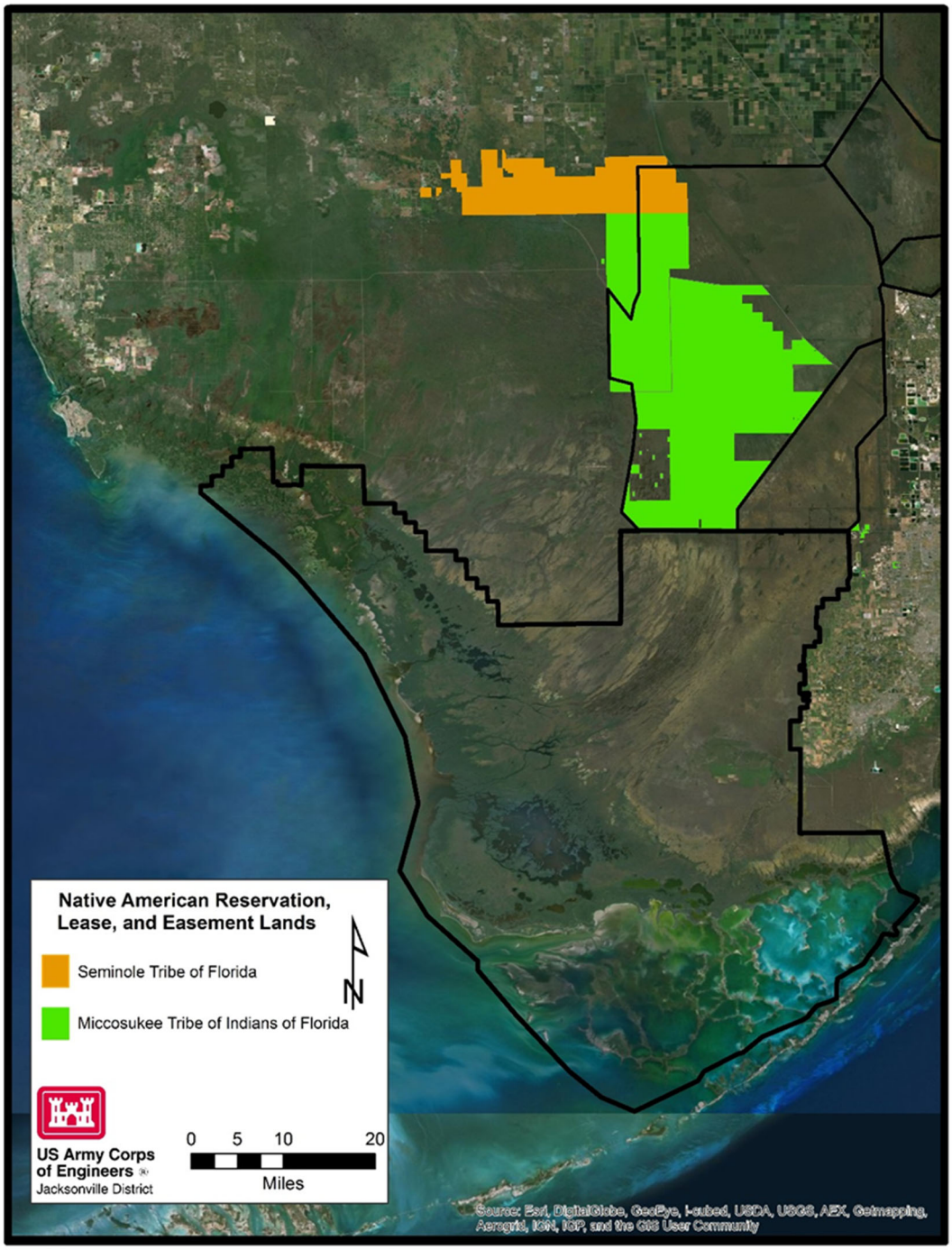


Figure 3-4. Map outlining the location of Tribal Reservation, Leased and Easement Lands

3.19 Cultural Resources

Within the larger region that includes ENP and WCA 3, there are numerous recorded archeological sites indicative of Native American habitation. Prior to European contact, the Everglades were a heavily populated area. Native Americans traveled via canoe and on foot through the sawgrass and inhabited many of the tree islands that dot the landscape. The earliest known habitation sites date to the Early

Archaic period (7500 BC) when the Everglades were much drier. However, within the larger area of south Florida, evidence of Paleo-Indian (12,000 to 7500 BC) habitation has also been recorded (i.e. Warm Mineral Springs (8SO18) and Little Salt Spring (8SO79) (Griffin 1988). Some of the Early Archaic habitation sites have only recently been rediscovered as the result of managed drainage programs in south Florida. As the climate warmed and sea level rose, many Native Americans abandoned the lowest of the tree islands as they became submerged. This process continued through what is known as the Middle Archaic, until climate conditions stabilized around 300 BC at the start of the Late Archaic. Today, many sites from both the Early and Middle Archaic periods are no longer submerged and may have more modern Native American use.

After the Archaic period, the region became incorporated into what is known as the Glades region and remained inhabited until European contact, when Old World diseases and slave raiding heavily reduced the Native populations during the late 1500s-1700s. Many of the tree islands through this portion of the Everglades have sites associated to the Glades period. This period has been broken down into successive stages starting with Glades I, which dates from 500 BC to AD 750, Glades Period II dating from AD 750 to 1200, and Glades Period III dating from AD 1200 to European contact in the 1500s. Typical habitation sites through this region are commonly referred to as middens, which are the accumulation of daily life activities on these tree islands. Material remains can stretch from the surface to well over one meter below the surface on certain islands. Native American burials can also be found among these habitation sites.

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

The broad region of ENP and WCA 3 has been subject to numerous cultural resource investigations and has 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.

There are 11 archaeological sites, 1 historic structure, 1 historic bridge, 5 historic canals and levees, and 2 historic and archaeological districts recorded within one-half mile of CEPP South features in the Florida Master Site File. One of these resources, the Shark River Slough Archaeological District (8DA06693 and 8MO03444), is listed in the National Register of Historic Places (reference number 96001181). Six of the archaeological sites are recorded only on the basis of historic aerial photography. The Florida State Historic Preservation Officer (SHPO) has found four of the remaining sites, all prehistoric middens, eligible for listing in the National Register of Historic Places (NRHP). The L-67A canal culvert, located at the confluence of L-67A and Tamiami Trail, and FDOT Bridge Number 870031, part of Tamiami Trail, have also been recorded as eligible for listing in the NRHP. The linear resources of the Tamiami Trail, the Tamiami Canal, and the L-67 Extension Canal have all been recorded as eligible for listing in the NRHP, as has the Airboat Association of Florida historic district.

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3.20 Recreation

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

4 ENVIRONMENTAL EFFECTS

Section 4 describes anticipated changes to the existing environment including direct, indirect, and cumulative effects. This assessment evaluates the anticipated environmental effects of ALTB2 and ALTB4 relative to the no action alternative (CSB2027).

For this analysis, intensity was rated as follows:

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

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

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

As stated in **Section 2.3**, ALTB4 utilizes operations from the 2020 COP Final EIS, as defined in the Appendix A (COP Water Control Plan), to define operating criteria for the partial implementation of CEPP South features and other existing infrastructure within the C&SF water management system (including S-152) for the WCAs, ENP, and ENP to SDCS, consistent with CSB2027 and the other action alternatives. However, ALTB4 was not explicitly modeled as part of the hydrologic modeling conducted during the CEPP PED phase to support a quantitative assessment of the Savings Clause requirements for the CEPP South features. Without the ability to conduct an independent, quantitative assessment through reliance on hydrologic modeling, the operational criteria for ALTB4 were methodically developed to maintain near equivalency with the regional water volume distribution between WCA 3A, WCA 3B, and ENP established under the COP to ensure hydrologic similarity to the CSB2027 base condition that was modeled. A complete description of potential environmental effects resulting from implementation of operations as defined in Appendix A (COP Water Control Plan) of the 2020 COP Final EIS, can be accessed at the following link www.saj.usace.army.mil/COP. Information contained within the EIS is incorporated by reference into this EA.

4.1 Climate

The impact of current or projected effects of climate change on C&SF project operations is difficult to estimate given the uncertainty in predictions of future weather patterns and water management strategies. Higher average ambient temperatures may result in increased evapotranspiration. Rainfall events may become less frequent and larger in magnitude. As a peat soil ecosystem, increasing drought would reduce available water to keep the soils wet, resulting in higher peat oxidation and loss of soil

elevations in freshwater wetlands. Regional surface water storage systems (i.e. canals) will most likely experience more rapid water loss when compared to current water levels, ultimately impacting availability of water supplies. Sea level change is one of the more certain consequences of climate change, and because it affects the land/ocean interface, it has the potential for environmental impacts on coastal areas. Future rates of sea level change are expected to result in significant impacts on coastal canals and communities, with loss of flood protection and increased saltwater intrusion being the primary effects. Additionally, coastal ecosystems and estuaries are expected to be adversely affected and require additional deliveries of freshwater to maintain desirable salinity patterns and healthy ecosystems. The influence of climate change is not anticipated to alter the severity or nature of impacts resulting from implementation of ALTB2 or ALTB4 as compared to CSB2027. The overarching project need is to improve water deliveries (timing, location, volume) for the benefit of natural resources. Implementation of CSB2027, ALTB2 or ALTB4 would not result in significant impacts to the climate of south Florida.

4.2 Geology and Soils

Implementation of the no action alternative and action alternatives would not result in significant impacts to geology and soils. Short-term impacts to geology and soils would be construction-related and temporary. Disturbance to localized areas would occur due to installation of the temporary pumps adjacent to the L-29 canal with ALTB4. Removal of surface cover (vegetation and soil), removal of cap rock, and/or removal of limestone may occur. The temporary pumps would be installed across the L-29 levee between L-67A and the CEPP South L-67D. Since the location is west of S-355A, additional pump collection sumps may need to be installed immediately adjacent and north of the L-29 levee at the one or two selected optimal temporary pump locations. Some vegetation may be disturbed or removed. When the pumps are removed in advance of the L-29 levee segment removal under CEPP South Contract 5, the sump excavations would be returned to the pre-installation condition.

Existing canal and levee systems within the project area chronically affect current water patterns. If water levels decrease far enough below ground to dry out the surface of organic soils, peat or muck fires, can occur. Suppressing fires during extremely dry conditions is essential for protecting organic soils. Two performance measures (inundation duration and cumulative drought intensity (i.e. soil oxidation)) were used to evaluate the risk of soil oxidation across WCA 3 and ENP. Inundation duration is the percent period of time water levels are above ground surface over the modeled period of record (1965-2005). Cumulative drought intensity is the sum of the daily depth of stage below ground (negative ponded depth) across the modeled period of record (1965-2005). **Figure 4-1** depicts the difference in inundation duration for ALTB2 relative to CSB2027. Values greater than zero on the horizontal axis in **Figure 4-1** indicates increased inundation duration relative to CSB2027. Values less than zero indicate decreased inundation duration relative to CSB2027. **Figure 4-2** depicts the difference in cumulative drought intensity for ALTB2 relative to CSB2027. Values greater than zero on the horizontal axis indicate increased risk for soil oxidation relative to CSB2027. Values less than zero indicate decreased risk. ALT B2 increased inundation duration and decreased drought intensity in portions of WCA 3B and in portions of ENP, consistent with the general trend of slightly increased water levels in these areas with ALTB2. Observed differences in inundation duration between ALTB2 and CSB2027 at any given location were negligible to minor and ranged from +/- 2 PPOR of inundation.

When compared to CSB2027, ALTB2 resulted in increased water levels in WCA 3B east of the Blue Shanty Flowway (Site 71 gauge) by 0.1-0.3 feet for average and wet conditions and increased water levels of 0.1-0.2 feet during dry conditions. Water levels within the Blue Shanty Flowway were observed to increase by 0.1-0.4 feet for average and wet conditions. Similar increases in water levels during wet conditions

(0.0-0.1 feet) were observed in ENP in NESRS with ALTB2 at the NESRS1 and NP-G3272 gauges. Potential decreases in inundation duration and increases in drought intensity were observed in portions of WCA 3A, consistent with the general trend of slightly lower water levels in WCA 3A with ALTB2. When compared to CSB2027, ALTB2 resulted in decreased water levels in portions of east-central (gauge 3A-3) central (gauge 3A-4), and southern WCA 3A (gauge 3A-28) of less than 0.1 feet for all hydrologic conditions (wet, median, dry). Reference **Section 4.4**. Increases in inundation duration in portions of WCA 3B and in portions of ENP with ALTB2 may enable the promotion of peat accretion by potentially reducing soil oxidation. ALTB2 may have negligible to minor long-term beneficial effects on soils by decreasing cumulative drought intensity. A potential decrease in dry event severity relative to CSB2027, may reduce fire incidence; however it should be recognized, that the frequency of fires within the project area are primarily influenced by weather patterns combined with human-caused ignition sources during extreme dry conditions.

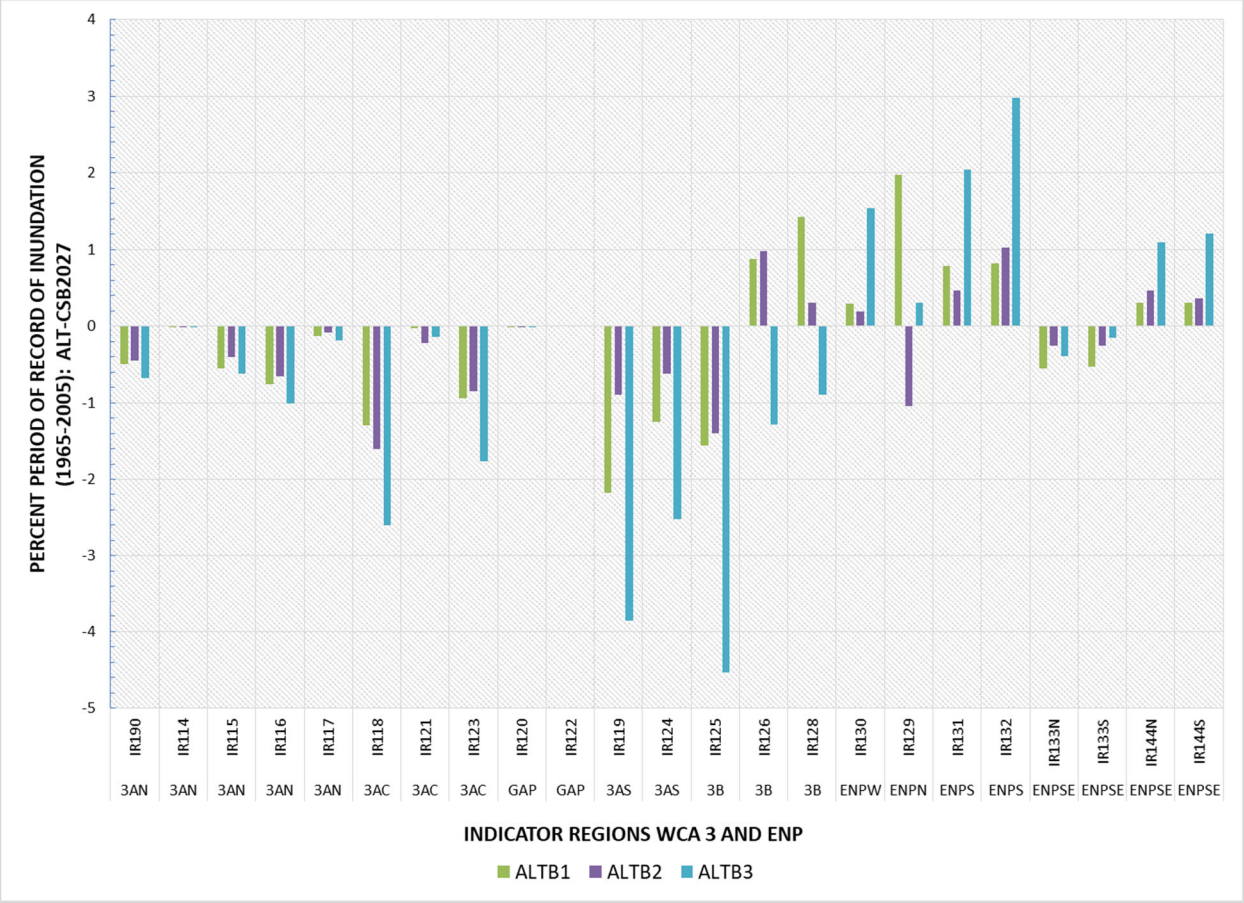

Figure 4-1. Difference in inundation duration (percent period of record in which water depth is above land surface elevation) for ALTB2 relative to CSB2027.

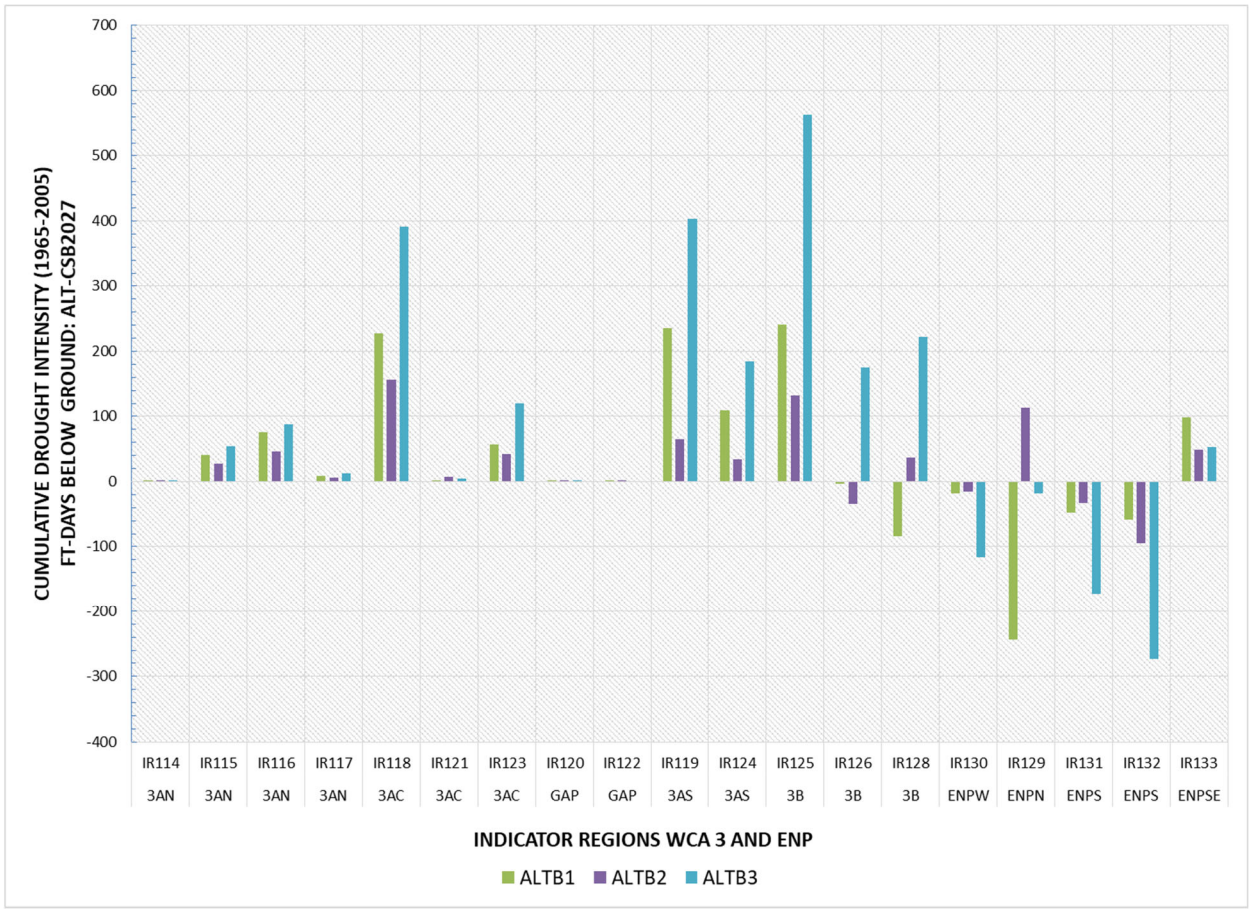

Figure 4-2. Difference in cumulative drought intensity (water depth relative to land surface elevation foot days below ground) for ALTB2 relative to CSB2027.

The hydrologic effects of ALTB4 would generally match CSB2027 for WCA 3, ENP NESRS, and ENP WSS. Water levels are expected to be similar. Construction and operation of S-631, S-632, S-633, and the L-29 canal temporary pumps, in conjunction with removal of a portion of the L-67C levee, and backfilling a portion of the east-west agricultural ditch is expected to improve hydrologic connectivity within the project area. Additional conveyance on the L-67A levee is expected to improve sheetflow in WCA 3B over a broader flow path than CSB2027, aiding in the restoration of natural drainage patterns that were altered as a result of the C&SF project. Improved hydrologic conditions in WCA 3B with ALTB4 may result in negligible to minor long-term beneficial effects for soils in WCA3B as discussed above; however the magnitude of beneficial effect in WCA 3B may be less as ALTB2 assumed the full build out of CEPP South features. Negligible to minor long-term adverse effects to soils in portions of WCA 3A where water levels are expected to decrease with ALTB2 may be further minimized with ALTB4.

For the interim operation with ALTB4, the CEPP South structures (S-631, S-632, and S-633) would be operated consistent with S-152 to maintain a water budget distribution between WCA 3A, WCA 3B, and ENP consistent with the CSB2027 (also similar to the 2020 COP Final EIS) and associated similar hydroperiod and hydropattern effects. S-631, S-632, S-633, and S-152 would collectively only be able to pass the equivalent volume currently allowed by the design capacity of S-152 which is 750 cfs to minimize the potential for over draining WCA 3A. The Site_71/SRS-1 stage constraint for WCA 3B of 8.5 feet NGVD would apply with ALTB4, consistent with current operations of S-152 under Phase 2 of the DPM Field Test.

CEPP South structures. ALTB2 and ALTB4, both provide increased operational flexibility to store water in the natural system.

4.3 Study Area Land Use

The primary use of land in the project area would continue to be agriculture and residential/commercial. CSB2027, ALTB2, and ALTB4 are not anticipated to change the way in which the land is used in the future.

4.4 Hydrology

The portion of the Greater Everglades within the CEPP South project area includes WCA 3A, WCA 3B and ENP. This section presents a general overview of the effect of alternatives on regional hydrology in these areas compared to CSB2027, including selected, representative performance measure graphics. For the evaluation of hydrological responses at various regions of the project area, RSM-GL model results were used. The RSM models uses a 41-year period of hydrologic record (1965 through 2005) which includes sufficient climatological variability (including natural fluctuations of water) to represent the full range of hydrologic conditions experienced within the South Florida region over a long-term period. RSM-GL simulates the region's complex hydrology using South Florida's climate records and technical details on regional canals, water control structures, local topography, and storage reservoirs. RSM-GL is better suited to evaluate the hydrological impacts in a regional scale than MD-RSM, which is mainly used to evaluate flood risk management for the C-111 South Dade Basin and the 8.5 SMA. In addition to the selected model output described in this section, a comprehensive suite of supplemental model outputs and performance measure graphics for the RSM-GL and MDRSM modeling results is provided in **Appendix E**, **Annex 2**.

Four alternatives, as described in **Section 2**, were simulated with RSM-GL: CSB2027, ALTB1, ALTB2, and ALTB3. Because the performance of ALTB4 closely resembles CSB2027 in terms of potential hydrologic effects in WCA 3A, WCA 3B, ENP, and the LECSAs, unique modeling of ALTB4 was determined to be unnecessary, and the hydrologic modeling outcomes from CSB2027 were utilized to support the quantitative hydrologic assessment of ALTB4. An overview of the hydrologic performance differences between alternatives ALTB2 and ALTB4, compared to the CSB2027 base condition, is provided in **Table 4-1**. To describe the hydrologic conditions and compare modeling scenarios, stage-duration curves are commonly used. A stage-duration curve is a plot showing the percentage of time a particular stage value is equaled or exceeded. They are versatile tools in evaluation of hydrological conditions and comparison of modeling scenarios. Stage duration exceedance analyses were developed at performance measure gauge locations for all alternatives. The key gauge locations were selected based on CEPP South features prioritizing WCA 3, the Blue Shanty Flowway, and the northern sloughs of ENP. The 10%, 50%, and 90% stage exceedance percentiles for all simulations were recorded to represent dry, median, and wet conditions, respectively, and presented in **Table 4-2** (refer to **Figure 12** in **Appendix E**, **Annex 2** for a map of monitoring gauges)**.** ALTB1, ALTB2, and ALTB3 were compared to CSB2027. If a stage at any given gauge and exceedance was higher than CSB2027, it was highlighted in green and conversely, if a stage was lower than the corresponding gauge and exceedance in CSB2027 simulation, it was highlighted in red. Individual gauge stage-duration exceedance plots can be found in **Appendix E.**

For all alternatives relative to CSB2027, there was a general trend of slightly lower water levels in WCA 3A, as visualized in **Table 4-3**. Conversely, higher water levels persisted across the majority of exceedances and alternatives within WCA 3B and the north-central reaches of the ENP. Further details and analysis were carried out for WCA 3A, WCA 3B, and ENP with respect to ALTB2, relative to CSB2027 and are in subsequent sections.

Table 4-1. Effects of the Alternatives on Hydrology

Geographic Region	Alternative	Performance Summary
Greater Everglades: WCA 3A and WCA 3B	CSB2027	High, Median, & Low stages (10%, 50%, & 90% exceedances, respectively) can be seen in **Table 4-2** for critical gauge locations.
	ALTB2	a) East-Central WCA 3A (3A-3): Minor adverse effect. Stages within WCA 3A slightly decrease by less than 0.1 ft. for all hydrologic conditions: wet, median, and dry. b) Central WCA 3A (3A-4): Minor adverse effect. Stages within WCA 3A slightly decrease by less than 0.1 ft. for hydrologic all conditions: wet, median, and dry. c) Southern WCA 3A (3A-28): Minor adverse effect. Stages within WCA 3A slightly decrease by less than 0.1 ft. for all conditions: wet, median, and dry. d) WCA 3B (site 71): Moderate to major improvements for average and wet conditions. Stages increased by 0.1-0.3 ft. Minor to moderate adverse effects during dry conditions with stages decrease by 0.1-0.2 ft. e) WCA 3B Blue Shanty Flowway: Moderate to major improvements for average and wet conditions with stages increased by 0.1-0.4 ft. Minor adverse effects during dry conditions with stages decrease by 0.0-0.1 ft.
	ALTB4	No significant change from CSB2027
Greater Everglades: ENP	CSB2027	High, Median, & Low stages (10%, 50%, & 90% exceedances, respectively) can be seen in **Table 4-2** for critical gauge locations.
		a) Western Shark Slough ENP (NP-201): Minor to moderate improvement for all hydrologic conditions with wet condition stages increasing 0.0-0.1 ft., moderate condition stages increasing 0.2-0.4 ft., and dry condition increasing stages 0.2-0.3 ft. b) Northeast Shark River Slough ENP (NESRS1 & NP-G3273): Minor improvements for wet conditions with stage increases 0.0-0.1 ft. Minor adverse effects for average and dry conditions with stages decreasing 0.0-0.1 ft. However, major increase in average annual overland flow into NESRS with increase of 105 kac-ft at Transect 18. c) Taylor Slough (NP-TSB): Negligible effects in stage and flows, as represented by transects 23A, 23B, & 23C.

Geographic Region	Alternative	Performance Summary
	ALTB4	No significant change from CSB2027

Table 4-2. Stage Exceedance Probabilities Developed from CEPP South RSM-GL Alternatives

-	CSB2027			ALTB1			ALTB2			ALTB3		
Gauge	**10%**	**50%**	**90%**	**10%**	**50%**	**90%**	**10%**	**50%**	**90%**	**10%**	**50%**	**90%**
WCA3A_3A-3	10.87	9.70	8.36	10.77	9.63	8.29	10.83	9.62	8.32	10.79	9.59	8.25
WCA3A_3A-4	10.44	9.43	8.42	10.35	9.37	8.39	10.38	9.35	8.40	10.36	9.31	8.37
WCA3A_3A-28	10.15	9.13	7.84	10.09	8.98	7.77	10.10	9.04	7.81	10.08	8.85	7.69
WCA3A_3GAVG	10.47	9.40	8.23	10.38	9.31	8.18	10.42	9.32	8.20	10.39	9.23	8.14
WCA3B_3B-71	8.13	7.21	6.39	8.30	7.61	6.41	8.31	7.49	6.42	8.31	7.47	6.23
WCA3B_BLUE_SHANTY	8.16	7.49	6.59	8.33	7.79	6.67	8.34	7.84	6.59	8.36	7.87	6.54
ENP_NP-205	6.90	6.39	4.82	6.87	6.38	4.79	6.87	6.39	4.81	6.88	6.38	4.79
ENP_NP-201	8.17	7.05	6.23	8.24	7.33	6.45	8.22	7.35	6.45	8.23	7.43	6.52
ENP_NP-34	3.33	2.50	0.82	3.31	2.50	0.83	3.30	2.54	0.88	3.30	2.56	0.94
ENP_NESRS1	7.94	7.51	6.26	8.05	7.42	6.37	8.03	7.45	6.19	8.04	7.51	6.30
ENP_G3273	7.69	7.22	5.30	7.79	7.10	5.25	7.77	7.15	5.27	7.77	7.21	5.33
ENP_NP-TSB	4.66	3.57	2.21	4.72	3.55	2.18	4.68	3.55	2.20	4.70	3.57	2.19

Note: Green represents higher stage relative to CSB2027 and red represents lower stage relative to CSB2027

Table 4-3 Stage Exceedance Probability Differences Relative to CSB2027 Baseline

-	CSB2027			ALTB1			ALTB2			ALTB3		
Gauge	**10%**	**50%**	**90%**	**10%**	**50%**	**90%**	**10%**	**50%**	**90%**	**10%**	**50%**	**90%**
WCA3A_3A-3	10.87	9.70	8.36	-0.10	-0.06	-0.07	-0.04	-0.08	-0.04	-0.08	-0.11	-0.11
WCA3A_3A-4	10.44	9.43	8.42	-0.09	-0.06	-0.02	-0.06	-0.08	-0.02	-0.08	-0.12	-0.04
WCA3A_3A-28	10.15	9.13	7.84	-0.06	-0.15	-0.07	-0.05	-0.09	-0.03	-0.07	-0.28	-0.15
WCA3A_3GAVG	10.47	9.40	8.23	-0.09	-0.10	-0.06	-0.05	-0.08	-0.03	-0.08	-0.18	-0.09
WCA3B_3B-71	8.13	7.21	6.39	0.17	0.40	0.02	0.18	0.28	0.02	0.18	0.26	-0.17
WCA3B_BLUE_SHANTY	8.16	7.49	6.59	0.18	0.30	0.09	0.18	0.35	0.00	0.20	0.38	-0.05
ENP_NP-205	6.90	6.39	4.82	-0.03	-0.01	-0.04	-0.03	0.00	-0.01	-0.02	-0.01	-0.03
ENP_NP-201	8.17	7.05	6.23	0.07	0.27	0.22	0.05	0.30	0.22	0.06	0.38	0.29
ENP_NP-34	3.33	2.50	0.82	-0.01	0.00	0.01	-0.02	0.04	0.06	-0.03	0.07	0.12
ENP_NESRS1	7.94	7.51	6.26	0.11	-0.09	0.10	0.09	-0.05	-0.07	0.10	0.00	0.04
ENP_G3273	7.69	7.22	5.30	0.10	-0.12	-0.05	0.07	-0.07	-0.03	0.08	-0.01	0.03
ENP_NP-TSB	4.66	3.57	2.21	0.06	-0.02	-0.03	0.02	-0.01	-0.01	0.04	0.00	-0.02

Note: Green represents higher stage relative to CSB2027 and red represents lower stage relative to CSB2027

4.4.1 Water Conservation Area 3A

The stages in WCA 3A were represented as the average of three selected gauges: 3A-28, 3A-3, and 3A-4. Stage duration curves were developed for all three WCA3A stage gauges as well as the average of all three gauges, WCA3A_3GAVG. When compared to CSB2027, ALTB2 resulted in lower water levels measured at all three WCA3A gauges for the 10%, 50%, and 90% exceedance levels, with the largest difference of -0.09 feet occurring at WCA-3A-28 for the 50% exceedance – still a relatively small difference (**Table 4-3**). The lower water levels modeled across WCA 3A were not unexpected. CEPP South features at the southern boundary of WCA 3A, specifically the creation of the Blue Shanty Flowway and the removal of Tamiami Road, decreased tail water constraints that were inhibiting flow into the ENP, allowing water to more easily flow out of WCA 3A. Conversely CEPP South modeling did not include the full build-out of CEPP (CEPP North and CEPP New Water) nor does it include the EAA Reservoir, both of which would add significant additional water to the system and likely alleviate any elevated risk of drying out of northern and central portions of WCA3.

In addition to stage-duration curves, a cyclic analysis of the 3-gauge average was conducted to represent the hydrologic conditions in WCA 3A. Cyclic analyses were also conducted for individual gauges 3A-28, 3A-3, and 3A-4 located in **Appendix E**. Cyclic analyses are used to determine the stages corresponding to a given exceedance probability for each Julian Day. Exceedance probabilities are calculated as the percentage of a given stage to be equaled or exceeded for each day. The results of the analysis for the probability exceedance percentiles for 5%, 10%, 25%, 50% (median value), 75%, 90%, and 95% for WCA3A_3GAVG are provided in **Figure 4-3** for CSB2027 and **Figure 4-4** for ALTB2. The maximum, minimum and average stages for each Julian day along with Zone A and Extreme High Water Line (EHWL) are also shown in the figure. The 50% exceedance was extracted for ease of comparison between CSB2027 and ALTB2 (**Figure 4-5**). The 50% exceedance comparison shows that the ALTB2 averages -0.02 feet lower as compared to CSB2027. Stage-duration curves for the simulated 3-gauge average for all alternatives is provided in **Figure 4-6.**

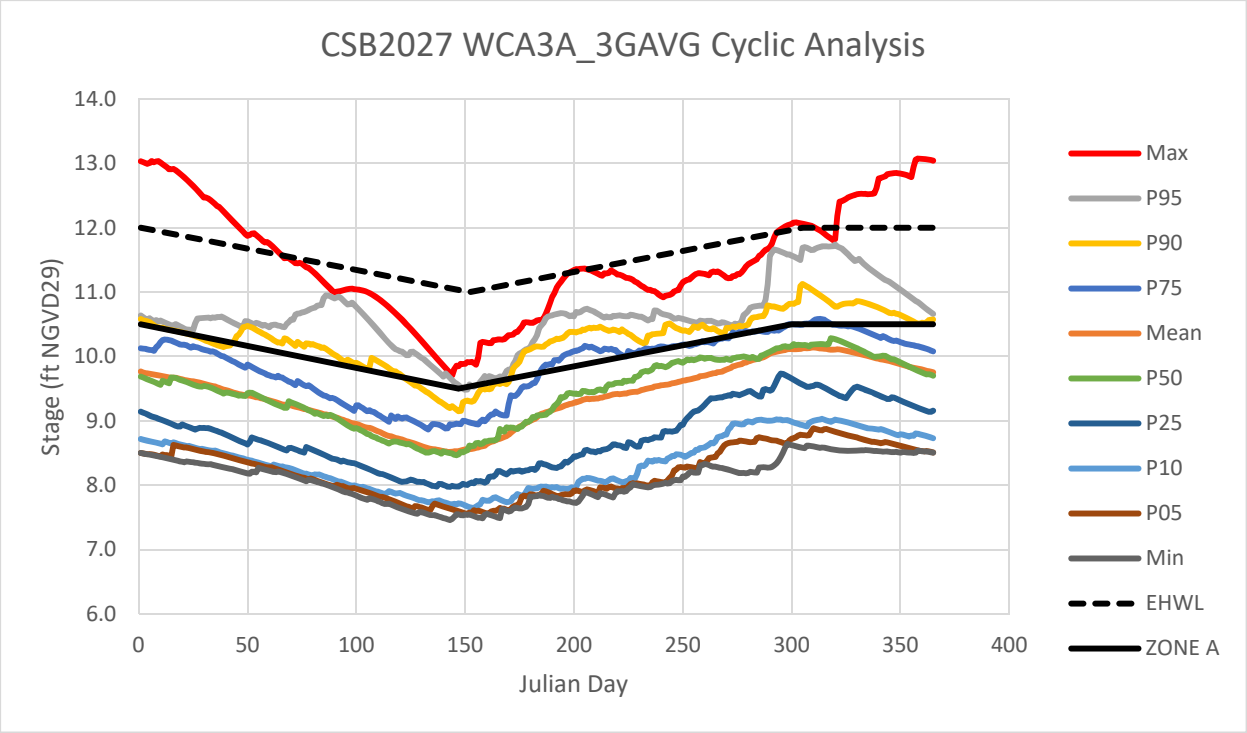

Figure 4-3. Cyclic Analysis of the WCA 3A 3-gauge average for CSB2027

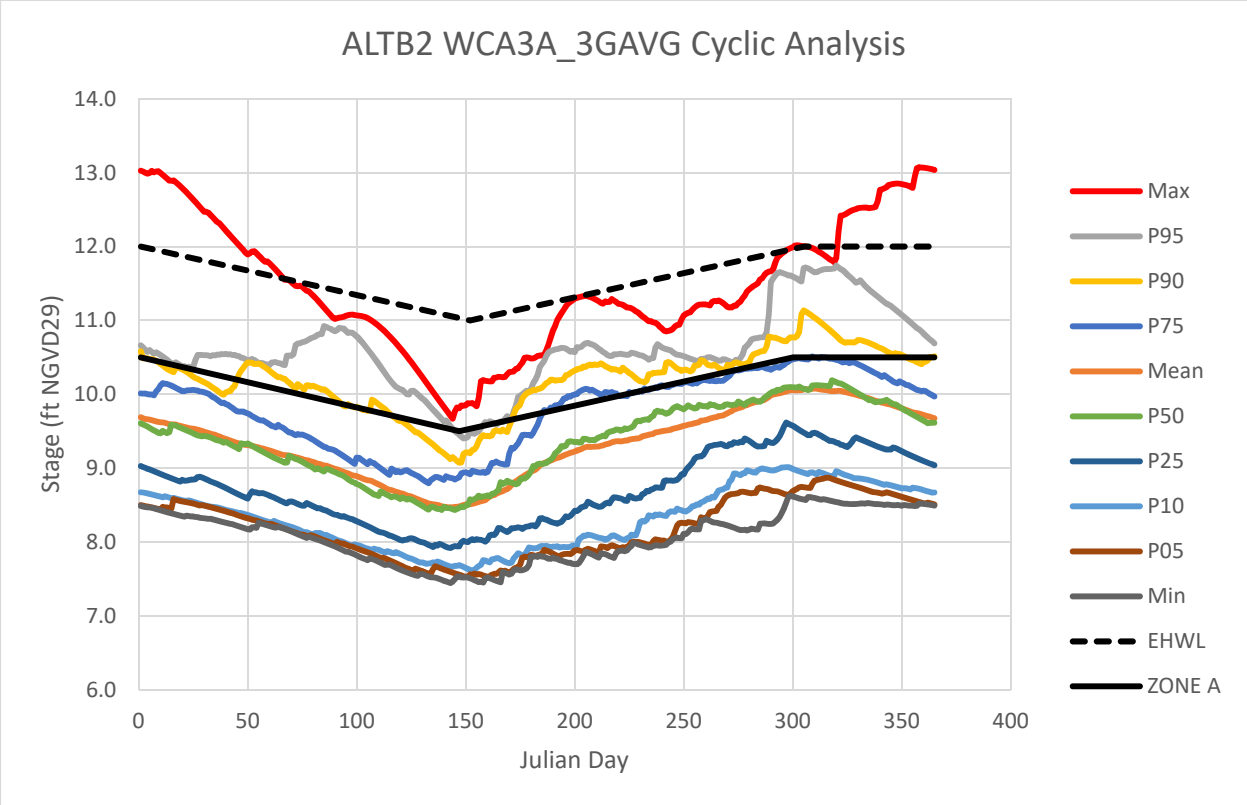

Figure 4-4. Cyclic Analysis of the WCA 3A 3-gauge average for ALTB2

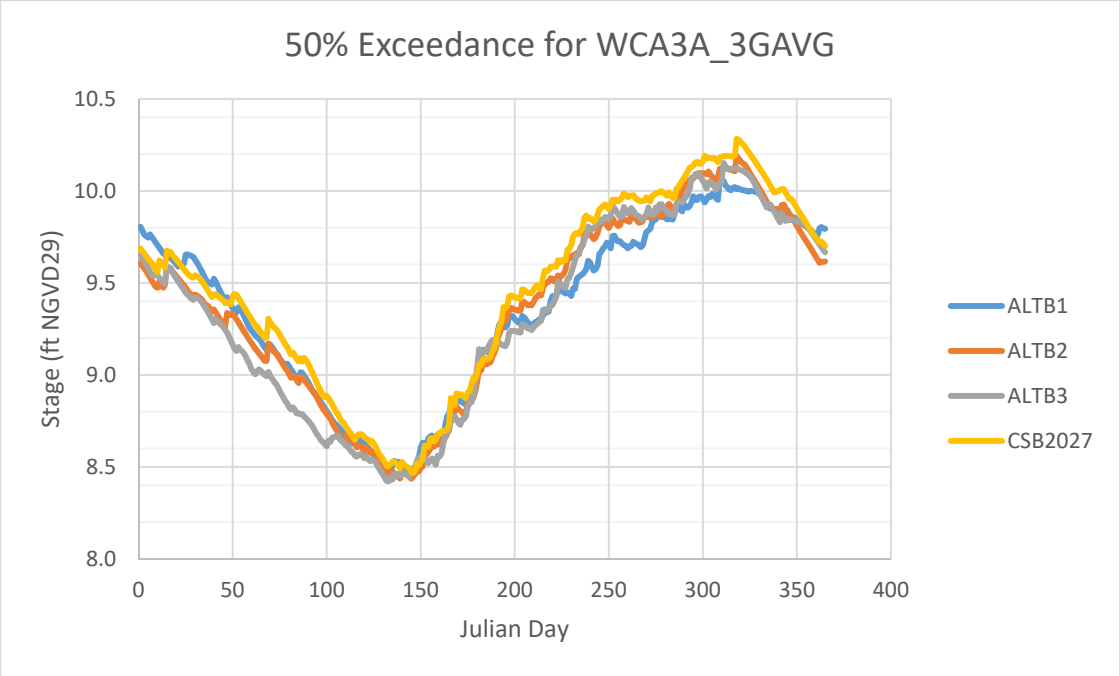

Figure 4-5. 50% Percentile Cyclic Analysis for WCA 3A 3-gauge Average

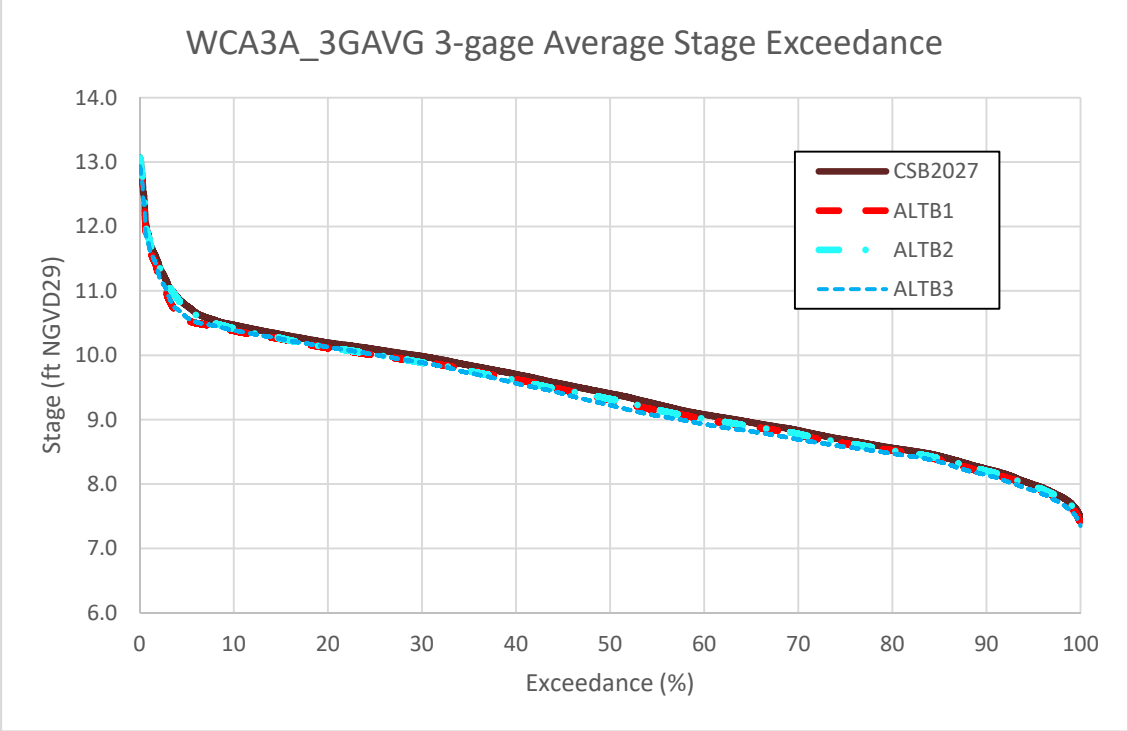

Figure 4-6. Stage Duration Curves for WCA 3A 3-gauge Average

4.4.2 WCA 3B Blue Shanty Flowway

The Blue Shanty Flowway is an integral part of the CEPP South project area, creating a preferential flow path for water to be delivered to ENP from WCA 3. A detailed description of the features that create the Blue Shanty Flowway is located in **Section 1.3**. The main source of flow inside the Blue Shanty Flowway, other than direct rainfall, is the addition of two 500 cfs gated culvert structures along the L-67A levee (S-632 and S-633). Based on the hydrologic modeling of the full suite of CEPP/EAA project features conducted to date under the 2014 CEPP Final PIR/EIS and the 2018 SFWMD Section 203 Report (included in the 2020 EAA Reservoir and STA Final EIS), continued S-152 operations under CEPP implementation have not been evaluated, and the combination of S-632 and S-633 were operated to provide a maximum inflow of 1,000 cfs (assumed inclusive of the S-152, were this feature subsequently incorporated into CEPP) into the Blue Shanty Flowway following completion of CEPP South components; this assumption will be revisited during future Water Control Plan updates, pending decisions regarding potential integration of S-152 into the C&SF Project. Based on the 1965-2005, 41–year period of record, the S-632 and S-633 structures discharged an average daily flow of 140 cfs and 142 cfs, respectively (**Table 4-4**). How the Blue Shanty flow affects the ENP is discussed in **Section 4.4.3.**

Table 4-4. ALTB2 S-632 and S-633 Culverts Period of Record Average Monthly Discharge (cfs) into Blue Shanty Flowway

Month	S-632	S-633
Jan	194	194
Feb	145	148
Mar	129	131
Apr	101	106
May	76	84
Jun	82	90
Jul	105	107
Aug	112	113
Sep	114	116
Oct	197	198
Nov	203	203
Dec	216	217
Average	**140**	**142**

The WCA3B_BLUE_SHANTY gauge in RSM-GL directly in the middle of the Blue Shanty Flowway was used to measure stages, develop depth-duration exceedances (**Figure 4-7**), and perform cyclic analyses. When compared to CSB2027, ALTB2 resulted in higher water levels measured at the WCA3B_BLUE_SHANTY gauge for the 10%, 50%, and 90% exceedance levels: +0.18 feet, +0.35 feet, and +0.002 feet, respectively (**Table 4-3**). In addition to stage-duration curves, a cyclic analysis of the WCA3B_BLUE_SHANTY gauge was conducted to represent the hydrologic conditions in the Flowway. The results of the analysis for the probability exceedance percentiles for 5%, 10%, 25%, 50% (median value), 75%, 90%, and 95% for are provided in for **Figure 4-8** for CSB2027 and **Figure 4-9** for ALTB2. The 50% exceedance was extracted for ease of comparison between CSB2027 and ALTB2 (**Figure 4-10**). The 50% exceedance comparison showed that the ALTB2 averages +0.33 feet higher as compared to CSB2027.

To visualize the increased flow through the Blue Shanty Flowway, flow vector maps for the CSB2027 and ALTB2 can be seen in **Figure 4-11** and **Figure 4-12**. The flow through the Blue Shanty Flowway can be seen in the ALTB2 flow vector map with the blue flow vectors indicating increased flow through the Flowway, continuing southward until water enters the ENP where water exiting the Blue Shanty Flowway mixes with water discharging from WCA 3 at the Tamiami Trail removal just west of the L-67 Extension levee degrade. The coloration of the arrows represents the relative volume of surface water flow (blue for higher flows;

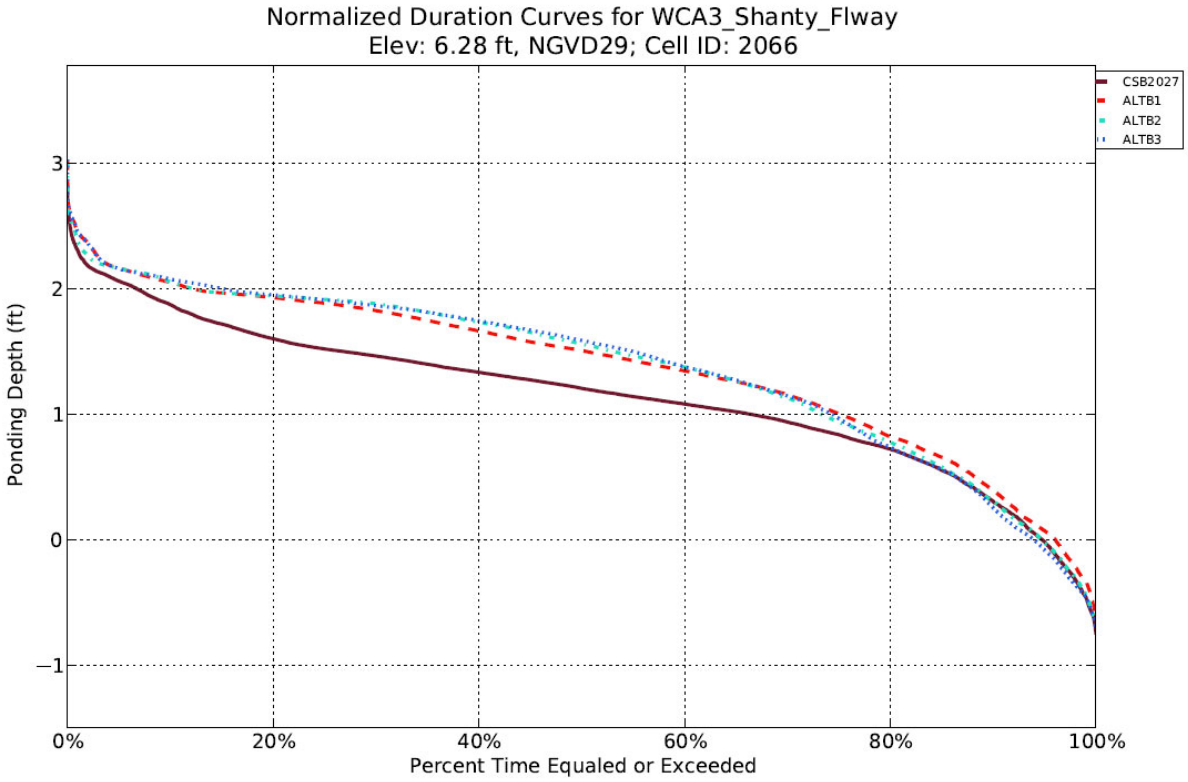

Figure 4-7. Depth Duration Curves for the Blue Shanty Gauge for all Alternatives

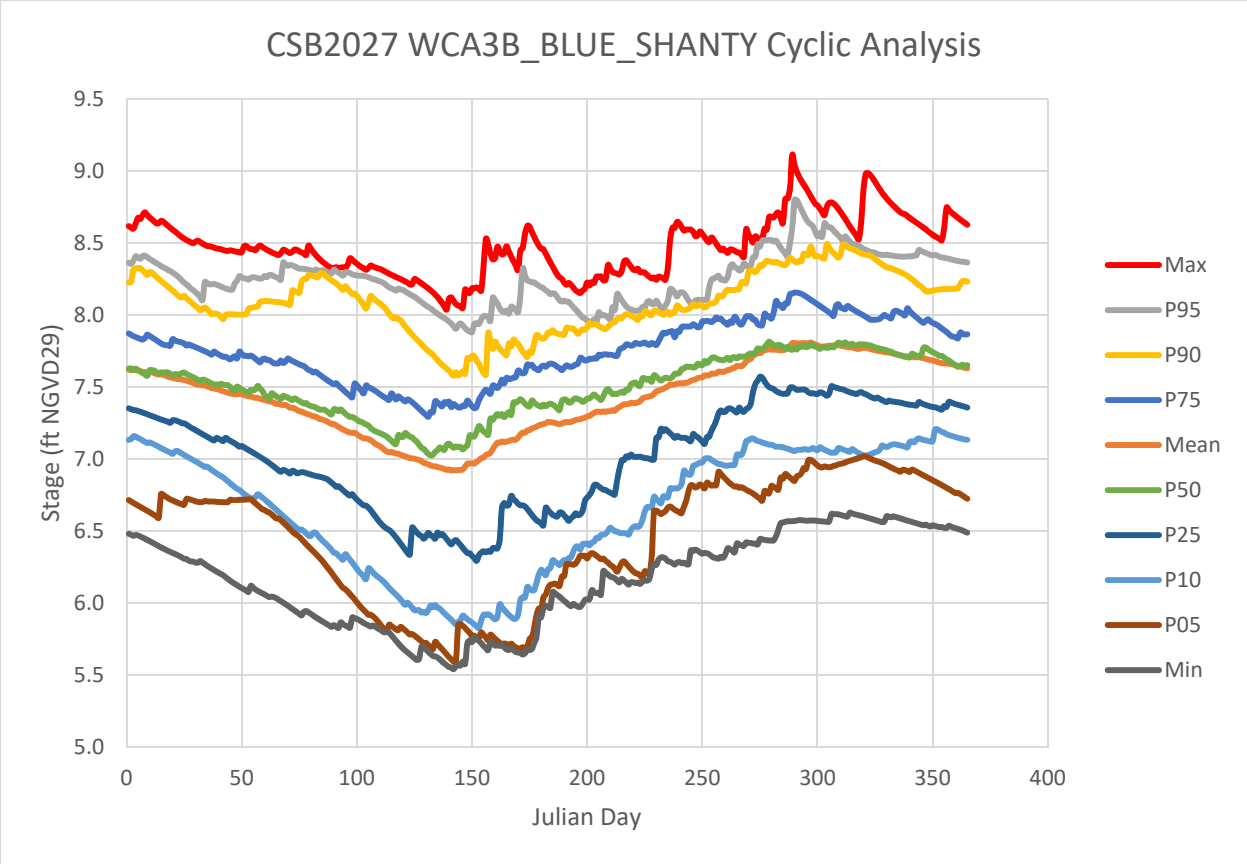

Figure 4-8. Cyclic Analysis of the WCA3B_BLUE_SHANTY for CSB2027

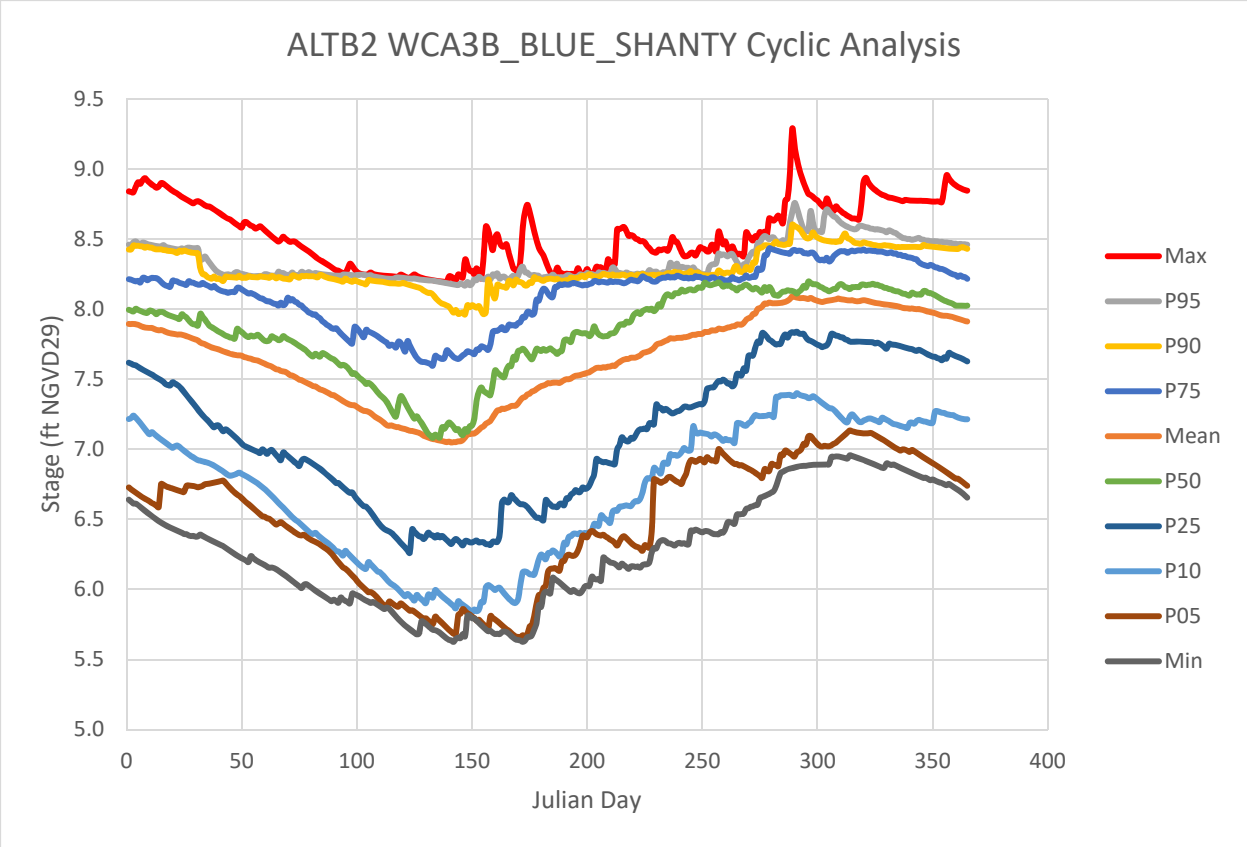

Figure 4-9. Cyclic Analysis of the WCA3B_BLUE_SHANTY for ALTB2

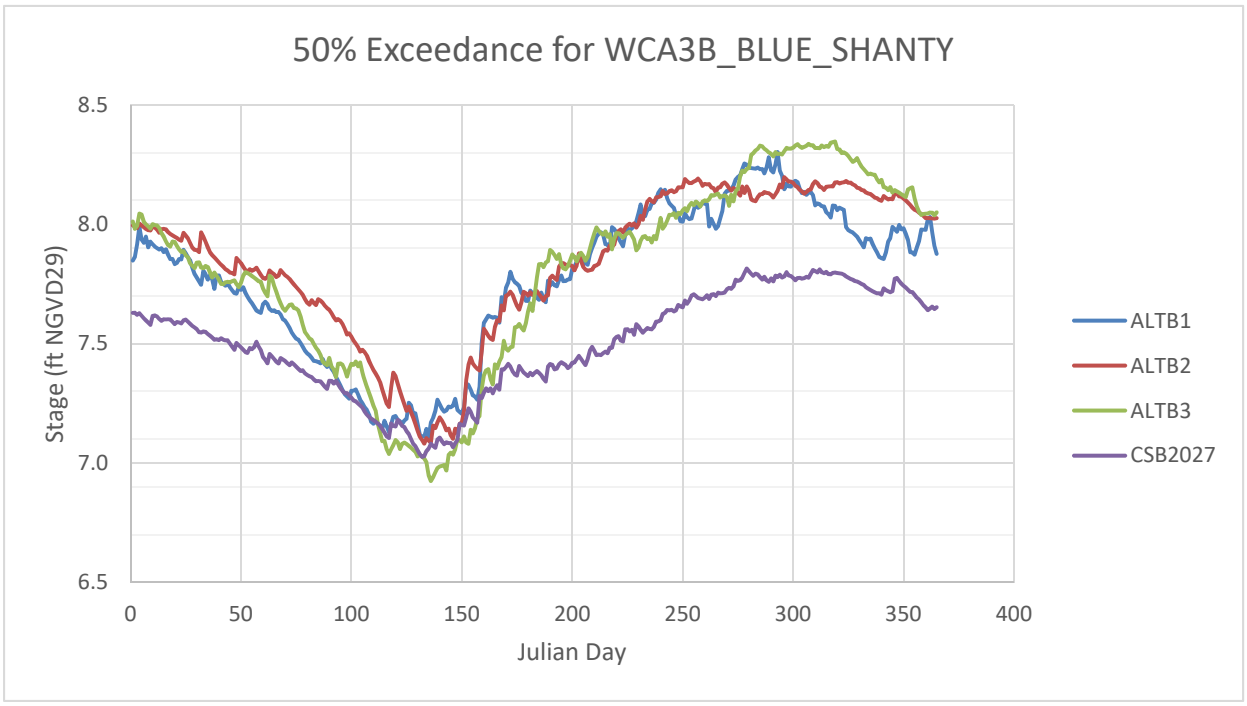

Figure 4-10. 50% Percentile Cyclic Analysis for WCA3B_BLUE_SHANTY Flowway

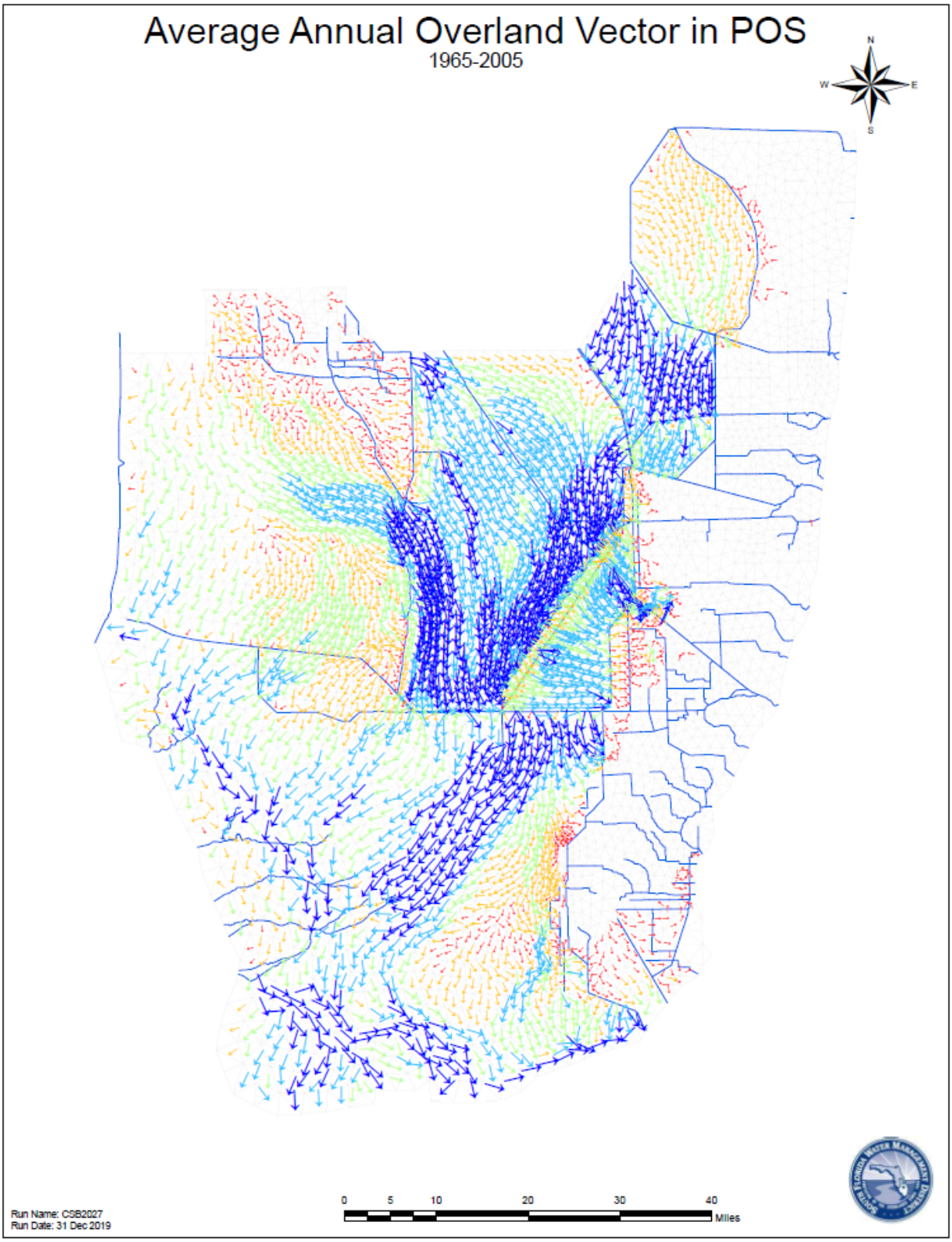

Figure 4-11. CSB2027 Average Annual Overland Flow Vectors

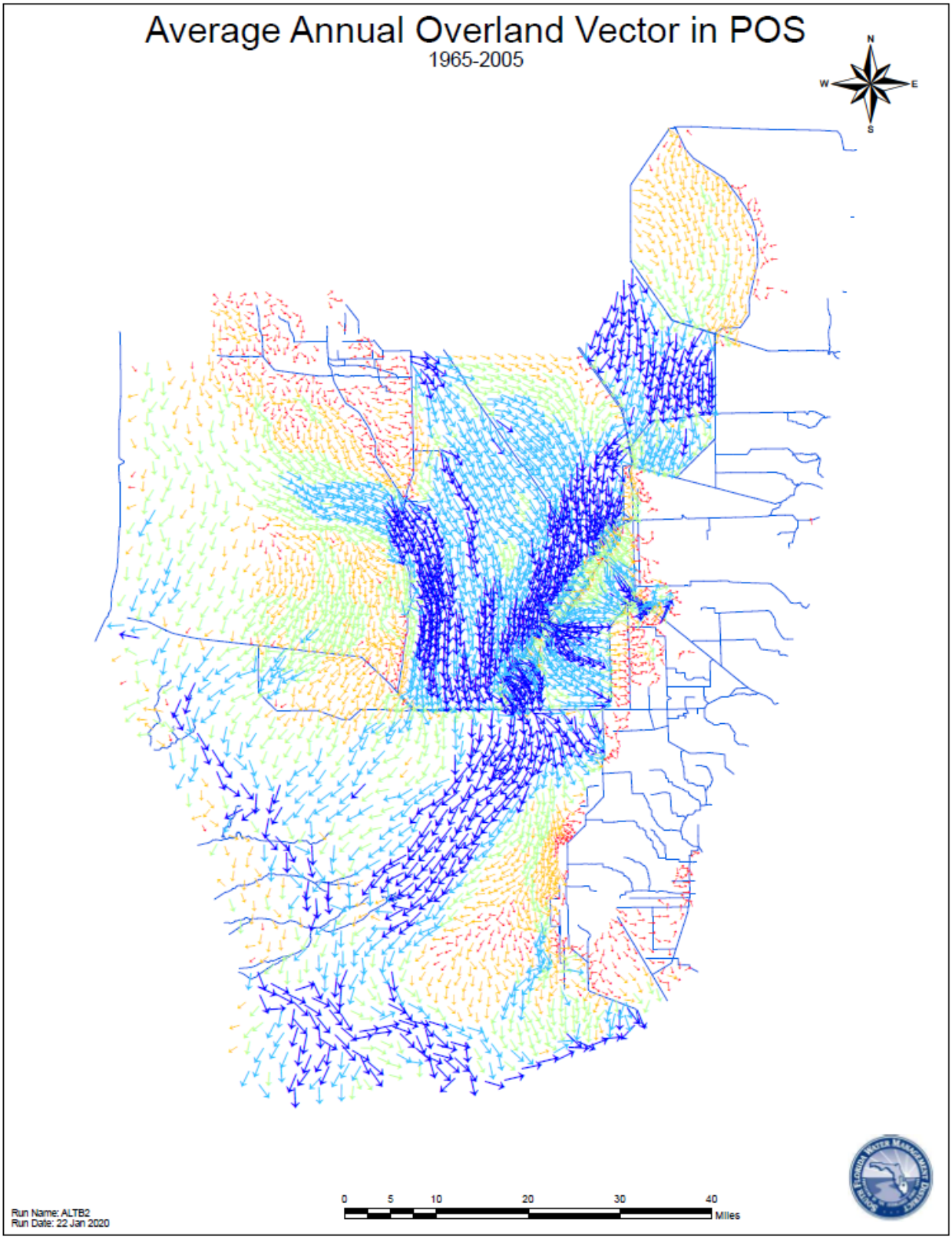

Figure 4-12. ALTB2 Average Annual Overland Flow Vectors

4.4.3 Everglades National Park

ENP was analyzed using two gauges from the RSM-GL: ENP_NP-201 and ENP_NESRS1. The ENP_NP-201 gauge was used to represent the Western Shark River Slough, while the ENP_NESRS1 was used to represent Northeast Shark River Slough. Average annual overland flow for two transects, Transect 17 and Transect 18, were used to represent flows into northern ENP. Transect 17 represents flows southward into northern ENP from WCA 3, south of Tamiami Trail and west of the L-67 Extension. Transect 18 represents flows southward into northern ENP from the Blue Shanty Flowway, south of Tamiami Trail and east of the L-67 Extension. The average annual overland flow was displayed as wet season (Jun-Oct) and dry season (Nov-May) for the period of record 1965-2005.

4.4.3.1 Western Shark River Slough

When compared to CSB2027, ALTB2 resulted in higher water levels measured at the ENP_NP-201 gauge for the 10%, 50%, and 90% exceedances: +0.05 feet, +0.30 feet, and +0.22 feet, respectively (**Table 4-3**). In addition to stage-duration curves, a cyclic analysis of the ENP_NP-201 gauge was conducted to represent the hydrologic conditions for Western Shark River Slough. The results of the analysis for the probability exceedance percentiles for 5%, 10%, 25%, 50% (median value), 75%, 90%, and 95% for are provided in for **Figure 4-13** for CSB2027 and **Figure 4-14** for ALTB2. The 50% exceedance was extracted for ease of comparison between CSB2027 and ALTB2 (**Figure 4-15**). The 50% exceedance comparison shows that the ALTB2 averages +0.32 feet higher as compared to CSB2027.

For Transect 17, CSB2027 resulted in an average annual overland flow total of 173,000 ac-ft. per year with the wet season at 92,000 ac-ft. per year and 81,000 ac-ft. per year for the dry season. Alternative ALTB2 resulted in an average annual overland flow total of 257,000 ac-ft. per year, with the wet season at 131,000 ac-ft. per year and 126,000 ac-ft. per year for the dry season. ALTB2 showed an increase of 84,000 ac-ft. on the average annual total, with an increase of 39,000 ac-ft. for the wet season (42% increase), and 45,000 ac-ft. for the dry season (56% increase) (**Figure 4-16**).

The average annual hydroperiod differences map between CSB2027 and ALTB2 (**Figure 4-17**) shows that the removal of the L-67 Extension levee just upstream of the NP-201 gauge and the expanded sheetflow through the Blue Shanty Flowway had significant effects on increased hydroperiods for Western Shark Slough. Increased hydroperiods are not necessarily seen throughout the rest of CEPP South, as there is not any additional water in the system, which would be available via CEPP New Water in the future.

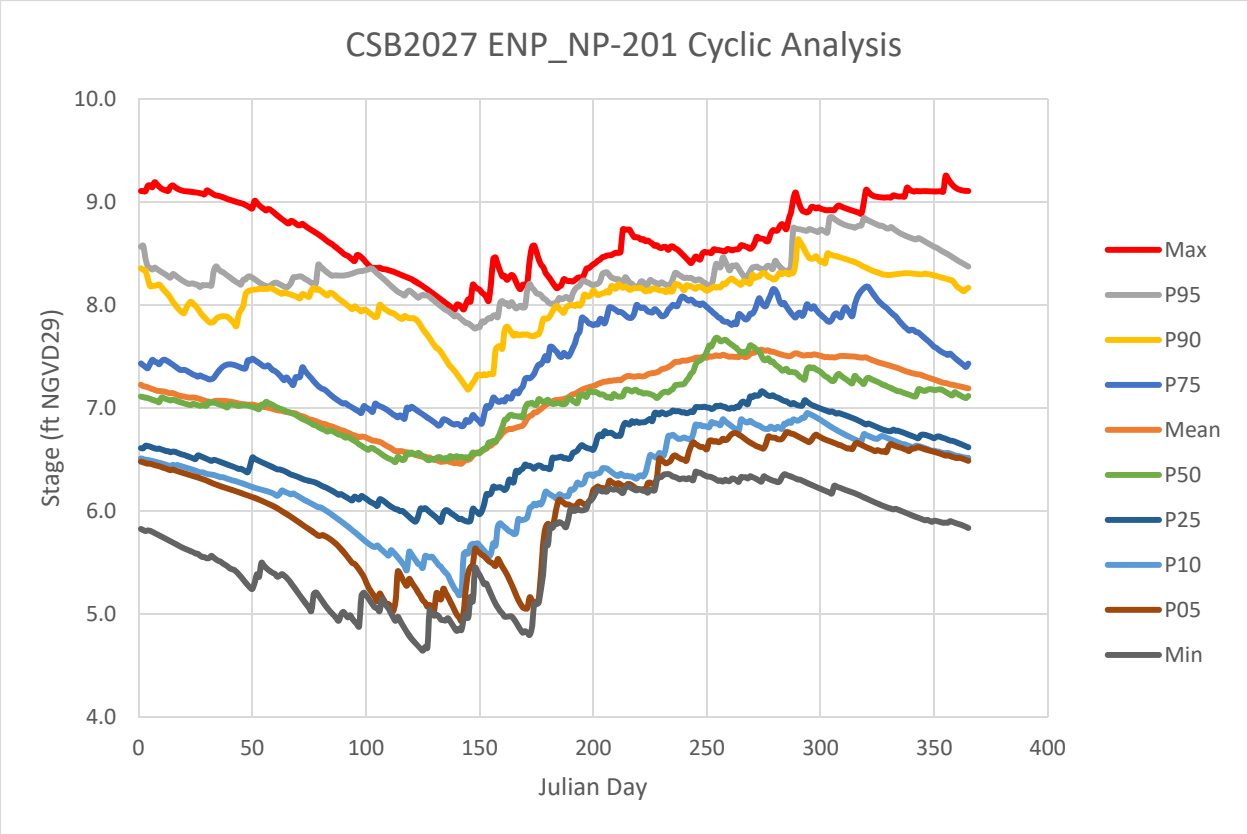

Figure 4-13. Cyclic Analysis of the ENP_NP-201 for CSB2027

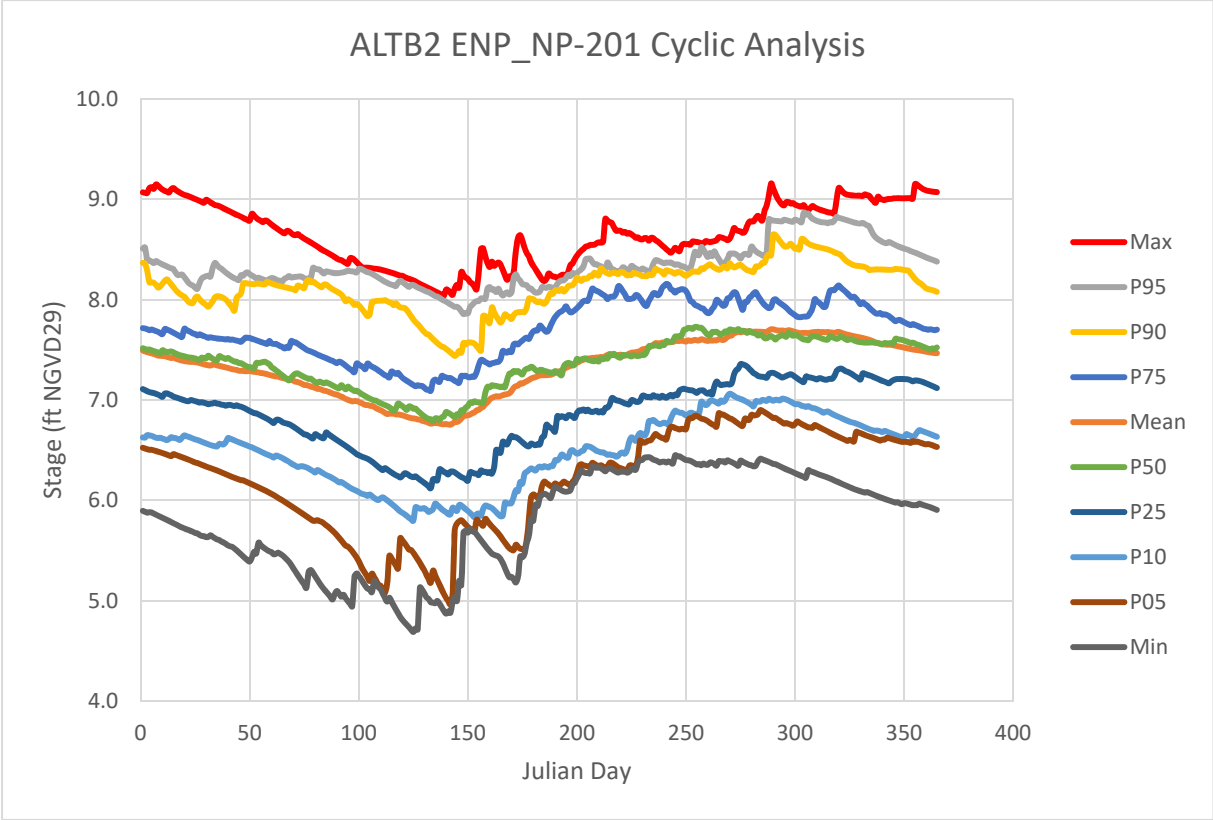

Figure 4-14. Cyclic Analysis of the ENP_NP-201 for ALTB2

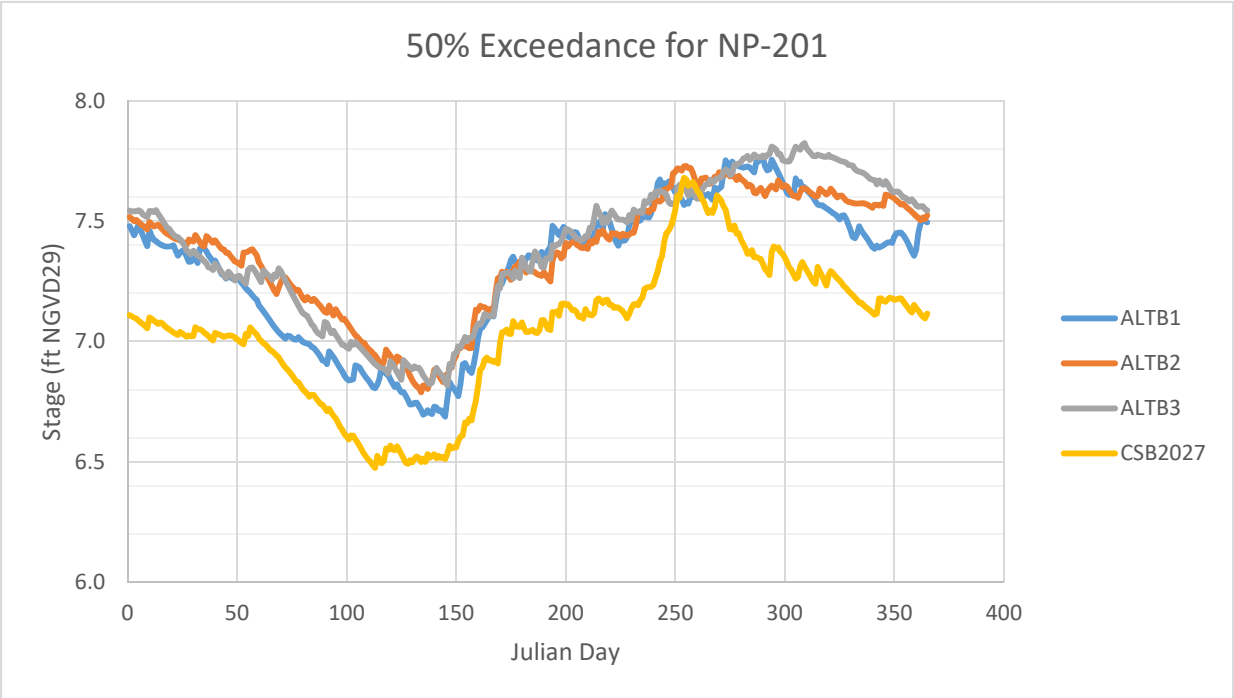

Figure 4-15. 50% Percentile Cyclic Analysis for ENP_NP-201

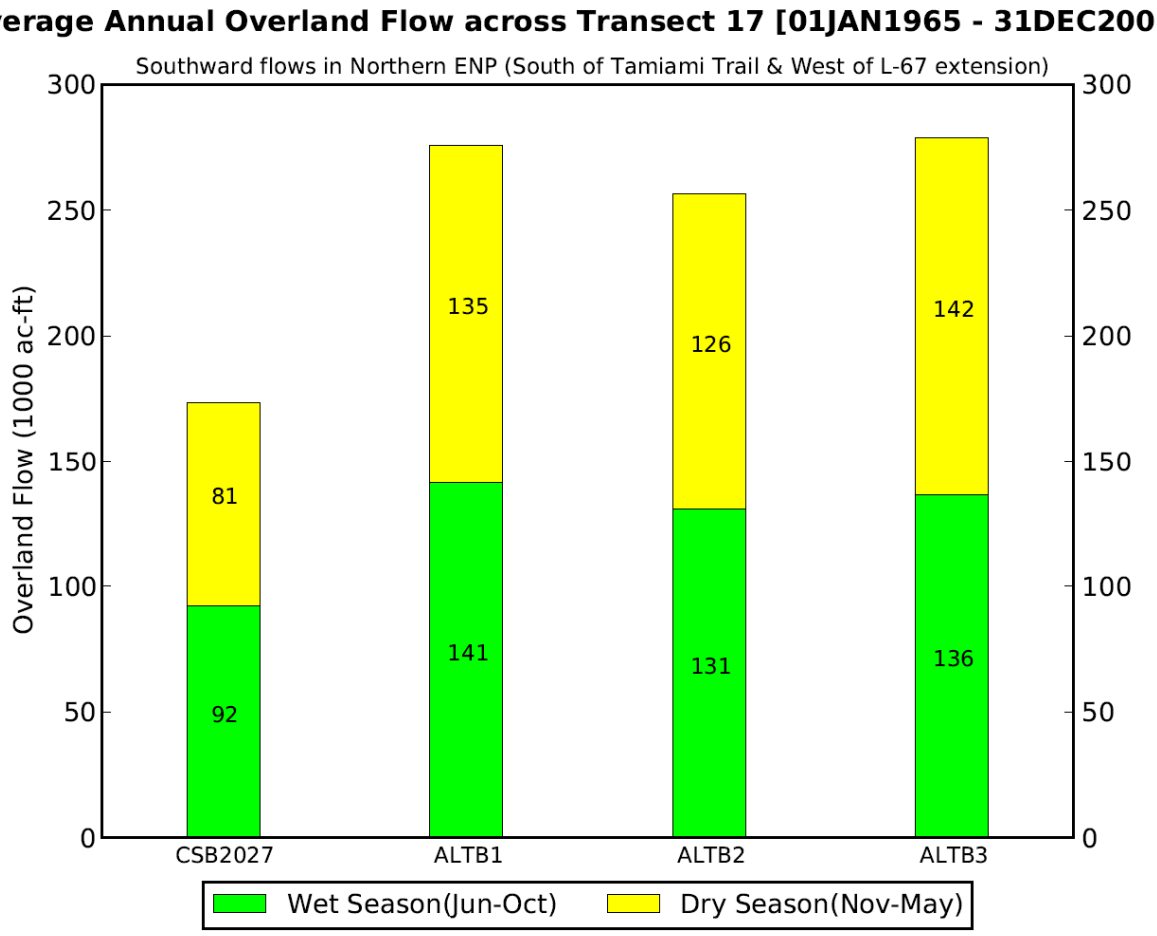

Figure 4-16. Average Annual Overland Flow across Transect 17

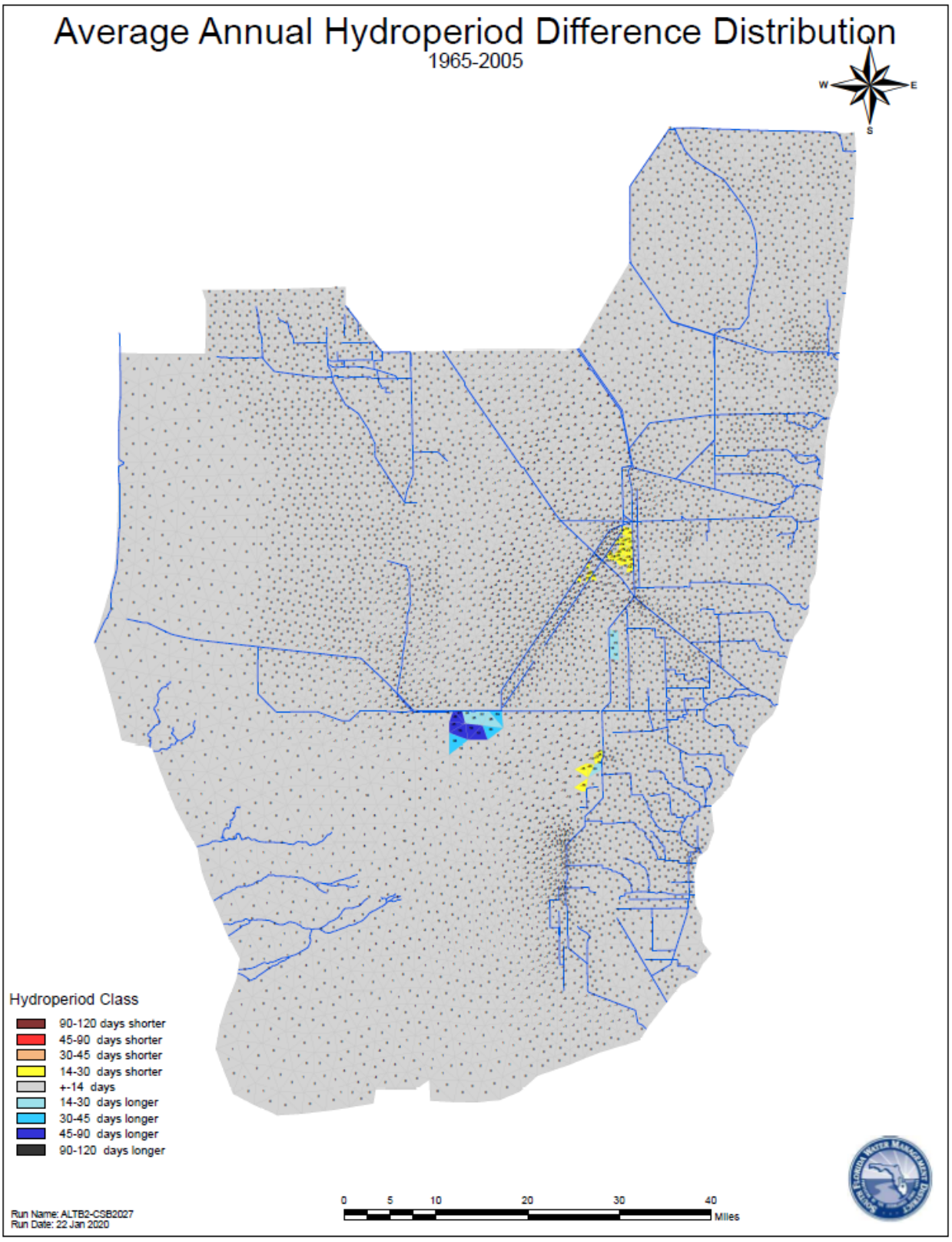

Figure 4-17. Differences in Average Annual Hydroperiods for ALTB2 and CSB2027

4.4.3.2 Northeast Shark River Slough

When compared to CSB2027, ALTB2 resulted in higher water levels measured at ENP_NESRS1 during wet events (10% exceedance) and lower water levels for the median (50% exceedance) and dry events (90% exceedance): +0.09 feet, -0.05 feet, and -0.07 feet, respectively (**Table 4-3**).

For Transect 18, CSB2027 resulted in an average annual overland flow total of 565,000 ac-ft. per year with the wet season at 235,000 ac-ft. per year and 330,000 ac-ft. per year for the dry season. ALTB2 resulted in an average annual overland flow total of 670,000 ac-ft. per year, with the wet season at 288,000 ac-ft. per year and 382,000 ac-ft. per year for the dry season. ALTB2 showed an increase of 105,000 ac-ft. on the average annual total, with an increase of 53,000 ac-ft. for the wet season (22% increase), and 52,000 ac-ft. for the dry season (16% increase) (**Figure 4-20**). The 50% exceedance was extracted for ease of comparison between CSB2027 and ALTB2 (**Figure 4-19**). The 50% exceedance comparison shows that the ALTB2 averages -0.05 feet higher as compared to CSB2027.

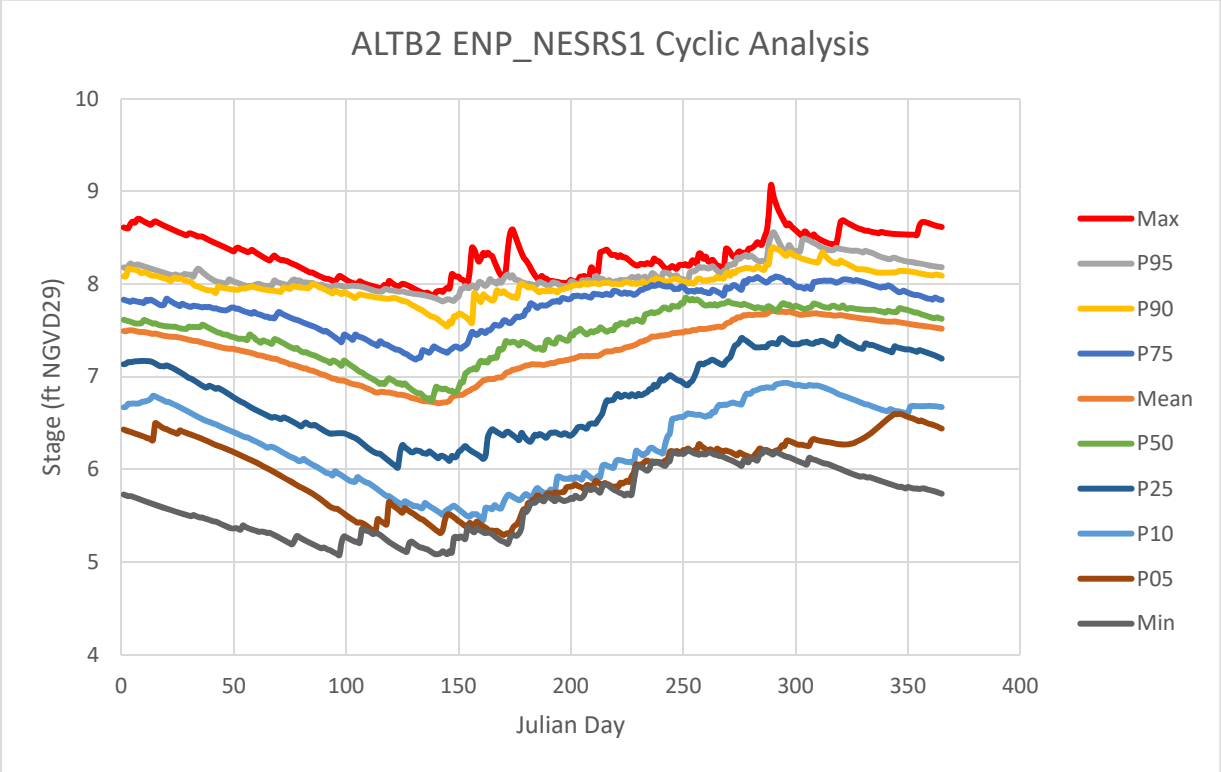

Figure 4-18. Analysis of the ENP_NESRS1 for ALTB2

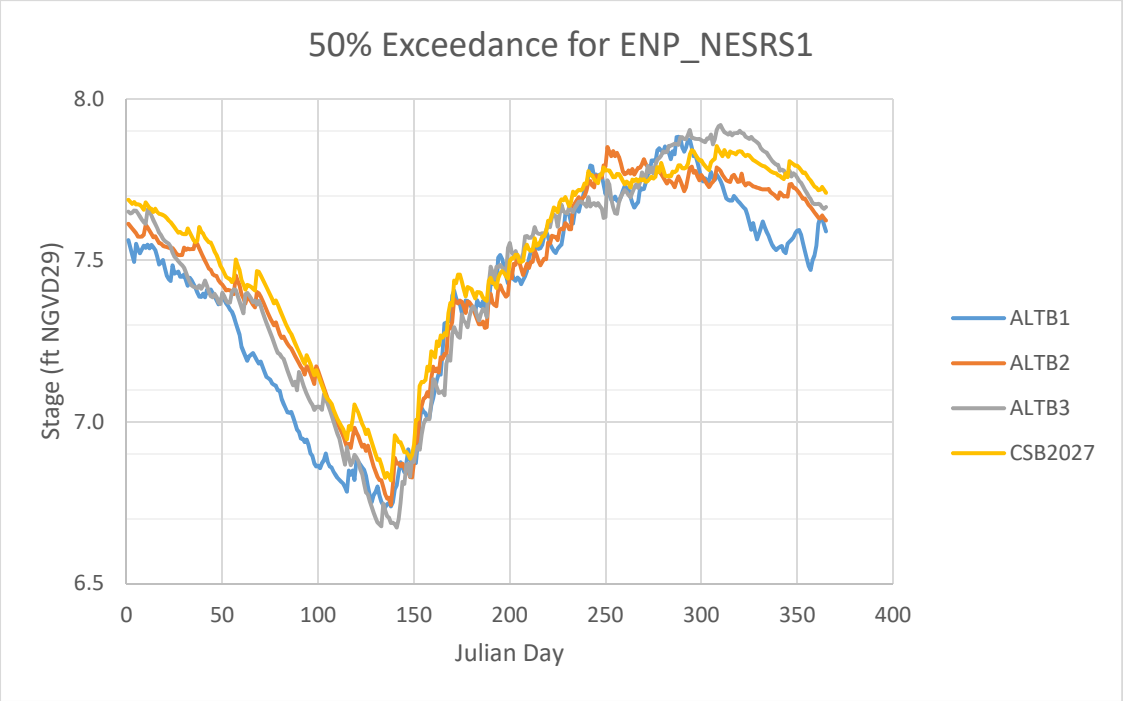

Figure 4-19. 50% Percentile Cyclic Analysis for ENP_NESRS1

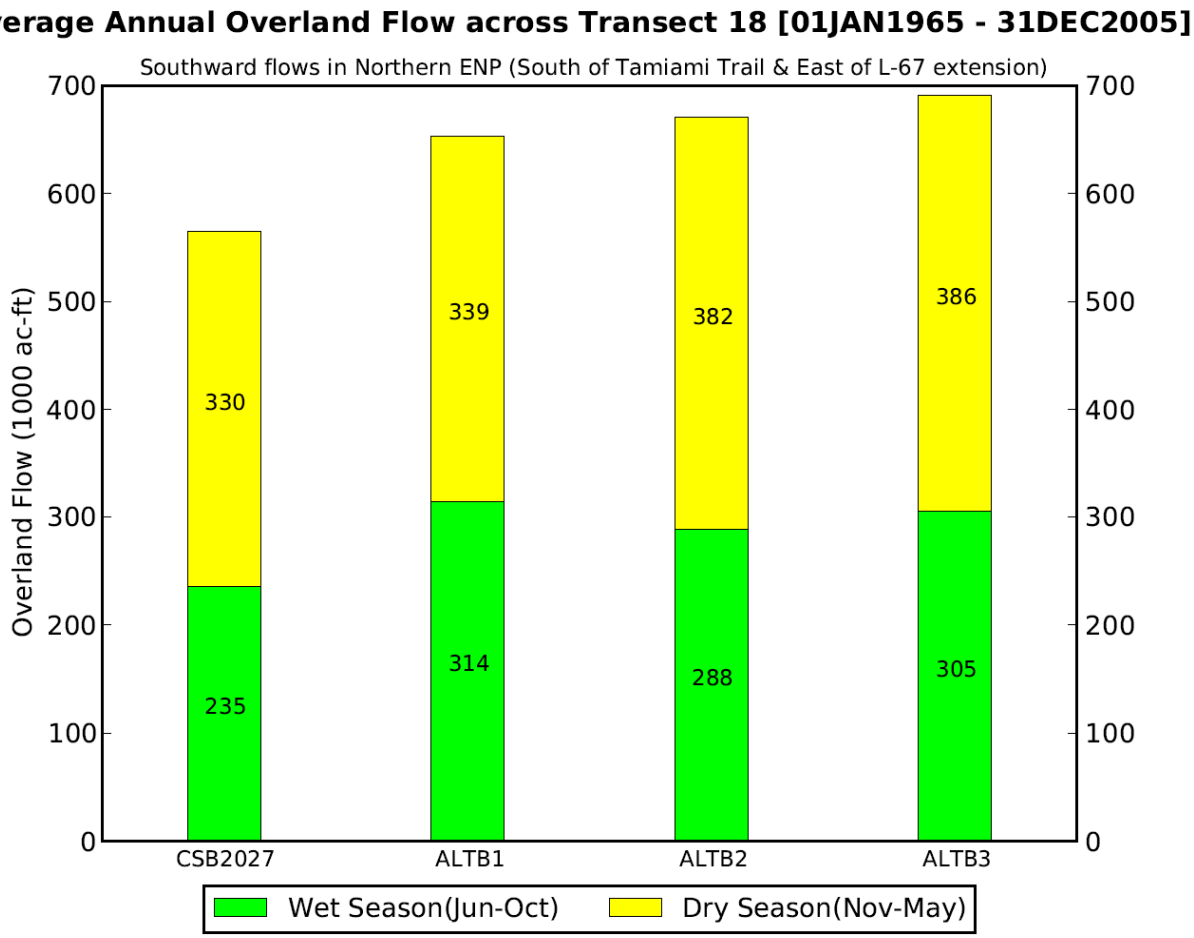

Figure 4-20. Average Annual Overland Flow across Transect 18

4.4.3.3 Taylor Slough

The southern end of the system (Taylor Slough through transects 23A, 23B, and 23C) showed negligible effects to the simulations. Until the EAA A-2 Reservoir and the A-2 STA is implemented and the full build out of CEPP is complete, the southern part of the ENP will likely not see fully realized benefits identified in the 2014 CEPP Final PIR/EIS. When compared to CSB2027, ALTB2 resulted in higher water levels measured at ENP_NESRS1 during wet events (10% exceedance) and lower water levels for the median (50% exceedance) and dry events (90% exceedance): +0.02 feet, -0.01 feet, and -0.01 feet, respectively (**Table 4-3**, **Figure 4-21**). Depth-duration curves were developed for all the simulations, showing relatively minor differences among alternatives and nearly the same results for all the transects at the bottom of the system. CSB2027 had the exact same overland flows for each transect (**Figure 4-22**, **Figure 4-23**, and **Figure 4-24**).

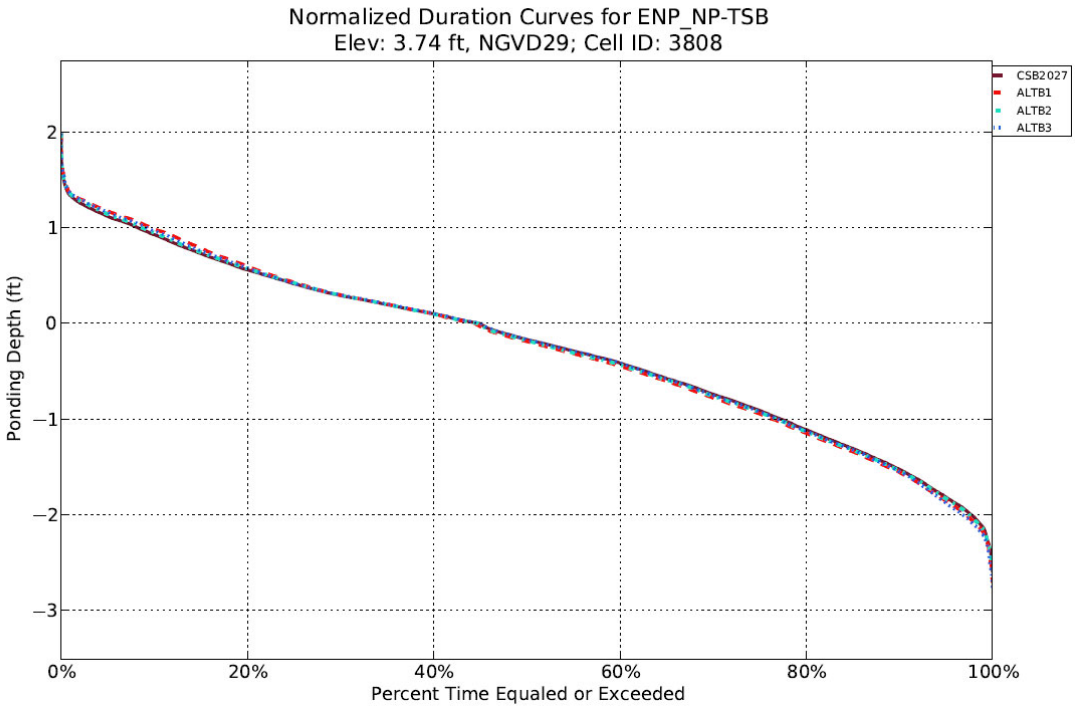

Figure 4-21. Depth Duration Curves for the EBP_NP-TSB Gauge for all Alternatives

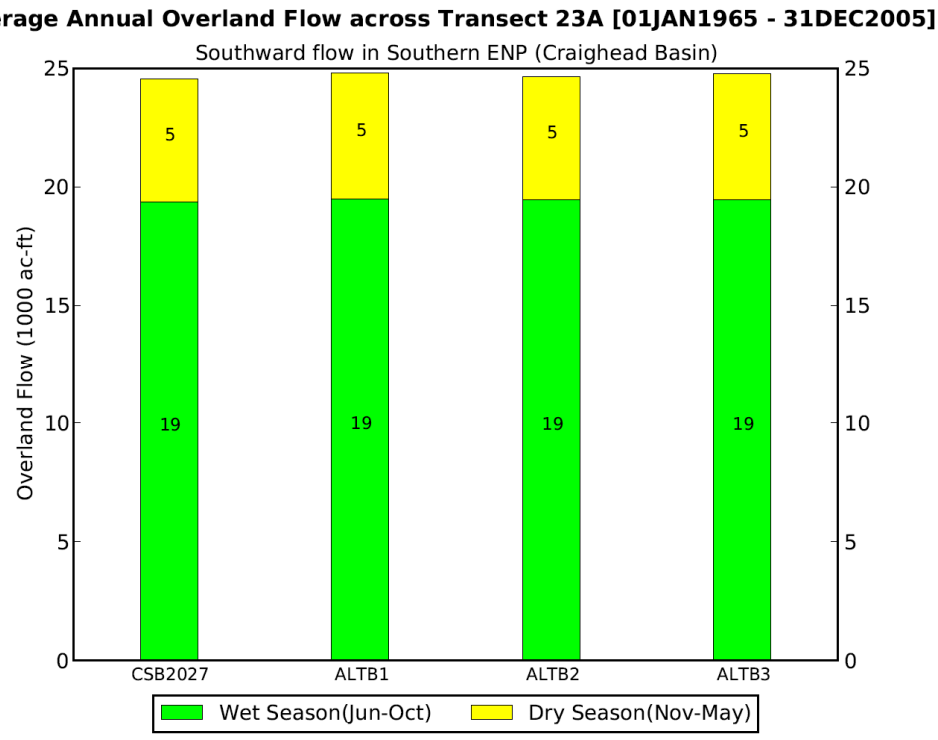

Figure 4-22. Average Annual Overland Flow across Transect 23A

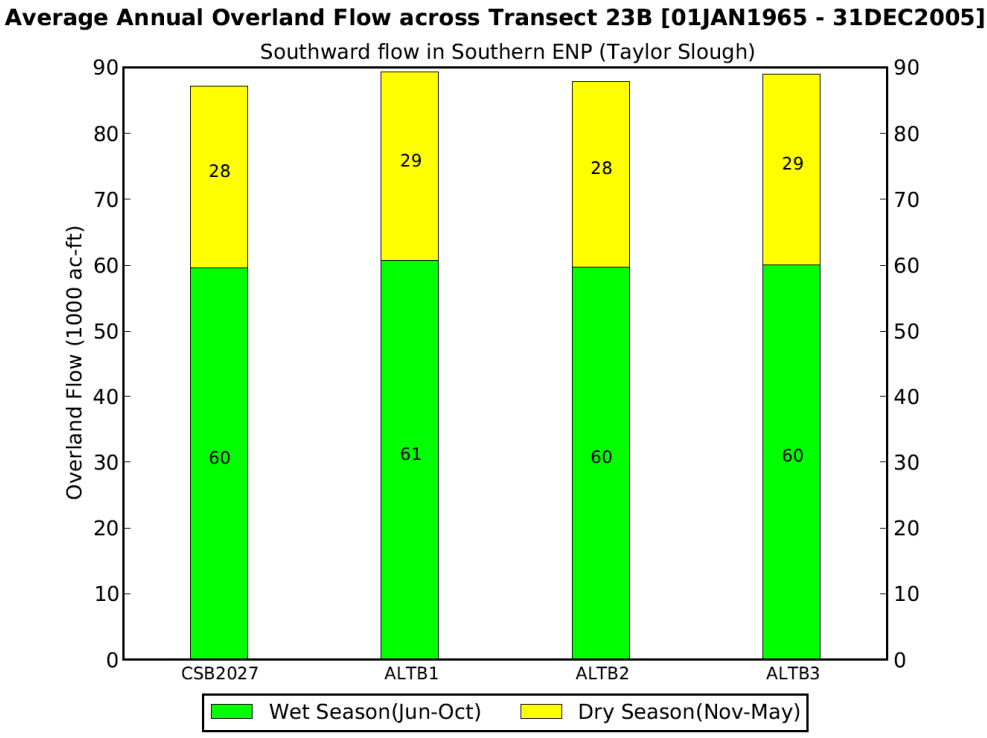

Figure 4-23. Average Annual Overland Flow across Transect 23B

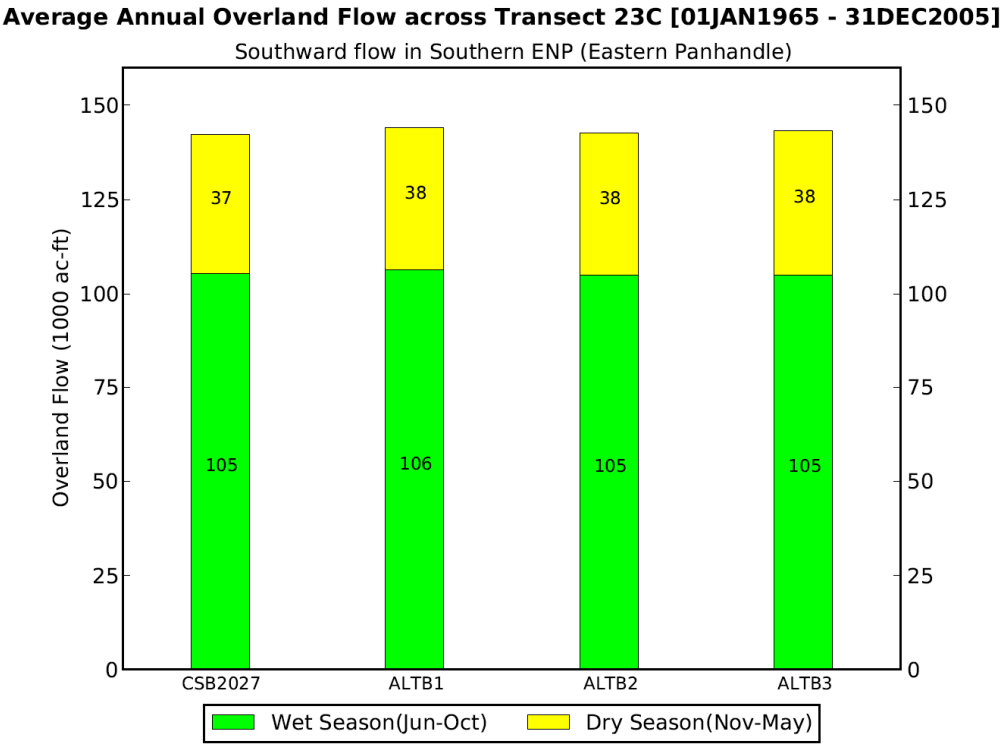

Figure 4-24. Average Annual Overland Flow across Transect 23C

4.4.4 ALTB4

The hydrologic effects of ALTB4 will generally match CSB2027 for WCA 3A, ENP NESRS, and ENP WSS. Average annual inflows to ENP will be equivalent to the CSB2027 at 738,000 acre-feet per year (sum of Transect 17 and Transect 18), with approximately 77 percent of total deliveries to NESRS. ALTB4 utilizes operations from the 2020 COP Final EIS, as defined in Appendix A of that document), to define operating criteria for existing infrastructure within the C&SF water management system for the WCAs, ENP, and ENP to SDCS. COP operations are included in CSB2027. Operation of CEPP South infrastructure (S-631, S-632, and S-633) will be operated subject to the operational constraints identified under the COP, and in the same manner as prescribed for the S-152 structure under DPM Phase 2. Inclusion of the CERP Broward County Water Preserve Areas C-11 Reservoir in CSB2027 results in no significant change to the average annual inflows from the S-9 pump station to WCA 3A, compared to the COP recommended plan (ALT Q+).

For CSB2027, the DPM (S-152) gated culvert is operated subject to the operational constraints identified under the COP, and in the same manner as prescribed for the S-152 structure under DPM Phase 2 Field Test. For the interim operation condition for CEPP South under ALTB4, the CEPP structures (S-631, S-632, and/or S-633) would be operated consistent with the DPM (S-152) to maintain a water budget distribution between WCA 3A, WCA 3B, and ENP consistent with CSB2027 (also similar to COP ALT Q+) and associated similar hydroperiod and hydropattern effects. S-631, S-632, S-633, and S-152 would collectively only be able to pass the equivalent volume currently allowed by the design capacity of S-152 which is 750 cfs to minimize the potential for over draining WCA 3A until additional CEPP features are constructed, or other upstream operational changes are implemented that will supply additional inflows south to WCA 3A. S-631, S-632, and S-633 structures, along with S-152, would be operated within the current limits of the S-152 operating permit (CERPRA Permit Number 0369865-001) for total phosphorus (TP) concentration. Structures would be closed when projected TP is expected to be greater than 10 parts per billion (ppb). Average annual inflows to WCA 3A from the S-631, S-632, S-633, and S-152 would be approximately 59,000 acre-feet per year, equivalent to the average utilization of S-152 in CSB2027. The additional utilization of S-631, S-632, and/or S-633 will provide increased operational flexibility to enhance the spatial distribution of inflows into WCA 3B, including within the Blue Shanty Flowway footprint.

The S-152 structure flow data was used to develop monthly average flows (**Table 4-5**). The months of June, July, and August the structure does not operate based on historical water quality trends and associated constraints. The remaining months, the S-152 operates as dictated by the DPM Operational Strategy and the COP water levels. The average monthly flow through S-152 was 153 cfs with the highest monthly average occurring in December at 187 cfs.

Table 4-5. CSB2027 Monthly Average Flows (cfs) at S-152 (DPM)

Month	Average
Jan	118
Feb	87
Mar	48
Apr	35
May	13
Jun	0
Jul	0

Month	Average
Aug	0
Sep	158
Oct	178
Nov	187
Dec	153
Average	**81**

Operating objectives and criteria of the L-29 temporary pumps (200 cfs total capacity) will be determined by the integrated DPM Science Team and CEPP AM team while observing downstream constraints. Downstream of the temporary pumps is L-29 canal and the pumping will cease when L-29 canal stages reach 8.5 feet, NGVD per the COP Water Control Plan. The L-29 temporary pump capacity will be limited to one-half of the combined inflow to WCA 3B from S-631, S-632, S-633, and S-152, and all pumps will be turned off when combined inflows at these structures are less than 100 cfs. In addition, the combined flow of the temporary pump releases into L-29 will be counted against the TTFF (COP) target flow.

4.5 Savings Clause Evaluations and Water Reservations Status

4.5.1 Flood Risk Management

A summary of the anticipated long-term effects on flood risk management of ALTB2 and ALTB4 is presented in **Table 4-6**. Additional supporting documentation for the effects characterization contained in **Table 4-6** is provided within this Section. The performance of each alternative is compared to the CSB2027 (no action alternative) which is described in Section 3 (Affected Environment). A limited discussion is provided within this section for each of the action alternatives as this EA evaluates adherence to Savings Clause requirements; in-depth evaluations, however, are focused on ALTB2 and ALTB4, since ALTB1 and ALTB3 were screened out as described in **Section 2.4**. The flood risk management (FRM) evaluation is focused principally on the urban and agricultural basins east of the WCAs and ENP (east of the East Coast Protective Levee), including LECSA 2 (Broward County), LECSA 3 (Miami-Dade County), and the 8.5 SMA. A brief summary of the frequency and duration of high water stages in WCA 3A is also included, as extended high stages in WCA 3A which are above Zone A of the Regulation Schedule have the potential to translate into public health and safety risk associated with the WCA 3A perimeter levee system. The summary of regional performance differences for the LECSAs and WCA 3A includes quantitative comparisons between the CSB2027 and the CEPP South action alternatives based on the RSM-GL modeling representations of these operational scenarios. The period of simulation (1965-2005) used for the CEPP South hydrologic modeling encompasses a wide range of historical climatologic and meteorologic conditions that are representative of south Florida hydrology. The CEPP South CSB2027 base condition assumptions for the SDCS operations and the resulting performance are unchanged from the results detailed in the 2020 COP Final EIS. Because the performance of ALTB4 closely resembles CSB2027 in terms of potential hydrologic effects in WCA 3A, WCA 3B, ENP, and the LECSAs, unique modeling of ALTB4 was determined to be unnecessary, and the hydrologic modeling outcomes from CSB2027 were utilized to support the quantitative Savings Clause assessment of ALTB4.

During the PED Phase for CEPP South, as detailed in the 2014 CEPP PIR/EIS Engineering Appendix (Section A.8.4), further technical investigations and additional hydrologic/hydraulic modeling with a higher resolution was to be conducted for the 8.5 SMA operations. The MD-RSM is a model designed to

investigate current and future operational alternatives for flood control and water supply in South Miami Dade County. MD-RSM was designed to overcome some of the limitations of the RSM-GL model to simulate at a sub-daily time-step water supply and flood control operational strategies considered in the South Dade Conveyance System and the C-111 Spreader Canal Project. Since the MD-RSM simulation period includes only three representative water years for wet, average, and dry conditions, long-term performance trends are more readily evaluated using the RSM-GL. The MD-RSM was mainly applied in the CEPP South to evaluate the COP/CERP constraint which requires maintenance of the authorized flood mitigation performance for the 1983 Base Condition, which represents the pre-project condition assumed for the 1992 MWD GDM plan development, in accordance with requirements of the Savings Clause and in recognition of evaluation requirements identified in the 2014 CEPP Final PIR/EIS.

Table 4-6. Effects of Alternatives on Flood Risk Management

Geographic Region	Alternative	Flood Risk Management Performance Summary
Greater Everglades	CSB2027	Frequency of WCA 3A Zone A exceedance: 18.0% of 41-year simulated period of record.
	ALTB2	Moderate 2.5% reduction to frequency of WCA 3A Zone A exceedance: 15.5% of 41-year simulated period of record.
	ALTB4	No significant change from CSB2027.
Lower East Coast Service Area 2 (Broward)	CSB2027	Consistent with the Water Control Plan for the East Coast Canals: C&SF primary canal stages along L-36 and L-35A (east of WCA 2A) are effectively managed below 5.0 feet, NGVD, except during extreme wet conditions (upper 2-3% of period of record). C&SF primary canal stages along L-37 (east of WCA 3A) are effectively managed below 7.2 feet, NGVD, except during extreme wet conditions (upper 4-5%). C&SF primary canal stages along L-33 (east of WCA 3B) are effectively managed below 6.3 feet, NGVD, except during extreme wet conditions (upper 1%).
	ALTB2	No significant change to C&SF primary canal stages compared to CSB2027 for wet to extreme wet conditions.
	ALTB4	No significant change from CSB2027.
Lower East Coast Service Area 3 (Miami-Dade)	CSB2027	Consistent with the COP Water Control Plan for the WCAs, ENP, and the ENP-SDCS: C&SF primary canal stages along L-30 (east of WCA 3B) are effectively managed below 7.5 feet, NGVD, except during extreme wet conditions (upper 2-3% of period of record); C&SF primary canal stages along L-31N (east of ENP at G-211) are effectively managed below 5.8 feet, NGVD, except during extreme wet conditions (upper 4-5%); C&SF primary canal stages along L-31N (east of ENP at S-331) are effectively managed below 5.0 feet, NGVD, except during extreme wet conditions (upper 1-2%); C&SF primary canal stages along L-31N (east of NDA/SDA at S-176) are effectively managed below 4.8 feet, NGVD, except during extreme wet conditions (upper 3-4%); C&SF primary canal stages along C-111 (east of Frog Pond Detention Area at S-177) are effectively managed below 4.0 feet, NGVD, except during extreme wet conditions (upper <1%); C&SF primary canal stages along C-111 (S-18C) are effectively managed below 2.65 feet, NGVD, except during extreme wet conditions (upper <4-5%).

Geographic Region	Alternative	Flood Risk Management Performance Summary
	ALTB2	Minor 1-2% increase in frequency of C&SF primary canal stages along L-30 (east of WCA 3B) above 7.5 feet, NGVD. No other significant changes to C&SF primary canal stages compared to CSB2027 for wet to extreme wet conditions.
	ALTB4	No significant change from CSB2027.
8.5 Square Mile Area	CSB2027	Based on MD-RSM high resolution model, total inundation duration during wet, average, and dry simulation years are shorter than the 1983 Base Condition constraint (authorized level of flood mitigation) by 54.28, 9.16, and 8.75 days, respectively. Consecutive days of inundation duration is shorter than the 1983 Base Condition constraint by 37.7 days. Consistent with technical evaluations in the 2020 COP EIS, CSB2027 adheres to the 8.5 SMA flood mitigation constraint.
	ALTB2	Based on MD-RSM high resolution model and compared to CSB2027, total inundation duration during wet, average, and dry simulation years are 0.57 days longer (shorter than the 1983 Base Condition constraint by 53.71 days), 1.39 days shorter, and 3.48 days shorter, respectively. Consecutive days of inundation duration is shorter than the 1983 Base Condition constraint by 36.96 days, and 0.74 days longer than CSB2027. Inundation duration performance metrics with CEPP planned increased inflows to WCA 3A are indeterminate and will need to be assessed prior to a permanent Water Control Plan update.
	ALTB4	No significant change from CSB2027. Inundation duration performance metrics with CEPP planned increased inflows to WCA 3A are indeterminate and will need to be assessed prior to a permanent Water Control Plan update.

Comprehensive documentation of the MD-RSM model development and the calibration/validation performance statistics are available in the SFWMD Calibration and Validation report completed in August 2018. The IMC, under its responsibility to serve as a central point to coordinate Comprehensive Everglades Restoration Program (CERP) and CERP-related modeling activities, was consulted by the Corps COP Project Team to implement a technical review of the MD-RSM in May 2018, following SFWMD release of a draft version of the MD-RSM calibration and validation report (Arteaga, R., et al., 2018. Miami Dade County Regional Simulation Model (MDRSM) Calibration and Validation Implementation Report).

The primary goals of the IMC technical review request were two-fold: (1) to ensure that the MD-RSM model was developed and implemented based on sound science and modeling principles; and (2) to determine the suitability of the MD-RSM to support formulation and evaluation of CERP, individual CERP projects such as C-111 Spreader Canal and CEPP (including CEPP South), and other closely-related South Florida Ecosystem Restoration planning efforts including the COP. The IMC concluded that there were no major improvements needed to the MD-RSM model to support the COP project, and feedback from the IMC technical review was used to improve the documentation in the calibration and validation report, and to help inform the 8.5 SMA Robustness and Validation testing that was pursued in parallel with the COP alternative modeling application. The model was verified to be adequate for evaluation of alternatives for flood mitigation, effectively simulating hydrologic effects of new structures and operational changes of existing structures for the purpose of project evaluations, and distinguishing

spatial and temporal differences in surface water depths and flows from changing regulation schedule where applicable.

Based on recommendations from the IMC technical review and since the calibration and validation periods applied during MD-RSM development were prior to full functionality of the MWD 8.5 SMA Project following completion of the C-111 NDA, additional robustness and validation checks of the MD-RSM capability to simulate the 8.5 SMA were conducted prior to application of the MD-RSM with the COP Round 2 alternative evaluations. These additional checks are fully documented in Annex 2 of the 2020 COP EIS Hydraulics and Hydrology Appendix (Appendix H). In summary, however, the results demonstrated that the MD-RSM model can reproduce the water levels in the 8.5 SMA for the period of May 2017 to February 2018 with a bias consistent with the results of the calibrated model. The biases remain consistent with the scale of bias observed in model calibration and support our conclusion that the MDRSM provides effective representation of the 8.5 SMA for planning purposes.

4.5.1.1 ALTB2

The modeling of ALTB2 using the RSM-GL model indicates no significant increases to regional groundwater stages during normal to wet conditions which would impact the levels of service for flood control within the LECSAs, as compared to the CSB2027. No notable changes to groundwater stages were indicated within LECSA 1 or LECSA2, consistent with the CEPP South not modifying the Regulation Schedules for WCA 1 and WCA 2. Minor reductions to groundwater stages, up to 0.05 feet, are evident across most of western LECSA 3 over the complete period of simulation, extending up to 3 miles east of the East Coast Protective Levee proximal to the water control structures along the C-1W canal (S-338), C-102 canal (S-194), and C-103 canal (S-196) (refer to **Figure 4-25**). During wet years, such as 1995 and 1999, moderately increased stages up to 0.2 feet are indicated north and east of the S-331 pump station along the C-1W canal, resultant from the reduced 8.5 SMA interior stages effectuated with removal of the L-67E Levee; these trends are reflected in the stage difference maps for the 1995 calendar year (**Figure 4-26**: average annual stage difference) and October 1995 (**Figure 4-27**: average monthly stage difference at the end of the wet season), respectively.

The L-30 canal stages (north of S-335) indicate a minor increase (less than 0.1 feet) to flood control stages during normal to extreme wet conditions (refer to **Figure 4-28**). L-30 canal stages are slightly lower than ALTB1, which represents the CEPP South and SDCS operations identified in the CEPP PIR. The L-31N canal stages (between G-211 and S-331) indicate no significant change during normal to wet conditions, similar to ALTB1 and ALTB3 (refer to **Figure 4-29**). The L-31N canal stages east of the C-111 South Dade NDA and SDA (between S-331 and S-176) indicate no significant change compared to CSB2027 during normal to extreme wet conditions, with a minor reduced use of the S-332 pump station to deliver water toward Taylor Slough (refer to **Figure 4-30**. Further south along the C-111 canal, for normal to wet hydrologic conditions, no significant changes are observed for the canal reach east of the SFWMD C-111 Spreader Canal Project (between S-176 and S-177; refer to **Figure 4-31**) or for the canal reach between S-177 and S-18C.

8.5 SMA flood mitigation FRM performance was evaluated using the MD-RSM, since the RSM-GL model resolution is too coarse around the 8.5 SMA to evaluate localized effects from the S-357, S-357N, and S-331 operations. The MD-RSM encompasses an area of 2,425 square miles, mostly in Miami-Dade County and the southern portion of Broward County (model domain is shown on **Figure 4-32**). The model areas with highest mesh resolution are located along the protection levee, which separates the urban areas from the ENP and the Water Conservation Area 3B, and where some of the areas of interest for this study

are located, including the 8.5 SMA and Frog Pond area. For computational purposes, the model was set up to run with a 15-minute time step, which still results in reasonable run times for simulation runs of one year. To cover different hydrologic conditions, the evaluation of alternatives using the MD-RSM model will be carried out using dry, average, and wet years that were selected during the COP modeling effort and vetted with the CERP Interagency Modeling Center.

The COP 1983 Base Condition identifies level of flood mitigation that will be maintained in the COP and throughout CERP implementation. The 1983 Base Condition represents the conditions in the 8.5 SMA before MWD implementation, and is consistent with requirements from the 8.5 SMA 2000 GRR ROD. The ROD requirement that "periodic flooding of landowners east of the proposed levee, before and after project implementation, will remain unchanged from conditions in existence prior to implementation of the MWD Project except where flowage easements are required" shall be assessed by comparing the COP action alternatives against the 1983 Base Condition. The 1983 Base Condition assumptions are further detailed in Annex 3 and Annex 6 to Appendix H of the 2020 COP EIS.

During development of the COP, performance measures were established by the Corps to assess the flood mitigation constraint for the 8.5 SMA. Performance measures consider rainfall accumulation/durations, recession rate, inundation duration, and antecedent conditions, consistent with model-based analysis applied for MWD 2000 8.5 SMA GRR (conducted using MODBRANCH). The COP Flood Risk Evaluation Methodology Metrics and Targets (listed below) were described and coordinated with the COP Flood Risk Subteam, and detailed in the COP Flood Risk Evaluation Methodology summary completed in June 2018, which was briefed to the COP PDT prior to the Round 1 alternative modeling. A consistent set of evaluation metrics is proposed for CEPP/CERP implementation:

(1) Maintain Peak Stages within 8.5 SMA

a) Metric: Change in the number of acres during a wet year (Water Year 2006) where flood mitigation is maintained at or below the 1983 Base condition wet year (Water Year 2006) peak stages. The period 20-24 June 1995 was a naturally occurring 1-in-10 year rainfall event (5-day duration) cited in the 8.5 SMA Final GRR for MODBRANCH modeling evaluations, and the period 1-7 July 1995 (week 26) had the highest ground water stages found during 1995. A comparable analysis of the Water Year 2006 rainfall time series for 8.5 SMA will be used to identify a 5-day naturally occurring rainfall event with a comparable rainfall volume for use with the MD-RSM model.
b) Target: Areas within the L-357 protective levee will not have an increase in flooding impacts as specified by the 1983 Base condition.
c) Comparison Points: Base 83 Planning Condition (from COP modeling), CSB2027
d) Model: MD-RSM

(2) Maintain Hydroperiods within 8.5 SMA

a) Metric: Hydroperiod at specified indicator locations during wet (Water Year 2006), dry (Water Year 2011), and average (Water Year 2007) years.
b) Target: Indicator locations within the L-357 protective levee will not have an increase in hydroperiod as specified by the 1983 Base condition.
c) Comparison Points: Base 83 Planning Condition (from COP modeling), CSB2027
d) Model: MD-RSM

(3) Consecutive Days of Inundation within 8.5 SMA

a) Metric: Consecutive days of inundation: number of consecutive days where the stage is above the ground surface elevation and number of days where the stage is greater than 18" above the ground surface elevation.
b) Target: Areas within the L-357 protective levee will not have an increase in consecutive days of inundation as specified by the 1983 Base condition.
c) Model Comparison: Base 83 Planning Condition (from COP modeling)
d) Model: MD-RSM

With the increased deliveries into NESRS with ALTB2, water levels within the ENP wetlands immediately west of 8.5 SMA (Angels Well and LPG-3) are inundated for approximately 160 days, or 43% of the MD-RSM wet year 2006 (Water Year extending from May 2005 through April 2006). The hydroperiod, or total number of days with water depths above ground during a year, were computed for the wet year (Water Year 2006), dry year (Water Year 2011), and average year (Water Year 2005) for each location. In order to evaluate potential changes in groundwater depths below ground, hydroperiods were also computed for theoretical hydroperiod depths of 3 inches and 6 inches below the ground surface elevation. The stage hydrograph for the ENP Angel's Monitoring Well 2005-2006 wet year illustrates: (1) compared to the 1983 Base Condition, elevated water stages within NESRS associated with MWD implementation of increased inflow volumes and prolonged inflow durations (CSB2027, ALTB1, ALTB2 and ALTB3); (2) compared to the 1983 Base Condition, increased peak stages following significant rainfall events such as Hurricane Katrina in August 2005 (2-day rainfall amount of 9.5 inches) due to higher antecedent stage conditions and reduced groundwater storage capacity; and (3) compared to CSB2027, reduced hydroperiod within eastern NESRS, immediately west of the 8.5 SMA (Angels Well and LPG-3) associated with the increased southwesterly sheetflow within NESRS with the CEPP South degrade of the L-67E Levee.

Based on the 2000 8.5 SMA GRR ROD requirement that "periodic flooding of landowners east of the proposed levee, before and after project implementation, will remain unchanged *from conditions in existence prior to implementation of the MWD Project* except where flowage easements are required," all 8.5 SMA locations within the interior of the 8.5 SMA flood mitigation levee are assessed by comparing the COP action alternatives against the 1983 Base Condition. The existing groundwater monitoring wells located east of the 8.5 Square Mile Area western perimeter levee are shown on **Figure 4-33** and **Figure 4-34**.

Similar to the evaluation approach used with MODBRANCH during development of the 2000 8.5 SMA GRR Plan and repeated during the COP evaluations, a performance measure was developed to display the MD-RSM peak stages across all model grid cells within the 8.5 SMA interior mitigation area. The 8.5 SMA interior mitigation area was divided into five sub-areas based on the location of the 8.5 SMA interior C357 Canal and land use: (1) Flowage Easement, North of the C-357 Canal (publicly-owned lands with no limitation of inundation depth and duration, shown in purple); (2) North of C-357 Canal (shown in dark blue); (3) West of C-357 Canal (including LPG-1, LPG-2, LPG-12, LPG-16, and LPG-17, shown in orange); (4) C-357 Canal (grid cells which include the C-357 Canal, shown in green); and (5) East of C-357 Canal (lands between the C-357 Canal and the L-31N Canal, which receive flood mitigation benefits from both the S357 and S-331 pump stations). For each MD-RSM simulation water year (wet, dry, or average), the annual peak stage is computed for each interior mitigation area grid cell (with an associated grid cell acreage), compared against the LiDAR-based average grid cell elevation, and classified into a depth bin ranging in 0.1 foot increments from >0.1 feet to >1.0 feet. The sub-areas within the 8.5 SMA interior mitigation area are shown in **Figure 4-35**, which included a side-by-side comparison of the sub-areas used for the Pennsucco-Dade-Monroe (PDM) MODBRANCH application (top panel) and the COP MD-RSM application

(bottom panel). The 8.5 SMA peak stage performance measure results for the CEPP South action alternatives (ALTB1; ALTB2; ALTB3) during the 2005-2006 wet year, including comparison versus the CSB2027 and 1983 Base Condition (83Base) are shown in the following figures for two sub-areas: **Figure 4-36** (North of C-357), and **Figure 4-37** (West of C-357); the remaining sub-areas, flowage easement, C-357 Canal, and East of C-357 are included in **Appendix E**. The initial evaluations of the CEPP South action alternatives, including ALTB2, indicated that the peak stages within the 8.5 interior flood mitigation area for all CEPP South action alternatives were consistently lower than the 1983 Base Condition and CSB2027 for all depth classifications across all sub-areas.

Stage duration curves within the sub-area West of C-357 are shown in **Figure 4-38** for LPG-2 and **Figure 4-39** for LPG-17, as these areas warranted a detailed evaluation given the recurrent water management challenges observed within this sub-area during the MWD Incremental field test operations and informed by the 8.5 SMA evaluation included in the 2020 COP EIS. The hydroperiod, or total number of days with water depths above ground during a year, were computed for the wet year (Water Year 2006), dry year (Water Year 2011), and average year (Water Year 2005) for each location. In order to evaluate potential changes in groundwater depths below ground, hydroperiods were also computed for theoretical hydroperiod depths of 3 inches and 6 inches below the ground surface elevation. Hydroperiod bar graphs for the wet, dry, and average MD-RSM simulation years, including the 3 inch and 6 inch theoretical hydroperiod surfaces, are summarized on **Figure 4-40** for LPG-2 and **Figure 4-41** for LPG-17 for each of the 1983 Base Condition, CSB2027 Base Condition, and CEPP South Alternatives. The figures indicate compliance with the 8.5 SMA flood mitigation constraint for hydroperiod duration (water year duration less than the 1983 Base Condition) at both locations, but the figures also show the CEPP South alternatives, including ALTB2, as having increased frequency of groundwater conditions within 6 inches of ground surface elevation at LPG-2. The stage hydrograph for the LPG-2 2005-2006 wet year is shown as **Figure 4-42**, which illustrates: (1) compared to the 1983 Base Condition, elevated water stages at LPG-2 associated with COP (represented in CSB2027) and CEPP South implementation of increased inflow volumes and prolonged inflow durations (ALTB1, ALTB2, ALTB3); (2) compared to the 1983 Base Condition, a slight increase in peak stages following significant rainfall events such as Hurricane Katrina in August 2005 (2-day rainfall amount of 9.5 inches); (3) Compared to the 1983 Base Condition, the CEPP South alternatives and the CSB2027 demonstrate a significant increased drainage rate and a significantly reduced duration with stages above ground given the ability to leverage the C-357/C-358 Canals and use of the S-357 pump station; (4) the CSB2027 and ALTB3 experience secondary events later in the wet season, where water levels temporarily rise above ground in response to moderate rainfall events due to the persistently higher groundwater stages with COP implementation; and (5) the CEPP South alternatives (including ALTB3), particularly ALTB1 and ALTB2) demonstrate a significant reduction in secondary peak events as a result of the NESRS increased southwesterly sheetflow attributable to the CEPP South degrade of the L-67E Levee (degrade not included in CSB2027). Throughout the hydrologic monitoring during the MWD Incremental field test, the use of the LPG-2 ground surface elevation (approximately 6.7 feet, NGVD) as a flood mitigation metric for 8.5 SMA inundation duration has been recognized by the Corps as a conservative criteria since the aerial topographic survey indicates this location as approximately 0.25-0.50 feet lower than most of the adjacent developed property. During the field test, Corps installed two additional monitoring wells at LPG-16 and LPG-17 to supplement the previously available groundwater data at LPG-2 and LPG-12 (refer to the maps on **Figure 4-33** and **Figure 4-34**); the new monitoring locations were fully instrumented and ground-surveyed in September 2019, although the data is not available in real-time (monthly downloads only). With the continued monitoring under the Increment 2 field test and the 2020 COP, the Corps will continue to consider adjustments to the flood mitigation criteria at LPG-2, such as using a hydroperiod duration criteria relative to a more representative elevation for this portion of the 8.5 SMA interior mitigation area.

The 8.5 SMA performance metrics are summarized in **Table 4-7** and **Table 4-8**, respectively for the LPG-2 and LPG-17 monitoring locations. All of the simulated CEPP South alternatives evaluated in this EA, including ALTB2, demonstrate adherence to the 1983 Base Condition constraint for 8.5 SMA flood mitigation. While this conclusion would allow implementation of additional inflows through the Blue Shanty Flowway and eastern ENP with the full CEPP South build-out, the assumption must be reiterated that the modeling evaluations conducted in support of this EA rely on the existing inflows to WCA 3A and do not account for increased future inflows that will be needed to achieve the full ecological benefits of CEPP that were identified in the 2014 CEP PIR/EIS. While it is notable that peak stages observed within the western portion of the 8.5 SMA were reduced, in part, due to the effects attributable to the CEPP South degrade of the L-67E Levee, the ultimate length of L-67E Levee (and adjacent canal backfill) that will be removed with CEPP South implementation remains under evaluation as part of the BAMM flood routing study and CEPP PED evaluations. Pending further certainty regarding the schedule for implementation of upstream operational changes that will supply additional inflows south to WCA 3A and quantification of these flows, which has the potential to alter these conclusions, future CEPP South hydrologic modeling will need to re-assess performance for the 8.5 SMA flood mitigation constraint. Since the CEPP degrade of the L-29 levee will be a permanent change to the C&SF infrastructure, hydrologic modeling in support of a future Water Control Plan update will necessarily be completed prior to PED design of this CEPP South component in 2023. Additional agency and public coordination efforts, including review of future hydrologic modeling outcomes, will be conducted to inform development of the permanent update to the Water Control Plan for the WCAs, ENP, and SDCS to incorporate the full complement of CEPP South components, with completion of this Water Control Plan update presently anticipated for 2024.

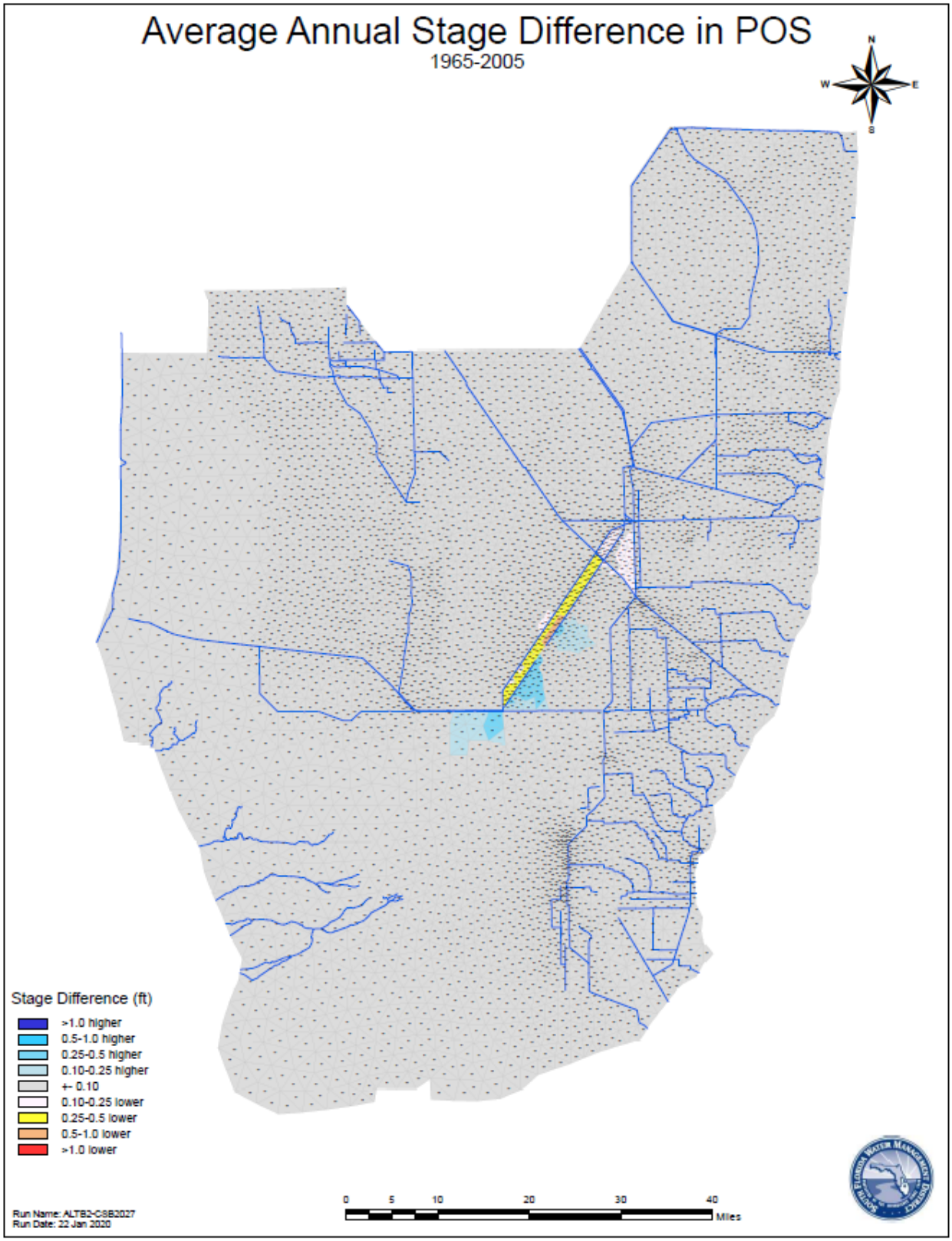

Figure 4-25. RSM-GL average annual stage difference map comparing ALTB2 versus CSB2027.

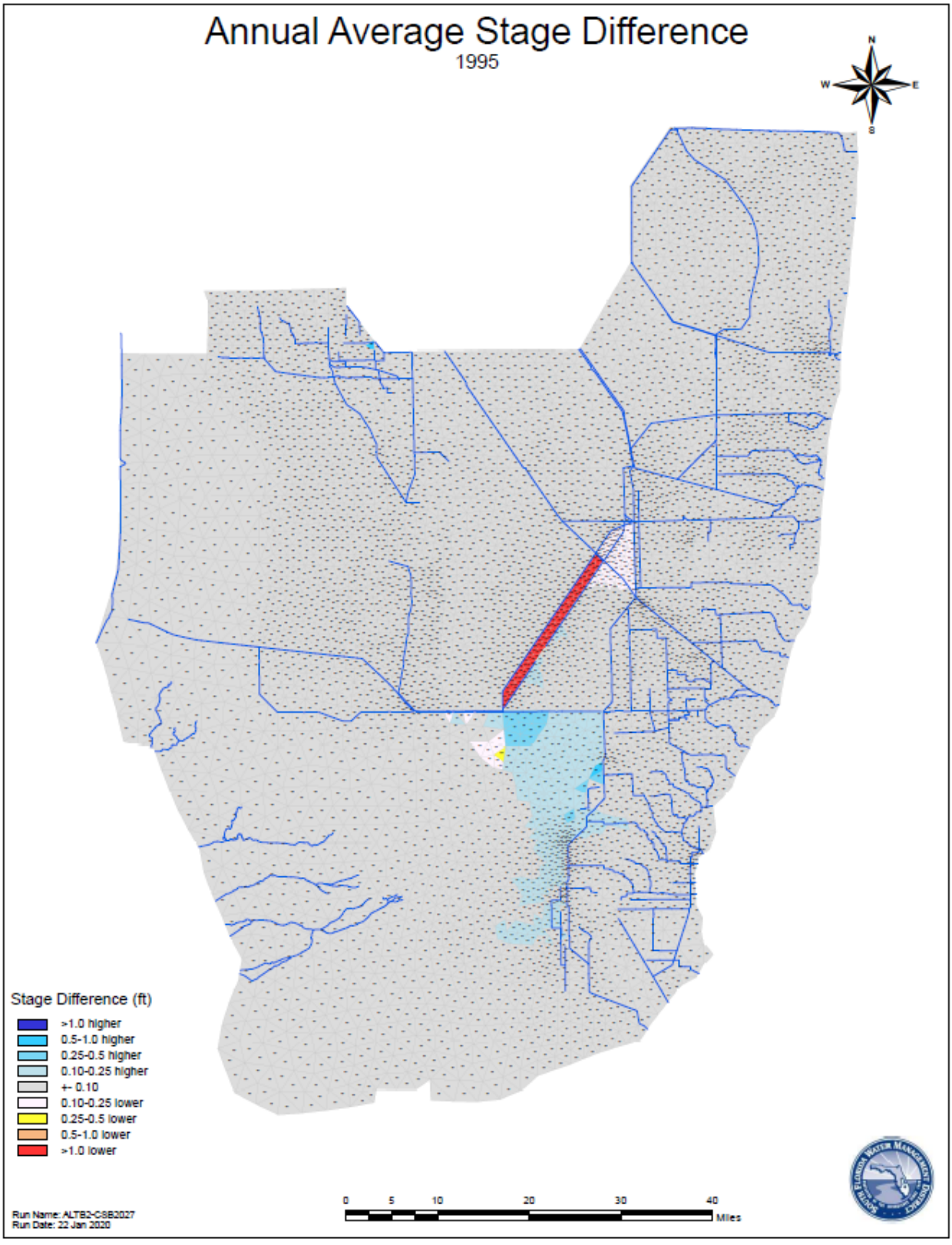

Figure 4-26. RSM-GL average annual stage difference map comparing ALTB2 versus CSB2027 for 1995.

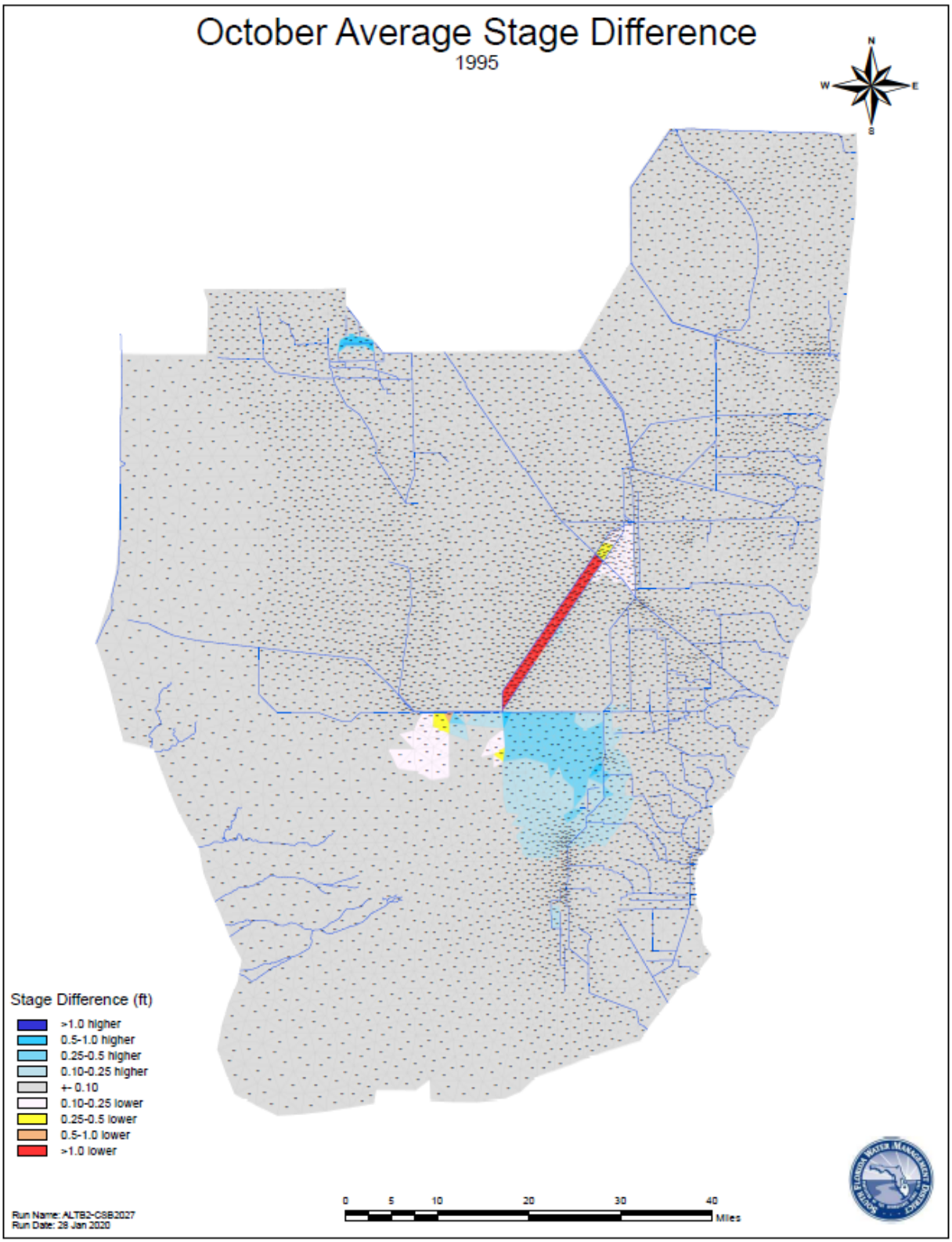

Figure 4-27. RSM-GL average annual stage difference map comparing ALTB2 versus CSB2027 for October 1995.

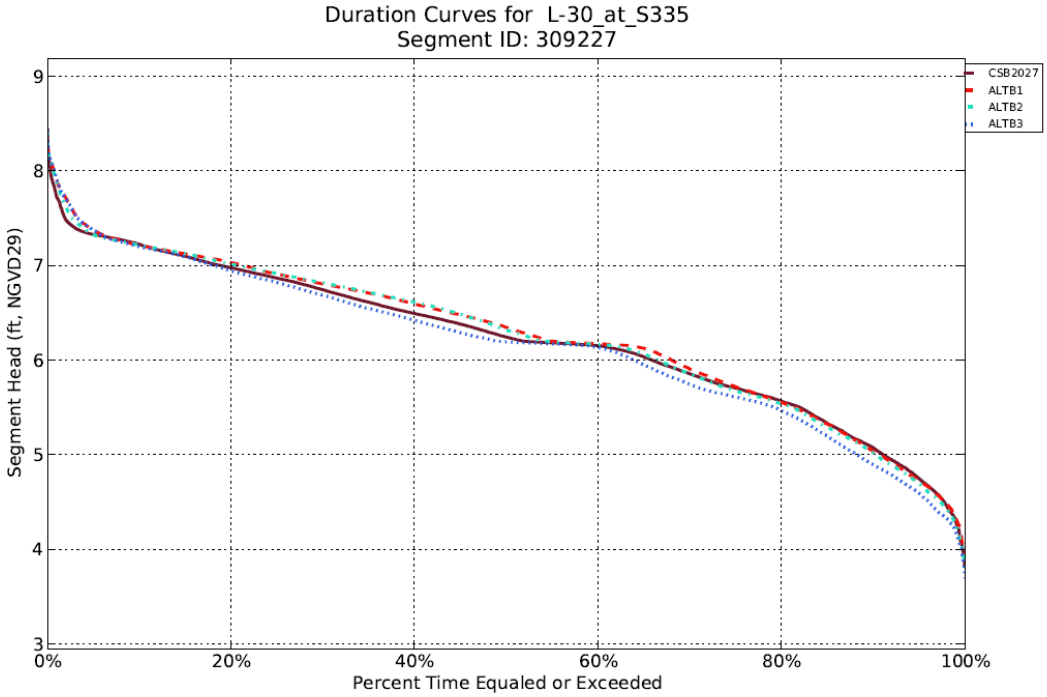

Figure 4-28. RSM-GL Stage Duration Curve for the L-30 canal, Upstream of the S-335 Water Control Structure, for the simulation period of record 1965-2005.

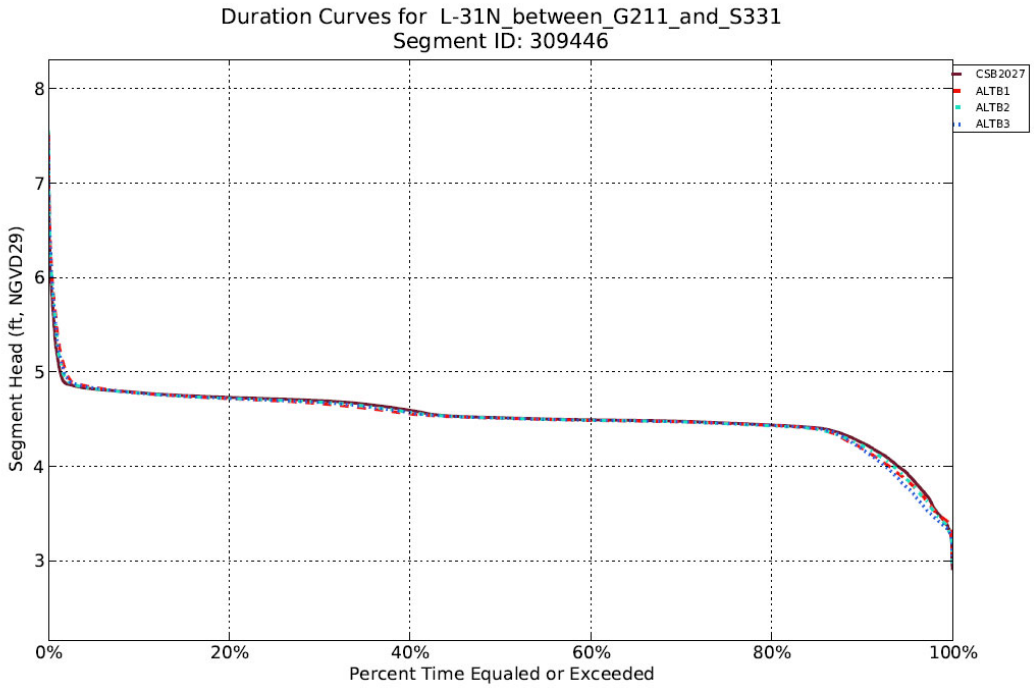

Figure 4-29. RSM-GL Stage Duration Curve for the L-31N canal, Upstream of the S-331 Water Control Structure, for the simulation period of record 1965-2005.

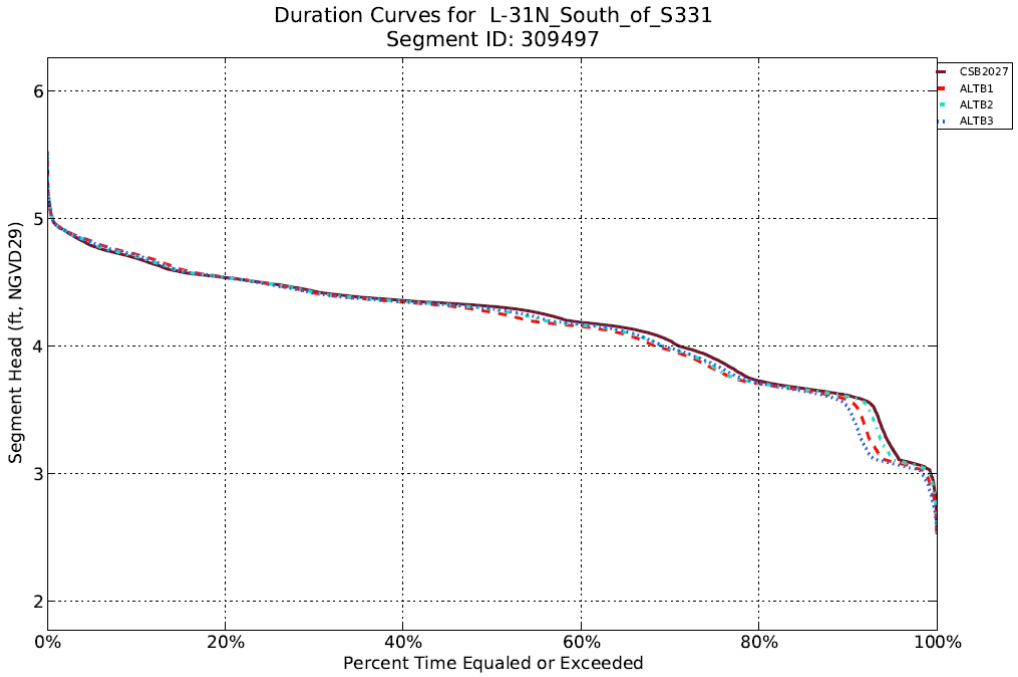

Figure 4-30. RSM-GL Stage Duration Curve for the L-31N canal, Upstream of the S-176 Water Control Structure, for the simulation period of record 1965-2005.

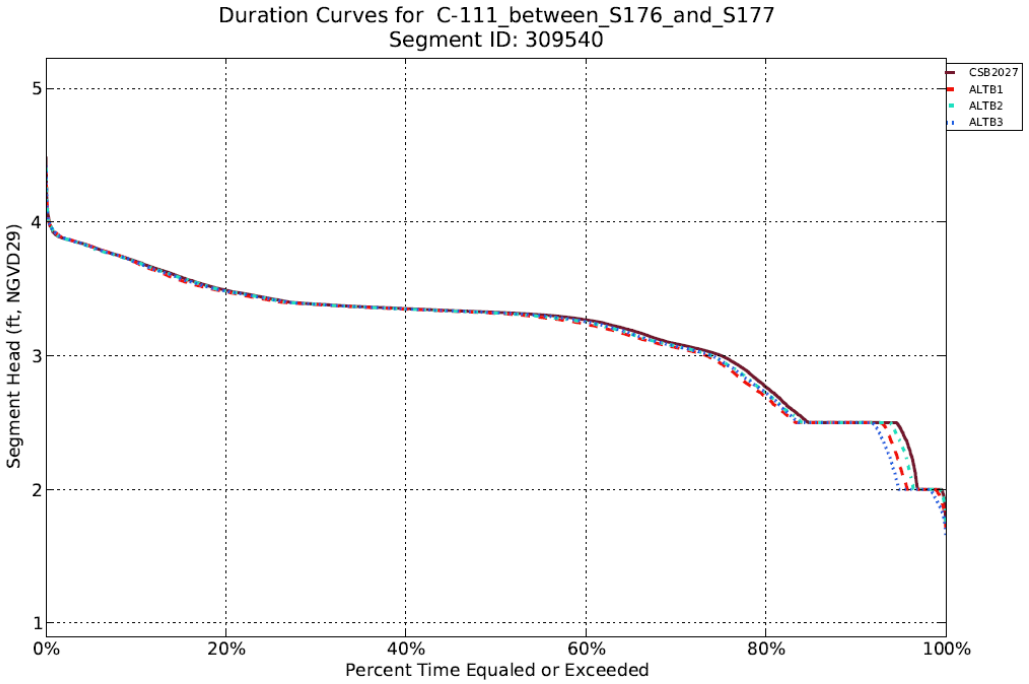

Figure 4-31. RSM-GL Stage Duration Curve for the L-31N canal, Upstream of the S-177 Water Control Structure, for the simulation period of record 1965-2005.

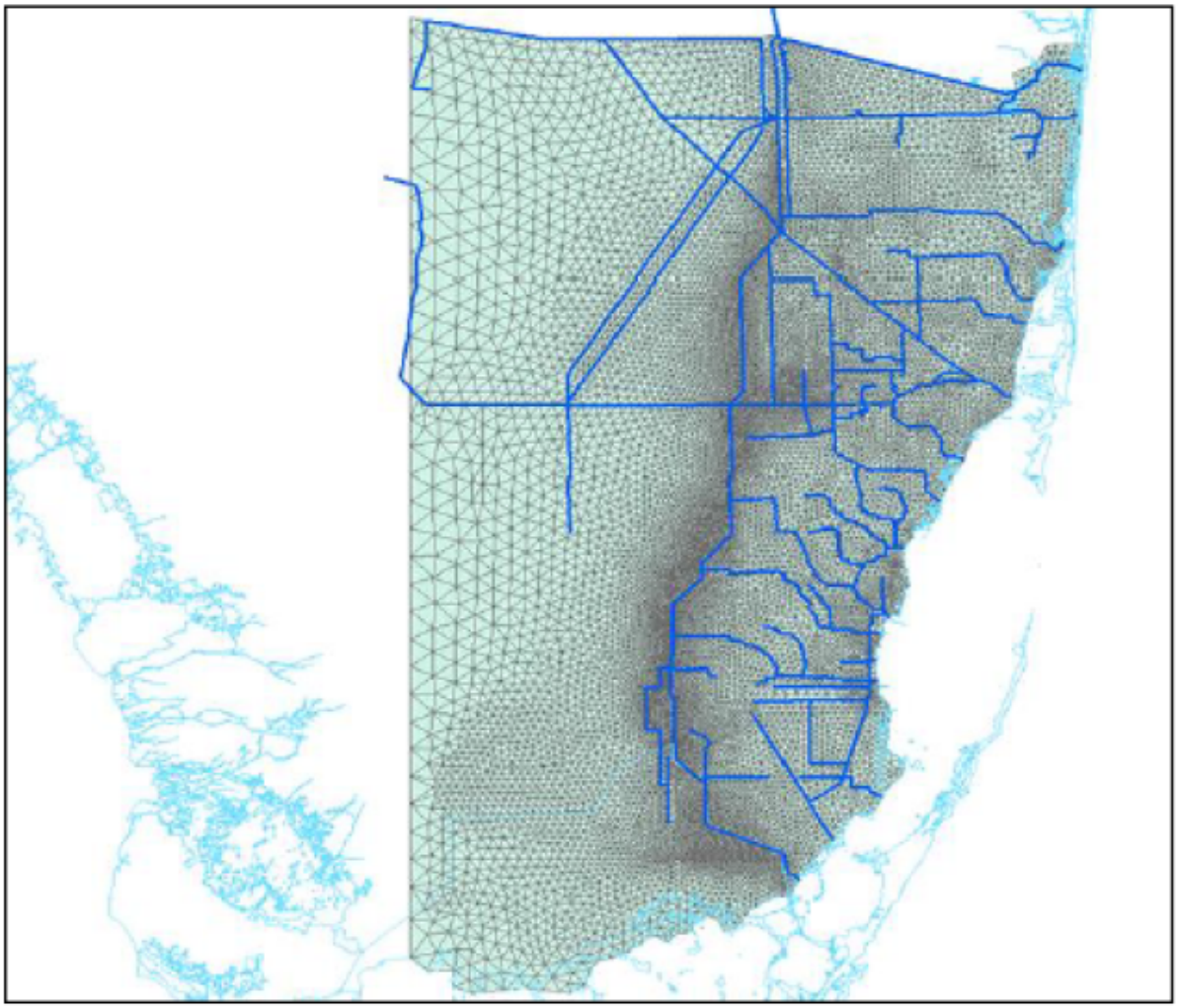

Figure 4-32. MD-RSM Model Domain.

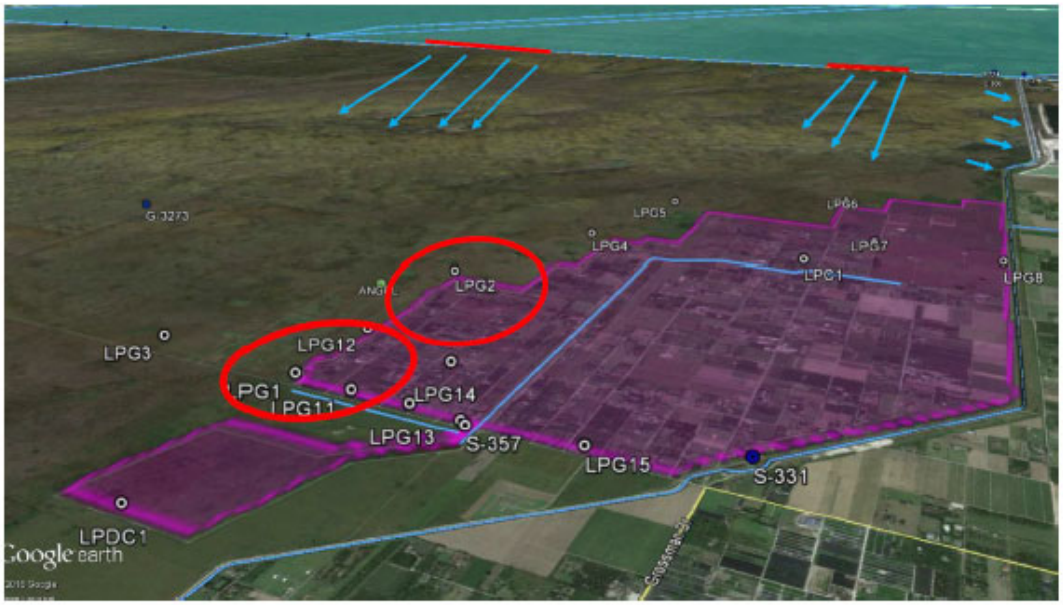

Figure 4-33. 8.5 SMA Location Map

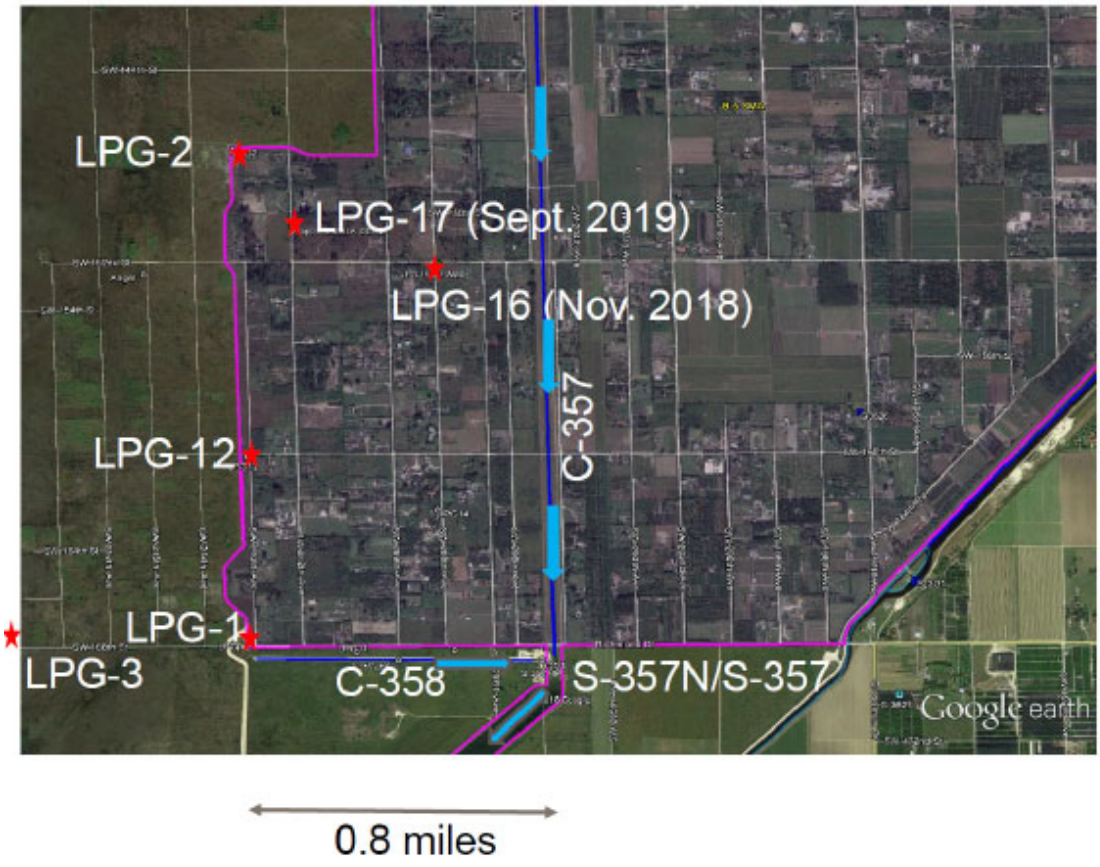

Figure 4-34. 8.5 SMA Southwest Flood Mitigation Features Map

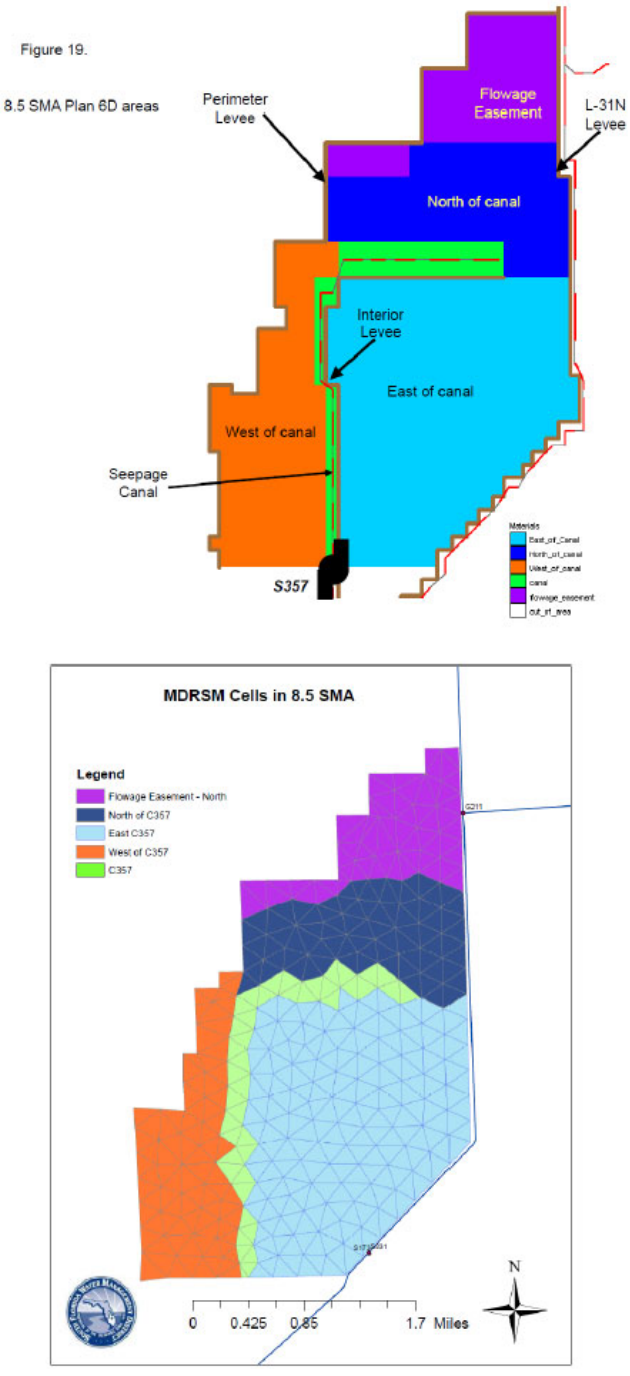

Figure 4-35. MD-RSM Model Element Resolution for 8.5 SMA, with 8.5 SMA Basin Sub-Areas Delineated for Flowage Easement (purple), North of C-357 (dark blue), West of C-357 (orange), East of C-357 (light blue), and adjacent to C-357 (green). MODBRANCH model 8.5 SMA Basin Sub-Areas are indicated on the Top Panel, for Reference.

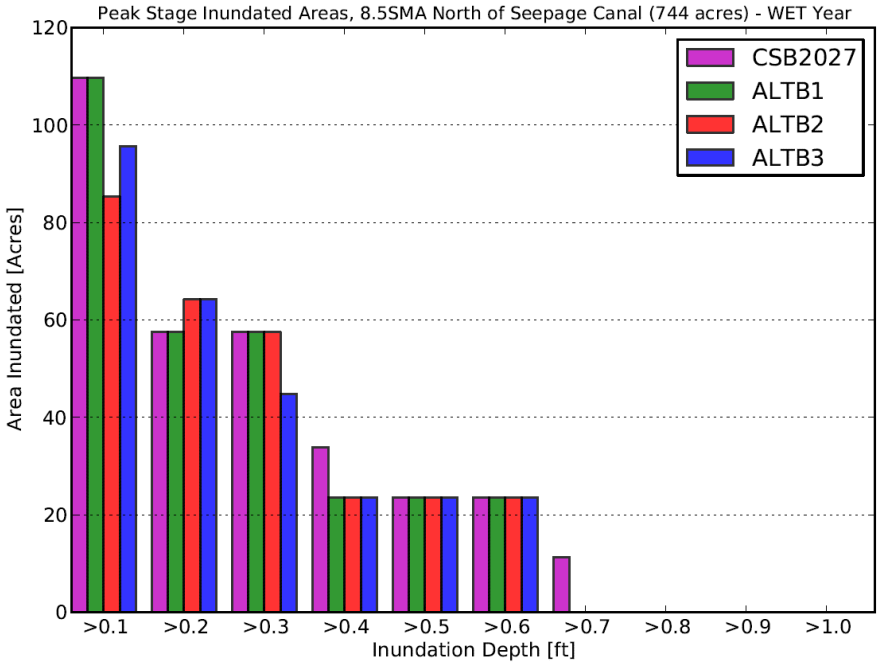

Figure 4-36. MD-RSM Peak Stage Inundation Areas for 8.5 SMA North of C-357 Sub-Basin with Depth Classifications Ranging from Greater than 0.1 feet up to Greater than 1.0 feet (0.1 foot Increments), CSB2027 Base Condition and CEPP South Alternatives in the 2005-2006 Wet Year.

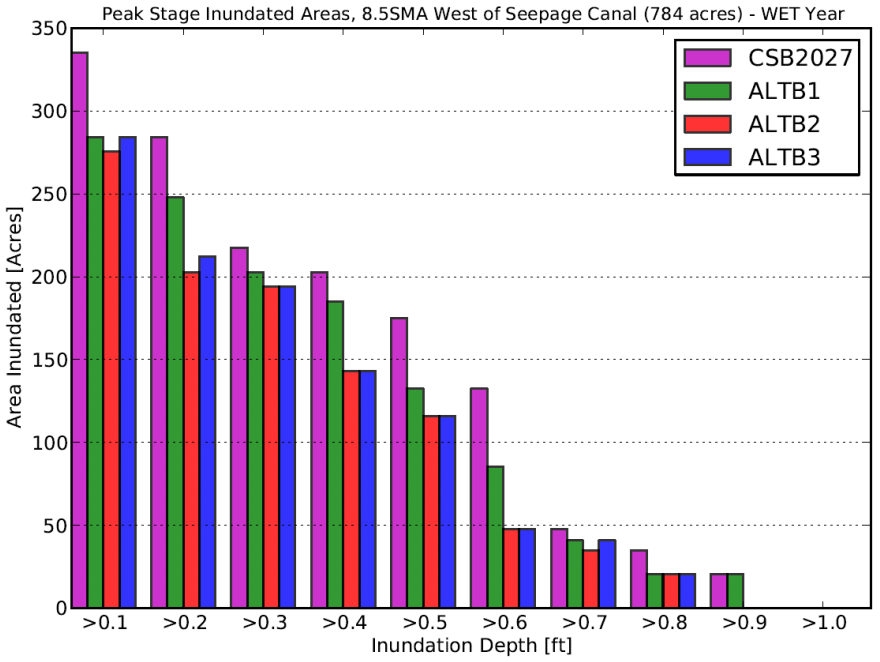

Figure 4-37. MD-RSM Peak Stage Inundation Areas for 8.5 SMA West of C-357 Sub-Basin with Depth Classifications Ranging from Greater than 0.1 feet up to Greater than 1.0 feet (0.1 foot Increments), CSB2027 Base Condition and CEPP South Alternatives in the 2005-2006 Wet Year.

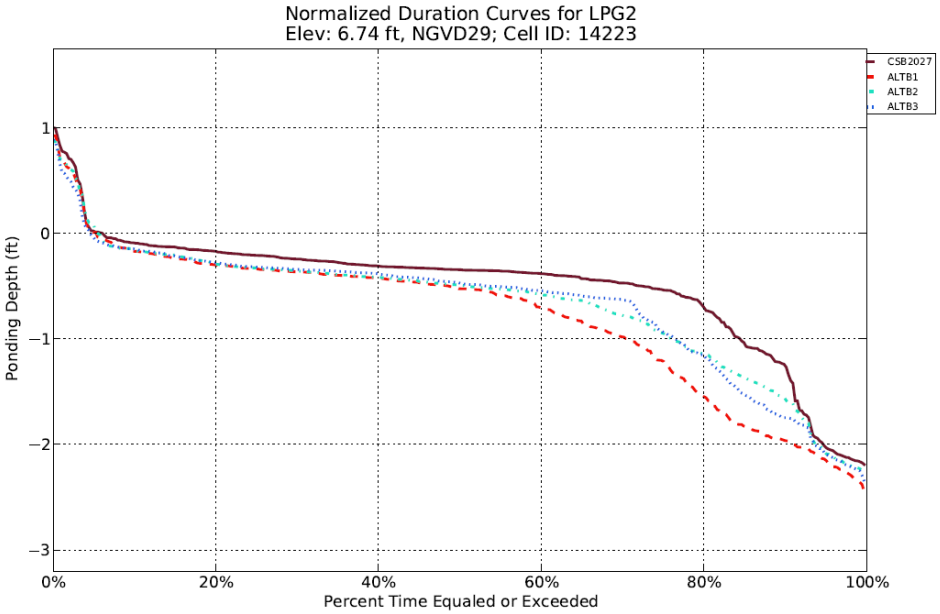

Figure 4-38. MD-RSM Stage Duration Curves for CSB2027 Base Condition and CEPP South Alternatives, 2005-2006 Wet Year at LPG-2

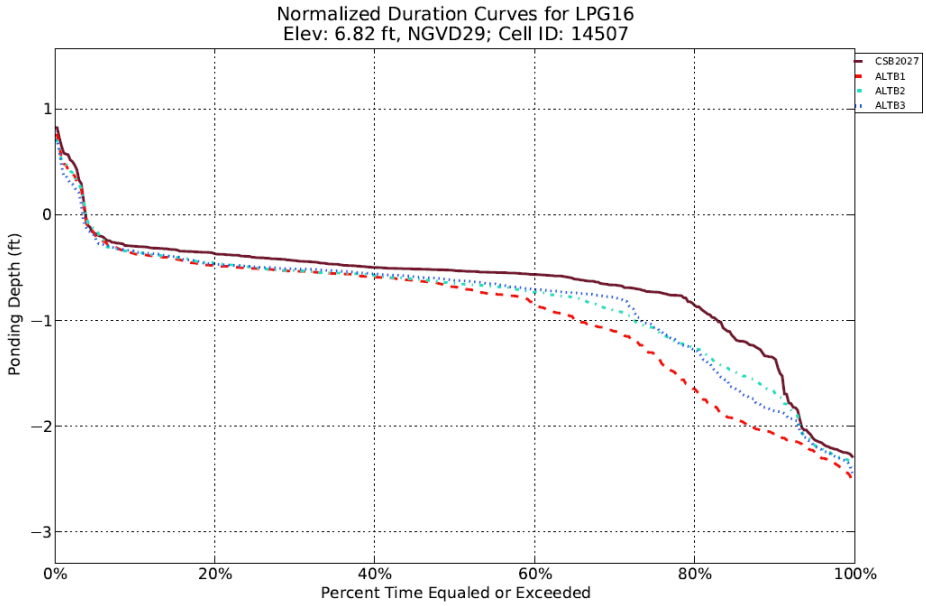

Figure 4-39. MD-RSM Stage Duration Curves for COP Base Conditions and Round 2 Alternatives, 2005-2006 Wet Year at LPG-17.

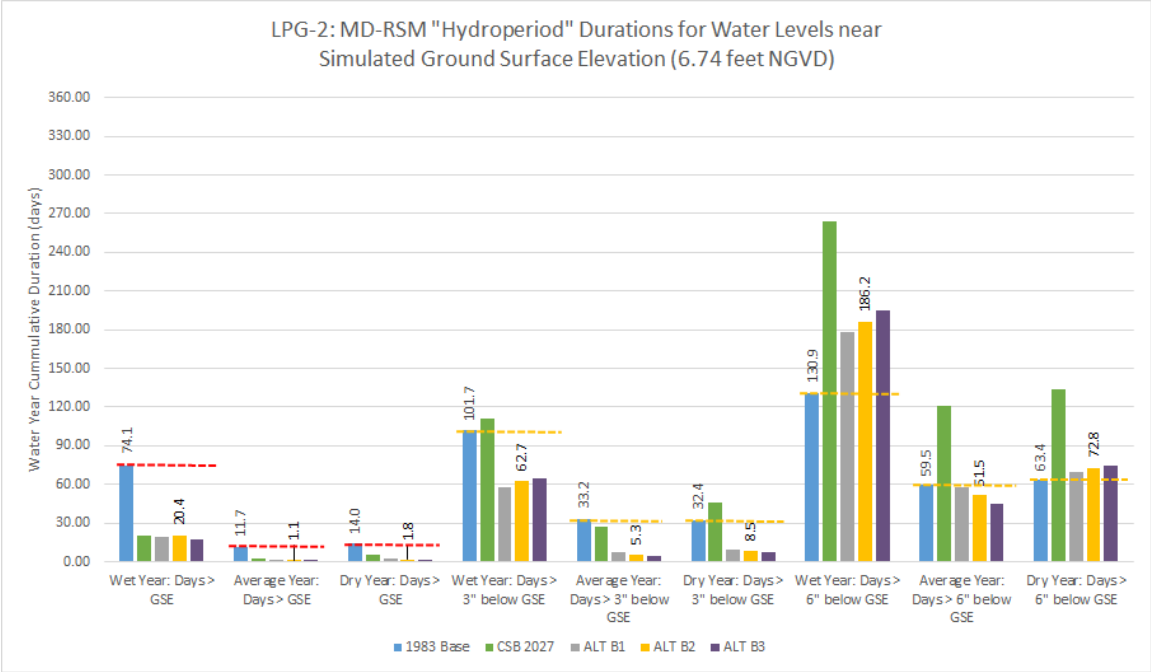

Figure 4-40. Hydroperiod bar graphs for the wet, dry, and average MD-RSM simulation years for the CSB2027 Base Condition and CEPP South Alternatives at LPG-2, including hydroperiod referenced against ground surface elevation and the 3 inch and 6 inch theoretical hydroperiod surfaces.

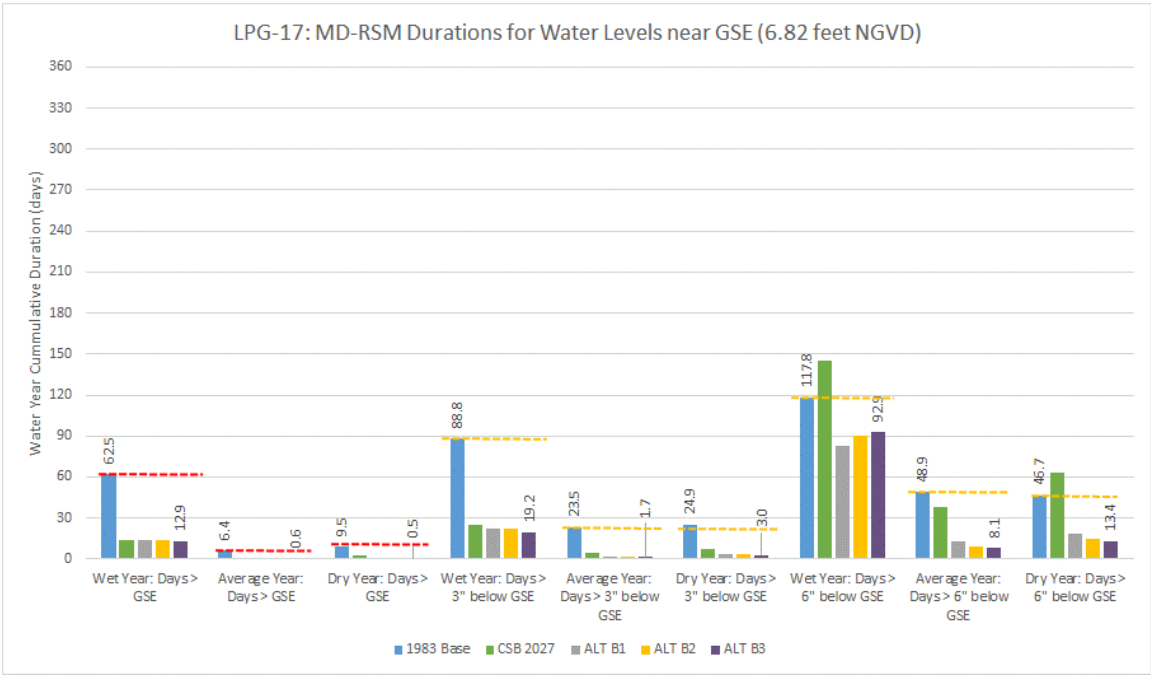

Figure 4-41. Hydroperiod bar graphs for the wet, dry, and average MD-RSM simulation years for the CSB2027 Base Condition and CEPP South Alternatives at LPG-17, including hydroperiod referenced against ground surface elevation and the 3 inch and 6 inch theoretical hydroperiod surfaces.

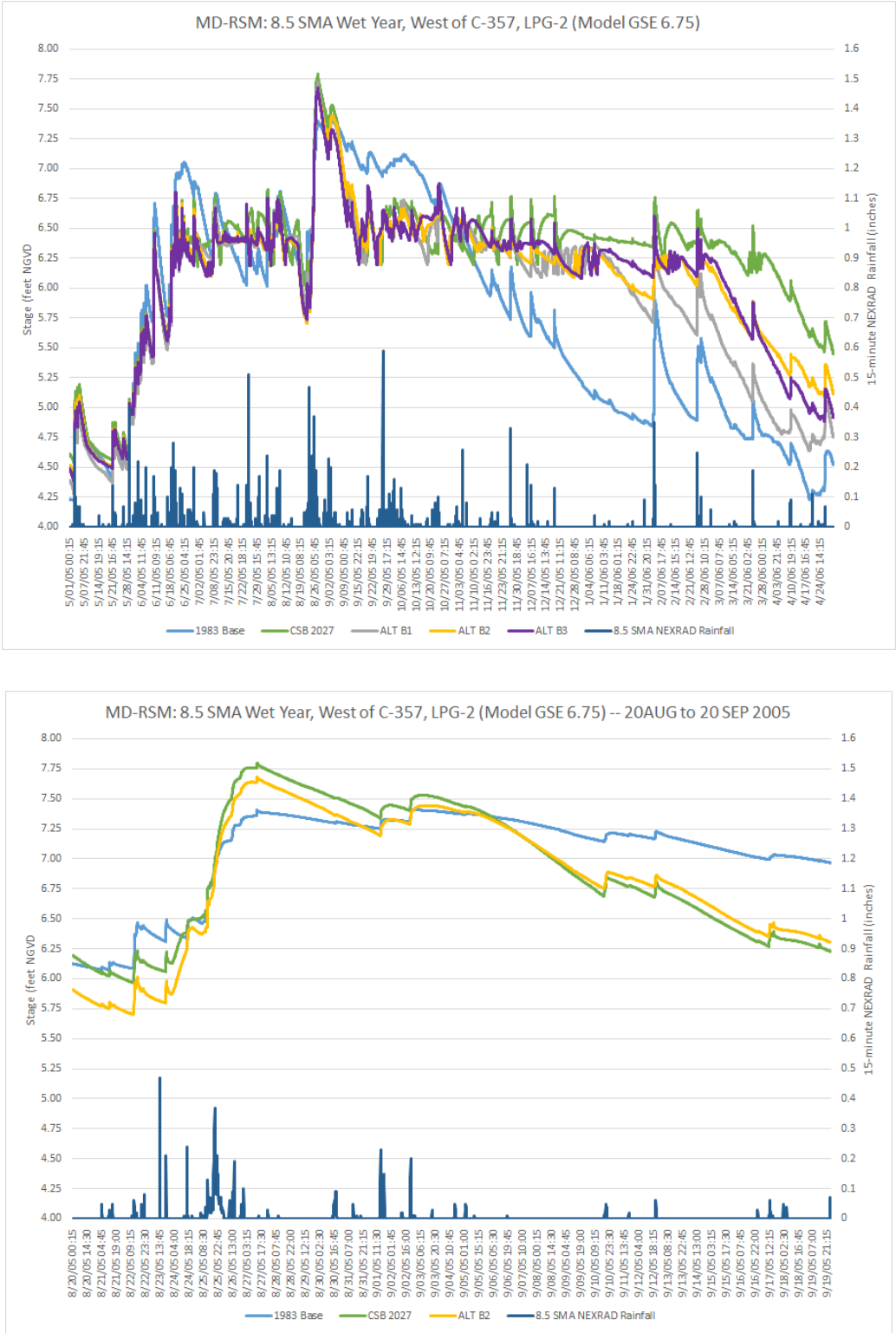

Figure 4-42. MD-RSM Stage Hydrographs for 1983 Base Condition, CSB2027 Base Condition, and CEPP South Alternatives, 2005-2006 Wet Year at LPG-2. Top Panel Displays the Entire Water Year and the Bottom Panel Displays the August 2005 Hurricane Katrina Rainfall Event and Post-Event Recession for ALTB2 and the Base Conditions.

Table 4-7. Summary of 8.5 SMA Accumulated Duration above Ground Surface Elevation at LPG-2 for MD-RSM Wet, Dry, and Average Years and Consecutive Inundation Duration in Wet Year, comparing 1983 Base Condition, CSB2027 Base Condition, and CEPP South Alternatives.

LPG-2	1983 Base	CSB2027	ALT B1	ALT B2	ALT B3
Wet Year: Cumulative Days > GSE	74.13	19.85	18.80	20.42	17.08
Average Year: Cumulative Days > GSE	11.65	2.49	1.30	1.10	1.08
Dry Year: Cumulative Days > GSE	14.03	5.28	2.00	1.80	1.40
Wet Year: Consecutive Days > GSE	56.24	18.54	18.49	19.28	14.45

Table 4-8. Summary of 8.5 SMA Accumulated Duration above Ground Surface Elevation at LPG-17 for MD-RSM Wet, Dry, and Average Years and Consecutive Inundation Duration in Wet Year, comparing 1983 Base Condition, CSB2027 Base Condition, and CEPP South Alternatives.

LPG-17	1983 Base	CSB2027	ALT B1	ALT B2	ALT B3
Wet Year: Cumulative Days > GSE	62.52	14.17	13.94	14.31	12.85
Average Year: Cumulative Days > GSE	6.43	0.73	0.61	0.58	0.56
Dry Year: Cumulative Days > GSE	9.49	2.64	0.72	0.61	0.52
Wet Year: Consecutive Days > GSE	53.63	14.17	14.00	14.31	12.85

4.5.1.2 ALTB4

The model-based comparison utilized in the 2014 CEPP Final PIR/EIS to accurately reflect the effects of the CEPP project was the Initial Operating Regime with the project (recommended plan Alt 4R2) compared to the Initial Operating Regime without the project (IOR Baseline IORBL1). Similarly, based on the plan formulation assumptions established for CEPP South, the simulation for CSB2027 also includes the effects of intervening CERP activities that were assumed to be implemented prior to the CEPP for the future without project condition, including: Indian River Lagoon-South Project; Broward County Water Preserve Areas Project, C-11 Reservoir; Caloosahatchee River (C-43) West Basin Storage Reservoir; and the C-111 Spreader Canal Western Project. Because of the incremental formulation of CERP projects contemplated under the formulation process described in the Draft Guidance Memoranda, methods to assess the potential effects of intervening CERP activities were not specifically addressed in the Draft Guidance Memoranda. Since each of these CERP projects assumed for the CEPP future without project condition (CSB2027 no action alternative) have completed PIR documents that demonstrate Savings Clause compliance for each of these projects, effects to existing legal sources or levels of service for flood protection that are observed in comparisons between the CSB2027 and previous Existing Condition baselines (such as the COP ECB19RR) shall not constitute a Savings Clause violation for CEPP. Non-CEPP Savings Clause impacts that are projected with implementation of intervening CERP activities will need to be addressed during implementation of these non-CEPP CERP projects. Updated supplemental Savings Clause analyses, using the most current available information, may need to be completed prior to implementation of CERP projects if subsequent revisions to the programmatic Integrated Delivery Schedule (IDS) or other new information is determined by the Corps to significantly change the appropriateness of prior CERP PIR analyses.

Consistent with the methodology established through CERP Draft Guidance Memoranda 3, implementation of the COP constitutes a non-CERP intervening activity that would establish the

appropriate reference condition from which to assess potential Savings Clause effects due to implementation of CEPP South. A comprehensive evaluation of the FRM performance of the COP is available in Section 4.15 of the 2020 COP Draft EIS (January 2020) and Final EIS (July 2020).

The hydrologic effects of ALTB4 will generally match CSB2027 for WCA 3A, ENP NESRS, ENP WSS, and all Lower East Coast Service Areas. Because the performance of ALTB4 closely resembles CSB2027 in terms of potential hydrologic effects in WCA 3A, WCA 3B, ENP, and the LECSAs, unique modeling of ALTB4 was determined to be unnecessary, and the hydrologic modeling outcomes from CSB2027 were utilized to support the quantitative Savings Clause assessment of ALTB4. The additional utilization of S-631, S-632, and/or S-633 will provide increased operational flexibility to enhance the spatial distribution of inflows into WCA 3B, including within the Blue Shanty Flowway footprint. The L-29 temporary pumps would be operated consistent with the S-333/S-333N flow targets prescribed under the TTFF and constrained by the maximum canal stage in the L-29 canal to of 8.5 feet, NGVD consistent with the COP. With no additional inflow volume or changed timing for inflows to NESRS, compared to CSB2027, ALTB4 will maintain adherence to the 8.5 SMA flood mitigation constraint. With no proposed changes to the SDCS operations, the FRM performance provided by the SDCS primary canal network (L-30, L-31N, C-111) will maintain the performance established with the COP intervening non-CERP project. Refer to the 2020 COP EIS for comprehensive evaluation of the FRM performance associated with COP implementation.

4.5.2 Water Supply

To analyze the potential elimination or transfer of existing legal sources, affected basins or users are evaluated. The basins and users that may be affected by the 2014 CEPP PIR/EIS recommended plan are displayed in **Table 4-9**, classified according to the categories identified in WRDA 2000. Since the CEPP South alternatives evaluated within this EA do not alter the CSB2027 flows from Lake Okeechobee and the EAA into the Everglades Protection Area, none of the action alternatives contemplated within this EA will alter the pre-project quantity or quality of water supply for users or natural systems located in the portions of the C&SF project north of WCA 3, including: Lake Okeechobee Service Area (LOSA); Seminole Indian Tribe of Florida, Brighton Reservation; Seminole Indian Tribe of Florida, Big Cypress Reservation; Caloosahatchee Estuary; or St. Lucie Estuary. A limited discussion is provided within this section for each of the action alternatives as this EA evaluates adherence to Savings Clause requirements; in-depth evaluations, however, are focused on ALTB2 and ALTB4, since ALTB1 and ALTB3 were screened out as described in **Section 2.4**.

Table 4-9. Existing Legal Sources Evaluated for Elimination and Transfer of Existing Legal Sources

WRDA 2000, Section 601(h)(5)	User or Natural System Evaluated in CEPP
(i) an agricultural or urban water supply;	• Lake Okeechobee Service Area (LOSA), including the Everglades Agricultural Area (EAA) • Lower East Coast Service Area 2 (LECSA-2) • Lower East Coast Service Area 3 (LECSA-3)
(ii) allocation or entitlement to the Seminole Indian Tribe of Florida under section 7 of the Seminole Indian Land Claims Settlement Act of 1987 (25 U.S.C. 1772e);	• Brighton Reservation • Big Cypress Reservation
(iii) the Miccosukee Tribe of Indians of Florida;	• Alligator Alley Reservation (west of WCA 3A) • Tamiami Trail Reservation (south of WCA 3A) • Reservations at Tamiami Trail/Krome Avenue

WRDA 2000, Section 601(h)(5)	User or Natural System Evaluated in CEPP
(iv) water supply for Everglades National Park; or	• ENP
(v) water supply for fish and wildlife.	• Caloosahatchee Estuary • St. Lucie Estuary • WCAs 2 and 3 • Biscayne Bay • Florida Bay

A summary of the anticipated long-term effects on urban and agricultural water supply of the alternative actions is presented in **Table 4-10**. ALTB2 and ALTB4 are compared to the CSB2027. **Figure 4-43** depicts the location of LECSAs 1, 2, and 3 in the project area. The summary of regional performance differences includes quantitative comparisons between the CSB2027 and CEPP South alternatives based on the RSM-GL CEPP modeling representations of these baselines and alternatives. The period of simulation (1965-2005; 40 total South Florida Water Years, May to April) used for the CEPP hydrologic modeling encompasses a wide range of historical climatologic and meteorologic conditions that are representative of south Florida hydrology. This analysis period includes several moderate wet and moderate dry periods, as well as less frequent and potentially more impactful periods of both extreme high rainfall and extreme drought conditions. Although not detailed in **Table 4-10**, discussion of water supply performance for ALTB1 and ALTB3 is also included within this section, as appropriate, given the recognition that future CEPP operations may be developed around the RDO targets that were applied for ALTB3. A preliminary assessment is included in this section, but a more detailed evaluation of changes to water supply availability for the natural system will be completed in support of future operational plan updates, pending quantification of increased inflows to WCA 3A.

Table 4-10. Effects of Alternatives on Water Supply

Geographic Region	Alternative	Water Supply Performance Summary
Lower East Coast Service Area 2 (Broward)	CSB2027	Total number of water years with 3 or more consecutive months with restrictions = 31. No locally triggered groundwater cutback events.
	ALTB2	Total number of water years with 3 or more consecutive months with restrictions = 31 (no change from CSB2027).
	ALTB4	No significant change from CSB2027.
Lower East Coast Service Area 3 (Miami-Dade)	CSB2027	Total number of water years with 3 or more consecutive months with restrictions = 10.
	ALTB2	Total number of water years with 3 or more consecutive months with restrictions = 10 (no change from CSB2027). Minor (less than 1 percent) increase in frequency of canal stage elevations which fall below the maintenance stage elevations sooner and for slight increased duration. Minor and localized groundwater stage reductions of less than 0.15 feet indicated in north and central LECSA 3 along L-30 (Pennsucco) and along L-31N during drought conditions. Potential elevated risk for reduced quantity and increased frequency of cutbacks to LECSA 3 water supply, in the absence of additional inflows to WCA 3A. Water supply performance metrics with CEPP planned increased inflows to WCA 3A are indeterminate and will need to be assessed prior to a permanent Water Control Plan update.
	ALTB4	No significant change from CSB2027. No reduced quantity or increased frequency of cutbacks to LECSA 3 water supply, in the

Geographic Region	Alternative	Water Supply Performance Summary
		absence of additional inflows to WCA 3A. Water supply performance metrics with CEPP planned increased inflows to WCA 3A are indeterminate and will need to be assessed prior to a permanent Water Control Plan update.

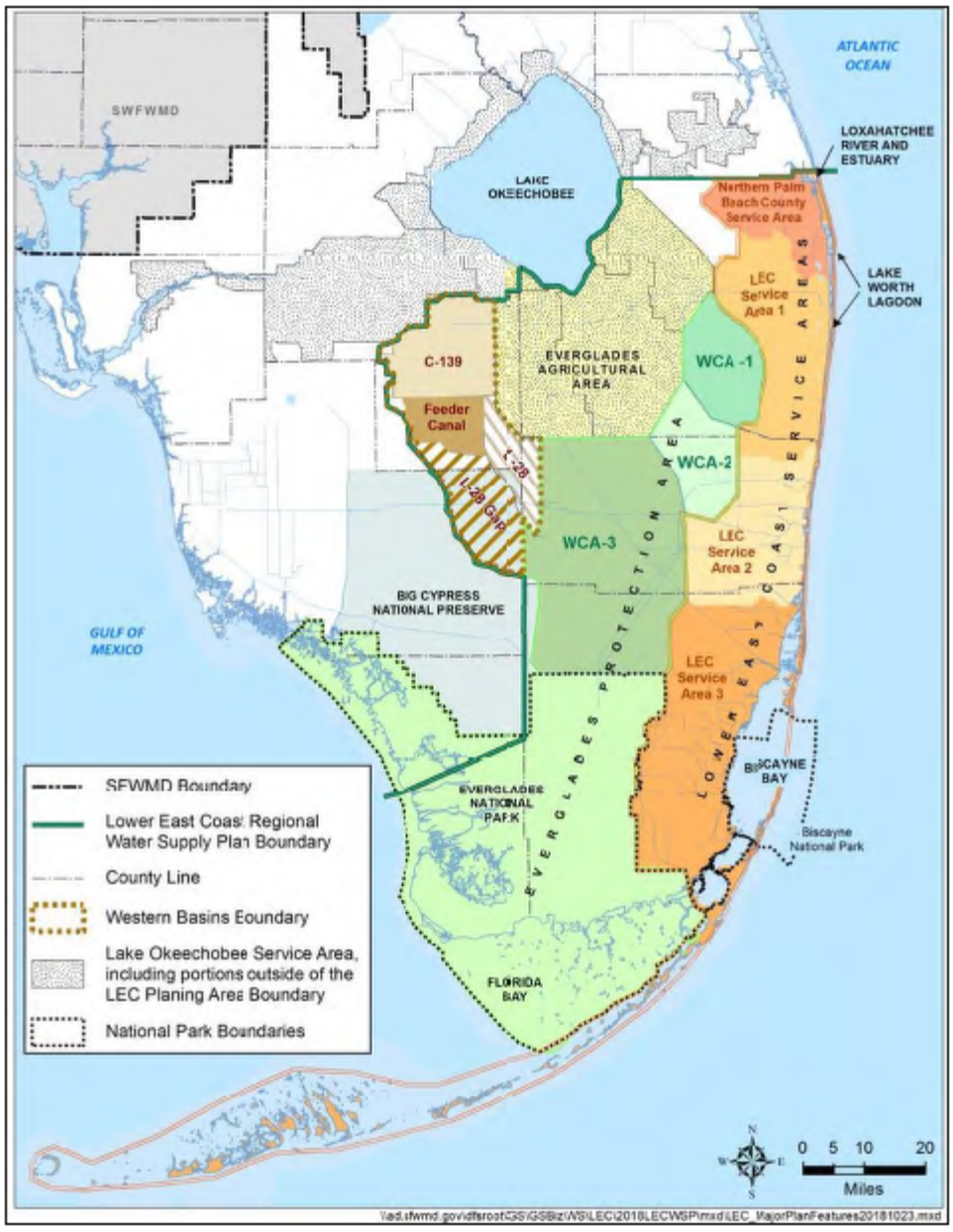

Figure 4-43. Location of LECSAs 1, 2, and 3.

4.5.2.1 ALTB2

Only model-based shallow water table stages predicted by the RSM-GL model were analyzed to determine if water supply would be affected by the alternatives. Canal stage duration curves derived from the

modeled alternatives were examined to determine if prolonged reductions in canal stages would affect saline water intrusion or water supply. Model results indicated that canal stage elevations would fall below the maintenance stage elevations sooner and for an increased duration (increase in number of days, not events) under ALTB1 (approximately 1-2% increase; refer to **Figure 4-30**) and ALTB3 (approximately 3-4 percent increase; refer to **Figure 4-31**) compared to CSB2027. The maintenance level for the L-31N Canal (S-331 to S-176) is 3.5 feet, NGVD, and the maintenance level for the C-111 Canal (S-176 to S-177) is 2.5 feet, NGVD. Model results also shown in these figures indicate that canal stage elevations would fall below the maintenance stage elevations sooner and for slight increased duration (less than 1% increase) for ALTB2, as compared to CSB2027. Prolonged reduction in canal stage elevations under low-water conditions will affect groundwater levels, which could result in movement of saline water into the Biscayne aquifer, resulting in harmful impacts to water supply well fields (e.g., Florida Keys Aqueduct Authority) and other existing legal users during drier conditions.

If saline water intrusion occurs in the Biscayne aquifer as a result of prolonged reductions in canal stage elevations below CSB2027, many permitted users in the area and along the coastal margin would be adversely affected. A review of the existing legal users of the Biscayne aquifer and surface water sources in the region was performed to determine who could possibly be affected by the implementation of the three alternatives. There are numerous permitted Biscayne aquifer wells and surface water pumps (lakes and canals) that are used for public water supply (PWS), irrigation (IRR) and industrial (IND) uses that could be impacted from the implementation of any operational plan that moderately reduces groundwater stages within the surficial aquifer during low-water conditions. In this area, groundwater levels respond quickly to canal stage elevation changes. If saline water intrusion occurred in the Biscayne aquifer as a result of prolonged reductions in canal stage elevations below CSB2027, many permitted users in the area and along the coastal margin would be adversely affected. Based on this analysis, ALTB2 has a minor effect to water supply performance, with fewer potential effects compared to ALTB1 and ALTB3, in the absence of increased inflows to WCA 3A that are a component of the authorized CEPP recommended plan.

The RSM-GL model results for volume and/or frequency of cutbacks were primarily used to evaluate effects to agricultural or urban water supply, which is applicable to the Lower East Coast Service Areas (LECSAs). The total number and frequency of Lake Okeechobee triggered water supply cutback events for LECSA 3 (Miami-Dade County) are shown in **Figure 4-44** and **Figure 4-45**. The total number of cutback events (water years with three or more consecutive months with restrictions) and the resulting frequency for Lower East Coast Service Areas (LECSAs) remains the same between CSB2027 and the simulated ALTB1, ALTB2 and ALTB3 at all events (14, 31 and 10 at LECSAs 1, 2 and 3 respectively) indicating no change in water supply performance within the LECSAs for this metric.

Additional information available to evaluate agricultural and urban water supplies includes regional groundwater differences maps, seepage volumes across the East Coast Protective Levee (ECPL), regional water supply deliveries, and canal stages near public water supply wellfields. These metrics are indicators of whether the water supply demand in the LECSAs can continue to be met by the regional system, including Lake Okeechobee, the WCAs, and the surficial aquifer system. A comparison of the regional groundwater stage difference maps comparing ALTB2 and the CSB2027 was used to identify where systemic groundwater reductions may occur. The April 1989 (**Figure 4-46**) and April 2001 **(Figure 4-47**) difference maps were selected to determine whether the CEPP ALTB2 project affects groundwater levels during specific dry year conditions where regional water levels are most likely to be impacted. April is typically the driest month of the year and 1989 was one of severest droughts within the RSM-GL 41-year period of simulation. As shown in **Table 4-11**, ALTB1 shows the least overall change for the LECSAs (no change from CSB2027 for 1989 dry year). ALTB2 shows the least change in WCA 3A (0.1 to 0.25 feet lower

than CSB2027 for the 1989 dry year) and the same or reduced degree of change (0.1 to 0.5 feet) than other action alternatives for the 2001 dry years). ALTB3 shows a reduction in water levels in the southern portion of WCA 2 (0.1 to 0.25 feet lower for 1989 dry year) and the largest improvement in North Central (NC) ENP (0.1 to 1.0 foot higher than CSB2027 for 1989 dry year). For the North Central (NC) ENP, ALTB2 and B3 show improved regional water levels (ranging from 0.1 to 1 foot higher than CSB2027 for both 1989 and 2001 dry years). Overall, ALTB2 shows the least amount of reduction in stages in the WCA 3 and in the NE ENP (0.1 to 0.25 feet lower than CSB2027 for 1989 dry year), an improvement in NC ENP (for both 1989 and 2001 dry years) and no change in WCA 2 and LECSAs 1 and 2 (for both dry years).

Table 4-11. Comparison of three Alternatives (ALTB1, ALTB2 & ALT B3) to Base Condition CSB2027

ALT/Year	LECSA1	LECSA2	LECSA3	WCA 2	WCA 3 (A or B or both)	NE ENP	NC ENP
ALTB1/1989	no change	no change	no change	no change	0.1 to 0.25 feet higher (B only)	0.1 to 0.5 feet higher	0.1 to 0.5 feet lower
ALTB1/2001	generally 0.1 to 0.25 feet higher; 0.1-0.5 feet lower in south	0.1 to 0.5 feet lower	0.1 to 1.0 foot lower	no change	0.1 to > 1.0 foot lower (A &B)	generally 0.1 to 0.5 feet lower, with localized increase of 0.1-0.25 along L-29	0.1 to 1.0 foot higher
ALTB2/1989	no change	no change	0.1 to 0.25 feet lower	no change	0.1 to 0.25 feet lower (B only)	0.1 to 0.5 feet lower	0.10 to 0.5 feet higher
ALTB2/2001	no change	no change	0.1 to 0.25 feet lower in south part and higher in north part	no change	0.1 to 0.25 feet lower (A&B)	0.1 to 0.25 feet lower	0.1 to 1.0 foot higher
ALTB3/1989	no change	0.1 to 0.5 feet lower	0.1 to 0.5 feet lower	0.1 to 0.25 feet lower	0.1 to 1.0 foot lower(A&B)	0.25 to 1.0 foot lower	0.1 to 1.0 foot higher
ALTB3/2001	no change	0.1 to 0.5 feet lower	0.1 to 0.5 feet lower	no change	0.1 to >1.0 foot lower (A&B)	0.1 to 1.0 foot lower	0.1 to 1.0 foot higher

The selected metrics provide more direct and higher resolution measures of potential water supply effects for the CEPP Savings Clause assessment than would be provided through assessment of inflow volume probability curves for each user group or basin, consistent with the Savings Clause evaluation methodology detailed in the 2014 CEPP PIR/EIS (Annex B). No adverse changes to LECSA 1 (Palm Beach County) and the North Palm Beach Service Area are indicated in the CEPP South modeling comparisons, and WCA 1 remains unchanged. For the Miccosukee Tribe of Indians of Florida, stage duration curves for gauges in WCA 3 and hydropattern maps of WCA 3 are evaluated.

4.5.2.2 ALTB4

ALTB4 will maintain the water supply performance of CSB2027 through operations which maintain the COP quantity of deliveries from WCA 3A to both WCA 3B and ENP, avoiding further reductions to WCA 3A

water levels prior to increased inflows to WCA 3A. For alternatives which increase the quantity of deliveries from WCA 3A, adjustments will need to be made during future hydrologic modeling to ensure that the chosen operational plan does not fall below or falls below at a minimal amount from the CSB2027 (less than 0.1 feet) in order to ensure no impact to water supply of existing legal users and saline water intrusion will not occur.

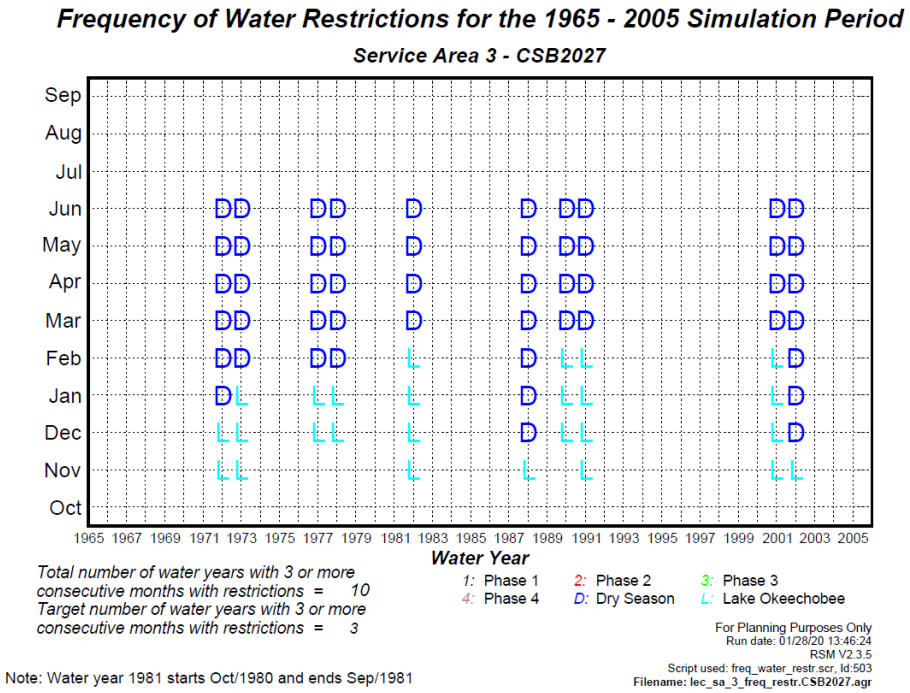

Figure 4-44. Frequency of Water Restrictions for the 1965–2005 Simulation Period for CSB2027 Scenario in LECSA 3.

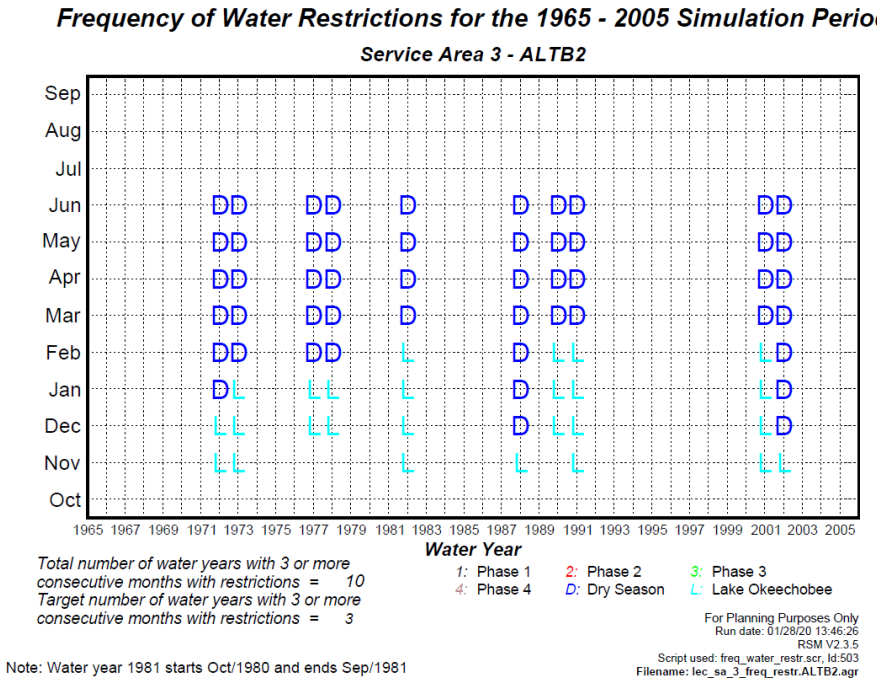

Figure 4-45. Frequency of Water Restrictions for the 1965–2005 Simulation Period for ALTB2 Scenario in LECSA 3.

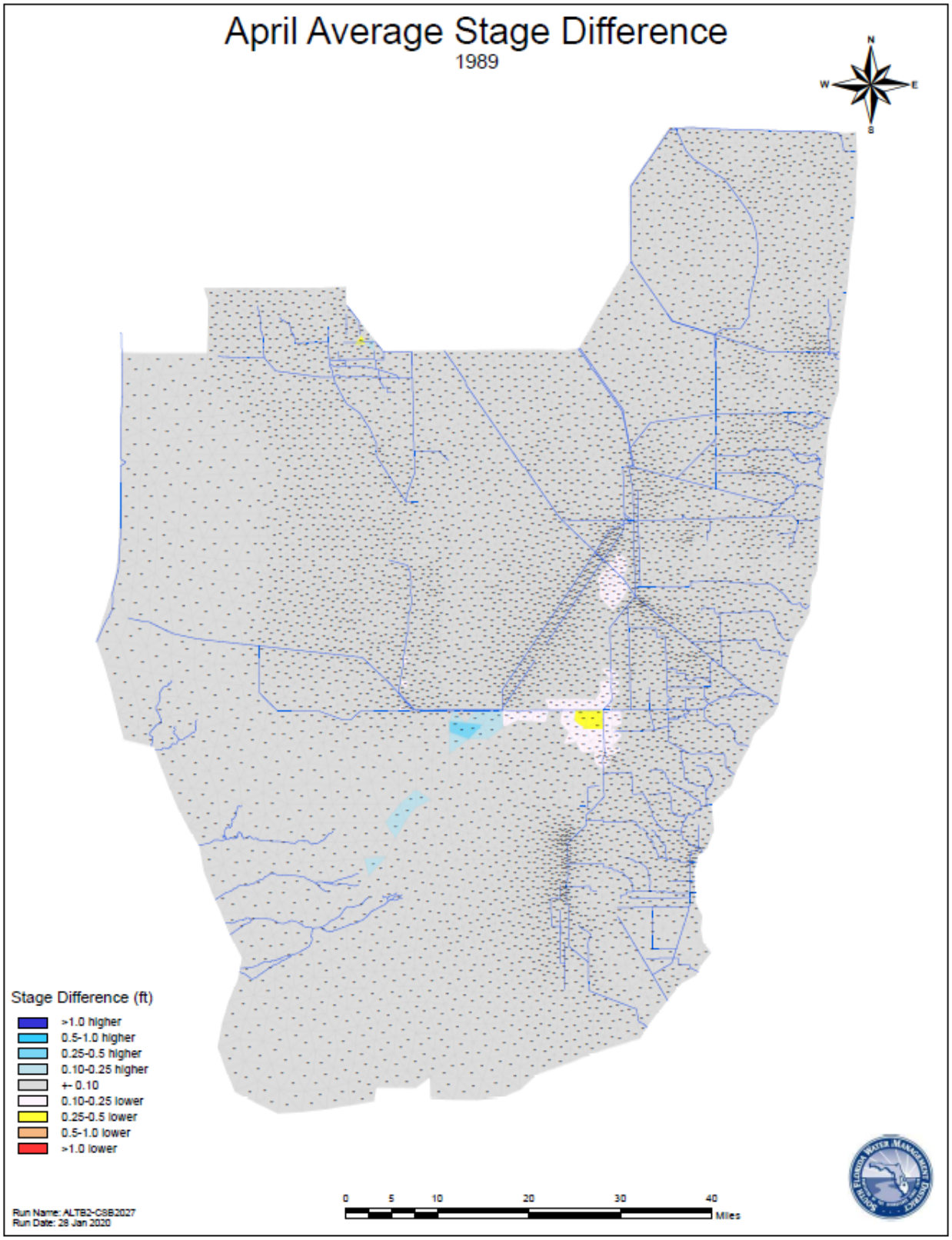

Figure 4-46. April 1989 Groundwater Stage Difference Map for ALTB2 and CSB2027.

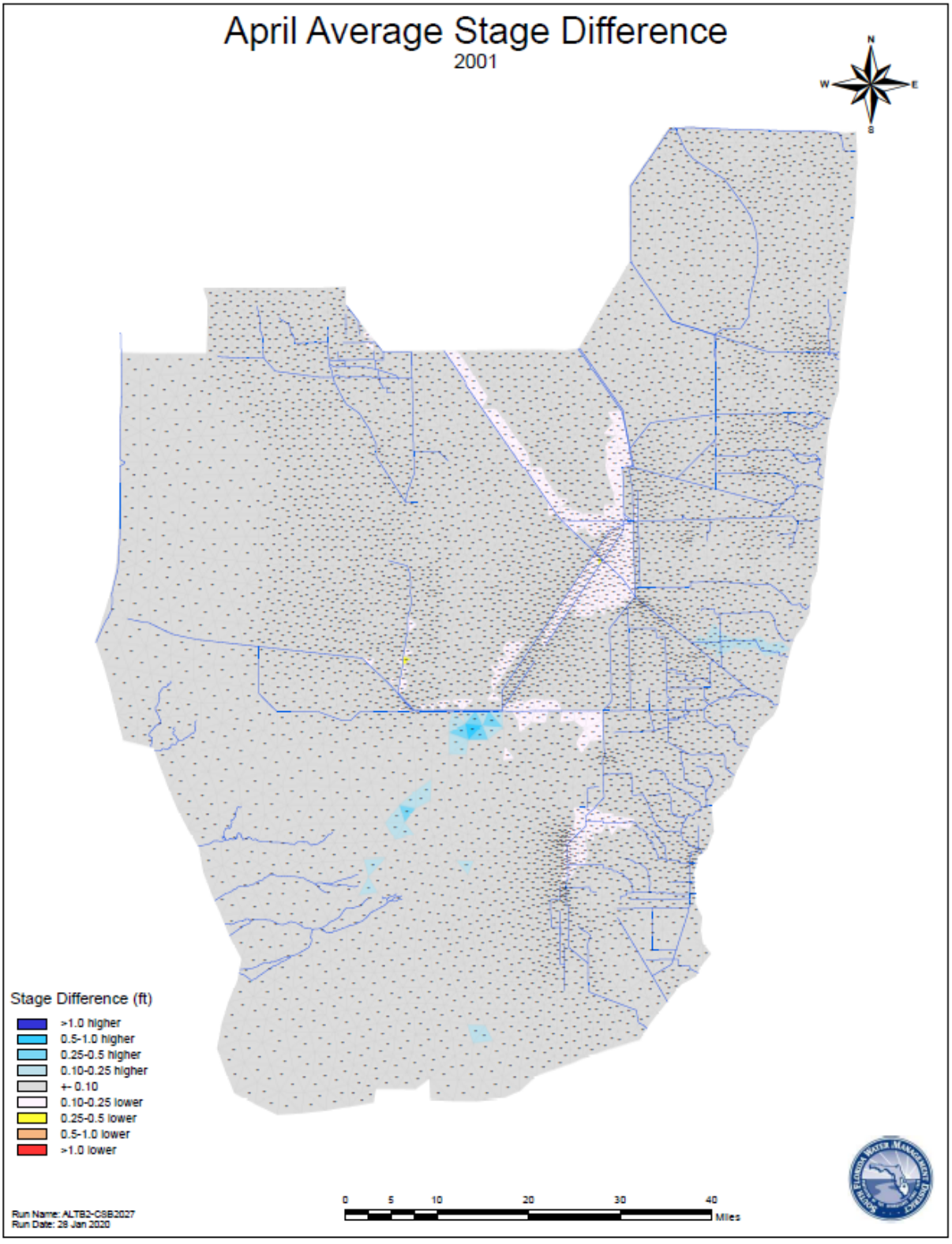

Figure 4-47. April 2001 Groundwater Stage Difference Map for ALTB2 and CSB2027.

4.5.3 Water Reservations Status Update

In accordance with Sections 601(h)(4)(A)(iii)(IV) and (V) of WRDA 2000, the 2014 CEPP Final PIR/EIS identified the appropriate quantity, timing, and distribution of water dedicated and managed for the natural system and the amount of water to be reserved or allocated for the natural system. The water made available for the natural system is the water required for the protection of fish and wildlife within natural systems, including water that contributes to meeting hydrologic, water quality, and ecologic targets for natural system restoration. In accordance with WRDA 2000 and implementing regulations, an analysis was conducted to identify water dedicated and managed for the natural system (refer to Section 6.8.1.1 and Annex B of the 2014 Final CEPP PIR/EIS). Water to be dedicated to the natural system is quantified where project benefits accrue, consistent with the habitat unit benefits quantified during CEPP plan formulation resultant from water being made available by the project. To follow the habitat unit benefits calculated during plan formulation, three spatial locations were selected in the 2014 CEPP PIR/EIS to quantify the water needed to achieve the benefits of the CEPP recommended plan: inflows to WCA 3 (along the formulation redline), inflows to ENP, and overland flows to Florida Bay.

Consistent with requirements identified in the 2014 CEPP PIR/EIS, the Corps and the SFWMD will update project assurances including water made available for the natural system, if necessary, for the implementation phases that are selected to be included in a PPA or amendment thereto prior to entering into the PPA or PPA amendment. This approach was expressly contemplated in the PIR/EIS (2014 CEPP Final PIR/EIS Annex B, page B-83). The Corps District Engineer will ensure that Project-Specific Assurances and Savings Clause requirements are met per PPA, per applicable policies and laws. The proposed MWD COP, a pre-CERP Foundation Project which is scheduled for implementation in August 2020, represents the regional operational plan in-place for WCA 3A, ENP, and the SDCS prior to implementation of CEPP South. The upstream storage components planned for EAA A-2 Reservoir and A-2 STA will not be completed prior to initial construction of CEPP South components In accordance with Section 601(h)(4)(B)(ii) of WRDA 2000 and implementing regulations, the Corps will not execute a PPA for any phase of CEPP until any required reservation or allocation of water for the natural system identified in the PIR/EIS is implemented under State law. CEPP South does not add any additional water to the existing water budget within WCA 3A, which provides the upstream source for re-distribution to WCA 3B (including the CEPP Blue Shanty Flowway) and ENP following implementation of CEPP South. Therefore, the Corps has determined that CEPP South does not require any water reservations prior to entering into a PPA for CEPP South.

CEPP North and the CEPP/EAA Reservoir integrated projects are the phases of CEPP when additional water will be added to the system through utilization of the expanded upstream storage. As required by Section 601(h)(4) of WRDA 2000, Section 385.35 of the Programmatic Regulations for the Implementation of CERP and the PIR/EIS, the new water made available by the project or phase will be protected using the State of Florida's reservation or allocation authority under state law prior to execution of the associated PPA. The future Validation Reports for CEPP North will discuss these water reservations or allocations. Additionally, SFWMD will be initiating the State rule-making process for the EAA Reservoir water reservations later in 2020.

4.6 Vegetative Communities

Typical Everglades vegetation, including tree islands, wet prairies, sawgrass marshes, and aquatic sloughs is contained in WCA 3B. However, within WCA 3B, the ridge and slough landscape has been severely degraded by the virtual elimination of overland sheetflow due to the L-67 canal and levee system. WCA

3B experiences very little overland flow and has become primarily a rain-fed system dominated by sawgrass marsh and long hydroperiods marl prairies, 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.

ENP is located south of Tamiami Trail and is supported hydrologically by deliveries through the S-333 and S-12 structures. Inflows to NESRS under current water management practices are greatly reduced when compared with pre-drainage conditions. The result has been lower wet season depths and more frequent and severe dry downs in sloughs and reduction in extent of shallow water edges. Vegetative trends within ENP have also included the conversion of slough/open-water marsh communities to shorter hydroperiod sawgrass marshes and wet prairie. Over-drainage in the peripheral wetlands along the eastern flank of NESRS (an area often referred to as the Rocky Glades) has resulted in shifts in community composition, invasion by exotic woody species and increased susceptibility to fire.

Implementation of the no action alternative and action alternatives would not result in significant impacts to vegetation communities. ALTB2 may create negligible to minor long-term beneficial effects for wetland vegetation in WCA3B and in portions of ENP NESRS and ENP WSS, which may experience increased overland flow and water depths relative to CSB2027. When compared to CSB2027, ALTB2 resulted in higher water levels measured at the WCA3B_BLUE_SHANTY gage for the 10%, 50%, and 90% exceedance levels with the largest difference of +0.35 feet occurring at the 50% exceedance. ALTB2 resulted in higher water levels measured at ENP_NESRS1 during wet events (10% exceedance) and lower water levels for the median (50% exceedance) and dry events (90% exceedance): +0.09 feet, -0.05 feet, and -0.07 feet, respectively. For Transect 18, ALTB2 showed an increase of 105,000 acre-feet per year on average over the modeled period of record with a 22% increase observed during the wet season and a 16% increase observed during the dry season. Increases in observed overall flow and water depths compared to CSB2027 with ALTB2 has the potential to reduce soil oxidation, which is expected to promote peat accretion. A potential decrease in drying even severity relative to CSB2027, may aid in the restoration of historic wetland vegetation communities. Shorter hydroperiod sawgrass marshes may transition to wet prairie and slough/open water marsh communities with improved hydrologic conditions.

The southern portion of WCA 3A is primarily affected by long durations of high water and a lack of seasonal variability in water depths created by impoundment structures (L-29 levee) under existing conditions. The increased duration of high water events in southern WCA 3A has negatively impacted tree islands and caused fragmentation of the sawgrass ridges, again resulting in the loss of historic landscape patterning. There was a general trend of slightly lower water levels in WCA 3A with ALTB2. When compared to CSB2027, ALTB2 resulted in lower water levels measured at all three WCA 3A gages (3A-28, 3A-3, and 3A-4) for the 10%, 50%, and 90% exceedance levels, with the largest difference of -0.09 feet occurring at WCA-3A-28 for the 50% exceedance. Reference **Section 4.4**. ALTB2 may result in beneficial effects to southern WCA 3A through reduction in high water levels or duration.

Taylor Slough is the major drainage feature on the eastern side of ENP. A small area of remnant slough-ridge-tree island patterned landscape persists in Taylor Slough. This pattern is diminished and narrow at the upstream end, but then broadens south of Anhinga Trail, toward the coast. Marl and peat soils occur over Miami limestone in this region and primary agents of change (or stressors) include regional water management infrastructure along the eastern boundary of ENP (specifically canals, seepage structures, and water detention areas), altered fire regime, historical land uses, and climate change. The southern end of the system showed negligible effects for ALTB2 relative to CSB2027. For Transect 23C, ALTB2

showed an increase of 1,000 acre-feet per year on average over the modeled period of record with a 3% increase observed during the dry season and no change observed during the wet season. Reference **Section 4.4**. Effects to vegetation within Taylor Slough and the nearshore communities (e.g. seagrasses and mangroves) of Florida Bay downstream is not expected with ALTB2. ALTB2 is not expected to result in effects to salinity based on the magnitude of change observed in increased freshwater flows to Taylor Slough.

The hydrologic effects of ALTB4 would generally match CSB2027 for WCA 3, ENP NESRS, and ENP WSS. Water levels are expected to be similar. Interim operations of S-631, S-632, S-633, and the L-29 canal temporary pumps, in conjunction with removal of a portion of the L-67C levee, and backfilling a portion of the east-west agricultural ditch is expected to improve hydrologic connectivity within the project area. Additional conveyance on the L-67A levee is expected to improve sheetflow in WCA 3B over a broader flow path than CSB2027, aiding in the restoration of natural drainage patterns that were altered as a result of the C&SF project. Improved hydrologic conditions in WCA 3B with ALTB4 may result in negligible to minor long-term beneficial effects for wetland vegetation in WCA3B as discussed above; however the magnitude of beneficial effect in WCA 3B may be less as ALTB2 assumed the full build out of CEPP South features.

For the interim operation with ALTB4, the CEPP South structures (S-631, S-632, and S-633) would be operated consistent with S-152 to maintain a water budget distribution between WCA 3A, WCA 3B, and ENP consistent with the CSB2027 (also similar to the 2020 COP Final EIS) and associated similar hydroperiod and hydropattern effects. S-631, S-632, S-633, and S-152 would collectively only be able to pass the equivalent volume currently allowed by the design capacity of S-152 which is 750 cfs to minimize the potential for over draining WCA 3A. The Site_71/SRS-1 stage constraint for WCA 3B of 8.5 feet NGVD would apply with ALTB4, consistent with current operations of S-152 under Phase 2 of the DPM Field Test. CEPP South structures. ALTB2 and ALTB4, both provide increased operational flexibility to store water in the natural system.

ALTB2 and ALTB4 include 1,003 acres of active vegetation management in WCA 3B to enhance flow by reconnecting historic sloughs. Reference **Figure 2-3**. Active vegetation management would be accomplished through the use of herbicides (i.e. glyphosate). The glyphosate would likely be applied via airboats in the growing season (August to January). Multiple treatments are not expected. One treatment is expected to open the sloughs. If there are missed spots, a follow-up treatment would happen approximately 6-12 months after the first spray concludes. Dead vegetation is expected to decompose in the water, however water TP collected in similarly treated areas under Phase 2 of the DPM Field Test continues to be less than or equal to 10 ppb (SFWMD Personal Communication). Dissolved oxygen curves are not negatively affected (i.e. neither lower in magnitude or lower in minimum O_2 values) from non-treated areas. Enhanced flow generally increases dissolved O_2 values compare to baseline, non-flowing conditions – this effect has been observed in both treated and non-treated (i.e. remnant sloughs) under the Phase 2 of the DPM Field Test.

The 2014 CEPP Final PIR/EIS summarized the acreage of wetland impacts due to construction of the recommended plan which has been reproduced as **Table 4-12**. Estimated acreages have been revised based on detailed design for features associated with CEPP South Contract 1 during PED, to include the L-67A gated culverts (S-631, S-632, and S-633), the associated spoil pile removal along the northwestern side of the L-67A canal, and backfill of the east-west agricultural ditch. Installation of the L-29 canal temporary pumps has also been included. Revised acreages were calculated based on the Universal Mitigation Assessment Method (UMAM) using a National Wetland Inventory (NWI) dataset. A UMAM

was performed in coordination with FDEP as part of the CERPRA permit for CEPP South Contract 1. Reference **Section 1.10**. The UMAM was used to quantify the functional loss and functional gain from the construction of features associated with CEPP South Contract 1 (**Table 4-13**). This information is provided for informational purposes and confirms the wetland impacts from construction do not change the overall amount of wetland benefit due to CEPP South implementation.

Based on the UMAM, construction of S-631, S-632, S-633, and the interim 3,000 foot levee gap on the L-67C under CEPP South Contract 1 is expected to result in permanent wetland impacts of 8.85 acres. The construction of the 3,000 foot interim levee gap on the L-67C is expected to result in permanent wetland impacts of 0.19 acres of wetlands and a 5.0 acre gain in wetlands as the levee transitions to sawgrass marsh.

Based on the UMAM, spoil pile removal at S-631 and S-632 is expected to result in a 6.29 acre gain in wetlands. The spoil piles currently contain low functioning wetlands with reduced value due to the presence of lime rock fill at their base. The lime rock is spoil product of the dredging of the adjacent canal. These areas will be scraped to natural grade and are expected to return to re-vegetate with sawgrass. The 2014 CEPP Final PIR/EIS identified that spoil piles along the northwestern side of the of the L-67A canal in the proximity of the L-67A gated culverts would be removed to facilitate sheetflow connectivity with the WCA 3A marsh. Reference **Figure 5** in **Appendix C** for the spoil piles to be removed based on coordination with the SFWMD, FDEP, and FWC.

Based on the UMAM, backfill of a portion of the east-west agricultural ditch (1.36 miles) is expected to result in a 24.9 acre gain in wetlands. Adjacent to the ditch are 16.21 acres of lime rock fill and muck excavated from the ditch. Vegetation on the spoil piles has naturally established and continues to be wetlands, however similar to the spoil piles discussed above, the base of the piles is artificial and consists of lime rock. These areas will be scraped to natural grade and are expected to return to re-vegetate with sawgrass. The 8.68 acre ditch will be restored to match the adjacent grade to sawgrass marsh.

Based on the UMAM, the total wetland impact will be 8.85 acres with a functional loss of 5.92; however the total wetland gain will be 36.18 acres with a functional gain of 7.90. The amount of functional gain obtained from construction of the features associated with CEPP South Contract 1 exceeds the functional loss incurred, therefore no additional mitigation is required. The UMAM evaluation did not include downstream benefits that will be obtained with restored water depths, duration and distribution in WCA 3A, WCA 3B, and ENP. The scope of the UMAM focuses solely on CEPP South project features associated with Contract 1.

Estimated acreages of wetland impacts remain within the range identified in the 2014 CEPP Final PIR/EIS and are mentioned in this EA for reference. These features function to redistribute the existing water from WCA 3A into WCA 3B and eastern ENP.

Installation of the L-29 temporary pumps under ALTB4 would result in temporary wetland impacts of 0.046 acres from the construction of collection sumps that would need to be installed immediately adjacent and north of the L-29 levee. Two sets of temporary pumps, rated at combined 100 cfs at each location, are expected to be installed; however three potential locations have been identified for construction (reference S-152-AMI-P2, S-632-AMI-P2, and S-633-AMI-P2 in **Figure 2-3**). S-152-AMI-P2, S-632-AMI-P2, and S-633-AMI-P2 are listed separately in **Table 4-12**. When the pumps are removed in advance of the L-29 levee segment removal under CEPP South Contract 5, the sump excavations would be returned to the pre-installation condition. Implementation of ALTB2 and ALTB4 is expected to result in an

overall net increase in wetland function in portions of WCA 3B and ENP where hydrology is expected to improve.

Table 4-12. Potential wetland impacts resulting from construction of CEPP South features.

Project Feature	Acres of Wetland Gain (Loss)
L-67C Gap Degrade	9
L-67C Flowway Degrade[1]	64
L-29 Degrade	46
Blue Shanty Levee Creation	(113)
L-67 Extension Levee Degrade	41
L-67 Extension Backfill	104
East-West Agricultural Ditch Backfill (4 Miles)[2]	81
S-631, S-632, & S-633	(8.66)
S-631 & S-632 Spoil Piles	6.829
S-632-AMI-P2 Temporary Pump[3]	(0.023)
S-633-AMI-P2 Temporary Pump[3]	(0.023)
S-152-AMI-P2 Temporary Pump[3]	(0.023)

[1] Estimated wetland acreage gained from CEPP South Contract 1 (L-67C 3,000 foot interim gap) = 5 acres

[2] Estimated wetland acreage gained from CEPP South Contract 1 (East-West Agricultural Ditch Backfill 1.36 miles) = 24.9 acres

[3] Estimated wetland impacts associated with temporary pumps adjacent to L-29 canal are temporary. Three potential locations have been identified; however only two sets of temporary pumps are expected to be installed.

Table 4-13. Summary of Wetland Impacts and Functional Loss CEPP South Contract 1 (UMAM)

Structure	Loss	FLUCCS	Acreage	Impact Delta	Functional Loss
S-631, S-632, & S-633	Loss	6411 Sawgrass Marsh	8.66	0.67	5.80
L-67C Levee Degrade	Loss	6411 Sawgrass Marsh	0.19	0.67	0.12
Total Loss	-	-	8.85	0.82	5.92
Structure	**Gain**	**FLUUCS**	**Acreage**	**Relative Functional Gain**	**Functional Gain**
Six Spoil Piles	Gain	6172 Mixed Hardwoods	6.29	0.224	1.40
Ag Ditch Spoil Piles	Gain	6172 Mixed Hardwoods	16.21	0.097	1.57
Ag Ditch Open Water	Gain	6440 Emergent Aquatic Vegetation	8.68	0.224	1.94
L-67C Levee Degrade	Gain	Upland	5.0	0.598	2.99

Total Gain	-	-	36.18	-	7.90

4.7 Fish and Wildlife Resources

A comparison of potential effects on fish and wildlife resources is summarized below. Implementation of the no action alternative and action alternatives would not result in significant impacts to fish and wildlife resources. Effects to state and federally listed species are described in further detail in **Section 4.8**.

Abundance of marsh fishes has been correlated with the duration of surface flooding throughout the central Everglades. High densities of small-sized freshwater fish, characterized the pre-drainage central Everglades ecosystem. Maximizing densities is an objective of many restoration scenarios as small-sized freshwater fish are an important energy source for higher-trophic levels such as wading birds, alligators, and larger fish. WCA3B, ENP NESRS, and ENP WSS, were observed to experience higher water levels and increased overland flows with ALTB2. Reference **Section 4.4**. Improved hydrologic conditions with ALTB2 may result in negligible to minor long-term beneficial effects on marsh fishes through improved habitat suitability. There was a general trend of slightly lower water levels in WCA 3A with ALTB2. Reference **Section 4.4**. In portions of WCA 3A where water levels would decrease, ALTB2 may result in negligible to minor long-term adverse effects. During dry years, lowering of water levels in WCA 3A may act to reduce the number or spatial extent of deeper water for large predatory fishes, although canals will continue to provide refugia for these species. Although posing a negative impact on larger fish species, these events may enable smaller fish populations to increase due to "predator release" or removal of larger fish species. Drying of marsh vegetation may also act to release nutrients into the water column, causing an increase in primary productivity, and consequently, increasing the food source of smaller fishes. Too frequent of drying events, however may act to reduce fish populations.

Important aquatic invertebrates of the freshwater marsh include Everglades crayfish (*Procambarus alleni*), slough crayfish (*Procambarus fallax*), riverine grass shrimp (*Palaemonetes paludosus*), amphipods (*Hyalleal aztecus*), the Florida apple snail (*Pomacea paludosa*) and numerous species of aquatic insects. The abundance and distribution of aquatic invertebrates in the project area may change with ALTB2 depending upon location and species. Over drained areas in WCA 3B, ENP NESRS, and ENP WSS are expected to be rehydrated. Aquatic invertebrates may rapidly colonize these newly re-hydrated areas. The influence of ALTB2 on aquatic invertebrates is likely to be complex given the diversity of life histories in the project area and is dependent upon individual species preferences for longer or shorter hydrologic conditions. ALTB2 may result in negligible to minor long-term beneficial effects in WCA 3B, ENP NESRS, and ENP WSS on aquatic invertebrates, dependent upon longer hydrologic conditions. Increased water depths may promote wetland vegetation transition through contraction of sawgrass marshes and expansion of wet prairies, and in deeper regions, sloughs. Periphyton is a community of cyanobacteria, algae, and zooplankton that is found wrapped around submerged aquatic vegetation. Periphyton is a primary component of invertebrate diets and is found throughout the low nutrient marshes of the project area. The formation of periphyton mats depends upon a healthy growth of submerged aquatic plants, which can only occur with high light penetration to the surface of the water column during wet, hot, summer months. Degraded periphyton mats are likely to be associated with exceptionally dense marsh vegetation and other alterations such as water quality. Periphyton mats form an important part of the foundation of the food web in freshwater marshes and sloughs. The mats are a food source for prey-base fish, and serve as habitat refuges for crayfish and other arthropods. Improved hydrologic conditions with ALTB2 may result in negligible to minor long-term beneficial effects on periphyton through improved habitat suitability.

Improved hydrologic conditions with ALTB2 may also result in negligible to minor long-term beneficial effects on amphibians and aquatic reptiles and wading birds through improved forage prey availability (fish and invertebrates). Over drained areas in WCA 3B, ENP NESRS, and ENP WSS that are expected to be rehydrated may also increase the spatial extent of suitable habitat for amphibians and aquatic reptiles. As hydrologic conditions improve, it is expected that species richness will also change. However, declines in some species may be offset by favorable habitat conditions for other species. Improved hydrologic conditions may also facilitate the movement of small amphibians and aquatic reptiles across the landscape.

While a potential increase in foraging conditions through improved prey availability for wading birds in WCA 3B, ENP NESRS, and ENP WSS may occur as a result of increased availability of water, slightly lower water levels in WCA 3A with ALTB2 may increase the probability that wading bird colonies in northern WCA 3A would experience drier conditions. Rapid recession rates during the breeding season can result in decreased nest success (through increased predation or decreased forage availability) and decreased juvenile survival (due to decreased forage availability).

Mammals occurring in the central Everglades are adapted to naturally fluctuating water levels. Mammals that utilize upland habitat may benefit from the lowering of water levels in WCA 3A with ALTB2 during high water events when sources of upland refugia become limited. Mammals utilizing areas that are currently dry may move to find adjacent suitable habitat as over drained areas in WCA 3B, ENP NESRS, and ENP WSS are expected to be rehydrated with ALTB2; however ALTB2 is not expected to convert upland habitat to wetlands where it currently exists in the project area due to the extent of change observed in water levels. Small mammals including raccoons and river otters may benefit from increased abundance of marsh fishes, invertebrates, amphibians, and aquatic reptiles in rehydrated areas of WCA 3B, ENP NESRS, and ENP WSS.

The hydrologic effects of ALTB4 would generally match CSB2027 for WCA 3, ENP NESRS, and ENP WSS. Water levels are expected to be similar. Interim operations of S-631, S-632, S-633, and the L-29 canal temporary pumps, in conjunction with removal of a portion of the L-67C levee, and backfilling a portion of the east-west agricultural ditch is expected to improve hydrologic connectivity within the project area. Additional conveyance on the L-67A levee is expected to improve sheetflow in WCA 3B over a broader flow path than CSB2027, aiding in the restoration of natural drainage patterns that were altered as a result of the C&SF project. Improved hydrologic conditions in WCA 3B with ALTB4 may result in negligible to minor long-term beneficial effects for fish and wildlife resources in WCA3B as discussed above; however the magnitude of beneficial effect in WCA 3B may be less as ALTB2 assumed the full build out of CEPP South features. Negligible to minor long-term adverse effects to fish and wildlife resources in portions of WCA 3A where water levels are expected to decrease with ALTB2 may be further minimized with ALTB4.

For the interim operation with ALTB4, the CEPP South structures (S-631, S-632, and S-633) would be operated consistent with S-152 to maintain a water budget distribution between WCA 3A, WCA 3B, and ENP consistent with the CSB2027 (also similar to the 2020 COP Final EIS) and associated similar hydroperiod and hydropattern effects. S-631, S-632, S-633, and S-152 would collectively only be able to pass the equivalent volume currently allowed by the design capacity of S-152 which is 750 cfs to minimize the potential for over draining WCA 3A. The Site_71/SRS-1 stage constraint for WCA 3B of 8.5 feet NGVD would apply with ALTB4, consistent with current operations of S-152 under Phase 2 of the DPM Field Test. CEPP South structures.

In summary, implementation of ALTB2 and ALTB4 may produce a variety of wetland habitats that would support conditions conducive to fish and wildlife resources in the project area. ALTB2 and ALTB4, both provide increased operational flexibility to store water in the natural system. Displacement of fish and wildlife with ALTB4 would be construction-related and temporary. Short-term impacts to localized areas would occur due to installation of the temporary diesel powered pumps adjacent to the L-29 canal with ALTB4. The temporary pumps would be installed across the L-29 levee between L-67A and the CEPP South L-67D. Since the location is west of S-355A, additional pump collection sumps may need to be installed immediately adjacent and north of the L-29 levee at the one or two selected optimal temporary pump locations. Fish and wildlife may be disturbed or displaced during installation. When the pumps are removed in advance of the L-29 levee segment removal under CEPP South Contract 5, the sump excavations would be returned to the pre-installation condition.

4.8 Threatened and Endangered Species

A comparison of potential effects on federally and state listed species within the project area is summarized below.

4.8.1 Federally Listed Species

The Corps acknowledges the potential usage and occurrence of threatened and endangered species and/or critical habitat within the project area (**Table 4-13**). Potential effects to federally listed species are summarized in **Table 4-13**. A complete description of the consultation history for CEPP South under Section 7 of the ESA of 1973, as amended, can be found in the BA in **Appendix D.1**. The BA was submitted to the USFWS on January 23, 2020 with supplemental correspondence dated February 14, 2020 for informal consultation on the Eastern black rail. The USFWS provided a request for additional information in response to the 2020 CEPP BA on April 14, 2020. The Corps responded on May 8, 2020. Further details on the life history of each species and their effects determinations can be found in **Appendix D.1**. The Corps commits to avoiding and minimizing for adverse effects on federally listed species, to the extent practicable, and would continue to coordinate with the USFWS and as needed.

Table 4-13. Status of federally threatened and endangered species under USFWS jurisdiction with the potential to occur within the CEPP South action area and the Corps' effects determination (E: Endangered; T: Threatened; SA Similarity of Appearance; CH: Critical Habitat; C: Candidate Species).

Common Name	Scientific Name	Status	May Affect Not Likely to Adversely Affect	May Affect	No Effect
Mammals					
Florida panther	*Puma concolor coryi*	E	X		
Florida manatee	*Trichechus manatus latirostris*	E, CH	X		
Florida bonneted bat	*Eumops floridanus*	E	X		
Birds					

Common Name	Scientific Name	Status	May Affect Not Likely to Adversely Affect	May Affect	No Effect
Cape Sable seaside sparrow	*Ammodramus maritimus mirabilis*	E, CH	X		
Everglade snail kite	*Rostrhamus sociabilis plumbeus*	E, CH	X		
Piping plover	*Charadrius melodus*	T			X
Red-cockaded woodpecker	*Picoides borealis*	E			X
Roseate tern	*Sterna dougallii*	T			X
Wood stork	*Mycteria americana*	T	X		
Reptiles					
American Alligator	*Alligator mississippiensis*	T, SA	X		
American crocodile	*Crocodylus acutus*	T, CH	X		
Eastern indigo snake	*Drymarchon corais couperi*	T	X		
Gopher tortoise	*Gopherus polyphemus*	C			X
Invertebrates					
Bartram's hairstreak butterfly	*Strymon acis bartrami*	E, CH			X
Florida leafwing butterfly	*Anaea troglodyta floridalis*	E, CH			X
Miami blue butterfly	*Cyclargus thomasi bethunebakeri*	E			X
Schaus swallowtail butterfly	*Heraclides aristodemus ponceanus*	E			X
Stock Island tree snail	*Orthalicus reses(not incl. nesodryas)*	T			X
Plants					
Crenulate lead plant	*Amorpha crenulata*	E			X
Deltoid spurge	*Chamaesyce deltoidea spp. deltoidea*	E			X
Garber's spurge	*Chamaesyce garberi*	T			X
Okeechobee gourd	*Cucurbita okeechobeensis ssp. okeechobeenis*	E			X

Common Name	Scientific Name	Status	May Affect Not Likely to Adversely Affect	May Affect	No Effect
Small's milkpea	*Galactia smallii*	E			X
Tiny polygala	*Polygala smallii*	E			X
Big pine partridge pea	*Chamaecrista lineata var. keyensis*	E			X
Blodgett's silverbush	*Argythamnia blodgettii*	T			X
Cape Sable thoroughwort	*Chromolaena frustrata*	E, CH			X
Carter's small-flowered flax	*Linum carteri var. carteri*	E, CH			X
Everglades bully	*Sideroxylon reclinatum spp. austrofloridense*	T			X
Florida brickell-bush	*Brickellia mosieri*	E, CH			X
Florida bristle fern	*Trichomanes punctatum spp. floridanum*	E, Pr CH			X
Florida pineland crabgrass	*Digitaria pauciflora*	T			X
Florida prairie clover	*Dalea carthagenesis floridana*	E			X
Florida semaphore cactus	*Consolea corallicola*	E, CH			X
Pineland sandmat	*Chaemaesyce deltoidea pinetorium*	T			X
Sand flax	*Linum arenicola*	E			X

4.8.2 State Listed Species

The project area provides habitat for several state listed species. While areas utilized by many of these species may be affected, ALTB2 and ALTB4 are not likely to adversely affect protected state species. Potential effects to state listed species would be similar to those outlined for fish and wildlife resources in **Section 4.7**. The Corps commits to avoiding, minimizing or mitigating for adverse effects during operations on state listed species, to the extent practicable, and would coordinate with the FWC as needed.

4.9 Essential Fish Habitat

Implementation of the no action alternative and action alternatives would not result in significant impacts to EFH. EFH as defined by the Magnusson-Stevens Fishery Conservation and Management Act, does not occur within the limits of construction. Portions of ENP NESRS and ENP WSS were observed to experience

higher water levels and increased overland flows with ALTB2. For Transect 18, ALTB2 showed an increase of 105,000 acre-feet per year on average over the modeled period of record with a 22% increase observed during the wet season and a 16% increase observed during the dry season. Transect 18 represents flows southward into northern ENP from the Blue Shanty Flowway, south of Tamiami Trail and east of the L-67 Extension levee. The southern end of the system (Taylor Slough) showed negligible effects for ALTB2 relative to CSB2027. For Transect 23C, ALTB2 showed an increase of 1,000 acre-feet per year on average over the modeled period of record with a 3% increase observed during the dry season and no change observed during the wet season. Reference **Section 4.4**. Effects to vegetation within Taylor Slough and the nearshore communities (e.g. seagrasses and mangroves) of Florida Bay downstream is not expected with ALTB2. ALTB2 is not expected to result in effects to salinity based on the magnitude of change observed in increased freshwater flows to Taylor Slough. The hydrologic effects of ALTB4 would generally match CSB2027. Until additional water is implemented and the full build out of CEPP is complete, the southern part of the ENP will likely not see fully realized benefits identified in the 2014 CEPP Final PIR/EIS. Reference **Appendix C** for further assessment of EFH.

4.10 Water Quality

Under the no action alternative, water quality within the project area would not be expected to change from conditions presented for ALTQ+ in the 2020 COP Final EIS. Under the COP, there is an increased risk for higher phosphorus loading in ENP and exceedance of the Settlement Agreement Consent Decree due to changes in the amount and timing of water releases from WCA 3A to ENP. An increase in long-term flow weighted mean concentrations of 0.1 to 0.8 ppb above baseline were predicted for ALTQ+ under the COP. The COP water quality analysis indicates that by 2023, with the use of adaptive management to implement the measures explored in the water quality sensitivity runs, the potentially negative impacts of ALTQ could be avoided and could result in a slight improvement to water quality (FWM TP) delivered to NESRS. This analysis also shows that through the use of adaptive management (incorporation of sensitivity run concepts), the potential for slight negative water quality impacts from ALTQ could be reduced before 2023. Please refer to **Section 3.13** for existing water quality within the project area and the 2020 COP Final EIS for complete water quality analysis of the COP ALTQ+.

Construction and operation of three new structures in the L-67A levee would change the distribution of water and locations of nutrient loading into WCA 3B, and would potentially increase nutrient loading to WCA 3B at S-151, S-631, S-632, and S-633 compared to the CSB2027. The operational criteria developed for S-152, allows opening of the S-152 structure only when the forecasted geometric mean for total phosphorus is at or below 10 ppb, and limits flow to 750 cfs. These criteria are protective of downstream waters by limiting surface water phosphorus loading to prevent degradation of the marsh. Under ALTB2 operations the S-151, S-631, S-632, and S-633 would not be limited to the S-152 operational constraints, therefore, there would potentially be higher nutrient loading into WCA 3B compared to CSB2027. Up to 1000 cfs could collectively flow through S-151, S-631, S-632, and S-633 under ALTB2, which could contribute to higher WCA 3B nutrient loading compared to the CSB2027 where flows into WCA 3B are limited to 750 cfs at S-152. Flows into WCA 3B will improve the hydrology of WCA 3B as compared to the no action alternative and would help reestablish ridge and slough formation. Improved hydroperiods resulting from increases in water levels would benefit water quality by reducing dry-outs and associated organic soil oxidation that lead to nutrient releases into the water column from marsh soils. Restoration of pre-impoundment flow patterns in historic sloughs is expected to provide an overall environmental benefit to the project area.

Sulfur reducing bacteria (SRB) is considered one of the primary drivers to mercury methylation within the Everglades system. ALTB2 is expected to increase and slightly shift sulfate loading in WCA 3B due to construction and distribution of flows through S-631, S-632, and S-633. The shift in the distribution of flows as well as additional sulfate loading may result in a shift of mercury concentrations in fish within WCA 3B. Atmospheric mercury deposition was off its mid-1990s high, which is thought to be the cause of the reduction in bio-accumulated mercury observed in fish over this time period, it is likely that future methylation and bioaccumulation that occurs after the implementation of CEPP South will not exceed peak concentrations seen 20 or so years ago unless atmospheric loading increases.

No additional nutrient loading would occur into WCA 3B with the implementation of ALTB4 as compared to the no action alternative. The operational criteria developed for S-152, and applied to S-631, S-632, S-633, and S-152 collectively under ALTB4, allows opening of the structures only when the forecasted geometric mean for total phosphorus is at or below 10 ppb. These criteria are protective of downstream waters by limiting surface water phosphorus concentrations to levels that prevent degradation of the marsh. The additional S-152 constraint of only allowing 750 cfs collectively through S-152, S-631, S-632, and S-633 also limits the nutrient loading to what currently occurs under the CSB2027. Construction and operation of three new structures in the L-67A levee would change the distribution of water and locations of nutrient loading into WCA 3B, but under the S-152 operational constraints, could benefit water quality in the downstream marsh by increasing operational flexibility in the system. Recent evidence from the DPM study shows that under current operations of the S-152, marsh impacts may include sediment P-enrichment downstream of the S-152 culvert and downstream of the degraded levee areas adjacent to sections of un-backfilled canal, where velocities are greatest (typically > 5 to 15 cm/s) (Saunders, 2020; Sklar 2018; 2019). Overall, flows into WCA 3B will improve the hydrology of WCA 3B as compared to the CSB2027 and would help reestablish ridge and slough formation. Improved hydroperiods resulting from increases in water levels would benefit water quality by reducing dry-outs and associated organic soil oxidation that lead to nutrient releases into the water column from marsh soils. Restoration of pre-impoundment flow patterns in historic sloughs is expected to provide an overall environmental benefit to the project area. If temporary pumps are used to move water from WCA 3B to the L-29 canal, the Technical Oversight Committee will need to consider if those flows need to be included in the Settlement Agreement Compliance Calculation for the SRS. It is expected these flows would be beneficial to the ENP (lower concentrations of phosphorus). Water quality would be monitored at the three new permanent WCA 3B inflow structures as described in the 2014 CEPP PIR/EIS Annex D—Adaptive Management and Monitoring Plan. Additionally, water quality would be monitored at the temporary pumps used to move water into the L-29 canal and towards eastern ENP.

4.11 Hazardous, Toxic, Radioactive Waste

HTRW within the project area would not be expected to change from current conditions. No hazardous, toxic or radioactive waste (HTRW) has been identified within the construction footprints of areas identified for installation of temporary pumps adjacent to the L-29 canal. Construction of the temporary pumps with ALTB4 is not expected to result in the discovery of HTRW. The risk for increased mobilization of existing HTRW where it might exist within the project area due to implementation of interim operations is low.

4.12 Air Quality

Implementation of the no action alternative and action alternatives would not result in significant impacts to air quality. Air quality within the project area would not be expected to significantly change from

current conditions. Short-term impacts to air quality would be construction-related and temporary, lasting only for the duration of construction. Construction related impacts to air quality in localized areas could include release of dust and emissions from vehicle/machinery exhaust associated with construction of the temporary diesel powered pumps adjacent to the L-29 canal with ALTB4. Short-term impacts to air quality would also occur due to operation of the temporary diesel powered pumps. Long-term impacts with ALTB2 and ALTB4 include operation of S-631, S-632, and S-633 using propane generators, which could include the release of emissions from propane combustion, however, it is not expected that long-term operations of the gated culverts would permanently affect air quality.

4.13 Noise

Implementation of the No Action and action alternatives would not result in significant impacts to the noise environment. Noise levels within the project area would not be expected to significantly change from current conditions. Potential increases in noise levels would be construction-related and temporary, lasting only for the duration of construction. Short-term impacts to noise levels in localized areas would occur due to construction and operation of the temporary diesel powered pumps adjacent to the L-29 canal with ALTB4. Long-term impacts from the project include interim operation of S-631, S-632, and S-633 using propane generations, which could include an increase in noise levels with ALTB2 and ALTB4 relative to the no action alternative. Increases in noise levels during operation of the gated culverts and temporary pumps would be limited to the immediate vicinity of the structures which are commonly located in remote rural areas. Increases in noise levels would be negligible. Sound levels would decrease with distance from the pump stations due to attenuation. Noise levels would not be expected to cause negative effects to human health.

4.14 Aesthetics

Implementation of the No Action and action alternatives would not result in significant impacts to aesthetics within the project area. Potential impacts to aesthetics within the project area would be construction-related and temporary. Short-term impacts to localized areas would occur due to installation of the temporary diesel powered pumps adjacent to the L-29 canal with ALTB4. The temporary pumps would be installed across the L-29 levee between L-67A and the CEPP South L-67D. Since the location is west of S-355A, additional pump collection sumps may need to be installed immediately adjacent and north of the L-29 levee at the one or two selected optimal temporary pump locations. Some vegetation may be disturbed or removed. When the pumps are removed in advance of the L-29 levee segment removal under CEPP South Contract 5, the sump excavations would be returned to the pre-installation condition. Vegetation within the footprint of the temporary pumps would be expected to re-vegetate. Reference **Section 4.6** for a discussion of potential wetland impacts resulting from implementation of the action alternatives.

4.15 Native Americans

Implementation of the No Action and action alternatives do not occur on Native American Reservation lands, though the proposed improvements to the S-356 pump station are very near the Krome Avenue Reservation of the Miccosukee Tribe of Indians of Florida. The Miccosukee Tribe of Florida also retains a lease of much of WCA 3A, including sections with proposed removal of spoil piles along L-67 A. The members of the Miccosukee Tribe of Indians of Florida and the Seminole Tribe of Florida rely upon the Everglades in its natural state to support their religious, subsistence, and commercial activities. Both of the Miccosukee Tribe of Indians of Florida and the Seminole Tribe of Florida have Federal Reservations

that are partially situated within WCA 3A. The Miccosukee Tribe of Indians of Florida also have Federal Reservation lands located approximately 6 miles west of CEPP South features.

The Miccosukee Tribe's religious activities traditionally include the planting and harvesting of corn on tree islands in the Everglades. Subsistence activities include gathering of materials, hunting, and fishing; while commercial activities include frogging, airboat and other guided tours, and providing recreational and tourism facilities within the Everglades. A representative from the Miccosukee Tribe of Indians of Florida has expressed concern regarding the use of spoil piles associated with L-67A currently used by members of the Tribe; however the spoil piles identified by the Miccosukee Tribe of Indians of Florida will be avoided by CEPP South Contract 1 construction.

Modeling data indicates the improved conveyance from WCA 3A into WCA 3B and ENP with ALTB2 may result in slightly lower water levels (0.1 foot) in WCA 3A and reduction of the ponding between L-67A and L67-C, with ALTB2 with corresponding increased water levels in ENP. Reference **Section 4.4**. There is potential increased risk to airboat accessibility of the tree islands within southern WCA 3A as a result of lowered water levels with ALTB2. Decreases in water levels in WCA 3A may prohibit access to tree islands by the Miccosukee Tribe, who currently use airboats for access to tree islands and as part of tourism related businesses (airboat concessionaires) along Tamiami Trail. Potential limitations to accessing tree islands via airboat may affect the ability of the Miccosukee Tribe to participate in cultural and religious practices that take place on these islands during extremely dry conditions. The hydrologic effects of ALTB4 would generally match CSB2027 for WCA 3, ENP NESRS, and ENP WSS. Water levels are expected to be similar. Potential increased risk to airboat accessibility with ALTB2 would be further minimized with ALTB4, as ALTB2 assumed the full build out of CEPP South features.

The Corps has sought input on the potential effects to historic properties, including those that may be religiously or culturally important, as a result of this project through Section 106 and government-to-government consultation. Four Federally-recognized tribes were invited to participate in the CEPP Cultural Resources Working Group, with meetings on November 25, 2019 and February 27 and March 12, 2020. Coordination and consultation is ongoing on a continuous basis to identify and discuss issues of concern, and solicit input from the tribal governments regarding their assessment of effects on Indian trust resources, tribal rights to use those resources, and cultural values related to those resources and rights within the area resulting from the implementation of the CEPP.

4.16 Cultural Resources

The proposed action would include construction of water control structures, degradation of spoil piles and levees, ditch backfill, and interim operations of these features. The proposed action does not include a change in the water budget or regulation schedules. The Corps has sponsored surveys of the CEPP South Contract 1 APE as part of the CEPP feasibility study. Cultural resources assessments by Panamerican Consultants, Inc. (2012), New South Associates, Inc. (2013), and Brockington (2018) included portions of the CEPP South features. These projects included the archaeological testing of where historic tree islands are near the constructed levees and canals near the CEPP South Contract 1 APE, documentation of the historic-aged built features, and limited testing of nearby tree islands. No historic properties have been documented within the APE. The impacts of construction include three cultural resources recorded in the Florida Master Site File; the alteration of L-67A (8BD5100), L-67C (8DA13014), and the Blue Shanty Canal (8DA12826, called the east-west agricultural ditch elsewhere in this document). These resources were documented in the Florida Master Site File (FMSF) as cultural resources as a result of Corps-sponsored surveys, but are not eligible for the NRHP.

Though volume of water is not modified by the proposed action, the flowpath would be changed from a single point on the north end of WCA 3B, S-152, to a more distributed route through multiple structures. The Site_71/SRS-1 stage constraint for WCA 3B of 8.5 feet NGVD would apply with the preferred alternative (ALTB4). The preferred alternative (ALTB4) was not explicitly modeled; however, the preferred alternative has the same constraints as the no action alternative for the purposes of cultural resources. The preferred alternative is expected to be similar to the no action alternative (CSB2027) in the modeling data. The modeling data show minimum variation between the no action alternative/preferred alternative and ALTB2 with relation to the tree islands closest to the modeled gauge. As discussed above, ALTB2 would have a greater affect than the preferred alternative. In order to assess the effects of project alternatives on tree islands, a selection of stage-duration curves of modeled gauges near tree islands were compared to the heights of tree islands in WCA 3A, WCA 3B, the proposed Blue Shanty Flowway, and ENP (**Figure 4-48**). The gauge WCA 3A-3A-4 is located in the central portion of WCA 3A (**Figure 4-49**), gauge WCA 3B-Shark is located in the central portion of WCA 3B (**Figure 4-50**), gauge WCA 3B_Shanty_Flowway is in the southwestern corner of WCA 3B within the proposed Blue Shanty Flowway (**Figure 4-51**), and gauge ENP-NESRS1 is located in northern ENP within the Shark River Slough (**Figure 4-52**).

The changes that may affect tree islands between the no action and preferred alternative are limited, as the existing constraints and water budget is maintained. The preferred alternative is not anticipated to result in inundation to tree islands beyond the no action alternative. Some variation can be seen between the no action (CSB2027)/preferred alternative and ALTB2. The charts present the elevation of the tree islands as horizontal lines, as their elevation is constant. The most significant change between the no action alternative/preferred alternative and ALTB2 is seen within the proposed Blue Shanty Flowway of ALTB2. In the model data, the ALTB2 results in a higher average water level. As the preferred alternative maintains the existing constraints and does not include the Blue Shanty Levee and Flowway, these effects would not apply the preferred alternative.

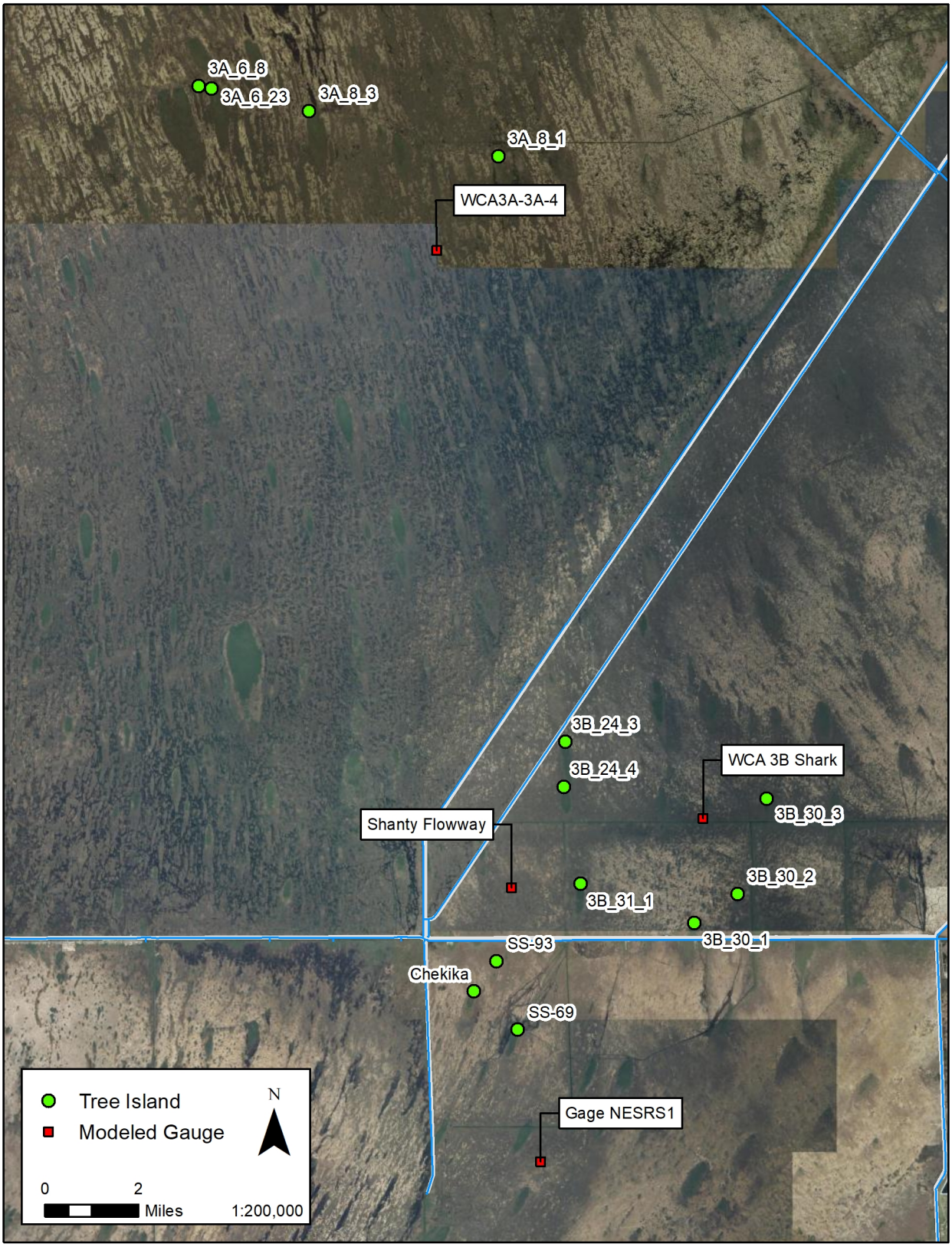

Figure 4-48. Location of tree islands and gauges used in the following stage-duration curves.

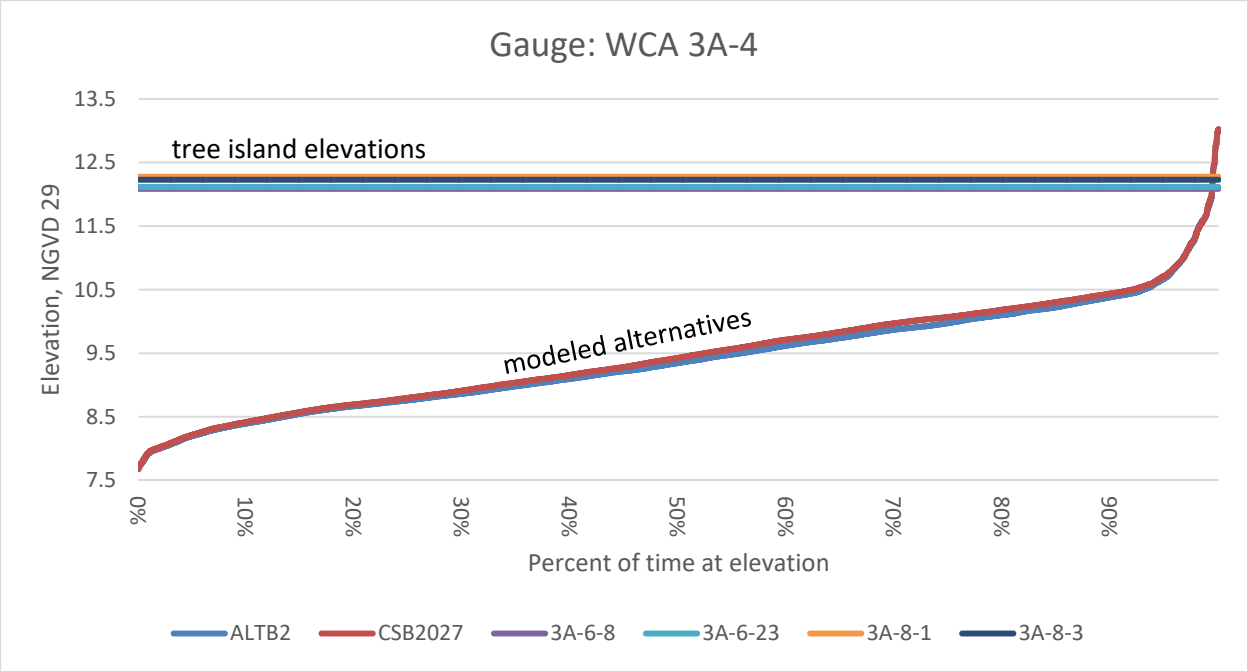

Figure 4-49. Stage duration curve for gauge WCA 3A-4 and heights of nearby tree islands.

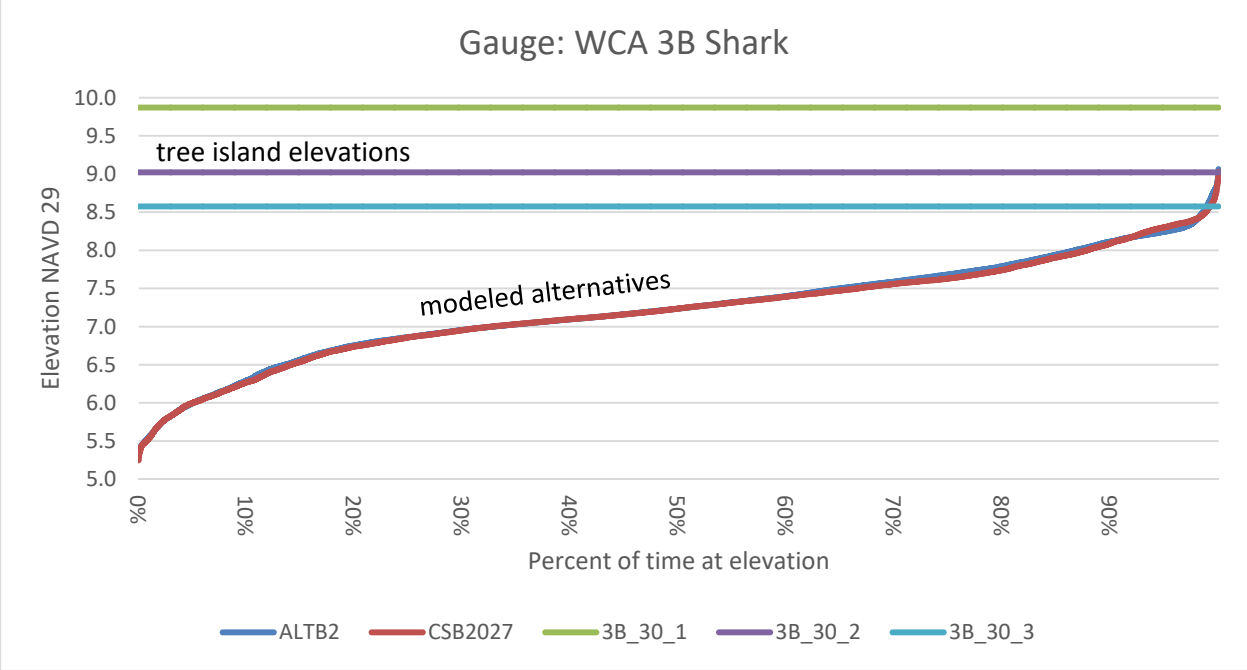

Figure 4-50. Stage duration curve for gauge WCA 3B Shark and heights of nearby tree islands.

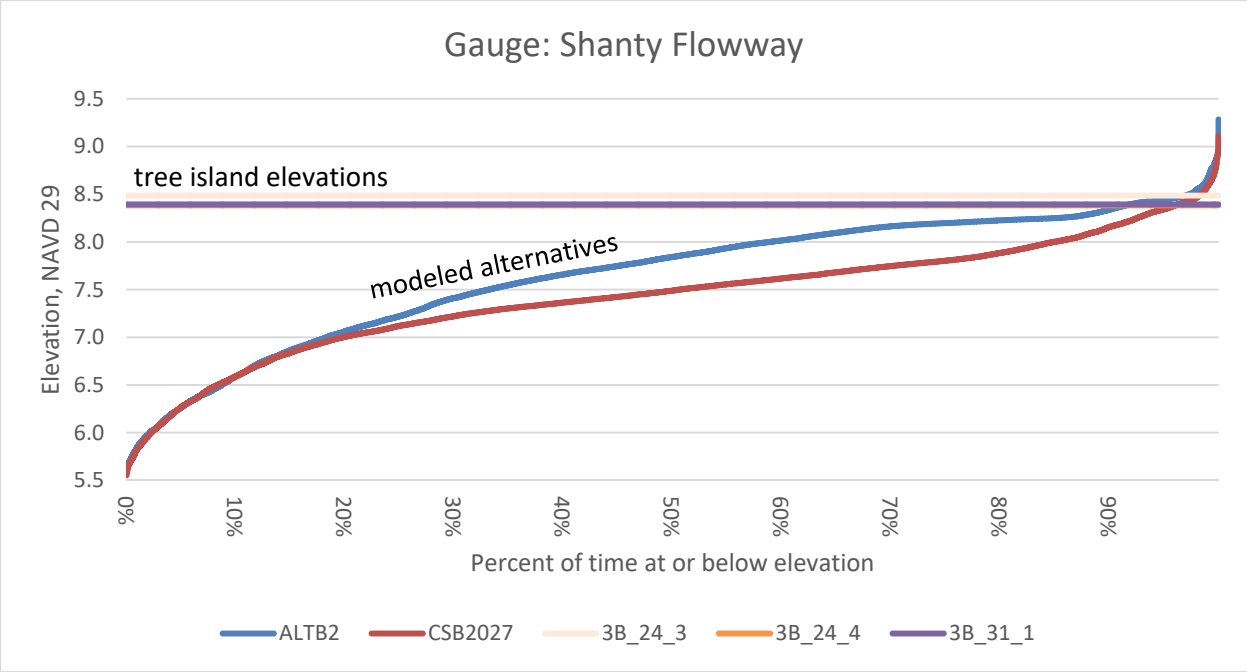

Figure 4-51. Stage duration curve for gauge Shanty Flowway and heights of nearby tree islands.

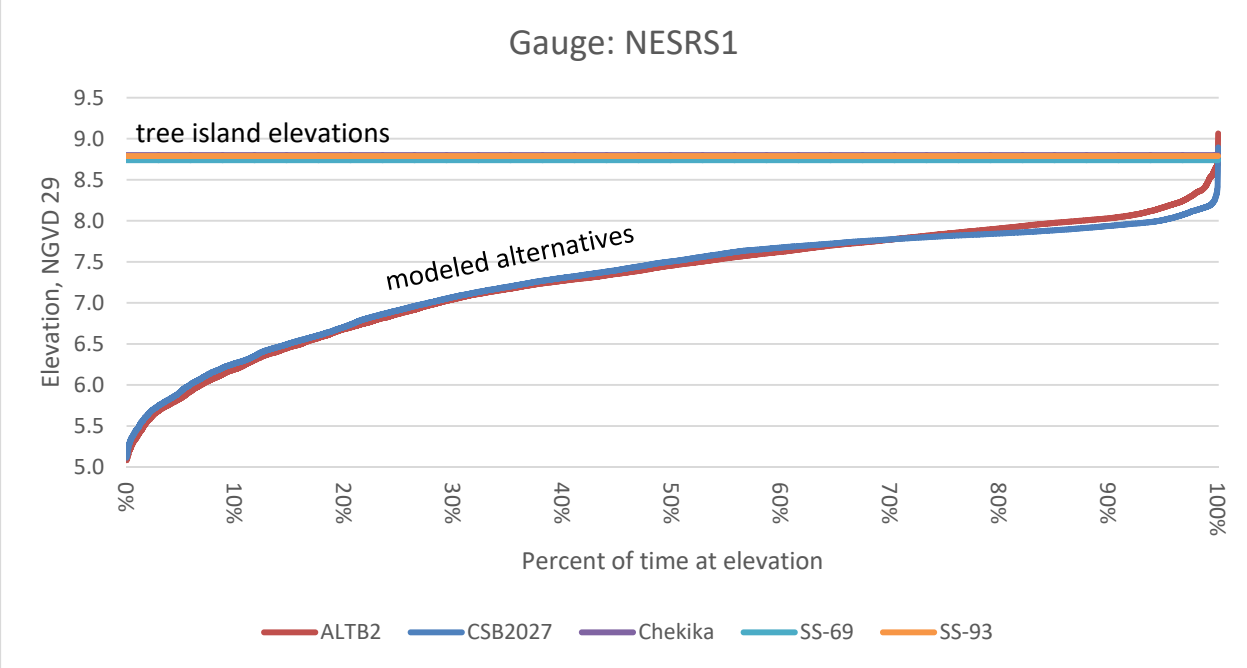

Figure 4-52. Stage duration curve for gauge NESRS1 and heights of nearby tree islands.

As identified in **Section 4.2**, the potential exists for the preferred alternative to lead to some peat accretion, which may have a protective effect to tree islands and cultural resources. Potential restoration of historic vegetative communities (**Section 4.6**) under the preferred alternative may also provide protection to tree islands and cultural resources.

Based on previous Corps' efforts to identify historic properties, the Corps determined the construction of CEPP South Contract 1 features and implementation of interim operations will not have an adverse effect on historic properties or cultural resources; though many of these features were considered in the 2014 CEPP Final PIR/EIS, a determination of effects on the specific construction features was not completed. The installation of temporary pumps and use of active vegetation management through herbicides to connect historic sloughs were determined to have no potential to effect cultural resources and historic properties. The footprint of the construction features do not correspond with the locations of tree islands on historic aerial photography and the features in the built environment have been determined not eligible for listing in the NRHP. The preferred alternative will not include new volumes of water and the existing constraints of the no action alternative will not lead to additional inundation of tree islands. Consultation regarding this determination was provided to the Florida State Historic Preservation Officer, Miami-Dade County certified local government, Miccosukee Tribe of Indians of Florida, Seminole Tribe of Florida, Seminole Tribe of Oklahoma, and Thlopthlocco Tribal Town on May 1, 2020. The SHPO concurred with the Corps' finding on May 28, 2020 (DHR Project File No.: 2020-2267). The Corps agreed to the request of the Seminole Tribe of Florida for an archaeological monitor for the removal of the spoil piles.

4.17 Recreation

Implementation of the no action alternative and action alternatives would not result in significant impacts to recreational resources. ALTB2 may create negligible to minor long-term beneficial effects for nature based recreation in WCA3B and in portions of ENP, including ENP NESRS and ENP WSS, which may experience increased overland flow and water depths relative to CSB2027. When compared to CSB2027, ALTB2 resulted in higher water levels measured at the WCA3B_BLUE_SHANTY gage for the 10%, 50%, and 90% exceedance levels with the largest difference of +0.35 feet occurring at the 50% exceedance. ALTB2 resulted in higher water levels measured at ENP_NESRS1 during wet events (10% exceedance) and lower water levels for the median (50% exceedance) and dry events (90% exceedance): +0.09 feet, -0.05 feet, and -0.07 feet, respectively. Reference **Section 4.4**. For Transect 18, ALTB2 showed an increase of 105,000 acre-feet per year on average over the modeled period of record with a 22% increase observed during the wet season and a 16% increase observed during the dry season. Increases in observed overall flow and water depths compared to CSB2027 with ALTB2 would potentially improve existing fishing opportunities in WCA 3B and in portions of ENP. Improved hydrologic conditions may result in improved habitat suitability for fish and wildlife resources, resulting in a beneficial effect for outdoor recreation opportunities.

There was a general trend of slightly lower water levels in WCA 3A with ALTB2. When compared to CSB2027, ALTB2 resulted in lower water levels measured at all three WCA 3A gages (3A-28, 3A-3, and 3A-4) for the 10%, 50%, and 90% exceedance levels, with the largest difference of -0.09 feet occurring at WCA-3A-28 for the 50% exceedance. Reference **Section 4.4**. ALTB2 may reduce airboat access and recreational fishing within the marsh during extreme dry periods, having a negligible to minor long-term adverse effect; however access to canals for recreation would not change with ALTB2 relative to CSB2027.

The FWC considers closures in the EWMA due to high and low water stages. High stage closures occur when the two-gauge average is over 11.6 feet, NGVD. Low stage closures occur when the two-gauge average is below 9.3 feet, NGVD. For recreational purposes, closure of WCA 3A is considered an impact as public access is diminished due to specific restrictions on hunting or the use of motorized devices. A closure before or during a hunting season may cause the hunter to modify from their current plan and/or pursue hunting in another location. A quantitative analysis of the number of days or the number of times the EWMA would be expected to close due to exceedance of the high and low water criteria was not

conducted for this EA. When compared to CSB2027, ALTB2 resulted in decreased water levels in portions of east-central, central, and southern WCA 3A of less than 0.1 feet for all hydrologic conditions (wet, median, dry). ALTB2 may decrease the number of days the EWMA is closed due to high water by providing increased operational flexibility at the boundary of WCA 3A with WCA 3B and with WCA 3B at ENP, however, ALTB2 may increase the number of days the EWMA is closed due to low water since no increased flow volumes into WCA 3A were assumed in the hydrologic modeling.

The hydrologic effects of ALTB4 would generally match CSB2027 for WCA 3, ENP NESRS, and ENP WSS. Water levels are expected to be similar. Interim operations of S-631, S-632, S-633, and the L-29 canal temporary pumps, in conjunction with removal of a portion of the L-67C levee, and backfilling a portion of the east-west agricultural ditch is expected to improve hydrologic connectivity within the project area. Additional conveyance on the L-67A levee is expected to improve sheetflow in WCA 3B over a broader flow path than CSB2027, aiding in the restoration of natural drainage patterns that were altered as a result of the C&SF project. Improved hydrologic conditions in WCA 3B with ALTB4 may result in negligible to minor long-term beneficial effects for nature based recreation in WCA3B as discussed above; however the magnitude of beneficial effect in WCA 3B may be less as ALTB2 assumed the full build out of CEPP South features. Negligible to minor long-term adverse effects to airboat access and recreational fishing within the marsh in portions of WCA 3A where water levels are expected to decrease with ALTB2 may be further minimized with ALTB4. ALTB2 and ALTB4, both provide increased operational flexibility to store water in the natural system.

4.18 Cumulative Effects

Cumulative effects include the effects of future Federal, State, Tribal, local, or private actions reasonably certain to occur in the action area considered in this EIS. 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. The following summarizes past, present, and projected efforts that cumulatively affect the regional environment of south Florida (**Table 4-14**). In addition, there are efforts underway by other Federal, State, and local agencies, as well as non-governmental organizations that are all working toward similar restoration goals. **Table 4-15** shows the net cumulative effects of the various resources which are directly or indirectly impacted. The proposed action (i.e. ALTB4) is expected to contribute to a net beneficial effect on the region. The magnitude of beneficial effect described under the proposed action in **Table 4-15** may be less than ALTB2 (as described above in **Section 4**), since ALTB2 assumed the full build out of CEPP South features.

Table 4-14. Past, present, and reasonably foreseeable actions and plans affecting the project area.

Projects and Operational Plans	Past Actions and Authorized Plans	Current Actions and Operating Plans	Reasonably Foreseeable Future Actions and Plans
Status of Non-CERP Projects	- C&SF project (1948) - ENP Protection and Expansion Act (1989) - MWD GDM and Final EIS (1992)	- SFWMD Restoration Strategies Project - MWD 8.5 SMA GRR (2000) - MWD Tamiami Trail Modifications Limited Reevaluation Report (2008)	- SFWMD Complete Restoration Strategies Project - MWD Closeout - Tamiami Trail Modifications Next Steps (TTMNS) Project, Phase 2

	- C-111 South Dade GRR (1994)	- C&SF C-51 West End Flood Control Project - Kissimmee River Restoration - Seepage Barrier near the L-31 N Levee (Miami-Dade Limestone Products Association) - Tamiami Trail Modifications Next Steps (TTMNS) Project, Phase 1 - SFWMD Florida Bay Initiatives - C-111 South Dade Project (Contracts 8, 8A, and 9)	
Operations Plan for Lake Okeechobee, WCA 3A, ENP and the SDCS	- Water Supply and Environment (WSE) Lake Okeechobee Regulation Schedule (2000) - IOP 2002 to 2012 ERTP	- Lake Okeechobee Regulation Schedule (LORS 2008) - SFWMD LEC Regional Water Supply Plan - ERTP October 2012 until replaced by the COP; temporary planned deviations included Increment 1 and Increment 1.1 and 1.2 and 2 Operational Strategies - Herbert Hoover Dike Dam Safety Modification Study (HHD DSMS) risk reduction measures (2011 through 2022)	- LORS 2008 to be replaced by revised Lake Okeechobee System Operating Manual by 2022 - SFWMD periodically revises the LEC Regional Water Supply Plan - COP expected implementation August 2020
CERP Projects		Congressional Authorization Received: - Broward County Water Preserve Areas Project - Caloosahatchee River (C-43) West Basin Storage Reservoir - Central Everglades Planning Project (CEPP) - Project for ecosystem restoration, Central and Southern Florida, Everglades Agricultural Area, Florida, as described in Section 1308 of WRDA 2018	Future CERP Projects: - Lake Okeechobee Watershed Restoration Project - Western Everglades Restoration Project - Biscayne Bay Coastal Wetlands Phase 2 - C-111 Spreader Canal Project Phase 2

		Congressional Authorization Received and Construction in Progress: - Central Everglades Planning Projects (DOI removal of portions of Old Tamiami Trail roadway and SFWMD increased capacity of S-333) - Indian River Lagoon-South Project - Picayune Strand Restoration Project - Site 1 Impoundment Project - Biscayne Bay Coastal Wetlands Project Phase 1 - C-111 Spreader Canal Western Project (operated by SFWMD)	

Table 4-15. Summary of cumulative effects.

Resource	Cumulative Effects
Hydrology	-
Past Actions	Flood and water control projects have greatly altered the natural hydrology.
Present Actions	Federal and state agencies are coordinating on and implementing projects to improve hydrology.
Proposed Action	Implementation of interim operations defined in the 2020 CEPP and EAA Reservoir DPOM would provide additional operational flexibility at the boundary of WCA 3A with WCA3 B and with WCA 3B at ENP compared to CSB2027. Implementation of interim operations of S-631, S-632, S-633, and the L-29 canal temporary pumps, in conjunction with removal of a portion of the L-67C levee, and backfilling a portion of the east-west agricultural ditch, would improve hydrologic connectivity within the project area. Additional conveyance on the L-67A levee would enable improved sheet flow in WCA 3B over a broader flow path than CSB2027. Operations of the S-631, S-632, and S-633 structures utilizing the S-152 constraints should be considered preliminary, pending future updates for full CEPP South implementation. Adaptive Management strategies or refinements may be needed to avoid potential downstream impacts (Saunders, 2020; Sklar, 2018; 2019).
Future Actions	Additional CERP projects propose to restore hydrology to more natural conditions.
Cumulative Effect	Although it is unlikely that natural hydrologic conditions would be fully restored to pre-drainage conditions, improved hydrology would occur with implementation of the Proposed Action. CERP is expected to improve the quantity, quality, timing and distribution of freshwater flow.
Endangered Species	-
Past Actions	Water management practices and urbanization have resulted in the degradation of existing habitat function and direct habitat loss leading to negative population trends of threatened and endangered species.
Present Actions	Current water management practices include interagency forums to discuss assessment of conditions in the C&SF project area to ensure wildlife recommendations are considered during the water

Resource	Cumulative Effects
	management decision process. The Corps coordinates with the USFWS and FWC as appropriate, as issues related to species under their purview arise.
Proposed Action	Effects determinations for Federally threatened and endangered species within the project area are listed in **Table 4-13**. The Corps acknowledges the potential usage and occurrence of the previously discussed threatened and endangered species and/or critical habitat within the CEPP South action area. Concurrence on the species effect determinations in **Table 4-13** was received from the USFWS on June 5, 2020.
Future Actions	Ongoing projects would be implemented to maintain threatened and endangered species within the project area. It is anticipated that suitable habitat for federally listed threatened and endangered species would be maintained under future restoration initiatives, but it may not occur with the current or historic footprints in some areas.
Cumulative Effect	Habitat improvement, monitoring, and management of threatened and endangered species are anticipated to allow populations to be maintained. Improvement of degraded populations is expected to be facilitated by the restoration and enhancement of suitable habitat through efforts to restore more natural hydrologic conditions within the project area.
Fish and Wildlife Resources	-
Past Actions	Water management practices have resulted in aquatic vegetation community changes and a resultant disruption of aquatic productivity and function that has had repercussions through the food web, including effects on wading birds, large predatory fishes, reptiles and mammals.
Present Actions	Ongoing efforts have been made by Federal and state agencies to implement projects to improve hydrology within the project area to restore habitat conditions for fish and wildlife resources.
Proposed Action	Increases in forage prey availability (i.e. crayfish and other invertebrates, fish) resulting from improved hydrologic conditions in localized areas of WCA 3B may in turn provide beneficial effects for amphibian, reptile, small mammal, and wading bird species. Significant adverse impacts to fish and wildlife resources is not expected to occur in WCA 3A and ENP.
Future Actions	Some level of improvement to fish and wildlife resources is expected to occur as a result of implementation of projects with the capability of improving the timing, quantity, quality and distribution of freshwater flow to the project area. Hydrologic restoration planned as part of CERP would further improve fish and wildlife habitat.
Cumulative Effect	Habitat improvement efforts are anticipated to benefit fish and wildlife resources.
Vegetation and Wetlands	-
Past Actions	Drainage of Florida's interior wetlands, conversion of wetlands to agriculture, and urban development has reduced the spatial extent and quality of wetland resources.
Present Actions	Efforts are being taken by state and Federal regulatory agencies to reduce wetland losses.
Proposed Action	Improved hydrologic conditions in localized areas of WCA 3B may benefit wetland vegetation. The proposed action may have beneficial effects on vegetative communities within localized portions of WCA 3B. Additional conveyance on the L-67A levee would enable improved sheet flow in WCA 3B over a broader flow path than current conditions. . Potential impacts to wetlands within the project area would be construction related and temporary. Short-term impacts to localized areas would occur

Resource	Cumulative Effects
	due to installation of the temporary diesel powered pumps adjacent to the L-29 canal. The temporary pumps would be installed across the L-29 levee between L-67A and the CEPP South L-67D. Since the location is west of S-355A, additional pump collection sumps may need to be installed immediately adjacent and north of the L-29 levee at the one or two selected optimal temporary pump locations. Some vegetation may be disturbed or removed. When the pumps are removed in advance of the L-29 levee segment removal under CEPP South Contract 5, the sump excavations would be returned to the pre-installation condition. Vegetation within the footprint of the temporary pumps would be expected to re-vegetate.
Future Actions	Some level of improvement to vegetative communities is expected to occur as a result of implementation of projects with the capability of improving the timing, quantity, quality, and distribution of freshwater flow to the project area. More natural hydrology as part of the CERP would assist in restoring natural plant communities.
Cumulative Effect	While the spatial extent of natural plant communities would not be restored to historic proportions, the quality of vegetative communities would be improved.
Water Quality	-
Past Actions	Water quality has been degraded from urban, suburban, commercial, industrial, recreational, and agricultural development. Due to impoundment of WCA 3B, nutrient enrichment to this area has been limited.
Present Actions	Efforts to improve water quality from agricultural areas are ongoing. Construction of federal and state projects can temporarily elevate localized levels of suspended solids and turbidity, and over time are expected to reduce nutrient loading. Operation of the S-152 structure for the DPM has limited nutrient loading into WCA 3B because of operational constraints for phosphorus concentrations and flow.
Proposed Action	Nutrient and sulfate loading will not increase from the construction and operation of CEPP South features, but the distribution of loading will change from the operation of the new features. Operating the new features (i.e., S-631, S-632, and S-633) and the existing S-152 culvert within the current S-152 operational constraints for phosphorus concentration and flows will keep nutrient loading at current levels. Overall, the project is expected to benefit water quality by restoring hydroperiods in WCA 3B. Operations of the S-631, S-632, and S-633 structures utilizing the S-152 constraints should be considered preliminary, pending future updates for full CEPP South implementation. Adaptive Management strategies or refinements may be needed to avoid potential downstream impacts (Saunders, 2020; Sklar, 2018; 2019).
Future Actions	Actions by the State of Florida's Restoration Strategies is expected to decrease nutrient concentrations and loadings to the project area. In general, there is a slowly improving trend in water quality entering and exiting the upstream WCAs.
Cumulative Effect	While anthropogenic effects on water quality are unlikely to be eliminated, water quality is expected to slowly improve. This is based on trends indicated by data analysis and the fact that Best Management Practices (BMPs) are continuing to reduce nutrient loading to the system.
Cultural Resources	-
Past Actions	Past water management practices and the compartmentalization have resulted in degradation of tree islands, peat fires, oxidation, and other effects to cultural resources.
Present Actions	Ongoing efforts to identify and consider cultural resources in the planning and operations has led to some protection to cultural resources. Efforts to improve water supply and quality have potentially stabilized tree islands with a high potential for cultural resources.

Resource	Cumulative Effects
Proposed Action	The proposed action effects historic water control features, but does not have an additional effect to cultural resources.
Future Actions	The fluctuation of water levels within historic ranges is not an adverse effect to historic cultural resources. Additional CERP projects will be reviewed to determine potential effects to cultural resources.

4.19 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. 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. The proposed action consists of interim operations of features associated with CEPP South Contract 1 defined in the proposed 2020 CEPP DOM (**Appendix A**), to include the installation and operation of temporary pumps adjacent to the L-29 canal as an interim measure to enhance and redirect flow south towards the L-29 canal in the Blue Shanty Flowway during the phased construction of CEPP South features. The proposed action would not cause the permanent removal or consumption of any natural resources.

4.20 Unavoidable Adverse Environmental Effects

As discussed in **Section 4**, adverse effects associated with implementing the proposed action are expected to be minimal. Potential impacts to wetlands within the project area would be construction-related and temporary. Short-term impacts to localized areas would occur due to installation of the temporary diesel powered pumps adjacent to the L-29 canal with ALTB4. The temporary pumps would be installed across the L-29 levee between L-67A and the CEPP South L-67D. Since the location is west of S-355A, additional pump collection sumps may need to be installed immediately adjacent and north of the L-29 levee at the one or two selected optimal temporary pump locations. Some vegetation may be disturbed or removed. When the pumps are removed in advance of the L-29 levee segment removal under CEPP South Contract 5, the sump excavations would be returned to the pre-installation condition. Vegetation within the footprint of the temporary pumps would be expected to re-vegetate. Implementation of the proposed action is expected to result in an overall net increase in wetland function throughout the project area through improved hydrology.

4.21 Conflicts and Controversy

Over the lifetime of the CEPP, considerable interest has been generated among local and regional stakeholders. At this time there is no known conflict or controversy associated with the proposed action based on public, state, and Federal agency review of the draft EA. **Appendix D.3** contains pertinent correspondence related to release of the draft EA, including a comment response matrix (**Table D.3-1**) to address comments received from public review. The Corps continually strives to include all interested parties in its decision making process and will continue to consider all issues that arise.

4.22 Environmental Commitments

The Corps commits to avoiding, minimizing, or mitigating for adverse effects, to the extent practicable. The 2014 CEPP Final PIR/EIS included an AMMP that includes adaptive management, water quality, hydrometeorologic, and ecological monitoring activities to ensure that the intended purposes of the

project would be achieved through long term operations. Implementation of the 2014 CEPP AMMP will be performed by RECOVER throughout the multi-year construction period and operations phase.

Following appropriate review, the recommendations from DPM Science Team and CEPP AM Team may be integrated into CEPP South project planning and implementation following the established Corps' protocols for Adaptive Management. Corps' guidance requires that modifications to a project's AM Plan be approved at Corps' Headquarters. The Corps and SFWMD leadership are engaged in collaborative discussions regarding the process to implement construction fixes, if needed, within the CEPP AM framework.

4.23 Compliance with Environmental Requirements

This subsection documents compliance of the proposed action with environmental requirements.

4.23.1 National Environmental Policy Act of 1969

Environmental information on the project has been compiled and the draft EA has been prepared and coordinated for public, state, and Federal agency review. The proposed action is in compliance with the NEPA.

4.23.2 Endangered Species Act of 1973

The 2014 CEPP PIR/EIS received a Programmatic Biological Opinion (BO) from the USFWS (Consultation Code: 04EF2000-2012-F-0290) with respect to Section 7 of the ESA of 1973 as amended on April 9, 2014 which stated that further consultation will be needed when more specific project details are finalized during the PED phase. The 2014 Programmatic BO did not provide provisions for incidental take of three endangered avian species (CSSS, snail kite, and wood stork). It was recognized that, when the Corps was closer to constructing portions of CEPP that will affect listed species, the USFWS will provide separate consultation document(s) which may authorize incidental take, and provide applicable reasonable and prudent measures (RPMs) and terms and conditions (TCs). A complete description of the consultation history for CEPP South under Section 7 of the ESA of 1973, as amended, can be found in the BA in **Appendix D.1**. The BA was submitted to the USFWS on January 23, 2020 with supplemental correspondence dated February 14, 2020 for informal consultation on the Eastern black rail. The USFWS provided a request for additional information in response to the 2020 CEPP BA on April 14, 2020. The Corps responded on May 8, 2020. The Corps determined that the proposed action may affect but is not likely to adversely affect the following federally listed species: Florida panther, Florida manatee and its designated critical habitat, Florida bonneted bat, Cape Sable seaside sparrow and its designated critical habitat, Everglade snail kite and its designated critical habitat, American alligator, American crocodile and its designated critical habitat, and the Eastern indigo snake. The Corps has determined that the proposed action will have no effect on any other federally listed species or their designated critical habitat. Concurrence on the above species effect determinations was received from the USFWS on June 5, 2020. .

The proposed action does not warrant re-initiation of consultation under the NMFS 2013 Programmatic Biological Opinion (BO) for the CERP. The Corps has determined that effects of the proposed action would have no effect on federally listed threatened and endangered species under the purview of the NMFS in accordance with provisions of Section 7 of the Endangered Species Act of 1973, as amended. An NOA regarding these effects determinations was provided to the NMFS at the start of the 30 day public review period. Reference **Appendix D.1**. In correspondence dated May 18, 2020, the NMFS stated that the NMFS

does not concur with nor review agency no effect determinations. The NMFS referenced the prior 2013 Programmatic BO as addressing CEPP directly.

4.23.3 Fish and Wildlife Coordination Act of 1958, as amended

The Fish and Wildlife Coordination Act, as amended (16 U.S.C. 661 et seq.) requires Federal agencies to consult with the USFWS regarding the impacts to fish and wildlife resources and the proposed measures to mitigate these impacts. Additional coordination authorities exist through the review process of the NEPA and the consultations required under the ESA (16 U.S.C. 1531 et seq.). A final Fish and Wildlife Coordination Act Report (FWCAR) was transmitted to the Corps by the USFWS on December 13, 2013, and was included in the 2014 CEPP Final PIR/EIS. The 2013 FWCAR recommended that the Blue Shanty Levee be constructed last and only if necessary, noting that an adequate monitoring plan for WCA 3B resources should be implemented, and that the full project, minus the Blue Shanty Levee should be allowed to function for several years to assess the need for the levee. Further recommendations on the location of the levee within WCA 3B were also provided to avoid tree islands. The 2013 FWCAR further recommend that a robust species monitoring plan by implemented to inform protection of federally listed species, including the CSSS. The project has been fully coordinated with the USFWS in response to the requirements of this Act. The Corps has and will continue to coordinate with the USFWS during the implementation of interim operations defined in the 2020 CEPP and EAA Reservoir DPOM. The proposed action is in full compliance with this Act.

4.23.4 National Historic Preservation Act of 1966

The proposed action will be in compliance with Section 106 of the National Historic Preservation Act, as amended (54 U.S.C. §300101 et. seq.). 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 with the Archaeological and Historic Preservation Act, as amended (54 U.S.C. §§312501-312508), Archeological and Resources Protection Act (16 U.S.C. §§470aa-470mm), American Indian Religious Freedom Act (42 U.S.C. §§1996 and 1996a), Native American Graves Protection and Repatriation Act (NAGPRA) (25 U.S.C. §3001 et. seq), Executive Order 11593, Protection and Enhancement of the Cultural Environment, Executive Order 13007, Indian Sacred Sites, Executive Order 13175, Consultation and Coordination With Indian Tribal Governments, the Presidential Memo of 1994 on Government to Government Relations, and appropriate Florida Statutes. Presentations and face-to-face meetings were conducted, as well as email and phone correspondence with state, federal, and tribal government staff members to brief them on the project development and to discuss issues of concern. The APE as determined under Section 106 of the NHPA was presented at a CEPP Cultural Resources Working Group Meetings on February 27, 2020. The Corps determined the use of temporary pumps and herbicide to connect historic sloughs has no potential to affect historic properties. The Corps determined CEPP South Contract 1 and interim operations will have no adverse effect to historic properties and provided this finding by letter to the SHPO, Seminole THPO, Miccosukee Tribal Representative, the Seminole Nation of Oklahoma THPO, Thlopthlocco Tribal Town THPO, and Miami-Dade County Certified Local Government on May 1, 2020. The SHPO concurred with the Corps' finding on May 28, 2020.

4.23.5 Clean Water Act of 1972

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

associated with the proposed action would not cause or contribute to violation of applicable state water quality standards, jeopardize any species listed as threatened or endangered, or result in significant adverse effects on human health and welfare, and overall impacts to wetlands would be avoided and minimized to the maximum extent practicable. Mitigation is not necessary because the project would improve overall hydrologic connectivity in the project area and would provide an overall increase in wetland ecosystem function. Water quality certification pursuant to Section 401 of the CWA will be obtained from the State of Florida prior to construction. Full compliance with this Act will be achieved upon the issuance of water quality certification by the State of Florida. All conditions in the water quality certification will be implemented in order to avoid or minimize adverse impacts to water quality.

4.23.6 Clean Air Act of 1972

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

4.23.7 Coastal Zone Management Act of 1972

A determination of consistency with the State of Florida Coastal Zone Management program pursuant to the Coastal Zone Management Act (CZMA) of 1972 is found in **Appendix B** of this EA. The Corps has coordinated a consistency determination pursuant to the CZMA of 1972 through the circulation of the draft EA. The Corps has determined that the proposed action is consistent to the maximum extent practicable with the enforceable policies of Florida's approved Coastal Zone Management Program. In correspondence dated June 24, 2020, the Florida State Clearinghouse indicated that the state had no objections to the project and therefore it is consistent with the FCMP. Full compliance with this Act will be evaluated upon the issuance of water quality certification by the State of Florida.

4.23.8 Farmland Protection Policy Act of 1981

No designated prime and unique farmland would be affected by project related activities. No conversion of important farmlands would take place. The proposed action is in compliance with this Act.

4.23.9 Wild and Scenic River Act of 1968

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

4.23.10 Marine Mammal Protection Act of 1972

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

4.23.11 Estuary Protection Act of 1968

The National Estuary Program (NEP) is an EPA program to protect and restore the water quality and ecological integrity of estuaries of national significance. No water bodies designated as estuaries of national significance under the NEP are located in the project area. No designated estuary would be affected by the proposed action. Florida Bay is downstream of the proposed action and would not be affected by the proposed action. This Act is not applicable.

4.23.12 Federal Water Project Recreation Act of 1965, as amended

Recreation and fish and wildlife enhancement have been given full consideration in the proposed action. Implementation of proposed action would not result in significant impacts to recreational resources. The proposed action may create beneficial effects for nature based recreation in the project area. The proposed action is in compliance with this Act.

4.23.13 Fishery Conservation and Management Act of 1976

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

4.23.14 Submerged Lands Act of 1953

No construction is proposed on submerged lands. The proposed action is in compliance with this Act.

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

There are no designated coastal barrier resources in the project area that would be affected by the proposed action. This Act is not applicable.

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

No HTRW has been identified within the construction footprints of the proposed action. The risk for increased mobilization of existing HTRW where it might exist within the project area due to implementation of interim operations is low. The proposed action is in compliance with these Acts.

4.23.17 Rivers and Harbors Act of 1899

The proposed action would not permanently obstruct navigable waters of the United States. The proposed action is in full compliance with this Act.

4.23.18 Safe Drinking Water Act of 1974, As Amended

The proposed action would not prevent public water supply utilities from meeting drinking water quality standards as outlined in the Safe Drinking Water Act of 1973, as amended. The majority of drinking water supply in the South Dade area is met with groundwater from the Biscayne aquifer, which is treated prior to consumption. Due to the hydrologic connectivity between the Biscayne aquifer and surface water bodies, prolonged reduction in canal stages will affect groundwater levels. Reduction in canal stages and groundwater levels would result in movement of saline water into the Biscayne aquifer, causing harmful impacts to water supply. The proposed action will maintain canal stage elevations for water supply and prevent saline water intrusion into the Biscayne aquifer. Reference **Section 4.5.2**. The proposed action is in full compliance with this Act.

4.23.19 Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646)

Acquisition of real estate is not required for the proposed action. This Act is not applicable.

4.23.20 Anadromous Fish Conservation Act

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

4.23.21 Migratory Bird Treaty Act and Migratory Bird Conservation Act

Migratory and resident bird species have been observed within the project area and are likely to use available habitat for foraging, nesting, and breeding. The proposed action is not expected to destroy migratory birds, their active nests, their eggs, or their hatchlings. The proposed action will not pursue, hunt, take, capture, kill or sell migratory birds. The proposed action is in compliance with these Acts.

4.23.22 Marine Protection, Research and Sanctuaries Act

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

4.23.23 Magnuson-Stevens Fishery Conservation and Management Act

The Corps has determined that the proposed action would have no effect on EFH and no adverse effects on federally managed fish species. Reference **Section 4.9**. An NOA for the draft EA was provided to the NMFS Habitat Conservation Division (HCD) at the start of the 30 day public review period. Correspondence was not received from the NMFS HCD in response to release of the draft EA. Reference **Appendix D.1**. The proposed action is in compliance with this Act.

4.23.24 E.O. 11990, Protection of Wetlands

Potential impacts to wetlands within the project area would be construction related and temporary. Short-term impacts to localized areas would occur due to installation of the temporary diesel powered pumps adjacent to the L-29 canal with ALTB4. The temporary pumps would be installed across the L-29 levee between L-67A and the CEPP South L-67D. Since the location is west of S-355A, additional pump collection sumps may need to be installed immediately adjacent and north of the L-29 levee at the one or two selected optimal temporary pump locations. Some vegetation may be disturbed or removed. When the pumps are removed in advance of the L-29 levee segment removal under CEPP South Contract 5, the sump excavations would be returned to the pre-installation condition. Vegetation within the footprint of the temporary pumps would be expected to re-vegetate. Implementation of the proposed action is expected to result in an overall net increase in wetland function throughout the project area through improved hydrology. The proposed action is in compliance with the goals of this E.O.

4.23.25 E.O. 11988, Floodplain Management

Executive Order 11988 requires federal agencies avoid, to the extent possible, the long and short term adverse impacts associated with the occupancy and modification of flood plains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. The Water

Resources Council Floodplain Management Guidelines for implementation of E.O. 11988, as referenced in U. S. Army Corps of Engineers (USACE) Engineering Regulation (ER) 1165-2-26, requires an eight step process that agencies should carry out as part of their decision making on projects that have potential impacts to, or are within the floodplain. The eight steps and project specific responses to them are summarized below.

1. Determine if a proposed action is in the base floodplain (that area which has a one percent or greater chance of flooding in any given year).

The proposed action is within the base flood plain. This EA addresses interim operations of features associated with CEPP South Contract 1 that include conveyance features that function to redistribute the existing water from WCA 3A into WCA 3B and eastern ENP.

2. If the action is in the base flood plain, identify and evaluate practicable alternatives to the action or to location of the action in the base flood plain.

Section 2 provides information on alternatives considered. **Section 2.4** provides justification for selection of the preferred alternative or proposed action. The proposed action needs to remain in the floodplain. Interim operations defined in the 2020 CEPP and EAA Reservoir DPOM (**Appendix A**) work in concert with C&SF operations to maintain current flood control in the project area. The proposed action provides increased operational flexibility to store water in the natural system during hurricanes or floods.

3. If the action must be in the floodplain, advise the general public in the affected area and obtain their views and comments.

The draft EA was provided for public review. During this process the local stakeholders and the general public have been afforded the opportunity to review and comment on the proposed action. All comments submitted during the public review period have been responded to in the final EA in **Table D.3-1**.

4. Identify beneficial and adverse impacts due to the action and any expected losses of natural and beneficial flood plain values. Where actions proposed to be located outside the base flood plain will affect the base flood plain, impacts resulting from these actions should also be identified.

Section 4 provides information on the environmental effects of the proposed action. The proposed action is not expected to impact natural or beneficial flood plain values. Implementation of interim operations defined in the 2020 CEPP and EAA Reservoir DPOM (**Appendix A**) would allow benefits to be achieved by setting the stage for restoration of sheet flow in the project area; improving seasonal hydroperiods and water depths to support wetland vegetation and fish and wildlife resources in the Everglades system consistent with the objectives of CEPP identified in the 2014 Final PIR/EIS. The proposed action is expected to meet the objectives and constraints identified in the EA, including maintenance of existing levels of service for flood protection cause by plan implementation. Reference **Section 4.4** and **4.5** for further information on flood risk management.

5. If the action is likely to induce development in the base flood plain, determine if a practicable non-flood plain alternative for the development exists. The proposed action is not expected to induce development in the flood plain.

6. As part of the planning process under the Principles and Guidelines, determine viable methods to minimize any adverse impacts of the action including any likely induced development for which there is

no practicable alternative and methods to restore and preserve the natural and beneficial flood plain values. This should include reevaluation of the "no action" alternative. The proposed action is not expected to induce development in the flood plain. The no action alternative was included in plan formulation. Reference **Section 2**. The proposed action will maintain authorized flood risk management in the project area.

7. If the final determination is made that no practicable alternative exists to locating the action in the flood plain, advise the general public in the affected area of the findings. The draft EA was provided for public review. All comments submitted during the public review period have been responded to in the final EA in **Table D.3-1**.

8. Recommend the plan most responsive to the planning objectives established by the study and consistent with the requirements of the Executive Order. The preferred plan is the most responsive to all of the project objectives and the most consistent with the executive order.

4.23.26 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 COP is expected to define operations for water management infrastructure in the project area and serve as the baseline for initial water management operations in the CEPP South project area. An environmental justice analysis was performed for implementation of the COP as described in the 2020 COP Final EIS. Reference Section 3.20 and Section 4.16 of the 2020 COP Final EIS. The environmental justice analysis was conducted to determine if there were disproportionate adverse impacts to low-income, minority communities within the project area. The two main risks of adverse impacts within the project area were groundwater stage increases potentially impacting agricultural parcels in the C-111 Basin and the potential for increased dry outs in WCA 3A potentially impacting tribal access to certain lands. Though the impact analysis did determine that the COP showed an increased risk of adverse impacts when compared to the no action alternative, the adverse impacts were not shown to be holistically disproportionate to the EJ communities analyzed. The Miccosukee Tribe provided correspondence on the 2020 COP Final EIS on March 16, 2020, indicating that implementation of the COP would create impacts to tribal lands in WCA 3A and disagreed with the Corps' environmental justice analysis, stating that the Miccosukee Tribe will be disproportionally impacted. The Corps maintains support for its analysis and has identified actions to mitigate for potential impacts to the Tribe and to appropriately address the Tribe's concern through implementation of the COP AMMP and operational flexibility. The environmental justice analysis performed for implementation of the COP, as described in the 2020 COP Final EIS, is incorporated by reference into this EA. For the interim operation with the proposed action, the CEPP South structures (S-631, S-632, and S-633) would be operated consistent with S-152 to maintain a water budget distribution between WCA 3A, WCA 3B, and ENP consistent with the CSB2027 (also similar to the 2020 COP Final EIS) and associated similar hydroperiod and hydropattern effects. The proposed action would not result in disproportionately high and adverse human health or environmental effects on minority populations and low-income populations. The proposed action is in compliance with this E.O.

4.23.27 E.O. 13089, Coral Reef Protection

No coral reefs would be impacted by the proposed action. This E.O. does not apply.

4.23.28 E.O. 13112, Invasive Species

The proposed action would have no significant impact on invasive species. During construction the contractor would be required to keep construction activities under surveillance, management, and control to prevent the transfer and spread of invasive species due to construction activities. The proposed action is in compliance with the goals of this E.O.

4.23.29 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 with the goals of this E.O.

4.23.30 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 will not pursue, hunt, take, capture, kill or sell migratory birds. The proposed action is in compliance with the goals of this E.O.

5 PREPARERS

This section provides a list of the persons involved in the preparation and review of this document. Reference **Table 5-1**.

Table 5-1. List of report preparers and reviewers.

Name	Organization	Discipline/Expertise	Role in Document Preparation
Ruben Arteaga	SFWMD	Hydrologic Modeling	IMC Modeling
Ken Bradshaw	Corps	Water Quality	Water Quality Evaluation
Laureen Borochaner	Corps	Engineering	Reviewer
Lehar Brion	SFWMD	Hydrologic Modeling	IMC Modeling Team Lead
Chris Altes	Corps	Archeologist	Cultural Resource Evaluation
Andrew Coman	Corps	Hydrologist	Hydrologic Evaluation/Operations
Dan Crawford	Corps	Hydrologist	Hydrologic Evaluation/Operations
Jeff Couch	Corps	Project Management	Reviewer
Sandeep Dabral	Corps	Hydrologic Modeling	IMC Modeling
Nancy Demonstranti	SFWMD	Water Supply	Water Supply Evaluation
Lan Do	Corps	Water Manager	Operations
Angela Dunn	Corps	Planning, Biologist	Reviewer
Jason Engle	Corps	Water Resources	Reviewer
Christyn Figueroa	Corps	Project Management	Reviewer
Howard Gonzales	Corps	Project Management	Reviewer
Andrew LoSchiavo	Corps	Planning, Biologist	Reviewer
Meredith Moreno	Corps	Archeologist	Reviewer
Melissa Nasuti	Corps	Biologist	Environmental Effects Evaluation
Sashi Nair	SFWMD	Hydrologic Modeling	IMC Modeling
Raul Novoa	SFWMD	Hydrologic Modeling	IMC Modeling
Jim Riley	Corps	Water Quality	Reviewer
Eric Summa	Corps	Planning	Reviewer
David Welter	SFWMD	Hydrologic Modeling	IMC Modeling
Walter Wilcox	SFWMD	Hydrologic Modeling	IMC Modeling

6 PUBLIC INVOLVEMENT

The following details public involvement during plan formulation for CEPP South.

6.1 Scoping and EA

Please reference **Section 1.9** (**Scoping and Issues**).

6.2 Agency Coordination

The Corps is in continuous coordination with other Federal and state agencies, Tribal representatives, and members of the general public. This extensive coordination is a result of the magnitude of the Corps efforts underway to implement water management strategies in south Florida. A meeting was held on February 11, 2020 to notify Federal, State, and local agencies, affected Indian Tribes, and other interested stakeholders on planning efforts as they relate to CEPP South. A designated public comment period provided opportunities for participation during that meeting. A government to government consultation meeting was held with the Miccosukee Tribe of Indians of Florida on July 1, 2020, and with the Seminole Tribe of Florida on July 14, 2020. **Appendix D.3** contains pertinent correspondence related to release of the EA, including a comment response matrix (**Table D.3-1**) to address comments received from public review.

6.3 List of Recipients

A Notice of Availability (NOA) for the draft EA was posted to the Jacksonville District Environmental Branch website to begin the 30 day review period. A news release notifying the public of the availability of the document was also released through the Jacksonville District's Corporate Communications Office. Hard copies of the NOA were not mailed due to COVID19. Comments received in response to public review were considered in developing the final EA and FONSI.

Copies of the draft and final EA were also posted to the internet at the following address:

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

7 REFERENCES

Saunders, C.J. (ed.). 2020. Appendix 6-1: Decomp Physical Model Research. 2020 South Florida Environmental Report – Volume I, South Florida Water Management District, West Palm Beach, FL.

SFWMD. 2020. South Florida Ecosystem Restoration Report available at https://www.sfwmd.gov/science-data/scientific-publications-sfer.

Sklar, F.H. (ed.). 2020. Chapter 6: Everglades Research and Evaluation. 2020 South Florida Environmental Report – Volume I, South Florida Water Management District, West Palm Beach, FL.

Sklar, F.H. (ed.). 2019. Chapter 6: Everglades Research and Evaluation. 2019 South Florida Environmental Report – Volume I, South Florida Water Management District, West Palm Beach, FL.

Sklar, F.H. (ed.). 2018. Chapter 6: Everglades Research and Evaluation. 2018 South Florida Environmental Report – Volume I, South Florida Water Management District, West Palm Beach, FL.

USACE. 1999. Comprehensive Review Study of the Central and Southern Florida Project, Comprehensive Everglades Restoration Plan Final Integrated Feasibility Report and Programmatic Environmental Impact Statement , U.S. Army Corps of Engineers, Jacksonville District, 1999.

USACE. 2010. Installation, Testing and Monitoring of a Physical Model for the Water Conservation Area 3 Decompartmentalization and Sheet Flow Enhancement Project Final Environmental Assessment and Design Test Documentation Report, U.S. Army Corps of Engineers, Jacksonville District, 2010.

USACE. 2012. Central and South Florida Project: Water Control Plan for Water Conservation Areas, Everglades National Park, and ENP South Miami-Dade Conveyance System. U.S. Army Corps of Engineers, Jacksonville District, 2012.

USACE. 2014. Central Everglades Planning Project Final Integrated Project Implementation Report and Environmental Impact Statement, U.S. Army Corps of Engineers, Jacksonville District, 2014.

USACE. 2015. Supplemental Finding of No Significant Impact Installation, Testing and Monitoring of a Physical Model for the Water Conservation Area 3 Decompartmentalization and Sheet Flow Enhancement Project, U.S. Army Corps of Engineers, Jacksonville District, 2015.

USACE. 2017. Supplemental Finding of No Significant Impact Installation, Testing and Monitoring of a Physical Model for the Water Conservation Area 3 Decompartmentalization and Sheet Flow Enhancement Project: Phase 2, U.S. Army Corps of Engineers, Jacksonville District, 2017.

USACE. 2018. Environmental Assessment, 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, 2018.

USACE. 2019. Central Everglades Planning Project South Validation Report, U.S. Army Corps of Engineers, Jacksonville District, 2019.

USACE. 2020. Central and Southern Florida, Everglades Agricultural Area, Final Environmental Impact Statement, U.S. Army Corps of Engineers, Jacksonville District, 2020.

USACE. 2020. Combined Operational Plan Draft Environmental Impact Statement, U.S. Army Corps of Engineers, Jacksonville District, 2020.

USFWS 1999. South Florida Multi-Species Recovery Plan. Southeast Region, Atlanta, Georgia, USA.