

April 2017

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

## **MODIFIED WATER DELIVERIES TO EVERGLADES NATIONAL PARK PROJECT: REMOVAL OF UNCONSTRUCTED CONVEYANCE AND SEEPAGE CONTROL FEATURES**



**Miami-Dade County, Florida**



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

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## **FINDING OF NO SIGNIFICANT IMPACT**

### **MODIFIED WATER DELIVERIES TO EVERGLADES NATIONAL PARK PROJECT: REMOVAL OF UNCONSTRUCTED CONVEYANCE AND SEEPAGE CONTROL FEATURES MIAMI-DADE COUNTY, FLORIDA**

The U.S. Army Corps of Engineers, Jacksonville District (Corps), has conducted an environmental assessment in accordance with the National Environmental Policy Act of 1969, as amended. The Corps assessed the effects of the following actions in the Modified Water Deliveries to Everglades National Park (MWD) Project: Removal of Unconstructed Conveyance and Seepage Control Features Environmental Assessment (EA), dated February 2017, and the Corps technical analysis dated September 2015 (Appendix A) for the MWD Project in Miami-Dade County, Florida. The proposed action consists of the following:

- Removal of authorized conveyance and seepage control features (CSCF) originally included in the MWD Project CSCF components that have not been constructed. Specifically, the components to be removed from the authorized project and associated Project Cooperation Agreement (PCA) include: (1) gated culvert structures S-345A, B, and C through the L-67A; (2) gated concrete headwall structures S-349A, B, and C in the L-67A Borrow Canal; and (3) degradation of the remaining 5.5 miles of the L-67 Extension.
- Amending the PCA between the Corps and the non-federal sponsor, the South Florida Water Management District (SFWMD), to revise the term "project" to eliminate the unconstructed CSCF components and incorporate the 2012 design refinement for the 8.5 SMA. The current PCA, which identifies cost share and construction, operation, and maintenance responsibilities, defines the term "project" by referring to the 1992 MWD General Design Memorandum and Environmental Impact Statement (GDM/EIS), 2000 8.5 Square Mile Area (SMA) General Reevaluation Report and Environmental Impact Statement (GRR/EIS), and 2008 Tamiami Trail Modifications (TTM) Limited Reevaluation Report and Environmental Assessment (LRR/EA).
- Completion of a series of operational tests (MWD Increment 1, MWD Increment 1.1/1.2, MWD Increment 2, and development of a Combined Operational Plan (COP) for the constructed features of the MWD Project and Canal 111 South Dade Project features. At this time, COP is anticipated to be implemented by 2019. It must be noted, however, that operational testing under the MWD Project increments may reveal the need for additional construction to address adverse effects associated with increased flow into Everglades National Park (ENP) associated with the MWD Project.
- Development of an Operations, Maintenance, Repair, Rehabilitation, and Replacement (OMRR&R) Manual before the features can be transferred to SFWMD for operation. The OMRR&R Manual will be developed based on the results of the incremental testing and the comprehensive water control plan update (*i.e.* COP).

In addition to the No Action Alternative, two alternatives were evaluated, including the proposed action. While the proposed action will not achieve the benefits to Water Conservation Area 3B as originally envisioned in the 1992 MWD GDM/EIS, the Recommended Plan is consistent with MWD Project design refinements documented within the 2000 8.5 SMA GRR/EIS, the 2008 TTM

LRR/EA, and the 2012 8.5 SMA EA. In addition, as outlined in Appendix A, and in coordination with the Department of the Interior and SFWMD, the Corps 2015 technical analysis determined that the previously constructed MWD Project features, the MWD Project features currently under construction, C-358 and S-357N, along with the acquisition of remaining real estate interests and completion of a project water control plan (*i.e.* COP), will achieve the statutory charge to improve water deliveries into ENP and, to the extent practicable, restore the natural hydrological conditions within ENP.

Given that the authority under which the MWD Project was developed was focused on delivery of water *to* ENP and improvement of the hydrology, to the extent practicable *within* ENP, the design changes and additional costs to make the necessary changes to the MWD Project to provide the benefits envisioned in the 1992 MWD GDM/EIS *outside* ENP would be difficult to justify under this authority. Although located within ENP, the 2008 TTM LRR/EA concluded that degradation of the remaining L-67 Extension may cause stages to exceed the MWD Project L-29 Borrow Canal maximum operating limit and compromise the condition of the Tamiami Trail roadway. Further improvements to water delivery volumes into ENP by up to 92%, compared to pre-MWD conditions described in the LRR, and improved hydrologic conditions within ENP can be expected upon completion of COP. Applicable real estate acquisitions must be completed to support the MWD increments operational tests needed to inform COP.

I have reviewed the Environmental Assessment (EA) for the Proposed Action. This Finding incorporates by reference all discussions and conclusions contained in the EA enclosed hereto. Based on the information analyzed in the EA, which reflects pertinent information obtained from agencies having jurisdiction by law and/or special expertise, I conclude that the Proposed Action will not significantly affect the quality of the human environment and does not require an Environmental Impact Statement. Reasons for this conclusion are in summary:

- a. The Proposed Action is in compliance with the Endangered Species Act and the Fish and Wildlife Coordination Act. The Corps agrees to maintain open and cooperative communication with the U.S. Fish and Wildlife Service, National Marine Fisheries Service, and the Florida Fish and Wildlife Conservation Commission regarding actions necessary to complete the MWD Project.
- b. A Federal consistency determination, in accordance with 15 CFR 930 Subpart C of the Coastal Zone Management Act, or a Section 404(b)(1) evaluation under the Clean Water Act, are not necessary to support the determination to remove specific CSCF components from the MWD Project and associated PCA amendment. The Corps determined that the Proposed Action is consistent, to the maximum extent practicable, with the enforceable policies of Florida's approved Coastal Zone Management Program.

- c. The Proposed Action has coordinated with the Florida State Historic Preservation Officer and appropriate federally recognized tribes in accordance with the National Historic Preservation Act and considerations given under the National Environmental Policy Act. The Corps has determined that the Proposed Action will have no effect on historic properties eligible, or potentially eligible, for listing in the National Register of Historic Places
- d. The Proposed Action will not adversely affect water quality and the continued operation of constructed MWD Project components are in compliance with the appropriate conditions in the Everglades Forever Act Permit (File No. 0246512-10) and consistent with the Clean Water Act.
- e. The Proposed Action will maintain the authorized purposes of the Central and Southern Florida Project, which includes flood control, navigation, preservation of fish and wildlife, drainage, salinity control, and water supply.

In view of the above, and the attached EA, and after consideration of public and agency comments received on the project, I conclude that the Proposed Action would not result in a significant effect on the human environment. This Finding of No Significant Impact incorporates by reference all discussions and conclusions contained in the EA enclosed herewith.



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

*2 May 2017*

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Date

**ENVIRONMENTAL ASSESSMENT  
ON  
MODIFIED WATER DELIVERIES TO EVERGLADES NATIONAL PARK PROJECT:  
REMOVAL OF UNCONSTRUCTED CONVEYANCE AND SEEPAGE CONTROL  
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MIAMI-DADE COUNTY, FLORIDA**

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**ENVIRONMENTAL ASSESSMENT ON MODIFIED WATER  
DELIVERIES TO EVERGLADES NATIONAL PARK PROJECT:  
REMOVAL OF UNCONSTRUCTED CONVEYANCE AND SEEPAGE  
CONTROL FEATURES MIAMI-DADE COUNTY, FLORIDA**

## **1.0 PROJECT PURPOSE AND NEED**

### **1.1 PROJECT AUTHORITY**

The Everglades National Park (ENP) Protection and Expansion Act, (Public Law [PL] 101-229, Section 104, 16 U.S.C. Part 410r-5 *et seq.*, December 1989), authorized the Secretary of the Army to undertake certain actions to improve water deliveries from the Central and Southern Florida (C&SF) Project to ENP.

Section 104 (a) (1)-(4) of the Act directed the U.S. Army Corps of Engineers (Corps) to address restoration of water deliveries and natural hydrological conditions. The Act states:

*(a)(1) Upon completion of a final report by the Chief of the Army Corps of Engineers, the Secretary of the Army, in consultation with the Secretary, is authorized and directed to construct modifications to the Central and Southern Florida Project to improve water deliveries into the park and shall, to the extent practicable, take steps to restore the natural hydrological conditions within the park.*

*(2) Such modifications shall be based upon the findings of the Secretary's experimental program authorized in Section 1302 of the 1984 Supplemental Appropriations Act (97 Stat. 1292) and generally as set forth in a General Design Memorandum to be prepared by the Jacksonville District entitled "Modified Water Deliveries to Everglades National Park". The Draft of such Memorandum and the Final Memorandum, as prepared by the Jacksonville District, shall be submitted as promptly as practicable to the Committee on Energy and Natural Resources and the Committee on Environment and Public Works of the United States Senate and the Committee on Interior and Insular Affairs and the Committee on Public Works and Transportation of the United States House of Representatives.*

*(3) Construction of project modifications authorized in this subsection and flood protection systems authorized in subsections (c) and (d) are justified by the environmental benefits to be derived by the Everglades ecosystem in general and by the park in particular and shall not require further economic justification.*

*(4) Nothing in this section shall be construed to limit the operation of project facilities to achieve their design objectives, as set forth in the Congressional authorizations and any modification thereof.*

As outlined in the Act, the Corps prepared a General Design Memorandum entitled Central and Southern Florida Project for Flood Control and Other Purposes, Part 1, Agricultural and Conservation Areas, Supplement 54, General Design Memorandum and Environmental Impact Statement, Modified Water Deliveries to Everglades National Park, Florida dated June 1992 (1992 MWD GDM/EIS). Public Law 101-229 was amended by PL 108-7 (Consolidated Appropriations

Resolution, 2003). This Act (PL 108-7) identified Alternative 6D; the Selected Alternative in the July 2000 General Reevaluation Report [GRR] and Final Supplemental EIS for 8.5 Square Mile Area [8.5 SMA], as the plan to be built, authorized relocation of residents, and other provisions (USACE 2000). Tamiami Trail Modifications are described in the Final Limited Reevaluation Report and Environmental Assessment (EA) and its addendum (USACE 2008). Additional design refinements for the 8.5 SMA are documented in the 2012 EA.

## **1.2 PROJECT LOCATION**

The Modified Water Deliveries (MWD) Project is a modification of the Central and Southern Florida (C&SF) Project. Features of the MWD Project are located in Miami-Dade County, including portions of ENP and adjacent areas (**Figure 1-1**). The 1992 MWD GDM/EIS defines the project boundary as Shark River Slough (SRS) and that portion of the C&SF Project north of structure 331 (S-331) to include Water Conservation Area 3 (WCA 3).

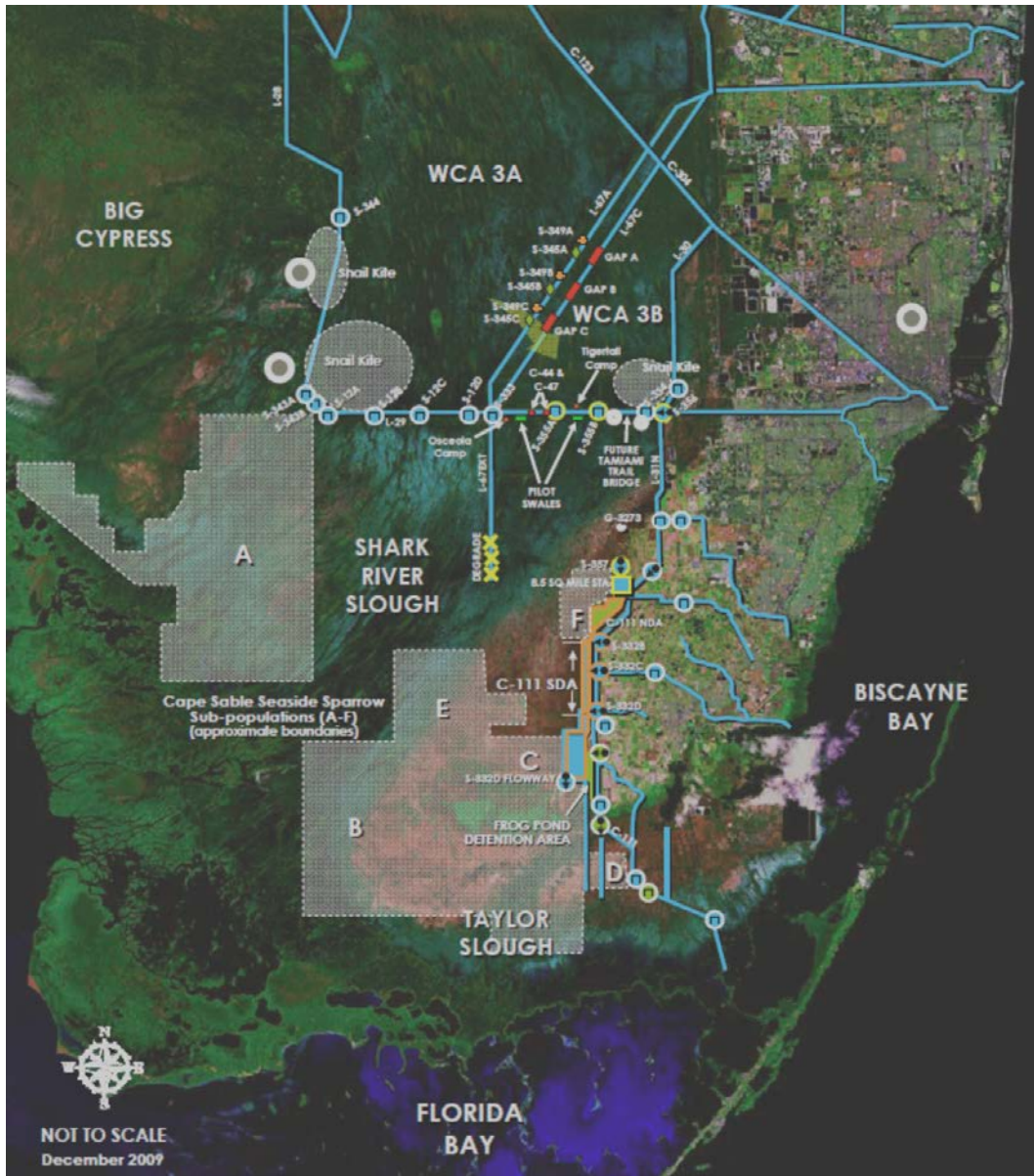


FIGURE 1-1: MWD PROJECT LOCATION

### 1.3 PROJECT BACKGROUND

The C&SF Project currently functions, and was originally authorized to function, as a multi-purpose water management system. The congressionally-authorized project purposes include flood control, agricultural irrigation, municipal and industrial water supply, preservation of fish and wildlife, water supply to ENP, preservation of ENP, prevention of saltwater intrusion, drainage and water control, groundwater recharge, recreation, and navigation.

The 1992 MWD GDM/EIS were published in July 1992. The stated goal of the MWD Project was to take steps to restore the natural hydrologic conditions within ENP to the extent practicable given the identified objectives:

- i. Timing: Changing the schedule of water deliveries so that it fluctuates in consonance with local meteorological conditions, including providing for long term and annual variation in ecosystem conditions in the Everglades;
- ii. Location: Restoring WCA-3B as a functioning component of the Everglades hydrologic system and restoration of water deliveries to Northeast Shark River Slough (NESRS), the center of the historic Shark River Slough (SRS);
- iii. Volume: Adjusting the magnitude of water discharged to ENP to minimize the effects of too much or too little water.

The authorized MWD Project includes modifications to the C&SF Project to provide a system of water deliveries to ENP across the full width of the historic SRS flow way. It consists of four main components: (1) conveyance and seepage control features (CSCF) to facilitate flow through the system from WCA 3A to WCA 3B and to manage seepage eastward from WCA 3B and ENP; (2) modifications to Tamiami Trail (TTM) to facilitate flow under the road to SRS; (3) flood mitigation for the developed East Everglades Area (also referred to as the 8.5 SMA); and (4) project implementation support, which includes monitoring and development of operational plans. The MWD GDM/EIS (USACE 1992) includes a discussion of the location, capacity, and environmental impacts for the proposed structural modifications, which included structures S-345A, B, and C; S-349A, B, and C; S-355A and B; S-334 modification, removal of the L-67 Extension levee and borrow canal filling (hereafter referred to as the L-67 Extension), and a levee and canal system for flood mitigation in 8.5 SMA. The levee and canal system for the 8.5 SMA included two pumping stations, S-356 and S-357 (**Figure 1-1**). Since the 1992 MWD GDM/EIS, there have been design changes to the MWD Project resulting in additional costs of project components.

The CSCF components were envisioned in the 1992 MWD GDM/EIS to hydrologically reconnect WCA 3A, WCA 3B, and Northeast Shark River Slough (NESRS), and to control increased seepage flows eastward from WCA 3B and NESRS. The following CSCF components have been completed to date: gated spillway structures S-355A and S-355B in the L-29 levee, modifications to gated spillway structures S-333 and S-334 to accommodate higher water levels in the L-29 Canal, pump station S-356 between the L-31N and L-29 canals (returns seepage to ENP), degradation of four of the nine miles of the L-67 Extension, and the raising of Tigertail Camp. Features originally included in the CSCF component, but not constructed, include: gated culvert structures S-345A, B, and C to convey water from WCA 3A through the L-67A levee, with associated modifications to the L-67C levee and inline structures S-349 A, B, and C in the L-67A

Borrow Canal to redirect water to the WCA 3B while maintaining water supply deliveries and modifications to the remaining 5.5 miles of the L-67 Extension levee and Canal.

The 8.5 SMA features were constructed to provide flood mitigation to the privately-owned lands of the Las Palmas Community located east of ENP, in order to prevent impacts from higher stages within NESRS resulting from the implementation of the MWD Project. Design changes for the 8.5 SMA were evaluated in a 2000 GRR/EIS, resulting in approval of a modified 8.5 SMA design to achieve the required level of flood mitigation (USACE 2000). The GRR/EIS recommended Alternative 6D, consisting of a perimeter levee (levee 357W [L-357W]), internal levees, an interior seepage collection canal (C-357), a new pump station (S-357), and a detention cell that would discharge into the proposed Canal 111 (C-111) South Dade Project Northern Detention Area (NDA) (**Figure 1-1**). A design refinement for the 8.5 SMA and EA was completed in August of 2012 (USACE 2012), based on the results from an operational test conducted in 2009, which indicated that the S-357 pump station and other 8.5 SMA features may not adequately mitigate impacts from increased flows to the southwest corner of the 8.5 SMA. To ensure the capability to use the S-357 pump station at maximum design capacity following completion of the NDA, hydrologic modeling identified an additional east-west seepage collection canal (C-358) was needed to properly mitigate groundwater stages in the southwest corner, east of L-357W. A gated control structure (S-357N), currently planned to be constructed by March 2017, will connect the C-358 seepage collection canal to the existing C-357 Canal, upstream of S-357. The design refinement evaluated in the 2012 8.5 SMA EA did not address water management operating criteria for S-357N or C-358 and stated that all gates would be in the closed position until a new operational protocol is developed for the MWD Project (USACE 2012). Operating criteria for S-357N and C-358 are included as part of the G-3273 Constraint Relaxation/S-356 Field Test and S-357N Revised Operational Strategy: Increment 1 Plus (MWD Increment 1.1/1.2) EA (USACE 2016c).

With regard to the TTM component, the original 1992 MWD GDM/EIS plan did not include modifications to provide full conveyance capacity under Tamiami Trail for the additional flow volumes of up to 4,000 cubic feet per second anticipated during the rainy season. By 2000, it was known that additional modifications to Tamiami Trail would be required to prevent damage to the road from increased flows and higher water levels to NESRS. Following an extensive evaluation of a full range of alternatives for Tamiami Trail, the 2008 TTM Limited Reevaluation Report (LRR) and EA recommended construction of a one mile bridge in the eastern segment of the roadway, raising the operational water level constraint in the L-29 Canal from 7.5 to 8.5 feet National Geodetic Vertical Datum (NGVD), and reinforcing the roadway in that area to meet Florida Department of Transportation standards. The 2008 TTM LRR/EA also concluded that degradation of the remaining L-67 Extension may cause stages to exceed the MWD Project L-29 Borrow Canal maximum operating limit and compromise the condition of the Tamiami Trail roadway. The TTM construction was completed in 2013.

The project implementation support component is ongoing and includes the efforts to complete a Combined Operational Plan (COP), provide staff and management support, conduct required monitoring, and complete necessary regulatory and real estate activities. The COP will be an integrated operational plan for WCA 3A, ENP, and the South Dade Conveyance System (SDCS), that includes the completed modifications of the C&SF Project such as the MWD Project and the



adjacent C-111 South Dade Project. The COP will include regional hydrologic modeling in order to balance the ecological restoration objectives of the MWD and C-111SD projects while demonstrating compliance with the project constraints. This will include flood mitigation requirements to prevent potential project-induced flood damages in the 8.5 SMA and to maintain the level of flood damage reduction associated with the 1994 C-111 GRR/EIS Recommended Plan. In order to evaluate the operation of project components for the purposes of developing COP, a series of Incremental Field Tests (MWD Increment 1, Increment 1.1/1.2, and Increment 2) are planned to test the system and to refine and optimize operation. These increments are also planned to allow for incremental hydrologic improvements pending necessary real estate acquisition and project construction completion.

The Corps initiated the Increment 1 Field Test under the authority of the MWD Project to evaluate raising or removing the existing G-3273 stage constraint for inflow into NESRS and to evaluate operations for the S-356 pump station for control of seepage into the L-31N Canal in October of 2015 while maintaining the L-29 Canal stage maximum operating limit of 7.5 feet, NGVD. National Environmental Policy Act (NEPA) documentation for MWD Increment 1 was completed on May 27, 2015 with signing of a Finding of No Significant Impact (FONSI) incorporating an EA (USACE 2015). MWD Increment 1 duration was planned for approximately two years, with a minimum duration of one year. Implementation of MWD Increment 1 began October 15, 2015 but was suspended on December 1, 2015, after which the Corps began to proceed with pre-storm drawdown and flood control operations, conducted in accordance with the 2012 Water Conservation Areas, Everglades National Park, and the Everglades National Park to South Dade Conveyance System Water Control Plan (hereafter referred to as the 2012 Water Control Plan), due to very strong El Niño conditions experienced across the C&SF Project during the 2015-2016 dry season. Regional water management operation next transitioned into a temporary emergency deviation to alleviate high water levels within WCA 3. NEPA documentation to support the 2016 Temporary Emergency Deviation was completed on February 12, 2016 with the signing of a FONSI, incorporating an EA (USACE 2016a). A Supplemental EA and FONSI were completed on May 10, 2016 (USACE 2016b).

During MWD Increment 1 and the 2016 Temporary Emergency Deviation, the Corps acquired information with respect to how 8.5 SMA and the SDCS respond to increased water levels in NESRS prior to the completion of construction of certain MWD Project and C-111 South Dade Project features. The operational limitations of canals within 8.5 SMA, ongoing MWD Project and C-111 South Dade Project construction efforts, and the incomplete construction status for needed infrastructure all currently limit inflows of additional water into NESRS. The Corps, therefore, proposed to modify the operational strategy, currently defined in the MWD Increment 1 EA and FONSI, dated May 27, 2015, to ensure flood mitigation within 8.5 SMA and to facilitate the construction completion of the MWD Project and C-111 South Dade Project. The Corps also proposed to modify the operational strategy to address the mandated terms and conditions of the July 22, 2016, Everglades Restoration Transition Plan Biological Opinion, which includes conditional expanded closure periods for the S-12A, S-12B, S-343A, S-343B, and S-344 structures relative to the 2012 Water Control Plan. NEPA documentation to support the revised operational strategy known as MWD Increment 1 Plus, hereafter referred to as MWD Increment 1.1/1.2, is currently available for public review (USACE 2016c).

Information and data gained during MWD Increment 1 and MWD Increment 1.1/1.2 will continue to be used to develop an expanded set of operation and monitoring criteria for a subsequent operational field test (MWD Increment 2) that will raise the maximum operating limit in the L-29 Canal level up to a maximum of 8.5 feet, NGVD, as anticipated in the 2008 TTM LRR/EA. Operational changes based on MWD Increment 1, MWD Increment 1.1/1.2, and MWD Increment 2 will inform the development of COP. The incremental approach to the development of the COP will: (1) allow interim benefits towards restoration of the natural systems; (2) reduce the uncertainty associated with operating the components of the MWD Project and C-111 South Dade Project; and (3) provide information to complete the COP efficiently. MWD Increment 1.1/1.2 will supersede the MWD Increment 1 Field Test in March 2017 and the MWD Increment 2 Field Test will be implemented by March 2018. A full array of alternatives based on data collection and other input received under the incremental tests, as well as during the COP NEPA analysis, will be analyzed during development of the COP. Currently, the COP is anticipated to be completed in 2019.

As stated in **Section 1.1**, the MWD Project was authorized in the ENP Protection and Expansion Act of 1989. The Act authorized and directed the Corps "to construct modifications to the Central and Southern Florida Project to improve water deliveries into the park and shall, to the extent practicable, take steps to restore the natural hydrological conditions within the park." The statute expressly directed that the modifications be constructed in general accordance with the recommended plan, as set forth in a GDM to be prepared by the Jacksonville District.

The Department of Interior (DOI) is 100% responsible for construction costs and any MWD Project costs associated with operational testing, development, and implementation of COP, until: (1) the features are deemed complete; (2) the construction contracts are closed out; and (3) the features are officially transferred to the C&SF non-federal sponsor, the South Florida Water Management District (SFWMD) for operation. Upon transfer of the project to the SFWMD, SFWMD will generally be responsible for 25% of the cost of operation and maintenance (O&M), and the Corps will be responsible for 75% of the cost of O&M.

In a letter dated March 14, 2012, former ENP Superintendent Dan Kimball requested that the Corps transfer the constructed features of the MWD Project to SFWMD for operation, and recommended that the Corps not construct CSCF components, specifically the gated culvert structures S-345A, B, and C located in the L-67A levee, the S-349A, B, and C structures located along the L-67A Borrow Canal, and the removal of the remaining portion of the L-67 Extension. Mr. Kimball recommended that the Corps not take other actions that were recommended in the 1992 MWD GDM/EIS, which was incorporated by reference in the authorizing statute. In Mr. Kimball's letter, he also recommended that the remaining unconstructed features and the final operating plan be deleted from the MWD Project and that the MWD Project be deemed complete upon finishing the ongoing construction, testing for the relaxation of the G-3273 constraint and S-356 operations, and transfer of the features to the non-federal sponsor, SFWMD, for operation.

In response to this request from Mr. Kimball, the Corps undertook a technical analysis to evaluate whether the completed project features, as well as those under construction, achieve the directive of the 1989 Act to improve water deliveries into ENP and "to the extent practicable, restore the

hydrologic connection within [ENP].” The July 17, 2015 technical analysis: (1) describes the constructed features and their benefits; (2) describes the anticipated benefits of the features currently under construction; (3) describes the unconstructed features and explains the limitations restricting completion of any unconstructed features; and (4) explains how water deliveries into ENP have been improved and natural hydrological conditions within ENP will have been restored, to the extent practicable, upon completion of construction that is underway and development of operations. The technical analysis has been coordinated with ENP, DOI, and the SFWMD and is provided as Appendix A.

As outlined in Appendix A, and in coordination with the DOI and SFWMD, the Corps 2015 technical analysis determined that the previously constructed MWD Project features and the MWD Project features currently under construction, C-358 and S-357N, along with the acquisition of remaining real estate interests and completion of a project water control plan, will achieve the statutory charge to improve water deliveries into ENP and, to the extent practicable, to restore the natural hydrological conditions within ENP.

Given that the authority under which the MWD Project was developed was focused on delivery of water *to* ENP and improvement of the hydrology, to the extent practicable, *within* ENP, the design changes and additional costs to make the necessary changes to the MWD Project to provide the benefits envisioned in the 1992 GDM/EIS *outside* ENP would be difficult to justify under this authority. Under the 2012 Water Control Plan, the improvements to water deliveries to ENP are only about 3%. However, further improvements to water delivery volumes into NESRS by up to 92%, and improved hydrologic conditions within ENP, can be expected upon completion of COP. Applicable real estate acquisitions must be completed to support the MWD increments operational tests needed to inform COP. Currently, COP is anticipated to be completed in 2019.

Hence, previously constructed project features and completion of COP to optimize delivery of water to ENP will achieve MWD Project purposes and benefits by improving water deliveries into ENP and, to the extent practicable, restoring the natural hydrological conditions within ENP. Improvements to conditions in ENP, however, require: (1) completion of COP, and (2) the development of a project Operations, Maintenance, Repair, Replacement, and Rehabilitation (OMRR&R) Manual. These requirements must be completed before the current MWD Project can be considered to be complete.

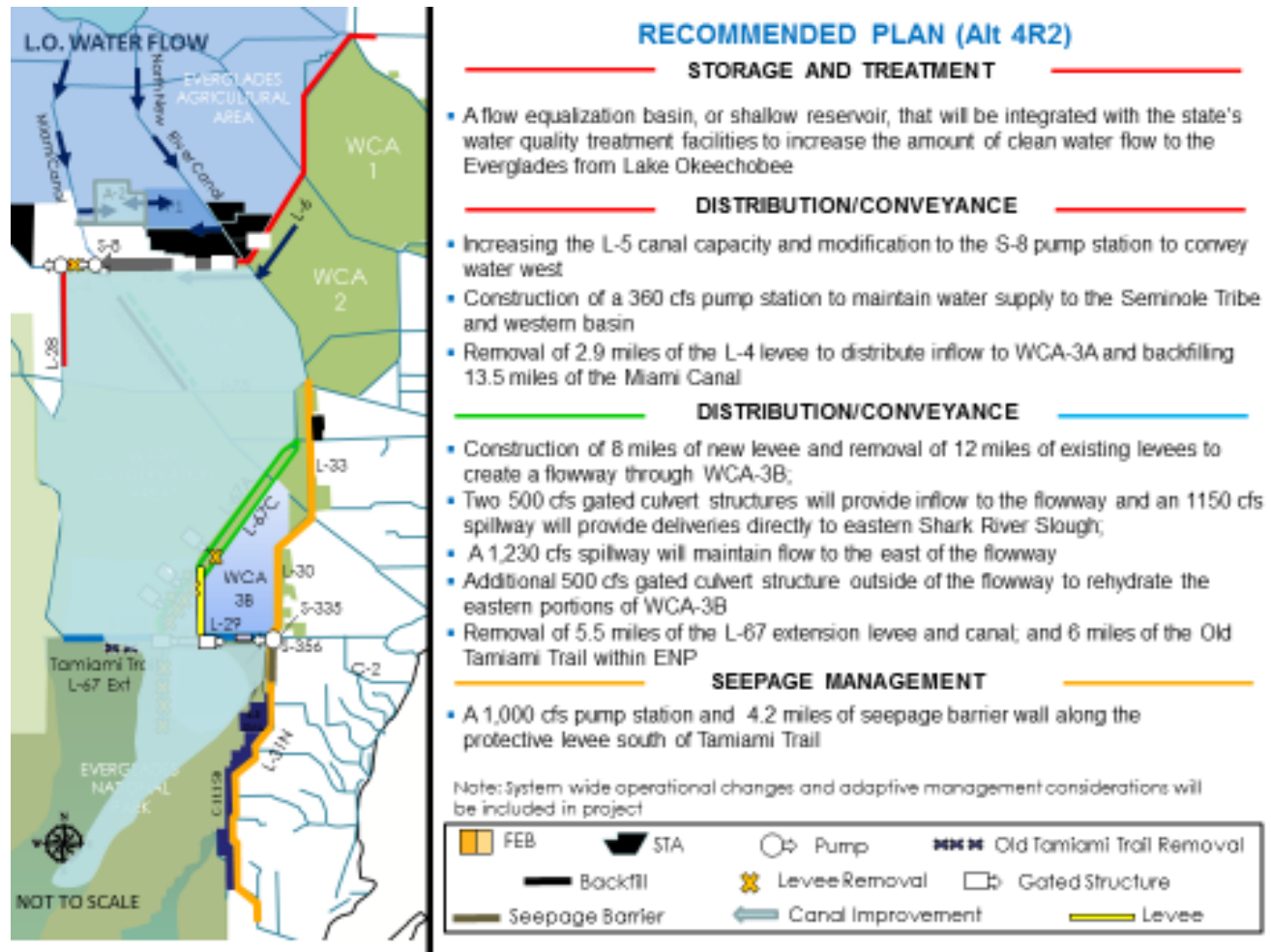
In 2012, the Corps and SFWMD (Appendix B) initiated planning of the Central Everglades Planning Project (CEPP), a group of components of the Comprehensive Everglades Restoration Plan (CERP). The purpose of CEPP is to improve the quantity, quality, timing, and distribution of water flows to the Northern Estuaries, Central Everglades (WCA 3 and ENP), and Florida Bay while increasing water supply for municipal, industrial, and agricultural users. Too much water from Lake Okeechobee during the wet season, and too little water during the dry season, impacts salinity levels within the Northern Estuaries, stressing estuarine ecosystems. Construction and operation of the WCAs compartmentalized a significant extent of the historical Everglades landscape, and, in turn, degraded the structure and function of the remaining system. As a result, the Everglades are approximately half their original size, water tables are lowered, wetlands altered, freshwater flows diverted, water quality degraded, and habitats invaded by non-native plants and animals. All of these impacts are caused directly or indirectly by changes in hydrology.

Changes in hydrology have led to the degradation of the historic slough, tree island, and sawgrass mosaic that previously characterized much of the study area, as well as the marl prairies that exist in the southern portion of the ENP. The changes in landscape pattern have had adverse effects on wildlife. Changes in the hydrology of the freshwater systems have led to effects on the estuarine and marine environments of Florida Bay. Alterations in seasonal inflow deliveries to Florida Bay have resulted in extreme salinity fluctuations. The already degraded state of the Everglades will continue to worsen in the absence of increased water deliveries, improved water timing, and restored distribution. Redirecting a portion of the approximately 1.7 billion gallons of water per day, on average, that is discharged to the Atlantic Ocean and the Gulf of Mexico is essential to meeting the quantity, quality, timing, and distribution of water required to realize a portion of the benefits envisioned in the CERP. The CEPP Recommended Plan will improve habitat function and quality, native plant and animal abundance, and species composition and diversity by delivering approximately 210,000 average annual acre-feet of additional water to the Everglades. A Draft Project Implementation Report (PIR) and EIS was released for public review August 28, 2013, a Final PIR/EIS was released August 8, 2014, and the Record of Decision was signed August 31, 2015. The SFWMD letter of support and financial capability for CEPP is included in **Appendix B**. CEPP was recently authorized under the Water Infrastructure Improvements for the Nation (WIIN) Act, signed December 16, 2016. Authorization makes the CEPP eligible for funding in a future appropriations bill.

The CEPP authorized plan would achieve the indicated benefits by reducing the large pulses of regulatory flood control releases sent from Lake Okeechobee by redirecting approximately 210,000 acre-feet of water on an annual basis to the historical southerly flow path. Prior to delivering additional water to existing stormwater treatment areas (STAs), water will be delivered first to the flow equalization basins (FEBs) which will: (1) provide storage capacity, (2) attenuate high flows, and (3) provide incidental water quality benefits. The STAs reduce phosphorus concentrations in the water to meet water quality standards. Rerouting this treated water south and redistributing it across spreader canals will facilitate hydropattern restoration in WCA 3A. This, in combination with Miami Canal backfilling and other CERP components, will reestablish a 500,000-acre flowing system through the northernmost extent of the remnant Everglades. The treated water will be distributed through WCA 3A to WCA 3B and ENP. A seepage barrier wall and pump station will manage seepage to maintain the levels of flood protection and water supply in the urban and agricultural areas east of the WCAs and ENP. As described in the CEPP PIR, uncertainty surrounding the timing of CEPP project dependencies, funding, resources, stakeholder input, and potential conflicting priorities will likely lead to an extended implementation period.

The CEPP Authorized Plan includes CSCF components similar to those defined in the 1992 MWD GDM/EIS and those discussed in this EA. The CEPP authorized plan is depicted in **Figure 1-2** and includes, but is not limited to: (1) three 500 cubic feet per second (cfs) conveyance structures located on the L-67A levee, (2) a northern L-67C levee gap (6,000 feet), (3) removal of approximately 8.0 miles of the L-67C levee within the proposed Blue Shanty flow way in southern WCA 3B, and (4) L-67 Extension levee degrade and Canal backfill (approximately 5.5 miles); these structures are functionally consistent with those CSCF components identified in the 1992 MWD GDM/EIS. Under CEPP, the L-29 Borrow Canal elevation allows stages up to 9.7 feet NGVD, therefore eliminating MWD Project constraints associated with the Tamiami Trail roadway. These CSCF components, within the L-67A and L-67A Borrow Canal, will provide

ecological benefits to WCA 3A and WCA 3B. A full description of the authorized plan from CEPP is included within the 2014 CEPP Final PIR/EIS (USACE 2014). The 2014 CEPP Final PIR/EIS and 2015 ROD is available at the following website: ([http://141.232.10.32/pm/projects/proj\\_51\\_cepp.aspx](http://141.232.10.32/pm/projects/proj_51_cepp.aspx)).



**FIGURE 1-2: CEPP AUTHORIZED PLAN**

**1.4 PROJECT NEED OR OPPORTUNITY**

The purpose of this EA is to document, and disclose to the public, potential environmental consequences on the human environment related to the 2012 ENP request and the conclusions in the subsequent Corps' 2015 technical analysis (reference Appendix A and Appendix D). The Corps' technical analysis determined that no new construction, beyond construction that is already complete or underway, is necessary to satisfy the intent of the MWD Project authorization. The Corps is considering modifying the project to remove unconstructed MWD Project features and is further defining what is required to complete the MWD Project. Several tasks have been identified as being required prior to transfer to SFWMD for operation.

If the remaining CSCF structural features are removed from the MWD Project, those tasks will include an amendment to the Project Cooperation Agreement (PCA) between the Corps and SFWMD. The current PCA, which identifies cost share and construction, operation, and maintenance responsibilities, defines the term "project" by referring to the 1992 MWD GDM/EIS, 2000 8.5 SMA GRR/EIS and 2008 TTM LRR/EA. If not all the structural features contained in the 1992 MWD GDM/EIS will be completed under the MWD Project, the PCA between the Corps and SFWMD will need to be amended to revise the term "project" to eliminate some of the structural features and incorporate the 2012 design refinement for the 8.5 SMA.

Additionally, a series of operational tests (MWD Increment 1, MWD Increment 1.1/1.2, and MWD Increment 2) will be performed to assist with the development and implementation of the COP. These operational tests are estimated to run approximately three years. However, the Corps intends to move toward full project implementation as soon as the ongoing construction, real estate interests, and water control plan development can be completed. At this time, COP is anticipated to be implemented by 2019. It must be noted, however, that operational testing under the MWD Project increments may reveal the need for additional construction to address any adverse effects associated with increased flow into NESRS. The PCA also requires the development of an OMRR&R Manual before the features can be transferred to SFWMD for operation. The OMRR&R Manual will be developed based on the results of the incremental testing and the comprehensive water control plan update (*i.e.* COP).

## **1.5 AGENCY GOALS AND OBJECTIVES**

The objectives of this document are to evaluate and disclose to the public any potential environmental consequences associated with the request (Proposed Action) from ENP to remove specific CSCF components (S-345A, B, and C; S-349A, B, and C; L-67 Extension modifications) from the MWD Project as identified in the MWD Project as described in the 1992 MWD GDM/EIS, 2000 8.5 SMA GRR/EIS and 2008 TTM LRR/EA.

## **1.6 RELATED ENVIRONMENTAL DOCUMENTS**

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

- *General Design Memorandum and Environmental Impact Statement, Modified Water Deliveries to Everglades National Park*, U.S. Army Corps of Engineers, Jacksonville District, June 1992
- *General Design Memorandum and Environmental Impact Statement, Modified Water Deliveries to Everglades National Park*, U.S. Army Corps of Engineers, Jacksonville District, Record of Decision, May 1993
- *C-111, Central and Southern Florida Project for Flood Control and Other Purposes, Final General Reevaluation Report and Environmental Impact Statement*, U.S. Army Corps of Engineers, Jacksonville District 1994
- *1998 Emergency Deviation from Test 7 of the Environmental Program of Water Deliveries to Everglades National Park to Protect the Cape Sable Seaside Sparrow, Central and Southern Florida Project for Flood Control and Other Purposes, Final Environmental Assessment*, U.S. Army Corps of Engineers, Jacksonville District, 1999

- *Jeopardy and Adverse Modification Biological Opinion on the Modified Water Delivery to Everglades National Park Experimental Program to Everglades National Park and Canal-111 South Dade Projects*, U.S. Fish and Wildlife Service, Vero Beach, Florida 1999
- *General Reevaluation Report and Final Supplemental Environmental Impact Statement, 8.5 Square Mile Area*, U.S. Army Corps of Engineers, Jacksonville District, July 2000
- *Central and Southern Florida Project for Flood Control and Other Purposes, Interim Structural and Operational Plan, Emergency Deviation from Test 7 of the Experimental Program of Water Deliveries to Everglades National Park for Protection of the Cape Sable Seaside Sparrow Final Environmental Assessment*, U.S. Army Corps of Engineers, Jacksonville District, 2000
- *Interim Operating Plan for the Protection of the Cape Sable Seaside Sparrow Final Supplemental Environmental Impact Statement*, U.S. Army Corps of Engineers, Jacksonville District, 2002
- *Biological Opinion, Final Interim Operating Plan*, U.S. Fish and Wildlife Service, Vero Beach, Florida, November 17, 2006
- *Interim Operational Plan for the Protection of the Cape Sable Seaside Sparrow Final Supplemental Environmental Impact Statement*, U.S. Army Corps of Engineers, Jacksonville District, December 2006
- *C-111 Engineering Documentation Report*, U.S. Army Corps of Engineers, Jacksonville District, May 2007
- *Draft Environmental Assessment; Design Modifications for the Canal 111 Project*, U.S. Army Corps of Engineers, Jacksonville District, June 2007
- *Modified Water Deliveries to Everglades National Park Tamiami Trail Modifications Final Limited Reevaluation Report and Environmental Assessment*, U.S. Army Corps of Engineers, Jacksonville District, June 2008
- *Draft Environmental Assessment; Proposed Interim Operating Criteria for 8.5 Square Mile Area Project*, U.S. Army Corps of Engineers, Jacksonville District, November 2008
- *Revised Draft Environmental Assessment; Proposed Interim Operating Criteria for 8.5 Square Mile Area Project*, U.S. Army Corps of Engineers, Jacksonville District, April 2009
- *Canal-111 Spreader Canal Project Implementation Report*, U.S. Army Corps of Engineers, Jacksonville District, 2009
- *Biological Opinion, Canal-111 Spreader Canal*, U.S. Fish and Wildlife Service, Vero Beach, Florida, August 25, 2009
- *Biological Opinion, Everglades Restoration Transition Plan*, U.S. Fish and Wildlife Service, Vero Beach, Florida, November 17, 2010
- *Central and Southern Florida Project Comprehensive Everglades Restoration Plan C-111 Spreader Canal Western Project Final Integrated Project Implementation Report and Environmental Impact Statement*, U.S. Army Corps of Engineers, Jacksonville District, January 2011
- *Environmental Assessment; Proposed Interim Operation Criteria for 8.5 Square Mile Area Project*, U.S. Army Corps of Engineers, Jacksonville District, June 2011
- *Environmental Assessment; Design Refinement for the 8.5 Square Mile Area*, U.S. Army Corps of Engineers, Jacksonville District, August 2012
- *Environmental Assessment for Expansion of C-111 Detention Area and Associated Features South Miami-Dade County*, U.S. Army Corps of Engineers, Jacksonville District, May 2012

- *Everglades Restoration Transition Plan Final Environmental Impact Statement*, U.S. Army Corps of Engineers, Jacksonville District, October 19, 2012
- *Final Integrated Project Implementation Report and Environmental Impact Statement; Central Everglades Planning Project*, U.S. Army Corps of Engineers, Jacksonville District, July 2014
- *Environmental Assessment; G-3273 Constraint Relaxation/S-356 Field Test and S-357N Operational Strategy*, U.S. Army Corps of Engineers, Jacksonville District, May 2015
- *Jeopardy Biological Opinion, Everglades Restoration Transition Plan*, U.S. Fish and Wildlife Service, Vero Beach, Florida, July 22, 2016
- *Environmental Assessment and Finding of No Significant Impact; G-3273 Constraint Relaxation/S-356 Field Test and S-357N Revised Operational Strategy: Increment 1 Plus (Increment 1.1/1.2)*, U.S. Army Corps of Engineers, Jacksonville District, February 2017.

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

### **1.7 DECISIONS TO BE MADE**

The adoption of the Proposed Action is the primary decision that must be made. Please reference **Section 1.5** for agency goals and objectives.

### **1.8 SCOPING AND ISSUES**

Please reference Appendix B for pertinent correspondence related to the Proposed Action.

### **1.9 PERMITS, LICENSES, AND ENTITLEMENTS**

A Federal consistency determination, in accordance with 15 CFR 930 Subpart C of the Coastal Zone Management Act, or a Section 404(b)(1) evaluation under the Clean Water Act, is not necessary to support the determination to remove specific CSCF components from the MWD Project and associated PCA amendment.



## 2.0 ALTERNATIVES

### 2.1 DESCRIPTION OF ALTERNATIVES

Each of the following alternatives described below in **Sections 2.1.1** through **2.1.3** were considered and evaluated as part of the 1992 MWD GDM/EIS, the Corps' 2015 Technical Analysis (Appendix A), and within this EA. A brief description of each alternative is provided in the following subsections.

#### 2.1.1 ALTERNATIVE A: NO ACTION ALTERNATIVE

Evaluation of the No Action Alternative is a requirement of NEPA. The No Action Alternative, Alternative A, is the MWD Project as defined in the 1992 MWD GDM/EIS. As identified in the 1992 MWD GDM/EIS, CSCF components consisted of multiple features. These features include the following components that have already been constructed and are complete:

- Spillway structures S-355A and B in the L-29 levee
- Modifications to the S-333 and S-334 to accommodate higher water levels in the L-29 Canal
- Tigertail Camp elevation raised to 12.00 feet NGVD, with 1st floor elevations of at least 12.5 feet.
- Pump Station S-356 between the L-31N and L-29 canals
- Osceola Camp elevation evaluation
- Degradation of the L-67 Extension, with 4 of 9.5 miles degraded.
- S-331 Command and Control Center completed, adding telemetry and remote control of conveyance features.

Authorized conveyance features originally included in the MWD Project CSCF components that have not been constructed to date include:

- Gated culvert structures S-345A, B, and C through the L-67A
- Gated concrete headwall structures S-349A, B, and C in the L-67A Borrow Canal
- Degradation of the L-67 Extension; the remaining 5.5 miles

The No Action Alternative, Alternative A, consists of full construction of all CSCF components as defined in the 1992 MWD GDM/EIS, 2000 8.5 SMA GRR/EIS, 2008 TTM LRR/EA, and the 2012 8.5 SMA EA, including the three gated culvert structures (S-345A, B, and C) through the L-67A levee, the three gated concrete headwall structures (S-349A, B, and C) in the L-67A Borrow Canal, and complete degradation of the L-67 Extension. Please refer to the 1992 MWD GDM/EIS, 2000 8.5 SMA GRR/EIS, 2008 TTM LRR/EA, and the 2012 8.5 SMA EA for full details. All construction would be completed under the authority of the MWD Project. The No Action Alternative also includes the MWD Incremental Field Tests, development of COP, and an OMRR&R Manual.

#### 2.1.2 ALTERNATIVE B: REMOVAL OF CSCF COMPONENTS (S-345A, B, AND C; S-349A, B, AND C AND REMAINING L-67 EXTENSION CANAL AND LEVEE REMOVAL) FROM MWD PROJECT

Alternative B consists of removal of the unconstructed CSCF components from the MWD Project. Specifically, the unconstructed CSCF components including the three gated culvert structures (S-345A, B, and C) through the L-67A levee, the three gated concrete headwall structures (S-349A,

B, and C) in the L-67A Borrow Canal, and complete degradation of the L-67 Extension would not be accomplished as part of the MWD Project. MWD Project benefits associated with these components would not be realized under the MWD Project authority as originally envisioned in the 1992 MWD GDM/EIS. Alternative B also includes the MWD Incremental Field Tests, development of COP, and an OMRR&R Manual.

### **2.1.3 ALTERNATIVE C: REDESIGN AND CONSTRUCT CSCF COMPONENTS BASED UPON NEW TECHNICAL INFORMATION.**

Alternative C consists of a reevaluation of CSCF features under the MWD Project to hydrologically reconnect WCA 3A and WCA 3B. Prior, and subsequent to, the 2015 technical analysis, the Corps identified some preliminary potential design refinements to meet the intent of the MWD Project's unconstructed CSCF components. Potential options included altering the location of the S-345 and S-349 structures, reducing the number of structures between WCA 3A and WCA 3B, vegetation management in WCA 3B, constructing conveyance channels in WCA 3B, or constructing collection canals adjacent to the S-355A and S-355B structures to provide some of the anticipated benefits envisioned under the 1992 MWD GDM/EIS. Any of these potential options would require a revised technical and engineering analysis, development of a MWD Project Post Authorization Change Report (LRR or GRR), and associated NEPA compliance. Alternative C also includes the MWD increments, development of COP, and an OMRR&R Manual.

## **2.2 ISSUES AND BASIS FOR CHOICE**

Based upon the 2012 ENP request and the Corps' subsequent 2015 technical analysis, the No Action Alternative, Alternative A, is not technically feasible at this time given identified funding, hydraulic, and ecological constraints. The rationale for this decision is summarized in the paragraphs below. The remaining unconstructed features originally planned in the 1992 MWD GDM/EIS include three gated concrete headwall structures (S-349A, B, and C), three gated culvert structures (S-345A, B, and C), and associated discharge channels and bounding levees in WCA 3, and the degradation of the remaining 5.5 miles of the L-67 Extension south of Tamiami Trail.

Although the additional conveyance structures in WCA 3 could still be constructed, it is now apparent that restoration of connectivity between WCA 3A and WCA 3B and flows north of Tamiami Trail could not result in additional benefits to these areas without substantially increased project costs and/or resulting in undesirable conditions in WCA 3B. Water moved from WCA 3A into WCA 3B would flow easterly instead of south toward ENP. Due to previously unanticipated marsh resistance, higher stages than originally planned in WCA 3B would be required to facilitate gravity flow through the constructed S-355A and S-355B spillways into the L-29 Borrow Canal at the increased MWD Project maximum operating limit. These higher stages would be likely to shift flow direction toward the south, but would also result in increased seepage eastward and necessitate implementation of additional, potentially costly, management measures north of Tamiami Trail to assure that existing levels of flood protection in developed areas to the east are maintained. In addition, flow rates from higher water levels in WCA 3B that would be necessary to effectively convey water south through S-355A and S-355B would still be constrained since water levels in the L-29 Borrow Canal would still be limited to 8.5 feet NGVD to avoid damage to the Tamiami Trail road base. Instead of benefitting WCA 3B, the resulting higher water levels

and reduced flow rates in WCA 3B, compared to the depths and flow rates originally anticipated, would be expected to have adverse ecological effects, including damaging tree islands and marsh vegetation.

Raising water levels in the L-29 Borrow Canal to stages anticipated in the 1992 MWD GDM/EIS is not feasible without roadway modifications and would result in unacceptable damages to Tamiami Trail, a major hurricane evacuation route. Roadway modifications, including up to the 9.7 feet, NGVD stage envisioned in the 1992 MWD GDM/EIS, were evaluated in the 2008 TTM LRR/EA, however, the Recommended Plan in the 2008 TTM LRR/EA only raised the maximum operating limit to 8.5 feet, NGVD. Thus, the 2008 TTM LRR/EA established a new high water level in the L-29 Borrow Canal that was more than a foot lower than the Recommended Plan in the 1992 MWD GDM/EIS, effectively capping the amount of water that could potentially be delivered into ENP. Under the 2012 Water Control Plan, the plan that defines operations within the project area, the L-29 Borrow Canal stage is capped at 7.5 feet, NGVD.

The 2008 TTM LRR/EA also indicates that the degradation of the remainder of the L-67 Extension could not be implemented without adequate engineering justification to demonstrate that further removal would not cause L-29 Borrow Canal stages to exceed the MWD maximum operating limit of 8.5 feet, NGVD. The 2008 TTM LRR/EA concluded that degradation of the remaining L-67 Extension may cause stages to exceed the MWD Project L-29 Borrow Canal maximum operating limit and compromise the condition of the Tamiami Trail roadway. Additional improvements to Tamiami Trail are already authorized under the DOI Tamiami Trail Next Steps Project authority, which are expected to alleviate the remaining concerns about the roadway elevation. However, removal of the remainder of the L-67 Extension remains impractical under the MWD Project due to the possibility of damage to the existing Tamiami Trail roadway as a result of increased downstream water levels.

Alternative C was also not selected due to the increased cost associated with the necessary evaluations to redesign CSCF components to provide some of the anticipated benefits envisioned under the 1992 MWD GDM/EIS. The required Post Authorization Change Report (LRR or GRR) and associated engineering, technical, and environmental analyses would add substantial costs to the MWD Project and would be contrary to the 2012 ENP request. The DOI is 100% responsible for construction costs and any MWD Project costs associated with operational testing and the development and implementation of COP, until: (1) the features are deemed complete, (2) the construction contracts are closed out, and (3) the features are officially transferred to the SFWMD for operation. As identified by the former ENP Superintendent in 2012, the funding agency, DOI, does not want to proceed with any further construction and wants the MWD Project features completed and transferred to SFWMD expeditiously.

### **2.3 ALTERNATIVES ELIMINATED FROM DETAILED EVALUATION**

Alternative C was eliminated from detailed evaluation in light of the 2012 ENP request from former Superintendent Dan Kimball, as well as the findings from the 2015 Corps technical analysis. The 2015 Corps technical analysis concluded that CSCF features could still be constructed, but only with significant changes in design and associated added costs. The DOI is 100% responsible for construction costs and any MWD Project costs associated with operational testing and the development and implementation of COP, until: (1) the features are deemed

complete, (2) the construction contracts are closed out, and (3) the features are officially transferred to the SFWMD for operation. As identified by Mr. Kimball in 2012, the funding agency, DOI, does not want to proceed with further construction and wants the MWD Project features completed and transferred to SFWMD expeditiously. For these reasons, only Alternative A (No Action Alternative) and Alternative B were retained for detailed evaluation.

## **2.4 PREFERRED ALTERNATIVE**

Based upon the Corps' 2015 technical analysis provided in Appendix A, as well as comparative evaluations conducted within this EA, Alternative B is the Preferred Alternative. This plan is expected to best meet the objectives identified in **Section 1.5** and 2012 ENP request.

### 3.0 AFFECTED ENVIRONMENT

#### 3.1 GENERAL ENVIRONMENTAL SETTING

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

The decline in the ecological function of the Everglades has been well documented. The 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, the reduced abundance and diversity of animals, and the spread of non-native vegetation.

A complete description of the affected environment with respect to existing conditions within the MWD Project Action Area may be found in the MWD Increment 1 EA and Proposed Finding of No Significant Impact dated December 8, 2016 (USACE 2016c).

#### 3.2 CLIMATE

The climate of South Florida is subtropical. The 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, *i.e.* 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. The mean annual temperature for the South Florida ecosystem ranges from 72° Fahrenheit (F) (22° Celsius [C]) in the northern Everglades to 76° F (24° C) in the southern Everglades (Thomas 1974). There is now evidence of anthropogenic changes to global climate patterns that will likely have an impact on South Florida in terms of rainfall, evapotranspiration, and temperature.

#### 3.3 GEOLOGY AND SOILS

The lower east coast of the Atlantic Coastal Ridge is mostly underlain by thin sand and Miami Limestone that is 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. The higher elevation

marshes of the southern Everglades on either side of SRS are characterized by calcitic marl soils deposited by calcareous algal mats and exposed lime rock surfaces with karst features such as solution pits and sinkholes.

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

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

### **3.5 HYDROLOGY**

The major characteristics of South Florida's hydrology are: (1) local rainfall, (2) evapotranspiration, (3) canals and water control structures, (4) flat topography, 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.

The levees and canals constructed during the last 60 years under the C&SF Project have divided the former Everglades into areas designated for development and areas for fish and wildlife benefits, natural system preservation, and water storage. The natural areas consist of the three WCAs located north of Tamiami Trail. ENP is located south of Tamiami Trail. The WCAs provide detention storage for water from Lake Okeechobee, the Everglades Agricultural Areas, and parts of the east coast region. Detention of water helps prevent floodwaters from inundating the east coast urban areas, provides water supply and detention for east coast urban and agricultural areas and ENP, improves the water supply for east coast communities by recharging underground freshwater reservoirs, reduces seepage, and provides control for saltwater intrusion in coastal aquifers. While the WCAs may reduce the severity of the drainage of the Everglades caused by the major canal systems, thus reducing impacts to fish and wildlife caused by the major drainage systems, the levees surrounding the WCAs still function to impound the Everglades, precluding the historic flow patterns. The C&SF Project infrastructure, combined with operational constraints, makes it difficult to provide natural timing, volume, and distribution. In wet periods, water is impounded in the WCAs and then discharged to ENP or coastal canals for eventual release to tide. During dry periods, water can flow through the canals to coastal areas and bypass the ENP wetlands.

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

The largest WCA is WCA 3, which is divided into two parts, 3A and 3B. It is approximately 40 miles long from north to south and covers approximately 915 square miles. Ground elevations slope southeasterly one to three feet in ten miles ranging from 13 feet NGVD in northwest WCA 3A to six feet, NGVD in southeast WCA 3B. The area is enclosed by approximately 111 miles of

levees, of which 15 miles are common to WCA 2. An interior levee system across the southeastern corner of the area reduces seepage into an extremely pervious aquifer.

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

Stage variability within WCA 3 typically follows an annual cycle; the levels vary from high stages in the late fall and early winter to low stages at the beginning of the wet season; typically late May or early June. Water stages within WCA 3A typically exceed the top of the WCA 3A Regulation Schedule during the months of August through October, with this duration extended to earlier in the wet season (May) and/or later into the dry season during wet years (November and December). Above normal rainfall patterns associated with El Niño conditions during the dry season months (November through May) may also result in water stages which exceed the top of the Regulation Schedule. 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.

Within WCA 3B, the ridge-slough-tree island structure has been severely compromised by the virtual elimination of overland sheetflow since the construction of the L-67 Canal/levee system in the early 1960s. WCA 3B has become primarily a rain-fed compartment, experiencing very little overland flow; it has largely turned into a sawgrass monoculture, where relatively few sloughs or tree islands remain.

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

Water enters NESRS primarily from WCA 3A via S-333, and then flows to the L-29 Borrow Canal with subsequent passage through several sets of culverts and the one mile Tamiami Trail Bridge, completed as part of the MWD Project in 2013, under the Tamiami Trail. S-355A and S-355B may also be used to deliver water from WCA 3B to the L-29 Canal for subsequent passage through the culverts to NESRS. The discharges made from WCA 3A through the S-12 structures and S-333 are target flows determined from the Rainfall Plan (USACE 2012). Under the Rainfall Plan, water deliveries would be computed and operation adjusted weekly, if necessary, based on the sum of two components: a rainfall response component and a WCA 3A regulatory component. The historical operational target flow distribution of 55% through S-333 into NESRS and 45% through the S-12 structures into ENP west of the L-67 Extension is no longer used as a constraint governing water management operations of WCA 3A and northern ENP under ERTTP. Weekly WCA 3A water management release decisions are coordinated with ENP. The eastern portions of the ENP are also influenced by the system of canals and structures that provide flood control and water supply for the lower east coast urban and agricultural areas.

### **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 ERTTP, specified canal water levels/ranges are meant to provide flood protection, water supply, and prevention of saltwater intrusion for the LEC. The LEC can be provided water supply from WCA 3A and Lake Okeechobee according to their respective regulation schedules. In wet conditions, the excess water from the LEC is discharged to tide.

### **3.5.4 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. The community has water management infrastructure consisting of a perimeter levee, a seepage collection canal, a pump station (S-357), and a southern detention area meant to collectively provide flood mitigation as part of the MWD Project (USACE 2000). An additional seepage collection canal and gated water control structure (S-357N), which are being constructed along the southern boundary of the 8.5 SMA, along Richmond Drive, as part of the MWD Project, are presently scheduled for completion in March 2017.

## **3.6 FLOOD CONTROL**

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

## **3.7 VEGETATIVE COMMUNITIES**

The Everglades landscape is dominated by a complex of freshwater wetland communities that includes open water sloughs and marshes, dense grass- and sedge-dominated marshes, forested islands, and wet marl prairies. The primary factors influencing the distribution of dominant freshwater wetland plant species of the Everglades are soil type, soil depth, and hydrological regime (USFWS 1999). These communities generally occur along a hydrological gradient with the slough/open water marsh communities occupying the wettest areas; flooded more than nine months per year, followed by sawgrass marshes; flooded six to nine months per year, and wet marl prairie communities; flooded less than six months per year (USFWS 1999). The Everglades freshwater wetlands eventually grade into intertidal mangrove wetlands and subtidal seagrass beds in the estuarine waters of Florida Bay. Development and drainage over the last century have dramatically reduced the overall spatial extent of the 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 diversity and heterogeneity.

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

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

The estuarine communities of Florida Bay have also been affected by upstream changes in freshwater flows through the Everglades. A reduction in freshwater inflows into Florida Bay and alteration of the normal salinity balance have affected mangrove community composition and may have contributed to a large scale die-off of seagrass beds (USFWS 1999). Mangrove communities along Biscayne Bay have also seen a reduction in freshwater inflows and in historic habitat range caused by urban and agricultural development, leaving only a remnant ribbon of suitable habitat immediately adjacent to the bay.

In contrast to the vast extent of wetland communities, upland communities comprise a relatively small component of the Everglades landscape and are largely restricted to Long Pine Key, the northern shores of Florida Bay, and the many tree islands scattered throughout the region.

Tree islands occur within freshwater marshes in areas of slightly higher elevation relative to the surrounding marsh. Lower portions of tree islands are dominated by hydrophytic, evergreen, broad-leaved hardwoods such as red bay (*Persea palustris*), sweetbay, dahoon holly (*Ilex cassine*), and pond apple (*Annona glabra*). Tree islands typically have a dense shrub layer that is dominated

by coco-plum (*Chrysobalanus icaco*). Additional constituents of the shrub layer commonly include buttonbush and large leather fern (*Acrostichum danaeifolium*). Elevated areas on the upstream side of some tree islands may contain an upland tropical hardwood hammock community dominated by species of West Indian origin (Gunderson et al. 1997), with species composition shifting towards the north and more temperate hardwood hammock species. Extended periods of flooding may result in tree mortality and conversion to a non-forested community. In the overdrained areas of WCA 3A, historic wildfires have consumed tree island vegetation and soils. Overall, the spatial extent of tree islands in WCA 3 has declined by 61% between 1940 and 1995 (Patterson and Finck 1999). Portions of the WCAs have been flooded to the extent that many forested islands have lost all tropical hardwood hammock trees. Tree islands are considered an extremely important contributor to habitat heterogeneity and overall species diversity within the Everglades ecosystem because they provide nesting habitat and refugia for birds and upland species and serve as hotspots of plant species diversity within the greater Everglades (Sklar and van der Valk 2002, USFWS 1999). Tree islands also contain extraordinarily high levels of total phosphorus (TP) in their soil suggesting that they may play a major role in the biogeochemical cycles of nutrients in the Everglades (Trexler and Childers 2010, Wetzel et al. 2009, 2011). Wetzel et al. (2011) found that soil TP levels within WCA 3A and WCA 3B tree islands were approximately four times higher than the surrounding marsh TP levels. Tree islands within WCA 3B may help to capture and focus nutrients, helping to minimize the potential effects on sawgrass and wet prairie communities within this region (Wetzel et al. 2011).

### 3.8 FISH AND WILDLIFE RESOURCES

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

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

Within the greater Everglades, numerous sport and larger predatory fishes occur in deeper canals and sloughs. Common species include largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), redear sunfish (*Lepomis microlophus*), black crappie (*Pomoxis nigromaculatus*), Florida gar (*Lepisosteus platyrhincus*), threadfin shad (*Dorosoma petenense*), gizzard shad (*Dorosoma cepedianum*), yellow bullhead (*Ameiurus natilis*), white catfish (*Ameiurus catus*), bowfin (*Amia calva*), and tilapia (*Tilapia* spp.) (USACE 1999). Large fish are an important food source for wading birds, alligators, otters, raccoons, and mink.

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

Common reptiles of freshwater wetlands include the American alligator (*Alligator mississippiensis*), snapping turtle (*Chelydra serpentina*), striped mud turtle (*Kinosternon bauri*), mud turtle (*Kinosternon subrubrum*), cooter (*Chrysemys floridana*), Florida chicken turtle (*Deirochelys reticularia*), Florida softshell turtle (*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 the 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-backed heron (*Butorides striatus*), cattle egret (*Bubulcus ibis*), black-crowned night heron (*Nycticorax nycticorax*), yellow-crowned night heron (*Nycticorax violacea*), roseate spoonbill (*Ajaia ajaja*), and wood stork (*Mycteria americana*) (USACE 1999).

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

### 3.9 THREATENED AND ENDANGERED SPECIES

#### 3.9.1 FEDERALLY PROTECTED SPECIES

The Corps has coordinated with the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS), 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 (Table 3-1).

**TABLE 3-1: FEDERALLY THREATENED AND ENDANGERED SPECIES WITHIN THE PROJECT AREA**

Common Name	Scientific Name	Status
<b>Mammals</b>		
Florida panther	<i>Puma concolor coryi</i>	E
Florida manatee	<i>Trichechus manatus latirostris</i>	E, CH

Florida bonneted bat	<i>Eumops floridanus</i>	E
<b>Birds</b>		
Cape Sable seaside sparrow	<i>Ammodramus maritimus mirabilis</i>	E, CH
Everglade snail kite	<i>Rostrhamus sociabilis plumbeus</i>	E, CH
Piping plover	<i>Charadrius melodus</i>	T
Red-cockaded woodpecker	<i>Picoides borealis</i>	E
Roseate tern	<i>Sterna dougallii</i>	T
Wood stork	<i>Mycteria Americana</i>	T
<b>Reptiles</b>		
American Alligator	<i>Alligator mississippiensis</i>	T, SA
American crocodile	<i>Crocodylus acutus</i>	T, CH
Eastern indigo snake	<i>Drymarchon corais couperi</i>	T
Gopher tortoise	<i>Gopherus polyphemus</i>	C
Green sea turtle	<i>Chelonia mydas</i>	E
Hawksbill sea turtle	<i>Eretmochelys imbricate</i>	E
Kemp's Ridley sea turtle	<i>Lipodochelys kempii</i>	E
Leatherback sea turtle	<i>Dermochelys coriacea</i>	E
Loggerhead sea turtle	<i>Caretta caretta</i>	T
<b>Fish</b>		
Smalltooth sawfish	<i>Pristis pectinata</i>	E
<b>Invertebrates</b>		
Bartram's hairstreak butterfly	<i>Strymon acis bartrami</i>	E
Elkhorn coral	<i>Acropora palmata</i>	T, CH
Florida leafwing butterfly	<i>Anaea troglodyta florldalis</i>	E
Miami blue butterfly	<i>Cyclargus thomasi bethunebakeri</i>	E
Schaus swallowtail butterfly	<i>Heraclides aristodemus ponceanus</i>	E
Staghorn coral	<i>Acropora cervicornis</i>	T, CH
Stock Island tree snail	<i>Orthalicus reses</i> (not incl. <i>nesodryas</i> )	T
<b>Plants</b>		
Crenulate lead plant	<i>Amorpha crenulata</i>	E
Deltoid spurge	<i>Chamaesyce deltoidea spp. deltoidea</i>	E
Garber's spurge	<i>Chamaesyce garberi</i>	T
Johnson's seagrass	<i>Halophila johnsonii</i>	E, CH

Okeechobee gourd	<i>Cucurbita okeechobeensis</i> ssp. <i>okeechobeensis</i>	E
Small's milkpea	<i>Galactia smallii</i>	E
Tiny polygala	<i>Polygala smallii</i>	E
Big pine partridge pea	<i>Chamaecrista lineata</i> var. <i>keyensis</i>	E
Blodgett's silverbush	<i>Argythamnia blodgettii</i>	T
Cape Sable thoroughwort	<i>Chromolaena frustrata</i>	E, CH
Carter's small-flowered flax	<i>Linum carteri</i> var. <i>carteri</i>	E, CH
Everglades bully	<i>Sideroxylon reclinatum</i> spp. <i>austrofloridense</i>	C
Florida brickell-bush	<i>Brickellia mosieri</i>	E, CH
Florida bristle fern	<i>Trichomanes punctatum</i> spp. <i>floridanum</i>	E
Florida semaphore cactus	<i>Consolea corallicola</i>	E, CH
Sand flax	<i>Linum arenicola</i>	E

### 3.9.2 STATE LISTED SPECIES

The project area also provides habitat for several state listed species (**Table 3-2**).

**TABLE 3-2: STATE LISTED SPECIES WITHIN THE PROJECT AREA**

Common Name	Scientific Name	Status
<b>Mammals</b>		
Florida black bear	<i>Ursus americanus floridanus</i>	T
Everglades mink	<i>Mustela vison evergladensis</i>	T
Florida mouse	<i>Podomys floridanus</i>	SC
Florida mastiff bat	<i>Eumops glaucinus floridanus</i>	E
<b>Birds</b>		
Piping plover	<i>Charadrius melodus</i>	T
Snowy plover	<i>Charadrius alexandrinus</i>	T
American oystercatcher	<i>Haematopus palliatus</i>	E
Brown pelican	<i>Pelecanus occidentalis</i>	SC
Black skimmer	<i>Rynchops niger</i>	SC
Least tern	<i>Sterna antillarum</i>	T
White-crowned pigeon	<i>Columba leucocephalus</i>	T
Least tern	<i>Sterna antillarum</i>	T
Limpkin	<i>Aramus guarauna</i>	SC
Little blue heron	<i>Egretta caerulea</i>	SC
Tricolored heron	<i>Egretta tricolor</i>	SC
Snowy egret	<i>Egretta thula</i>	SC
Reddish egret	<i>Egretta rufescens</i>	SC
White ibis	<i>Eudocimus albus</i>	SC
Roseate spoonbill	<i>Platalea ajaja</i>	SC
<b>Fish</b>		
Mangrove rivulus	<i>Rivulus marmoratus</i>	SC
<b>Invertebrates</b>		

Miami blue butterfly	<i>Cyclargus [=Hermiargus] thomasi bethunebakeri</i>	E
Florida tree snail	<i>Liguus fasciatus</i>	SC
Plants		
Pine-pink orchid	<i>Bletia purpurea</i>	T
Lattice vein fern	<i>Thelypteris reticulata</i>	E
Eaton's spikemoss	<i>Selaginella eatonii</i>	E
Wright's flowering fern	<i>Anemia wrightii</i>	E
Tropical fern	<i>Schizaea pennula</i>	E
Mexican vanilla	<i>Manilla mexicana</i>	E

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

### 3.10 ESSENTIAL FISH HABITAT

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

### 3.11 WATER QUALITY

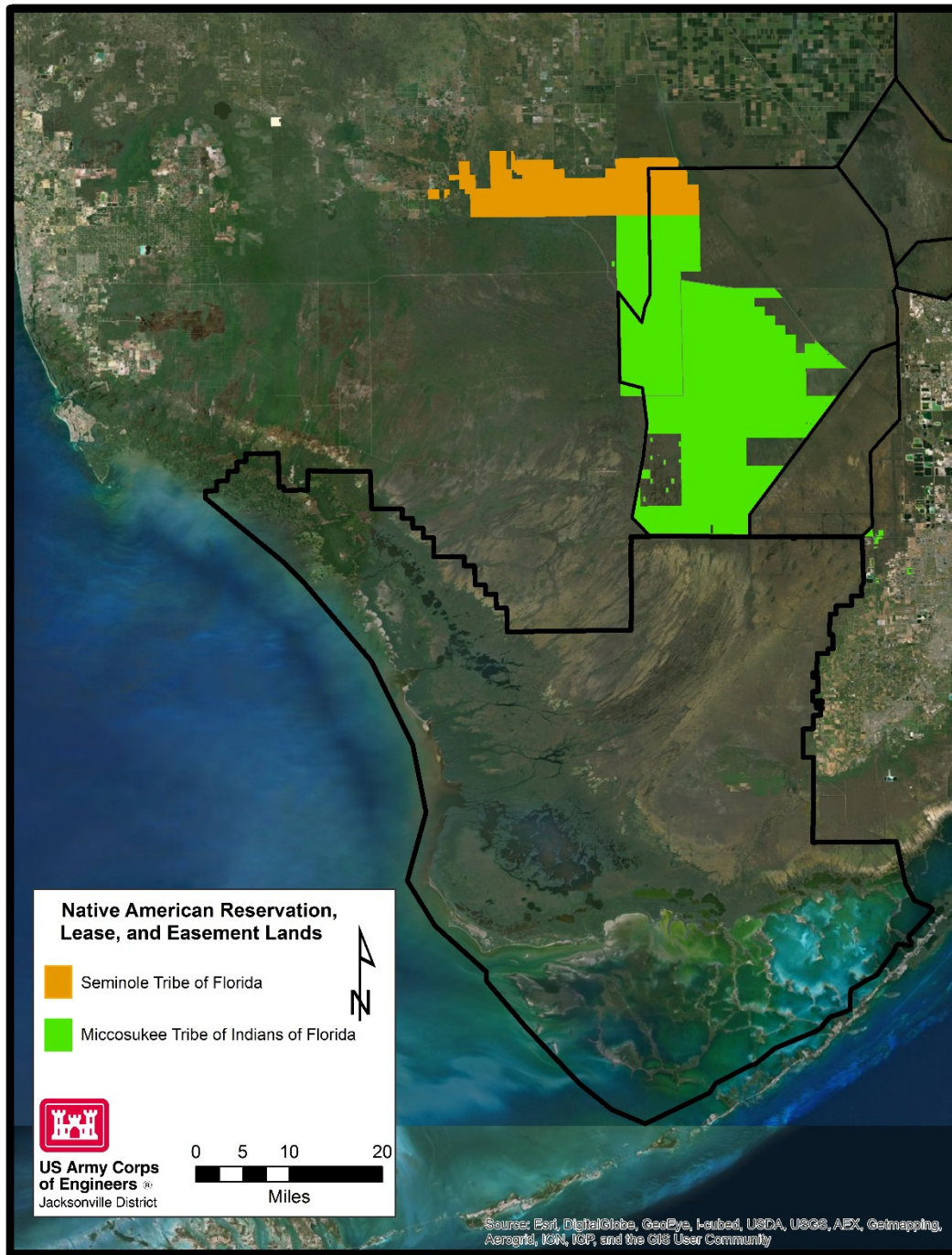
Water quality in the study area is significantly influenced by development. The C&SF Project led to significant changes in the landscape by opening large land tracts for urban development and agricultural uses, and by the construction of extensive drainage networks. Natural drainage patterns in the region have been disrupted by the extensive array of levees and canals, which has resulted in further water quality degradation. The WCAs are fed from Lake Okeechobee, as well as runoff from the Everglades Agricultural Area, after being routed through the Stormwater Treatment Areas (STAs) under normal conditions. Water is not normally allowed to be directly routed from Lake Okeechobee and the Everglades Agricultural Area runoff to the WCAs. STAs have been designed, constructed, and operated for flood control purposes, and additionally, to reduce the phosphorous concentrations in runoff from the Everglades Agricultural Area and the regulatory releases from Lake Okeechobee that discharge into the WCAs. Water quality impairment within the study area can generally be attributed to nutrients and bioavailable forms of mercury.

Nutrients, such as phosphorous and nitrogen compounds, are a concern in the estuaries, WCAs, ENP, and Lake Okeechobee since they result in an imbalance of flora and fauna. Within the Everglades Protection Area (EPA), phosphorus concentrations are regulated by the "Phosphorus Rule" 62-302.540 F.A.C. and are subject to the terms of the 1992 Consent Decree in *United States v. South Florida Water Management District* (S.D. Fla No. 88-1886-CIV-MORENO). Total phosphorus is the nutrient of concern within WCA 3 and NESRS. Under the current conditions, total phosphorus concentrations at the structures involved in this project area are within the low range for the entire water year (2016). It is anticipated that SRS will be in compliance with the SA requirements for WY 2016 (1 October 2015-30 September 2016).

### 3.12 NATIVE AMERICANS

There are two federally recognized tribes, the Miccosukee Tribe of Indians of Florida and the Seminole Tribe of Florida, that are located within and adjacent to the project area (**Figure 3-1**). 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, as well as 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 historically recognized rights within ENP, originating from the Native Americans who historically lived throughout South Florida, including in vast portions of the project area.

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



**FIGURE 3-1: MAP OUTLINING THE LOCATION OF TRIBAL RESERVATION, LEASED, AND EASEMENT LANDS**

**3.13 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. The project area contains a wide variety of cultural resources that vary in



their significance. There are archaeological resources associated with some of the earliest recorded habitation in South Florida, and relatively recent sites directly associated with modern Native American tribes who were removed from ENP shortly after its creation. Approximately 295 cultural resources, as identified in the Florida Master Site File, are located within the project area. Of these resources, 125 sites are located within WCA 3 north of the L-29 Canal. The majority of these sites were identified based on a 1987 aerial analysis of the WCAs and the presence of archaeological materials was not ground-truthed (Taylor 1987). Only approximately 25 sites within WCA 3 have been identified based on a physical archaeological investigation. A total of 10 cultural resources within the northern portion of the project area have been identified as eligible for listing in the National Register of Historic Places (NRHP), including Mack's Fish Camp Historical District.

The southern portion of the project area, south of the L-29 Canal, is located entirely within ENP. ENP has been subject to many archaeological investigations that have identified approximately 170 cultural resources within the project area. Of these resources, 6 are listed in the NRHP, including two archaeological districts. A small portion of the Ten Thousand Islands Archaeological District is located on the western edge of the project area and the Shark River Slough Archaeological District is contained entirely within the project area. The Shark River Slough Archaeological District contains no less than 63 archaeological resources, 39 of which are contributing resources to the district (Schwandron 1996). Sites typically found within the SRS are described as earth middens, however, multi-occupation sites such as Tiger Hammock (8DA11), which is associated with Glades II and III and Seminole occupations, have also been identified.

### **3.14 AIR QUALITY**

Air monitoring reports are prepared annually by FDEP to inform the public of the air pollution levels throughout the State of Florida. All areas within the state are designated with respect to each of the six pollutants (carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>), particle pollution (10 microns or less in diameter (PM<sub>10</sub>), and 2.5 microns or less in diameter (PM<sub>2.5</sub>), and sulfur dioxide (SO<sub>2</sub>)) as attainment (*i.e.*, in compliance with the standards); non-attainment (*i.e.*, not in compliance with the standards); or unclassifiable (*i.e.*, insufficient data to classify). Attainment areas can be further classified as maintenance areas. Maintenance areas are areas previously classified as non-attainment which have successfully reduced air pollution 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. Florida remains designated as unclassifiable for PM<sub>10</sub>. Although sufficient data have been collected for attainment determinations, USEPA has not considered PM<sub>10</sub> for attainment determinations in Florida yet.

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

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

A search of the FDEP petroleum spill and storage sites database in October of 2014 identified six petroleum storage sites and one spill site along Tamiami Trail between S-333 and S-356.

Petroleum storage at the Everglades Safari site was closed in 2005, however, a petroleum spill at this site is listed as ongoing as of October 2014. Petroleum storage facilities operated by the SFWMD are located at the S-333 and S-356 structures.

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

### **3.16 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 air boats, off road vehicles, swamp buggies, motor boats, and occasional air traffic. Sources of noise in rural areas include noise associated with agricultural production such as the processing and transportation of 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 subtropical 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 lower east coast. Development is typically immediately adjacent to, or nearby, protected natural areas.

### **3.18 SOCIOECONOMICS**

Florida's economy is characterized by strong wholesale and retail trade, government, and service sectors. The economy of South Florida is based on services, agriculture, and tourism. The three counties that comprise the lower east coast are heavily populated. Much of the land within the area potentially impacted is part of ENP and publicly owned.

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

### **3.19 AGRICULTURE**

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

### **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 provided to the public within WCA 3, including wildlife viewing and nature photography. Hiking and bicycling are also permitted on existing levees within the project area where appropriate. There are also several recreational areas at locations along the boundary of WCA 3. Similar recreational opportunities are provided in ENP.

## **4.0 ENVIRONMENTAL EFFECTS**

### **4.1 GENERAL ENVIRONMENTAL EFFECTS**

The following includes anticipated changes to the existing environment including direct, indirect, and cumulative effects. Environmental effects are expected to be spatially limited and low to moderate in magnitude. Potential environmental effects of the No Action Alternative, Alternative A, are fully documented in the 1992 MWD GDM/EIS (USACE 1992) and are incorporated hereto by reference. In addition, environmental effects of Alternative B, the Proposed Action, are fully documented within the sections below.

### **4.2 CLIMATE**

Implementation of the No Action Alternative and Alternative B would not result in significant effects to the climate of South Florida. The influence of climate change is not anticipated to alter the severity or nature of effects resulting from the Proposed Action.

### **4.3 GEOLOGY AND SOILS**

#### **4.3.1 ALTERNATIVE A: NO ACTION ALTERNATIVE**

The No Action Alternative, Alternative A, consists of full construction of all CSCF components as defined in the 1992 MWD GDM/EIS, including the three gated culvert structures (S-345A, B, and C) through the L-67A levee, the three gated concrete headwall structures (S-349A, B, and C) in the L-67A Borrow Canal, and complete degradation of the L-67 Extension. Please refer to the 1992 MWD GDM/EIS (USACE 1992) for full details. Construction of permanent structures (S-345A, B, and C and S-349A, B, and C) or structural modifications to existing C&SF Project features (L-67 Extension degradation) would result in geologic impacts within the actual construction footprint of these project components. Geologic impacts resulting from removal of surface cover, *i.e.* vegetation and soil, or removal of cap rock from blasting, and/or removal of limestone would occur under implementation of Alternative A (USACE 1992).

Full construction of all CSCF components, as described in the 1992 MWD GDM/EIS, has the potential to improve hydroperiods in WCA 3B. Improved hydroperiods within WCA 3B and NESRS has the potential to reduce soil oxidation and promote peat accretion. A potential decrease in the severity of drying events relative to the existing condition has the potential for reducing the incidence of fire within NESRS, however, the frequency of muck fires is primarily controlled by weather patterns within the area. As outlined in **Section 2.2**, although the additional conveyance structures in WCA 3 could still be constructed, it is now apparent that restoration of connectivity between WCA 3A and WCA 3B and flows north of Tamiami Trail could not result in additional benefits to these areas without substantially increased project costs and/or resulting in undesirable conditions in WCA 3B at this time (USACE 2015).

#### **4.3.2 ALTERNATIVE B: REMOVAL OF CSCF COMPONENTS (S-345A, B, AND C, S-349A, B, AND C AND REMAINING L-67 EXTENSION CANAL AND LEVEE REMOVAL) FROM MWD PROJECT**

Alternative B consists of the removal of the unconstructed CSCF components from the MWD Project. Specifically, the unconstructed CSCF components include the three gated culvert structures (S-345A, B, and C) through the L-67A levee, the three gated concrete headwall structures (S-349A, B, and C) in the L-67A Borrow Canal, and complete degradation of the L-67

Extension. These would not be completed as part of the MWD Project. Since no further construction would occur, there are no additional impacts on geology and soils within the project area directly related to removal of surface cover, *i.e.* vegetation and soil, removal of cap rock from blasting, and/or removal of limestone. In addition, implementation of Alternative B would not improve hydroperiods within WCA 3B and NESRS, therefore soil oxidation and peat accretion would remain the same as the existing condition.

#### 4.4 STUDY AREA LAND USE

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

#### 4.5 HYDROLOGY

##### 4.5.1 ALTERNATIVE A: NO ACTION ALTERNATIVE

The original constructed C&SF Project took the area that was in the historic central Everglades flow path and divided it into three large WCAs; WCA 1, WCA 2, and WCA 3. The L-67 A and L-67C levees and associated borrow canals constructed as part of the C&SF Project further divided WCA 3 into WCA 3A and WCA 3B. Water that historically flowed in a south/southwesterly direction through the area that is now WCA 3 was redirected by these levees, therein providing flood protection for developing areas to the east. When this historic water flow pattern was interrupted, WCA 3B, which included the original headwaters of SRS in ENP and was also the original pathway of much of the water entering ENP, was hydrologically isolated from the system.

ENP has received most of its water supply through C&SF Project features and, to a lesser extent, direct rainfall. As a result of original ENP boundary alignment and private land ownership on its eastern edge, most of the water delivered to ENP was initially provided through the C&SF Project S-12A/B/C/D water control structures located in southern WCA 3A in accordance with the 1963 WCA 3A Regulation Schedule. Water moved into what was then a historically drier area, well west of its original NESRS flow path. The timing of water delivery also differed substantially from that in the historic rainfall-driven system. The S-12 structures were not open year round, so water exiting these structures not only entered ENP in an area that was historically much drier, but the timing and duration of flows into ENP had substantially changed. These changes in water delivery patterns resulted in substantial changes to the ecosystem south of Tamiami Trail, both in western areas that received the primary WCA 3A regulatory water releases, and NESRS areas where flow was significantly reduced. Starting in 1985, the Experimental Deliveries Program to ENP revised the WCA 3A Regulation Schedule and provided some additional flows to NESRS under the Rainfall Plan, but inflows to ENP continued to be constricted by Tamiami Trail roadway design limitations and flood protection requirements for the developed areas to the south and east of NESRS.

To achieve the objectives stated in the authorizing legislation, the project originally recommended, in the 1992 MWD GDM/EIS, to hydrologically reconnect WCA 3A, WCA 3B, and NESRS (**Figure 1-1**). The MWD Project recommended plan included three gated concrete headwall structures (S-349A, B, and C), three gated culvert structures (S-345A, B, and C), associated discharge channels and bounding levees, and two spillway structures (S-355A and B). Water was expected to move from WCA 3A into the southern end of WCA 3B by passing through the S-345 culvert structures, located in the L-67A levee, while the S-349 structures functioned to maintain

water supply deliveries and to prevent flows from short circuiting down the L-67A borrow canal; *i.e.*, continuing down to the southern end of WCA 3A. Discharge canals and bounding levees running perpendicular to the L-67A and L-67C levees would move water southeasterly as it passed out of the S-345 culverts across the area between the L-67A and C levees (a.k.a. "the pocket") and extending through degraded sections of the L-67C levee, where it was discharged into WCA 3B. With these features, WCA 3A and WCA 3B would be hydrologically reconnected.

Once in WCA 3B, the water was expected to flow southward as it had historically where the S-355A and S-355 B structures in the southern end would pass that water across the L-29 levee into the L- 29 Borrow Canal. Once in the L-29 Borrow Canal, water was expected to pass through 19 sets of culverts under Tamiami Trail, into the northern portions of ENP, therein rehydrating the historic NESRS flow way in the northeastern corner of ENP.

In addition, the 1992 MWD GDM/EIS recommended plan also included the degradation of 9.5 miles of the L-67 Extension within the northern ENP to permit the hydrologic reconnection of portions of the slough within ENP that had been isolated from one another.

Since the initial implementation of the MWD Project, much more has been learned about the hydrology of the area, and some of the assumptions made at the time the 1992 MWD GDM/EIS was prepared have proven incorrect; refer to 2000 8.5 SMA GRR/EIS and 2008 TTM LRR/EA. In addition, alterations in the original project design have been necessary and these design refinements, and associated technical challenges, have resulted in reductions to flow capacity as compared to what was believed to be possible at the time the 1992 MWD GDM/EIS was prepared.

Reconnecting WCA 3B to the system, hydraulically, with WCA 3A poses unanticipated challenges. These include projected high water impacts to tree islands and the ecosystem within WCA 3B, a reduced capability to move water out of WCA 3B via the S-355A and S-355B structures, flow patterns in WCA 3B that were more eastward than southward, and the need to control seepage losses out of the area to prevent associated flood impacts on the adjoining developed areas of Miami-Dade County.

The S-355A and S-355B structures, located on the L-29 levee along the southern boundary of WCA 3B, were constructed in 1996 for the purpose of moving water out of the southern end of WCA 3B into the L-29 Borrow Canal and through the 19 sets of culverts under the Tamiami Trail into the northern ENP. However, since the S-355A and S-355B structures were constructed, more has been learned about the hydrology of the area. The upstream marsh resistance to flow makes these structures very ineffective at getting water out of WCA 3B. When the structures have been opened under previous limited-duration testing without additional inflows from WCA 3A, the headwater stage quickly equalizes with the downstream stage, the L-29 Borrow Canal, and southerly water flow essentially ceases. As a result, passing the flows envisioned in the 1992 MWD GDM/EIS with increased MWD Project water levels in the downstream L-29 Borrow Canal would require higher headwater stages in WCA 3B than were anticipated in the 1992 MWD GDM/EIS. Within the existing system constraints, these higher headwater stages in WCA 3B would be expected to have adverse impacts to the ecology of that area by damaging the tree islands and marsh vegetation.

In addition, it is now known that flow patterns in the current WCA 3B area, which has been significantly impacted by soil subsidence resulting from reduced water inflows, are eastward rather than the north-to-south direction that had been expected in the 1992 MWD GDM/EIS plan and was historically experienced in this area. The higher stages that would be needed to move water across Tamiami Trail are likely to redirect this flow southward, but we would now expect that the higher stages and increased eastward flow would result in increased seepage rates to the east through the L-30 levee. While the MWD Project was formulated in the 1992 MWD GDM/EIS to handle seepage from NESRS and the 8.5 SMA south of Tamiami Trail, it was not formulated to handle this seepage from WCA 3B north of Tamiami Trail. The result would be a reduction in the effectiveness of the C&SF Project features in maintaining existing levels of flood protection. Offsetting these impacts would require a large increase in the cost of the MWD Project in order to handle the seepage resulting from the differing flow patterns and the increased water levels that would be needed in WCA 3B.

Although the additional conveyance structures in WCA 3 could still be constructed, it is now apparent that restoration of connectivity between WCA 3A and WCA 3B, and flows north of Tamiami Trail, could not result in additional benefits to these areas without substantially increased project costs and/or resulting in undesirable conditions in WCA 3B.

In addition, due to concerns associated with the Tamiami Trail roadway, as outlined in the 2008 TTM LRR/EA, degradation of the remainder of the L-67 Extension would not be implemented without adequate engineering justification to demonstrate that further removal would not cause L-29 Borrow Canal stages to exceed the MWD Project maximum operating limit of 8.5 feet, NGVD. Raising water levels in the L-29 Borrow Canal to stages anticipated in the 1992 MWD GDM/EIS is not feasible without roadway modifications. It would result in unacceptable damages to the Tamiami Trail, a major hurricane evacuation route. Roadway modifications, including up to the 9.7 feet, NGVD level envisioned in the 1992 MWD GDM/EIS, were evaluated in the 2008 TTM LRR/EA, however, the Recommended Plan in the 2008 TTM LRR/EA only raised the maximum operating limit to 8.5 feet NGVD. Thus, the 2008 TTM LRR/EA established a new high water level in the L-29 Borrow Canal that was more than a foot lower than the Recommended Plan in the 1992 MWD GDM/EIS, effectively capping the amount of water that could potentially be delivered into ENP. Under the 2012 Water Control Plan, the plan that defines operations within the project area, the L-29 Borrow Canal stage is capped at 7.5 feet, NGVD. The 2008 TTM LRR/EA concluded that degradation of the remaining L-67 Extension may cause stages to exceed the MWD Project L-29 Borrow Canal maximum operating limit and compromise the condition of the Tamiami Trail roadway. Additional improvements to Tamiami Trail are already authorized under the DOI Tamiami Trail Next Steps Project authority, which is expected to alleviate any remaining concerns about the roadway elevation. However, the removal of the remainder of the L-67 Extension remains impractical at this time under the MWD Project due to the likely occurrence of damage to the existing Tamiami Trail roadway as a result of increased downstream water levels.

#### **4.5.1 ALTERNATIVE B: REMOVAL OF CSCF COMPONENTS (S-345A, B, AND C; S-349A, B, AND C AND REMAINING L-67 EXTENSION CANAL AND LEVEE REMOVAL) FROM MWD PROJECT**

As outlined in the No Action Alternative, to achieve the objectives stated in the 1989 ENP Protection and Expansion Act, the project originally recommended in the 1992 MWD GDM/EIS would hydrologically reconnect WCA 3A, WCA 3B, and NESRS (**Figure 1**). Removal of the three gated concrete headwall structures (S-349A, B, and C) and three gated culvert structures (S--345A, B, and C) from the MWD Project, as described in Alternative B, would preclude any hydrologic connection between WCA 3A and WCA 3B. WCA 3B, which included the original headwaters of SRS in ENP, and was the original pathway of much of the water entering ENP, would continue to be hydrologically isolated from the greater Everglades system. S-355A and S-355B, previously constructed in 1996 as components of the MWD Project, will not be operated to increase deliveries to NESRS in the near-term.

Continued implementation of the MWD Incremental Field Tests is expected to result in improvements to hydroperiods in WCA 3A and NESRS. An increase in flow volume to NESRS has been realized with the G-3273 constraint relaxation under MWD Increment 1, the first increment of the field test, which maintains the current 7.5 feet NGVD maximum operating limit in the L-29 Borrow Canal. Further improvements to water delivery volumes into NESRS by up to 92%, and improved hydrologic conditions within the park, can be expected upon completion and implementation of Increment 2 and the COP Water Control Plan in 2019.

#### **4.6 VEGETATIVE COMMUNITIES**

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). Improved hydroperiods within WCA 3B, NESRS, and ENP have the potential to reduce soil oxidation, which is expected to promote peat accretion. Peat accretion, coupled with improved hydrological connectivity, would have had significant beneficial effects on the mosaic of vegetation communities within the project area.

Flows through WCA 3A, WCA 3B, and NESRS under current system compartmentalization and 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 drydowns in sloughs and a reduction in the extent of shallow water edges. Within WCA 3B, the ridge-slough-tree island structure has been severely compromised by the virtual elimination of overland sheetflow since the construction of the L-67 Canal/levee system in the early 1960s. WCA 3B has become primarily a rain-fed compartment, experiencing very little overland flow; it has largely turned into a sawgrass monoculture, where relatively few sloughs or tree islands remain. Overdrainage within ENP has resulted in the conversion of slough/open-water marsh communities to shorter hydroperiod sawgrass marshes and wet prairies (Davis et al. 1994, Davis and Ogden 1997; Armentano et al. 2006; McVoy et al. 2011).



#### **4.6.1 ALTERNATIVE A: NO ACTION ALTERNATIVE**

Under the No Action Alternative, as outlined in the 1992 MWD GDM/EIS, the purpose of CSCF components was to improve hydrological connectivity within WCA 3A, WCA 3B, and NESRS. However, reconnecting WCA 3B to the system hydraulically with WCA 3A presents a number of unanticipated challenges. These include projected high water impacts to tree islands and the ecosystem within WCA 3B, a reduced capability to move water out of WCA 3B via the S-355A and S-355B structures, flow patterns in WCA 3B that were more eastward than southward, and the need to control seepage losses out of the area to prevent associated flood impacts on the adjoining developed areas of Miami-Dade County.

The S-355A and S-355B structures, located on the L-29 levee along the southern boundary of WCA 3B, were constructed in 1996 for the purpose of moving water out of the southern end of WCA 3B into the L-29 Borrow Canal and through the 19 sets of culverts under the Tamiami Trail into northern ENP. However, since the S-355A and S-355B structures were constructed, more has been learned about the hydrology of the area. The marsh resistance to flow makes these structures very ineffective at getting water out of WCA 3B. When the structures have been opened under previous limited-duration testing, the headwater stage quickly equalizes with the downstream stage (the L-29 Borrow Canal) and southerly water flow essentially ceases. As a result, passing the flows envisioned in the 1992 MWD GDM/EIS with increased MWD Project water levels in the downstream L-29 Borrow Canal would require higher headwater stages in WCA 3B than were anticipated in the 1992 MWD GDM/EIS. Within the existing system constraints, these higher headwater stages in WCA 3B would be expected to have adverse impacts to the ecology of that area by damaging the tree islands and marsh vegetation. Extreme high water levels and prolonged inundation periods within WCA 3B would result in negative impacts to tree islands.

Tree islands in SRS rise above the surrounding marsh. Since 1942, a 55% decline in the extent and number of tree islands in SRS has been observed due to intensive fires that migrate across the marshes and burn tree island peat soils, leaving rocky outcroppings. Tree islands are connected to the surrounding marsh via the roots of the trees. When the water table drops below these roots, tree islands often become too dry and can burn. Implementation under Alternative A, as originally envisioned in the 1992 MWD GDM/EIS, would have allowed improvements in hydroperiod. However, due to the unanticipated challenges identified above, the S 355A and S-355B structures are ineffective at moving water out of WCA 3B. As a result, WCA 3B and NESRS remain unconnected, thus, beneficial effects on tree islands within ENP would not be realized under the No Action Alternative without substantial changes to the MWD Project design.

#### **4.6.2 ALTERNATIVE B: REMOVAL OF CSCF COMPONENTS (S-345A, B, AND C; S-349A, B, AND C AND REMAINING L-67 EXTENSION CANAL AND LEVEE REMOVAL) FROM MWD PROJECT**

Implementation of Alternative B would maintain existing vegetation communities and allow continuation of adverse effects on vegetation within WCA 3A, WCA 3B, and NESRS as a result of altered hydroperiods and compartmentalization. Shorter hydroperiod sawgrass marshes may transition to wet prairie and slough/open water marsh communities with improved hydroperiods. Shifts from one vegetation type to another may occur in a relatively short time frame, 1 to 4 years, following hydrological alteration (Armentano et al. 2006, Zweig 2008, Zweig and Kitchens 2008, Sah et al. 2008). Although improvements in hydroperiods within WCA 3A and NESRS are

anticipated under the MWD Incremental Field Tests and COP, significant improvements in hydroperiods and the associated benefits to vegetative communities in WCA 3B would not be realized in the near term under Alternative B, but delayed until implementation of CEPP.

Continued implementation of the MWD Incremental Field Tests is expected to result in improvements to hydroperiods in WCA 3A and NESRS. An increase in flow volume to NESRS has been realized with the G-3273 constraint relaxation under MWD Increment 1, the first increment of the field test, which maintains the current 7.5 feet NGVD maximum operating limit in the L-29 Borrow Canal. Further improvements to water delivery volumes into NESRS by up to 92%, and improved hydrologic conditions within the park, can be expected upon completion and implementation of Increment 2 and the COP Water Control Plan in 2019. Increases in hydroperiod would improve historic vegetation patterns within the project area.

## **4.7 FISH AND WILDLIFE RESOURCES**

Improved hydroperiods would increase forage prey availability, *i.e.* crayfish, other invertebrates, and fish, and therefore provide a direct benefit for amphibian, reptile, small mammal, and wading bird species within WCA 3A, WCA 3B, and ENP.

### **4.7.1 ALTERNATIVE A: NO ACTION ALTERNATIVE**

Based upon the Corps' 2015 technical analysis (Appendix A), implementation of the No Action Alternative is not technically feasible without substantial changes in project design and project cost. Although the additional conveyance structures in WCA 3 could still be constructed, it is now apparent that restoration of connectivity between WCA 3A and WCA 3B and flows north of Tamiami Trail could not result in additional benefits to these areas without substantially increased project costs and/or resulting in undesirable conditions in WCA 3B. Instead of benefitting WCA 3B, the resulting higher water levels and reduced flow rates in WCA 3B, compared to the depths and flow rates originally anticipated, would be expected to have adverse ecological effects, including damaging tree islands and marsh vegetation. Negative effects on plant communities would translate into negative effects on the fish and wildlife resources that rely upon these communities.

### **4.7.2 ALTERNATIVE B: REMOVAL OF CSCF COMPONENTS (S-349A, B, AND C; S-349A, B, AND C AND REMAINING L-67 EXTENSION CANAL AND LEVEE REMOVAL) FROM MWD PROJECT**

The implementation of Alternative B would maintain the current conditions for fish and wildlife resources within the project area and allow the continuation of adverse effects on vegetative communities upon which fish and wildlife resources rely. The improved hydroperiods within WCA 3B, as originally anticipated under the 1992 MWD GDM/EIS (No Action Alternative), would not be realized in the near term, but delayed until CEPP implementation, .

Continued implementation of the MWD Incremental Field Tests is expected to result in improvements to hydroperiods in WCA 3A and NESRS. An increase in flow volume to NESRS has been realized with the G-3273 constraint relaxation under MWD Increment 1, the first increment of the field test, which maintains the current 7.5 feet NGVD maximum operating limit in the L-29 Borrow Canal. Further improvements to water delivery volumes into NESRS by up to 92%, and improved hydrologic conditions within the park, can be expected upon completion and

implementation of Increment 2 and the COP Water Control Plan in 2019. The increases in hydroperiod increase forage prey availability, *i.e.* crayfish, other invertebrates, and fish, thereby providing a direct benefit for amphibian, reptile, small mammal, and wading bird species within WCA 3A, WCA 3B, and ENP.

## **4.8 THREATENED AND ENDANGERED SPECIES**

### **4.8.1 FEDERALLY PROTECTED SPECIES**

#### **4.8.1.1 ALTERNATIVE A: NO ACTION ALTERNATIVE**

Implementation of the No Action Alternative was anticipated to improve ecological and hydrological connectivity between WCA 3A, WCA 3B, and NESRS. Improved hydroperiods, as originally anticipated under the 1992 MWD GDM/EIS (No Action Alternative), would increase forage prey availability, *i.e.* crayfish, other invertebrates, and fish, providing a direct benefit to listed wading bird species, including the threatened wood stork. However, based upon the Corps' 2015 Technical Analysis (Appendix A), implementation of the No Action Alternative is not technically feasible without substantial changes. Although the additional conveyance structures in WCA 3 could still be constructed, it is now apparent that restoration of connectivity between WCA 3A and WCA 3B and flows north of Tamiami Trail could not result in additional benefits to these areas without substantially increased project costs and/or resulting in undesirable conditions in WCA 3B. Instead of benefitting WCA 3B, the resulting higher water levels and reduced flow rates in WCA 3B, compared to the depths and flow rates originally anticipated, would be expected to have adverse ecological effects, including damaging tree islands and marsh vegetation. Negative effects on plant communities would translate into negative effects on the fish and wildlife resources that rely upon these communities. Threatened and endangered species would also be negatively affected due to negative effects on prey resources.

#### **4.8.1.2 ALTERNATIVE B: REMOVAL OF CSCF COMPONENTS (S-345A, B, and C; S-349A, B, and C AND REMAINING L-67 EXTENSION CANAL AND LEVEE REMOVAL) FROM MWD PROJECT**

Implementation of Alternative B would maintain current conditions for threatened and endangered species within the project area and allow continuation of adverse effects on vegetative communities upon which these species rely. Improved hydroperiods, as originally anticipated under the 1992 MWD GDM/EIS (No Action Alternative), would not be fully realized in the near term, but delayed until CEPP implementation. In the near term, however, continued implementation of the MWD Incremental Field Tests is expected to result in improvements to hydroperiods in WCA 3A and NESRS. An increase in flow volume to NESRS has been realized with the G-3273 constraint relaxation under MWD Increment 1, the first increment of the field test, which maintains the current 7.5 feet NGVD maximum operating limit in the L-29 Borrow Canal. Further improvements to water delivery volumes into NESRS by up to 92%, and improved hydrologic conditions within the park, can be expected upon completion and implementation of Increment 2 and the COP Water Control Plan in 2019. The increases in hydroperiod increase forage prey availability, *i.e.* crayfish, other invertebrates, and fish, thereby providing a direct benefit for amphibian, reptile, small mammal, and wading bird species within WCA 3A, WCA 3B, and ENP. These improvements also benefit threatened and endangered species within the project area. Due to the MWD increments, and continued improvements in hydrology associated

with these water management changes, the Corps has determined that Alternative B would have no additional effect on threatened and endangered species as compared with the existing condition.

**TABLE 4-1: FEDERALLY THREATENED AND ENDANGERED SPECIES WITHIN THE PROJECT AREA AND SPECIES EFFECT DETERMINATION**

Common Name	Scientific Name	Status	2014 CEPP Determination
<b>Mammals</b>			
Florida panther	<i>Puma concolor coryi</i>	E	No Effect
Florida manatee	<i>Trichechus manatus latirostris</i>	E, CH	No Effect
Florida bonneted bat	<i>Eumops floridanus</i>	E	No Effect
<b>Birds</b>			
Cape Sable seaside sparrow	<i>Ammodramus maritimus mirabilis</i>	E, CH	No Effect
Everglade snail kite	<i>Rostrhamus sociabilis plumbeus</i>	E, CH	No Effect
Piping plover	<i>Charadrius melodus</i>	T	No Effect
Red-cockaded woodpecker	<i>Picoides borealis</i>	E	No Effect
Roseate tern	<i>Sterna dougallii</i>	T	No Effect
Wood stork	<i>Mycteria Americana</i>	T	No Effect
<b>Reptiles</b>			
American Alligator	<i>Alligator mississippiensis</i>	T, SA	No Effect
American crocodile	<i>Crocodylus acutus</i>	T, CH	No Effect
Eastern indigo snake	<i>Drymarchon corais couperi</i>	T	No Effect
Green sea turtle	<i>Chelonia mydas</i>	E	No Effect
Hawksbill sea turtle	<i>Eretmochelys imbricate</i>	E	No Effect
Kemp's Ridley sea turtle	<i>Lipodochelys kempii</i>	E	No Effect
Leatherback sea turtle	<i>Dermochelys coriacea</i>	E	No Effect
Loggerhead sea turtle	<i>Caretta</i>	T	No Effect
<b>Fish</b>			
Smalltooth sawfish	<i>Pristis pectinata</i>	E	No Effect
<b>Invertebrates</b>			
Bartram's hairstreak butterfly	<i>Strymon acis bartrami</i>	E	No Effect
Elkhorn coral	<i>Acropora palmata</i>	T, CH	No Effect
Florida leafwing butterfly	<i>Anaea troglodyta floridalis</i>	E	No Effect
Miami blue butterfly	<i>Cyclargus thomasi bethunebakeri</i>	E	No Effect

Schaus swallowtail butterfly	<i>Heraclides aristodemus ponceanus</i>	E	No Effect
Staghorn coral	<i>Acropora cervicornis</i>	T, CH	No Effect
Stock Island tree snail	<i>Orthalicus reses</i> (not incl. <i>nesodryas</i> )	T	No Effect
<b>Plants</b>			No Effect
Crenulate lead plant	<i>Amorpha crenulata</i>	E	No Effect
Deltoid spurge	<i>Chamaesyce deltoidea</i> spp. <i>deltoidea</i>	E	No Effect
Garber's spurge	<i>Chamaesyce garberi</i>	T	No Effect
Johnson's seagrass	<i>Halophila johnsonii</i>	E, CH	No Effect
Okeechobee gourd	<i>Cucurbita okeechobeensis</i> ssp. <i>okeechobeeensis</i>	E	No Effect
Small's milkpea	<i>Galactia smallii</i>	E	No Effect
Tiny polygala	<i>Polygala smallii</i>	E	No Effect
Big pine partridge pea	<i>Chamaecrista lineata</i> var. <i>keyensis</i>	E	No Effect
Blodgett's silverbush	<i>Argythamnia blodgettii</i>	T	No Effect
Cape Sable thoroughwort	<i>Chromolaena frustrata</i>	E, CH	No Effect
Carter's small-flowered flax	<i>Linum carteri</i> var. <i>carteri</i>	E, CH	No Effect
Everglades bully	<i>Sideroxylon reclinatum</i> spp. <i>austrofloridense</i>	C	No Effect
Florida brickell-bush	<i>Brickellia mosieri</i>	E, CH	No Effect
Florida bristle fern	<i>Trichomanes punctatum</i> spp. <i>floridanum</i>	E	No Effect
Florida semaphore cactus	<i>Consolea corallicola</i>	E, CH	No Effect
Sand flax	<i>Linum arenicola</i>	E	No Effect

#### 4.8.2 STATE LISTED SPECIES

Improved hydroperiods, as originally anticipated under the 1992 MWD GDM/EIS (No Action Alternative), would increase forage prey availability, *i.e.* crayfish, other invertebrates, and fish, providing a direct benefit to listed wading bird species, including the threatened wood stork.

##### 4.8.2.1 ALTERNATIVE A: NO ACTION ALTERNATIVE

Implementation of the No Action Alternative was anticipated to improve ecological and hydrological connectivity between WCA 3A, WCA 3B, and NESRS. However, based upon the Corps' 2015 Technical Analysis (Appendix A), implementation of the No Action Alternative is not technically feasible without substantial changes. Although the additional conveyance structures in WCA 3 could still be constructed, it is now apparent that restoration of connectivity between WCA 3A and WCA 3B and flows north of Tamiami Trail could not result in additional benefits to these areas without substantially increased project costs and/or resulting in undesirable conditions in WCA 3B. Instead of benefitting WCA 3B, the resulting higher water levels and

reduced flow rates in WCA 3B, compared to the depths and flow rates originally anticipated, would be expected to have adverse ecological effects, including damaging tree islands and marsh vegetation. Negative effects on plant communities would translate into negative effects on the fish and wildlife resources that rely upon these communities. State listed wildlife species would also be negatively affected due to negative effects on prey resources.

#### **4.8.2.2 ALTERNATIVE B: REMOVAL OF CSCF COMPONENTS (S-345A, B, and C; S-349A, B, and C AND REMAINING L-67 EXTENSION CANAL AND LEVEE REMOVAL) FROM MWD PROJECT**

Implementation of Alternative B would maintain current conditions for state listed species within the project area and allow the continuation of adverse effects on vegetative communities upon which these species rely. Impacts to state listed species would be similar to those outlined for fish and wildlife resources in **Section 4.7**. Improved hydroperiods, as originally anticipated under the 1992 MWD GDM/EIS (No Action Alternative), would not be realized, but delayed until CEPP implementation. In the near term, however, continued implementation of the MWD Incremental Field Tests is expected to result in improvements to hydroperiods in WCA 3A and NESRS. An increase in flow volume to NESRS has been realized with the G-3273 constraint relaxation under MWD Increment 1, the first increment of the field test, which maintains the current 7.5 feet NGVD maximum operating limit in the L-29 Borrow Canal. Further improvements to water delivery volumes into NESRS by up to 92%, and improved hydrologic conditions within the park, can be expected upon completion and implementation of Increment 2 and the COP Water Control Plan in 2019. The increases in hydroperiod increase forage prey availability, *i.e.* crayfish, other invertebrates, and fish, thereby providing a direct benefit for amphibian, reptile, small mammal, and wading bird species within WCA 3A, WCA 3B, and ENP. These improvements also benefit threatened and endangered species within the project area. Due to the MWD Increments, and continued improvements in hydrology associated with these water management changes, the Corps has determined that Alternative B would have no additional effect on threatened and endangered species as compared with the existing condition.

#### **4.9 ESSENTIAL FISH HABITAT**

The Magnuson-Stevens Fishery Conservation and Management Act, 16 USC 1801 et seq. Public Law 104-208 reflects the Secretary of Commerce and Fishery Management Council authority and responsibilities for the protection of essential fish habitat (EFH). Federal agencies that fund, permit, or carry out activities that may adversely impact EFH are required to consult with the National Marine Fisheries Service (NMFS) regarding the potential effects of their actions on EFH. In conformance with the 1996 amendment to the Act, the information provided in this EA and within the 2014 CEPP PIR/EIS will comprise the required EFH assessment and has been coordinated with NMFS.

Mangrove habitats provide food and refuge to a large variety of species (SAFM 1998). These species include: spiny lobsters, pink shrimp, snook (*Centropomus undecimalis*), goliath grouper (*Epinephelus itajara*), tripletail (*Lobotes surinamensis*), leatherjack (*Oligoplites saurus*), gray snapper (*Lutjanus griseus*), dog snapper (*L. jocu*), sailor's choice (*Haemulon parra*), bluestriped grunt (*H. sciurus*), sheepshead (*Archosargus probatocephalus*), black drum (*Pogonias cromis*), and red drum (SAFM 1998). Seagrass habitats are heavily utilized by both juvenile and adult fishes and invertebrates for feeding and shelter (SAFM 1998). Species that depend on seagrass

habitats include the penaeid pink and brown shrimp and spiny lobster (SAFM 1998). Seagrass performs as an important nursery habitat for red drum, snook (*Centropomus undecimalis*), bonefish (*Albula vulpes*), tarpon (*Megalops atlanticus*), and several species of snapper and grouper, and is critical to the health of a number of commercial and recreational fisheries (SAFM 1998). There are no coral reefs or hardbottom communities located within the project area or the nearshore waters affected by the project. Corals found within Florida Bay and Biscayne Bay are outside the area of potential effect.

The MWD Project Area includes the southern estuaries comprised of Biscayne National Park and a large portion of ENP, and are a shallow estuarine system, with an average depth of less than 3 feet. Florida Bay is the main receiving water of the greater Everglades, heavily influenced by changes in timing, distribution, and quantity of freshwater flows into the southern estuaries. The southern estuaries contain essential fish habitat for corals, coral reef and live bottom habitat, red drum (*Sciaenops ocellatus*), penaeid shrimps, spiny lobster (*Panulirus argus*), other coastal migratory pelagic species, and the snapper-grouper complex. Species generally present in the southern estuaries region include brown shrimp (*Penaeus aztecus*), pink shrimp (*Penaeus duorarum*), white shrimp, spiny lobster, stone crab, gulf stone crab, red drum, Spanish mackerel, and gray snapper (*Lutjanus griseus*). EFH in the southern estuaries is comprised of seagrasses, estuarine mangroves, intertidal flats, the estuarine water column, live/hardbottoms, and coral reefs.

#### **4.9.1 ALTERNATIVE A: NO ACTION ALTERNATIVE**

The MWD Project, as envisioned in the 1992 MWD GDM/EIS, would serve to hydrologically reconnect WCA 3A, WCA 3B, and ENP, particularly NESRS. The majority of the hydrological and ecological benefits resulting from implementation of the No Action Alternative will be concentrated in these areas. As envisioned in the 1992 MWD GDM, the MWD Project was expected to have a minor beneficial indirect effect by increasing overland flow into the southern estuaries. Since implementation of the No Action Alternative is not anticipated to result in significant direct benefits to downstream estuarine communities, including Florida Bay, Biscayne Bay, Manatee Sound, and Barnes Sound, no effects on EFH are anticipated.

#### **4.9.2 ALTERNATIVE B: REMOVAL OF CSCF COMPONENTS (S-345A, B, AND C; S-349A, B, AND C AND REMAINING L-67 EXTENSION CANAL AND LEVEE REMOVAL) FROM MWD PROJECT**

As envisioned in the 1992 MWD GDM, the MWD Project was expected to have a minor beneficial indirect effect by increasing overland flow into the southern estuaries. Implementation of Alternative B would result in continued degradation of the southern coastal estuaries due to lack of MWD overland flows, although significant freshwater flows through the system above anticipates that MWD Project flows are needed to benefit the southern estuaries and offset high salinities. It is anticipated that other CERP projects, including CEPP, will help to offset the loss of benefits associated with full implementation of the MWD Project, as originally envisioned in the 1992 MWD GDM/EIS. Since implementation of Alternative B is not anticipated to result in significant benefits to downstream estuarine communities, including Florida Bay, Biscayne Bay, Manatee Sound, and Barnes Sound, no effects on EFH are anticipated.

## 4.10 WATER QUALITY

### 4.10.1 ALTERNATIVE A: NO ACTION ALTERNATIVE

The MWD Project, as envisioned in the 1992 MWD GDM/EIS, would serve to hydrologically reconnect WCA 3A, WCA 3B, and ENP, particularly NESRS. The 1992 MWD Project recommended plan (**Figure 1-1**) included three gated concrete headwall structures (S-349A, B, and C), three gated culvert structures (S-345A, B, and C), associated discharge channels and bounding levees, and two spillway structures (S-355A and B). Water was expected to move from WCA 3A into the southern end of WCA 3B by passing through the S-345 culvert structures, located in the L-67A levee, while the S-349 structures functioned to prevent flows from short circuiting down the L-67A Borrow Canal (*i.e.*, continuing down to the southern end of WCA 3A). Discharge canals and bounding levees running perpendicular to the L-67A and L-67C levees would move water southeasterly as it passed out of the S-345 culverts across the area between L-67A and L-67C levees (a.k.a. "the pocket") and extending through degraded sections of the L-67C levee, where it was discharged into WCA 3B. With these features, WCA 3A and WCA 3B would be hydrologically reconnected. Once in WCA 3B, the water was expected to flow southward as it had historically to where the S-355A and S-355B structures in the southern end would pass that water across the L-29 levee into the L-29 Borrow Canal. Once in the L-29 Borrow Canal, water was expected to pass through 19 sets of culverts under Tamiami Trail into the northern portions of ENP, therein rehydrating the historic NESRS flow way in the northeastern corner of ENP. This change to flow patterns would shift a portion of the current canal flow from the L-67A, normally routed directly to the ENP via the S-333, to sheetflow across the WCA 3B, eventually discharging into the ENP via the L-29 culverts. For the L-67A canal flow path, there is essentially no nutrient uptake. For the sheetflow routing path through the WCA 3B, significant nutrient uptake would be expected before the WCA 3B water discharges into the ENP.

Increased hydration of WCA 3B from the No Action Alternative will reduce the risk for severe drydown and thus reduce fire risk to some degree. Water quality degradation, such as the release of Total Phosphorous and increased methyl mercury in the water column, associated with fire events and their aftermath, will be reduced as a result of increased hydration.

As a result of these new connections, water quality within WCA 3B and NESRS may be affected. Flows from WCA 3A to WCA 3B would increase nutrient loading to WCA 3B and reduce nutrient loading to NESRS.

### 4.10.2 ALTERNATIVE B: REMOVAL OF CSCF COMPONENTS (S-345A, B, AND C; S-349A, B, AND C AND REMAINING L-67 EXTENSION CANAL AND LEVEE REMOVAL) FROM MWD PROJECT

Implementation of Alternative B would not result in any changes to existing water quality within the project area. It is anticipated that other CERP projects, including CEPP, will help to offset the loss of benefits associated with full implementation of the MWD Project, as originally envisioned in the 1992 MWD GDM/EIS.

Water quality monitoring and analyses during the incremental field tests will be used to help identify potential changes to the operating rules that could increase the probability of water quality compliance for additional flows entering NESRS. A water quality assessment will be evaluated at



the S-356 Pump Station. Concurrently, compliance with the Long-Term Limit will be determined in accordance with the Settlement Agreement, Appendix A, requirements on an annual basis during the incremental testing. Water quality conditions in the vicinity of the L-29 Canal and L-31N Canal might be affected by implementation of the project. In order to understand the potential effects, a robust water quality monitoring program is included within the MWD Incremental Field Tests.

#### **4.11 NATIVE AMERICANS**

The Miccosukee Tribe of Indians of Florida and the Seminole Tribe of Florida rely upon the Everglades in its natural state to support their cultural, subsistence, and commercial activities. Portions of the tribes' Federal reservation lands are either partially situated, or immediately adjacent, to WCA 3A. In addition, the tribes hold easements and leases from the State of Florida over large portions of the WCA 3A. Subsistence activities for members of the Miccosukee Tribe of Indians of Florida and the Seminole Tribe of Florida include gathering of materials, hunting, trapping, frogging, and fishing, while the Miccosukee Tribes of Indians of Florida's commercial activities additionally include frogging, airboat and other guided tours, and providing recreational and tourism facilities within the Everglades. As part of the consideration of effects, consultation with the appropriate federally recognized tribes was initiated on January 13, 2017 and is documented in Appendix B.

Previous consultations with the Miccosukee Tribe of Indians of Florida and the Seminole Tribe of Florida have indicated that restoration of sheetflow and hydroperiods in the Everglades is a priority. Beneficial effects on tree islands within WCA 3 and ENP would enhance the tribes' hunting, fishing, trapping, foraging, and frogging rights within Federal reservation lands, and lands owned and leased by the tribes. The Miccosukee Tribe of Indians of Florida have continuously expressed concern with high water levels in WCA 3A where many tribal members live and utilize culturally sensitive areas.

##### **4.11.1 ALTERNATIVE A: NO ACTION ALTERNATIVE**

The No Action Alternative consists of full construction of all CSCF components as defined in the 1992 MWD GDM/EIS, including the three gated culvert structures (S-345A, B, and C) through the L-67A, the three gated concrete headwall structures (S-349A, B, and C) in the L-67A Borrow Canal, and complete degradation of the L-67 Extension. Implementation of the No Action Alternative, as originally envisioned in the 1992 MWD GDM/EIS, would have allowed improvements in hydroperiods; however, due to unanticipated challenges, the S 355A and S-355B structures are ineffective at moving water out of WCA 3B. As a result, WCA 3B and NESRS remain unconnected, thus, beneficial effects on tree islands within ENP would not be realized under the No Action Alternative without substantial changes to the MWD Project design. If implemented, the No Action Alternative has the potential to cause high water impacts to tree islands and the ecosystem within WCA 3B.

High water impacts to tree islands in WCA 3B as a result of implementation of Alternative A may directly affect lands owned and leased by the Miccosukee Tribe of Indians of Florida and the Seminole Tribe of Florida

Consultation with the Seminole Tribe of Florida and the Miccosukee Tribe of Indians of Florida has been an integral part of all portions of the MWD Project. Consultation would continue and would be concluded during the Pre-Construction Engineering Design (PED) phase of each of the remaining CSCF components with implementation of Alternative A. During the PED phase, the Corps will develop detailed designs using the appropriate level of analysis. If applicable, further consultations will be conducted. No construction would occur until all legal requirements have been met.

#### **4.11.2 ALTERNATIVE B: REMOVAL OF CSCF COMPONENTS (S-345A, B, AND C; S-349A, B, AND C AND REMAINING L-67 EXTENSION CANAL AND LEVEE REMOVAL) FROM MWD PROJECT**

Alternative B consists of the removal of the unconstructed CSCF components from the MWD Project. Specifically, the unconstructed CSCF components include the three gated culvert structures (S-345A, B, and C) through the L-67A, the three gated concrete headwall structures (S-349A, B, and C) in the L-67A Borrow Canal, and complete degradation of the L-67 Extension would not be completed. Improved hydroperiods, as originally anticipated under the 1992 MWD GDM/EIS, (No Action Alternative), would not be realized, which may result in continued impacts to Native American land use. However, continued implementation of the MWD Incremental Field Tests is expected to result in improvements to hydroperiods in WCA 3A and NESRS. An increase in flow volume to NESRS has been realized with the G-3273 constraint relaxation under MWD Increment 1, the first increment of the field test, which maintains the current 7.5 feet NGVD maximum operating limit in the L-29 Borrow Canal. Further improvements to water delivery volumes into NESRS by up to 92%, and improved hydrologic conditions within the park, can be expected upon completion and implementation of Increment 2 and the COP Water Control Plan in 2019.

Although improvements in hydroperiods are anticipated under the MWD Incremental Test and COP, significant improvements in hydroperiods and the associated benefits to vegetative and wildlife communities which the tribes utilize for their cultural, medicinal, and subsistence activities would not be realized in the near term under Alternative B, but delayed until CEPP implementation. While implementation of Alternative B would see some improvements to hydroperiods in WCA 3A and NESRS and stasis to hydroperiods within WCA 3B, implementation of Alternative A may result in undesirable conditions in WCA 3B, suggesting Alternative B would offer the greatest benefits to Native American communities within the study area..

## **4.12 CULTURAL RESOURCES**

As part of the consideration of effects, the Corps has been actively consulting with interested parties in conjunction with its obligation under Section 106 of the National Historic Preservation Act (NHPA) and consideration given under the NEPA. Consultation has occurred between the Corps, the State Historic Preservation Officer (SHPO), and the appropriate federally-recognized tribes. Letters requesting concurrence of the Corp's determination of effects were sent to the SHPO, the Miccosukee Tribe of Indians of Florida, and the Seminole Tribe of Florida on January 13, 2016. The SHPO concurred with the Corps determination of no effect in a letter dated January 31, 2017 (Appendix B). The Seminole Tribal Historic Preservation Office concurred with the

Corps determination of no effect in a letter dated March 2, 2017 (Appendix B). No formal comments were received from the Miccosukee Tribal Representative.

#### **4.12.1 ALTERNATIVE A: NO ACTION ALTERNATIVE**

The No Action Alternative consists of full construction of all CSCF components as defined in the 1992 MWD GDM/EIS, including the three gated culvert structures (S-345A, B, and C) through the L-67A levee, the three gated concrete headwall structures (S-349A, B, and C) in the L-67A Borrow Canal, and the complete degradation of the L-67 Extension. Implementation under the No Action Alternative, as originally envisioned in the 1992 MWD GDM/EIS, would have allowed improvements in hydroperiods; however, due to unanticipated challenges, the S 355A and S-355B structures are ineffective at moving water out of WCA 3B. As a result, WCA 3B and NESRS remain unconnected, thus, beneficial effects on tree islands within ENP would not be realized under the No Action Alternative without substantial changes to the MWD Project design. If implemented, the No Action Alternative has the potential to cause high water impacts to tree islands and the ecosystem within WCA 3B.

Construction of permanent structures (S-345A, B, and C and S-349A, B, and C) or structural modifications to existing C&SF Project features (L-67 Extension degradation) may result in effects to cultural resources within the actual construction footprint of these project components. Additionally, the long term effects of fluctuating water levels on cultural resources remain unknown. Current testing associated with the ERTTP Programmatic Agreement is investigating these effects, and will be completed prior to the determination of the effects of fluctuating water on historic properties.

The Corps has previously determined that there is a reasonable probability that any project activities that involve tree islands could affect properties listed, or eligible for listing, in the National Register of Historic Places (NRHP), and that construction of project features will be designed to avoid these properties (USACE 1992). Through previous consultation with the Seminole Tribe of Florida's Tribal Historic Preservation Office, the Miccosukee Tribe of Indians of Florida's Native American Graves Protection and Repatriation Act Representative, the Florida State Historic Preservation Office, ENP's Chief of Cultural Resources, and the Florida Bureau of Archaeological Research, it has been determined that detailed designs are necessary to ensure that the appropriate cultural resources surveys have been completed to identify all cultural resources within the specific areas of potential effect and to guarantee avoidance, minimization, or mitigation of adverse effects to historic properties (USACE 2014). Therefore, consultation and coordination with each of these agencies would continue and would be concluded during the PED phase of each of the remaining CSCF components with implementation of Alternative A. During the PED phase, the Corps will develop the detailed designs using the appropriate level of NEPA analysis. If applicable, further consultations will be conducted for compliance with Section 106 of the National Historic Preservation Act (NHPA). No construction will occur until all legal requirements have been met, including appropriate NEPA analysis and consultation under Section 106 of the NHPA.

#### **4.12.2 ALTERNATIVE B: REMOVAL OF CSCF COMPONENTS (S-345A, B, AND C; S-349A, B, AND C AND REMAINING L-67 EXTENSION CANAL AND LEVEE REMOVAL) FROM MWD PROJECT**

Alternative B consists of removal of the unconstructed CSCF components from the MWD Project. Specifically, the unconstructed CSCF components include the three gated culvert structures (S-345A, B, and C) through the L-67A levee, the three gated concrete headwall structures (S-349A, B, and C) in the L-67A Borrow Canal, and complete degradation of the L-67 Extension that would not be completed as part of the MWD Project. Since no further construction would occur, the implementation of Alternative B would have no effect to historic properties eligible, or potentially eligible, for listing in the NRHP.

#### **4.13 AIR QUALITY**

Air quality conditions within the project area are in compliance under the No Action Alternative. Air quality within the project area would not be expected to change from current conditions with implementation of Alternative B.

#### **4.14 HAZARDOUS, TOXIC, OR RADIOACTIVE WASTES (HTRW)**

Due to the need for excavation, the No Action Alternative could potentially result in the discovery of HTRW. In comparison, implementation of the Alternative B would not result in the discovery of HTRW since there is no excavation or other construction activities being considered. The project has a very low risk for increased mobilization of existing HTRW where it might exist within the study area. Increased operation of C&SF Project features will increase the frequency of diesel fuel delivery to pump stations.

#### **4.15 NOISE**

Noise levels within the project area would not be expected to change from current conditions with implementation of the No Action Alternative or Alternative B. Noise levels associated with implementation of the No Action Alternative would occur from continued operation of diesel powered pump stations related to C&SF operation (USACE 2015). Noise levels within the project area as a result of implementation of Alternative B are expected to be similar to that of the No Action Alternative. Potential impacts would be limited to the immediate vicinity of the associated pump stations, which are located in remote rural areas. Sound levels would decrease with distance from the pump stations due to attenuation. Under the No Action Alternative, temporary increases in noise level caused by engines of earth-moving machinery would be expected during construction activities; however, this would be limited to the immediate area of construction. Noise levels are not expected to cause negative effects to human health. Implementation of Alternative B would not result in impacts to noise levels within the project area.

#### **4.16 AESTHETICS**

The No Action Alternative includes construction of permanent structures, or structural modifications, to existing C&SF Project features. As such, the existing landscape profile would be altered. Specifically, construction of the S-345A, B, and C and S-349A, B, and C structures in the L-67A levee and L-67A Borrow Canal, respectively, have the potential to adversely affect aesthetics within WCA 3A and WCA 3B through impairments to the viewshed. However, it is anticipated that the ecological benefits associated with improved hydroperiods in WCA 3A, WCA 3B, and ENP would assist to offset those impacts. In addition, degradation of the L-67 Extension

would have minor negative effects to aesthetics during construction, but removal of this barrier and restoration of ecological connectivity would result in a beneficial effect on aesthetics within this area of ENP. In contrast, implementation of Alternative B would not alter aesthetics and would remain consistent with the existing condition.

#### **4.17 AGRICULTURE**

The majority of agricultural activities within Miami-Dade County are located south of Tamiami Trail and directly east of ENP within, and adjacent to, the SDCS. No effects to agricultural lands are anticipated as a result of implementation of the No Action Alternative or Alternative B.

#### **4.18 RECREATION**

Implementation of the No Action Alternative and Alternative B would not result in significant impacts to recreation.

#### **4.19 CUMULATIVE EFFECTS**

Cumulative effects are defined in 40 CFR 1508.7 as those effects that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time. The following summarizes past, present, and projected Corps efforts that cumulatively affect the regional environment of South Florida (**Table 4-1**). Additional information on design refinements and operational modifications to MWD and C-111 South Dade Project features can be found within the environmental documents listed in **Section 1.6**. **Table 4-2** shows the net cumulative effects of the various resources which are directly or indirectly impacted.

**TABLE 4-1: PAST, PRESENT, AND REASONABLY FORESEEABLE ACTIONS AND PLANS AFFECTING THE PROJECT AREA**

	Past Actions/Authorized Plans	Current Actions and Operating Plans	Reasonably Foreseeable Future Actions and Plans
Status of Non-CERP Projects	<ul style="list-style-type: none"> <li>▪ C&amp;SF Project (1948)</li> <li>▪ ENP Protection and Expansion Act (1989)</li> <li>▪ MWD GDM/EIS (1992)</li> <li>▪ C-111 South Dade GRR (1994)</li> </ul>	<ul style="list-style-type: none"> <li>▪ MWD 8.5 SMA GRR/EIS (2000)</li> <li>▪ MWD Tamiami Trail LRR/EA (2008)</li> <li>▪ MWD 8.5 SMA Interim Operating Criteria EA (2011) and Design Refinement EA (2012)</li> <li>▪ C&amp;SF C-51 West End Flood Control Project</li> <li>▪ Kissimmee River Restoration</li> <li>▪ Seepage Barrier near the L-31 N Levee (Miami-Dade Limestone Products Association)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Tamiami Trail Modifications Next Steps Project (ENP/DOI Project)</li> <li>▪ SFWMD Restoration Strategies Project</li> <li>▪ MWD Project Completion (Components under construction and COP)</li> <li>▪ C-111 South Dade Project (Contracts 8, 8A, and 9)</li> <li>▪ SFWMD Florida Bay Initiatives</li> <li>▪ Florida Department of Transportation Roadway Enhancement Projects</li> <li>▪ Miccosukee Tribe Projects (To Be Determined)</li> </ul>
Operation Plan for Lake Okeechobee, WCA 3A, ENP and the SDCS	<ul style="list-style-type: none"> <li>▪ Water Supply and Environment Lake Okeechobee Regulation Schedule (2000)</li> <li>▪ Interim Operational Plan for Protection of the Cape Sable Seaside Sparrow 2002 to 2012</li> </ul>	<ul style="list-style-type: none"> <li>▪ Lake Okeechobee Regulation Schedule (LORS 2008)</li> <li>▪ SFWMD LEC Regional Water Supply Plan</li> <li>▪ ERTTP October 2012 to present</li> <li>▪ Herbert Hoover Dike Dam Safety Modification Study risk reduction measures (2011 through 2025)</li> </ul>	<ul style="list-style-type: none"> <li>▪ LORS 2008 to be replaced by revised Lake Okeechobee Regulation Schedule by 2024-2025 (per Integrated Delivery Schedule)</li> <li>▪ SFWMD periodically revises the LEC Regional Water Supply Interim Plan</li> <li>▪ ERTTP to be replaced by COP to be completed to include MWD Project and C-111 Project components (~2019)</li> </ul>
CERP Projects	Congressional Authorization for CERP in the Water Resources Development Act of 2000.	Congressional Authorization Received: <ul style="list-style-type: none"> <li>▪ Biscayne Bay Coastal Wetlands Project</li> <li>▪ Broward County Water Preserve Areas Project</li> <li>▪ Caloosahatchee River (C-43) West Basin Storage Reservoir</li> <li>▪ C-111 Spreader Canal Western Project.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Future CERP Projects (CEPP, Broward County Water Preserve Areas, Loxahatchee River Restoration Project, Lake Okeechobee Watershed)</li> </ul>

	Past Actions/Authorized Plans	Current Actions and Operating Plans	Reasonably Foreseeable Future Actions and Plans
		<ul style="list-style-type: none"> <li>▪ Central Everglades Planning Project Congressional Authorization Received and Construction in Progress:</li> <li>▪ Indian River Lagoon-South Project</li> <li>▪ Picayune Strand Restoration Project</li> <li>▪ Site 1 Impoundment Project</li> </ul>	Restoration Project, Western Everglades Restoration Project.

**TABLE 4-2: SUMMARY OF CUMULATIVE EFFECTS**

<b>Hydrology</b>	
<b>Past Actions</b>	Flood and water control projects have greatly altered the natural hydrology.
<b>Present Actions</b>	Federal and State agencies are coordinating on and implementing projects to improve hydrology. Changes in water management operations under the MWD Increment 1 and Increment 1.1/1.2 (March 1, 2017) operational tests are anticipated to increase flows into NESRS relative to the 2012 Water Control Plan, thereby improving hydroperiods within ENP.
<b>Proposed Action</b>	Removal of the three gated concrete headwall structures (S-349A, B, and C) and three gated culvert structures (S-345A, B, and C) from the MWD Project, as described in Alternative B, would preclude any hydrologic connection between WCA 3A and WCA 3B. S-355A and S-355B will not be operated to increase deliveries to NESRS in the near-term.
<b>Future Actions</b>	Under CEPP, significant beneficial hydrologic effects are anticipated within the greater Everglades through restoration of sheetflow and rehydration of previously drained areas. Improved hydrologic conditions will result from increasing depths and extending hydroperiods in WCA 3A, WCA 3B, and ENP. Additional CERP projects propose to restore hydrology to more natural conditions.
<b>Cumulative Effect</b>	Although it is unlikely that natural hydrologic conditions would be fully restored to pre-drainage conditions, improved hydrology would occur. CEPP is expected to improve the quantity, quality, timing, and distribution of freshwater flow.
<b>Threatened and Endangered Species</b>	
<b>Past Actions</b>	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.
<b>Present Actions</b>	Ongoing efforts have been made by Federal and State agencies to implement projects to improve hydrology within the project area. Ongoing projects have been implemented to maintain Cape sable seaside sparrow (CSSS) populations. The USFWS recovery plan is used as a management tool. Increased operational constraints on the S-12A, S-12B, S-343A, and S-343B as included in the 2016 ERTTP BO and the 2017 MWD Increment 1.1/1.2 operational test are anticipated to reduce hydrologic effects of the C&SF Project on CSSS.
<b>Proposed Action</b>	The proposed action would have no effect on threatened and endangered species as compared with the existing condition.
<b>Future Actions</b>	Ongoing projects would be implemented to maintain threatened and endangered species within the project area. ERTTP implementation represents a paradigm shift from single species to multi-species management. ERTTP includes performance measures specifically directed at managing water levels and releases for the protection of multiple species and their habitats within the project area.
<b>Cumulative Effect</b>	Habitat improvement, monitoring, and management of threatened and endangered species is 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.
<b>Fish and Wildlife Resources</b>	
<b>Past Actions</b>	Water management practices have resulted in aquatic vegetation community changes and the resulting disruption of aquatic productivity and function that has had repercussions throughout the food web, including effects on wading birds, large predatory fishes, reptiles, and mammals.
<b>Present Actions</b>	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. It is anticipated that under MWD Increment 1.1/1.2 increases in forage prey availability ( <i>i.e.</i> crayfish and other invertebrates and fish) resulting from improved hydroperiods would, in turn, provide beneficial effects for amphibian, reptile, small mammal, and wading bird species within NESRS.



<b>Proposed Action</b>	The proposed action would maintain the current conditions for fish and wildlife resources within the project area and allow the continuation of adverse effects on vegetative communities upon which fish and wildlife resources rely.
<b>Future Actions</b>	Some level of improvement to fish and wildlife resources is expected to occur as a result of the implementation of projects with the capability of improving the timing, quantity, quality, and distribution of freshwater flow to the study area. Hydrologic restoration planned as part of CEPP would further improve fish and wildlife habitat. With the implementation of CEPP, significant beneficial effects are anticipated within the Greater Everglades. Rehydration within previously dry areas of WCA 3A, 3B, and ENP would increase the spatial extent of suitable habitat for several fish and wildlife resources. Increases in forage prey availability (crayfish, other invertebrates, and fish) would directly benefit amphibian, reptile, small mammal, and wading bird species. Nesting and foraging activities of resident bird species are anticipated to be significantly improved.
<b>Cumulative Effect</b>	Habitat improvement efforts are anticipated to benefit fish and wildlife resources.
<b>Vegetation and Wetlands</b>	
<b>Past Actions</b>	Drainage of Florida's interior wetlands, conversion of wetlands to agriculture, and urban development has reduced the spatial extent and quality of wetland resources.
<b>Present Actions</b>	Efforts are being taken by State and Federal regulatory agencies to reduce wetland losses. Significant beneficial effects are anticipated within the Greater Everglades due to implementation of MWD Increment 1.1/1.2.
<b>Proposed Action</b>	The proposed action would maintain existing vegetation communities and allow continuation of adverse effects on vegetation within WCA 3A, WCA 3B, and NESRS as a result of altered hydroperiods and compartmentalization. Flows through WCA 3A, WCA 3B, and NESRS under current system compartmentalization and 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 drydowns in sloughs and a reduction in the extent of shallow water edges.
<b>Future Actions</b>	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 study area. More natural hydrology as part of the CEPP would assist in restoring natural plant communities. Improved hydroperiods and sheetflow within WCA 3A, 3B, and ENP would result in reduced soil oxidation, promoting the peat accretion necessary to rebuild the complex mosaic of habitats across the landscape. Increased freshwater flows to Florida Bay would aid to lower salinity levels, benefiting mangrove communities and seagrass beds.
<b>Cumulative Effect</b>	While the spatial extent of natural plant communities would not be restored to historic proportions, the quality of vegetative communities would be improved.
<b>Cultural Resources</b>	
<b>Past Actions</b>	Previous water control plans and associated environmental analyses had determined that there were no effects to cultural resources associated with changing water regulation schedules. However, the effects of fluctuating water levels to historic properties and culturally significant sites remains unknown. Current testing associated with the ERTTP Programmatic Agreement is investigating these effects and will be completed prior to the determination of the effects of fluctuating water on historic properties.
<b>Present Actions</b>	Ongoing efforts have been made by Federal and State agencies to implement projects to improve hydrology within the project area, thereby stabilizing the tree islands which are known to have a high potential for cultural resources.
<b>Proposed Action</b>	The proposed action would maintain the current condition and would therefore have no effect. Since no further construction would occur, the implementation of Alternative B would pose no effect to historic properties eligible, or potentially eligible, for listing in the NRHP.
<b>Future Actions</b>	Continued improvement to hydroperiods and sheetflow within WCA 3A, 3B, and ENP could reduce soil oxidation, which could stabilize the environment, and this, in turn, could stabilize tree

	islands containing cultural resources. Investigations mandated in the Programmatic Agreement for ERTTP will assist to determine the effects of fluctuating water on historic properties.
<b>Cumulative Effect</b>	The cumulative effects of fluctuating water levels to historic properties and culturally significant sites remains unknown. Current testing associated with the ERTTP Programmatic Agreement is investigating these effects, and will be completed prior to the determination of the effects of fluctuating water on historic properties. If necessary, mitigation measures for effects to historic properties could potentially reduce the cumulative effect to any long-term adverse effects. Mitigation measures for culturally significant sites are unknown.
<b>Water Quality</b>	
<b>Past Actions</b>	Water quality has been degraded from urban, suburban, commercial, industrial, recreational and agricultural development.
<b>Present Actions</b>	Efforts to improve water quality from agricultural areas are ongoing. Federal and State projects would temporarily elevate localized levels of suspended solids and turbidity.
<b>Proposed Action</b>	Implementation of the proposed action would not result in any changes to existing water quality within the project area.
<b>Future Actions</b>	Actions by the State of Florida's Restoration Strategies would decrease nutrient concentration and loadings to the project area. The Broward County Water Preserve Area Project, (WRRDA 2014) would reduce storm runoff deliveries to WCA 3 and improve water quality coming across the Tamiami Trail. Under CEPP, changes in the quantity, timing, and distribution of flows within WCA 3A and WCA 3B may result in temporary increases in phosphorus concentrations at some TP Rule monitoring stations; however, this should not significantly affect TP Rule compliance. Over the long-term, distributing the flow over the northern WCA 3A marsh, reducing short-circuiting down the canals, adding more flow from the lake that is treated to the water quality based effluent limits (WQBEL), should result in improved water quality within WCA 3 and a reduction in flow weighted mean total phosphorous concentration entering ENP. The salinity conditions of the southern estuaries are expected to be improved by the project.
<b>Cumulative Effect</b>	While anthropogenic effects on water quality are unlikely to be eliminated, water quality is expected to slowly improve over existing and recent past conditions. During detailed planning and design, the Corps and SFWMD are committed to ensuring that project feature implementation will not result in violations of water quality standards.
<b>Water Supply/Flood Control</b>	
<b>Past Actions</b>	Water supply and flood control for agricultural and urban users has benefited from the construction and operation of the C&SF Project.
<b>Present Actions</b>	Availability of water from Lake Okeechobee for agricultural users was recently diminished through implementation of 2008 LORS. The availability of water for urban and agricultural users was recently diminished through the implementation of ERTTP. The SFWMD has implemented Restricted Allocation Area Rules to cap users dependent on water supplies from Lake Okeechobee and the regional system; the Everglades.
<b>Proposed Action</b>	Implementation of the project would likely have no effect on water supplies to agricultural users dependent on Lake Okeechobee. Agricultural, municipal, and industrial water supply in Lower East Coast Service Area 2 and 3 will increase slightly in the future.
<b>Future Actions</b>	Future supplies would not change unless additional CERP storage or hydrologic improvements to the Everglades are implemented and increase water availability.
<b>Cumulative Effect</b>	While effects on water supplies are unlikely to improve, water supplies available for agricultural and urban users are expected to remain stable until additional storage mechanisms are implemented.

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

The Proposed Action consists of removal of unconstructed MWD Project CSCF components, specifically the S-345A, B, and C and S-349A, B, and C structures, along with degradation of approximately 5.5 miles of the L-67 Extension from the MWD Project. It does not include construction of permanent structures or modifications to existing water management features. The Proposed Action would not cause the permanent removal or consumption of any natural resources.

## **4.21 UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS**

Environmental effects for each resource are discussed in **Section 4.0**. Environmental benefits associated with the full construction of the CEPP components, which provide the functionality of the MWD Project, as defined in the 1992 MWD GDM/EIS, would not be realized until CEPP, PPA South is implemented. Full realization of benefits would be delayed until CEPP implementation, anticipated in 2021, and WCA 3B would continue to suffer from adverse effects associated with lack of ecological connectivity.

## **4.22 CONFLICTS AND CONTROVERSY**

Over the lifetime of the MWD and C-111 South Dade Projects, considerable interest has been generated among local and regional stakeholders. The Corps continually strives to include all interested parties in its decision making process and will continue to consider all issues that arise.

## **4.23 ENVIRONMENTAL COMMITMENTS**

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

## **4.24 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS**

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

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

### **4.24.2 ENDANGERED SPECIES ACT OF 1973**

Implementation of Alternative B would maintain current conditions for threatened and endangered species within the project area. Operations of the constructed features of the MWD Project and Canal 111 South Dade Project are included within the 2012 Water Control Plan, MWD Increment 1, and post March 1, 2017, by MWD Increment 1.1/1.2. The Corps entered into Endangered Species Act consultation for the 2012 Water Control Plan, MWD Increment 1, and MWD Increment 1.1/1.2, resulting in a 2012 Biological Opinion for ERTTP and a revised 2016 ERTTP Biological Opinion. The Corps has determined that implementation of Alternative B would maintain current conditions and result in no additional effects on listed species, as compared with the No Action Alternative. The Proposed Action is in full compliance with the Act.

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

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

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

The Proposed Action is in compliance with Section 106 of the National Historic Preservation Act, as amended (PL 89-665). As part of the requirements and consultation process contained within the National Historic Preservation Act implementing regulations of 36 CFR 800, this project is also in compliance through ongoing consultation with the Archaeological and Historic Preservation Act, as amended (PL 93-29), Archeological Resources Protection Act (PL96-95), American Indian Religious Freedom Act (PL 95-341), Native American Graves Protection and Repatriation Act (PL 101-601), Executive Order 11593, 13007, and 13175, the Presidential Memo of 1994 on Government to Government Relations, and appropriate Florida Statutes. Consultation with the Florida State Historic Preservation Office, appropriate federally recognized tribes, and other interested parties was initiated on January 13, 2017 (**Appendix B**). The SHPO concurred with the Corps determination of no effect in a letter dated January 31, 2017. The Seminole Tribal Historic Preservation Office concurred with the Corps determination of no effect in a letter dated March 2, 2017. No formal comments were received from the Miccosukee Tribal Representative. The Proposed Action is in compliance with the goals of this Act.

#### **4.24.5 CLEAN WATER ACT OF 1972**

A Section 404(b) (1) evaluation under the Clean Water Act is not necessary to support the determination to remove specific CSCF components from the MWD Project and associated PCA amendment. The Proposed Action will not adversely affect water quality and the continued operation of constructed MWD Project components is in compliance with the appropriate conditions in the Everglades Forever Act Permit (File No. 0246512-10) and consistent with the Clean Water Act.

#### **4.24.6 CLEAN AIR ACT OF 1972**

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. The Proposed Action is in full compliance with the Act.

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

A Federal consistency determination in accordance with 15 CFR 930 Subpart C is not necessary to support the determination to remove specific CSCF components from the MWD Project and associated PCA amendment. The Proposed Action is in full compliance with the Act.

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

For the area affected by the MWD Project, USDA-NRCS had previously determined that there are delineations of Important Farmland Soils (Farmland of Unique Importance) within the project area. Approximately 975 acres of Prime and Unique Farmland are located mainly within the boundaries of ENP. Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. The land is also used as cropland, pastureland, rangeland, forest land, or other land, but it cannot be used as urban built-up land. According to 7 CFR 657.5, unique farmland is land other than prime farmland that is used for the production of specific high value food and fiber crops. These lands are not used in producing feed, food, fiber, forage, and oilseed crops. Almost all land in central and southern Florida used for agricultural production has been designated unique farmland. The Proposed

Action will not result in any effects to prime or unique farmland. The Proposed Action is in full compliance with the Act.

#### **4.24.9 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.

#### **4.24.10 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.

#### **4.24.11 ESTUARY PROTECTION ACT OF 1968**

No designated estuary would be affected by the Proposed Action. This Act is not applicable.

#### **4.24.12 FEDERAL WATER PROJECT RECREATION ACT OF 1965, AS AMENDED**

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

#### **4.24.13 FISHERY CONSERVATION AND MANAGEMENT ACT OF 1976**

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

#### **4.24.14 SUBMERGED LANDS ACT OF 1953**

Submerged lands of the State of Florida would not be affected by this action. The Proposed Action is in compliance with the Act.

#### **4.24.15 COASTAL BARRIER RESOURCES ACT AND COASTAL BARRIER IMPROVEMENT ACT OF 1990**

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

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

Implementation of the Proposed Action is not expected to result in the discovery of HTRW since there is no excavation or other construction activities associated with this project. The Proposed Action has a very low risk for increased mobilization of existing HTRW where it might exist within the study area. The Proposed Action is in compliance with these Acts.

#### **4.24.17 RIVERS AND HARBORS ACT OF 1899**

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

**4.24.18 SAFE DRINKING WATER ACT OF 1974, AS AMENDED**

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

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

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

**4.24.20 ANADROMOUS FISH CONSERVATION ACT**

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

**4.24.21 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.

**4.24.22 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.

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

No EFH would be impacted by this action. Therefore, the Proposed Action is in compliance with this Act.

**4.24.24 E.O. 11990, PROTECTION OF WETLANDS**

The Proposed Action will not affect wetlands. The Proposed Action is in compliance with the goals of this Executive Order (E.O.).

**4.24.25 E.O. 11988, FLOODPLAIN MANAGEMENT**

This E.O. instructs Federal agencies to avoid development in floodplains to the maximum extent possible. The Proposed Action does not include any construction. This action is consistent with the intent of this E.O. and is in compliance.

**4.24.26 E.O. 12898, ENVIRONMENTAL JUSTICE**

E.O. 12899 provides that each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority or low income populations. The Proposed Action would not result in disproportionately high and adverse human health or environmental effects on minority populations or low-income populations. The Proposed Action is in compliance with this E.O.

**4.24.27 E.O. 13089, CORAL REEF PROTECTION**

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

**4.24.28 E.O. 13112, INVASIVE SPECIES**

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

**4.24.29 E.O. 13045, PROTECTION OF CHILDREN**

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

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

Migratory and resident bird species have been observed within the project area and are likely to use available habitat for foraging, nesting, and breeding. The Proposed Action is not expected to destroy migratory birds, their active nests, their eggs, or their hatchlings. The Proposed Action is in compliance with the goals of this E.O.

**4.24.1 USACE, JACKSONVILLE DISTRICT BURIAL RESOURCES AGREEMENT WITH THE SEMINOLE TRIBE OF FLORIDA**

The Corps, Jacksonville District maintains a Trust Agreement with the Seminole Tribe of Florida regarding proposed actions that may adversely affect American Indian burial resources. This agreement was entered by both parties pursuant to the Corps’ Trust Responsibility, as outlined in the November 1, 2012 Chief of Engineers Memorandum, “Tribal Consultation Policy.” The Burial Resources Agreement establishes a framework that serves as the basis for consultation regarding the presence of burial resources within the Jacksonville District's area of action and jurisdiction for the Civil Works Program, and sets forth procedures that ensure the culturally sensitive treatment of burial resources pursuant to the Corps’ Trust Responsibility. Consultation with the Seminole Tribe of Florida was initiated on January 13, 2017 and is ongoing (Appendix B). The Proposed Action is in compliance with the goals of this Agreement.

**5.0 LIST OF PREPARERS****TABLE 5-1: TABLE OF PREPARERS**

Name	Organization	Role in EA
Donna George	USACE	Project Manager
Gina Ralph	USACE	Biologist
Dan Crawford	USACE	Hydrologist/Engineer
Jim Riley	USACE	Water Quality
Meredith Moreno	USACE	Archeologist



## **6.0 PUBLIC INVOLVEMENT**

### **6.1 AGENCY COORDINATION**

The Corps is in continuous coordination with other Federal and State agencies, tribal representatives, and members of the general public. This extensive coordination is a result of the magnitude of Corps efforts underway to implement water management strategies in South Florida. All agency coordination letters related to the Proposed Action are included in **Appendix B**.

### **6.2 LIST OF RECIPIENTS**

A notice of availability for the EA and Proposed FONSI was mailed to Federal and State agencies, tribal representatives, and members of the general public. A complete mailing list is available upon request. The EA and Proposed FONSI was also posted the internet at the following address:

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

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