August 2013

Environmental Assessment and Draft Finding of No Significant Impact

PROPOSED G-3273 PLANNED DEVIATION FROM THE 2012 WATER CONSERVATION AREAS, EVERGLADES NATIONAL PARK, AND ENP-SOUTH DADE CONVEYANCE SYSTEM WATER CONTROL PLAN

MIAMI-DADE COUNTY, FLORIDA

U.S. Army Corps
of Engineers
JACKSONVILLE
DISTRICT

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PROPOSED G-3273 PLANNED DEVIATION FROM THE 2012 WATER CONSERVATION AREAS, EVERGLADES NATIONAL PARK, AND ENP-SOUTH DADE CONVEYANCE SYSTEM WATER CONTROL PLAN MIAMI-DADE COUNTY, FLORIDA

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

a. The proposed action will not adversely affect existing fish and wildlife habitat. This proposed action may affect, but is not likely to adversely affect, the Cape Sable Seaside Sparrow or its designated critical habitat.

b. This EA represents a Planned Deviation from the G-3273 Constraint described in the 2012 Water Conservation Areas-Everglades National Park-South Dade Conveyance System Water Control Plan and October 2012 Everglades Restoration Transition Plan (ERTP) Record of Decision, as well as utilization of S-355A and S-355B to increase flows from Water Conservation Area (WCA) 3A and 3B. The G-3273 constraint will be increased from 6.8 feet to 7.5 feet from the present through January 2013 and June 2014 through January 2015 when WCA 3A is above 12.0 feet (as measured by the WCA 3 gage average [Sites 63, 64 and 65]) and expected to exceed the period of record maximum and S-331 Pump Station is operating at maximum capacity.

c. A determination of no adverse effect on historic properties has been made for the 2013 wet season. Deviations for the 2014 wet season, covered by this EA will be consistent with the ERTP cultural resource Programmatic Agreement or will require additional cultural resource consultation. This action is in compliance with the National Historic Preservation Act.

d. The proposed action will not adversely affect the authorized purposes of the Central and Southern Florida Project.

e. The proposed action is not expected to significantly affect water quality and effects, if any, are expected to be minor. Water quality will continue to be monitored at the existing S-12, S-333 and S-334 structure locations.

f. The proposed action will move more water into Northeast Shark River Slough from WCA 3A and 3B by utilizing S-333, S-355A, and S-355B thereby avoiding high water levels in the Water Conservation Areas. All structure flows and canal levels will be monitored to ensure that no significant effects occur to flood protection levees. This Planned Deviation will afford the Corps an opportunity to collect data for use in the proposed G-3273 Constraint Modification and S-356 Field Test. The Planned Deviation will be effective until January 2015.

_____ _____

Alan M. Dodd
Colonel, U.S. Army
District Commander

Date

ENVIRONMENTAL ASSESSMENT
ON
PROPOSED G-3273 PLANNED DEVIATION
MIAMI-DADE COUNTY, FLORIDA

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1.0 PROJECT PURPOSE AND NEED

1.1 PROJECT AUTHORITY

Operations in the project area are currently governed by the Water Control Plan (WCP) for the Water Conservation Areas (WCAs), Everglades National Park (ENP), and ENP-South Dade Conveyance System (SDCS) which replaced the Interim Operational Plan (IOP) in October 2012. The WCAs-ENP-SDCS WCP defines water management operating criteria for Central and South Florida Project (C&SF) features and the constructed features of the Modified Water Deliveries (MWD) to Everglades National Park (ENP) and Canal 111 (C-111) South Dade projects. The WCP incorporates more flexible operating criteria to better manage WCA 3A for the benefit of multiple species and represents a positive step toward balancing the competing needs of a complex system (USACE 2012).

1.2 PROJECT LOCATION

The C&SF system-wide project is located in South Florida and includes portions of several counties as well as portions of ENP, Big Cypress National Preserve, and adjacent areas (Figure 1-1). The 1992 MWD GDM defines the project boundary as Shark River Slough and that portion of the C&SF Project north of S-331 to include Water Conservation Area 3 (WCA 3). G-3273 lies within eastern ENP, directly west of the 8.5 Square Mile Area (SMA).

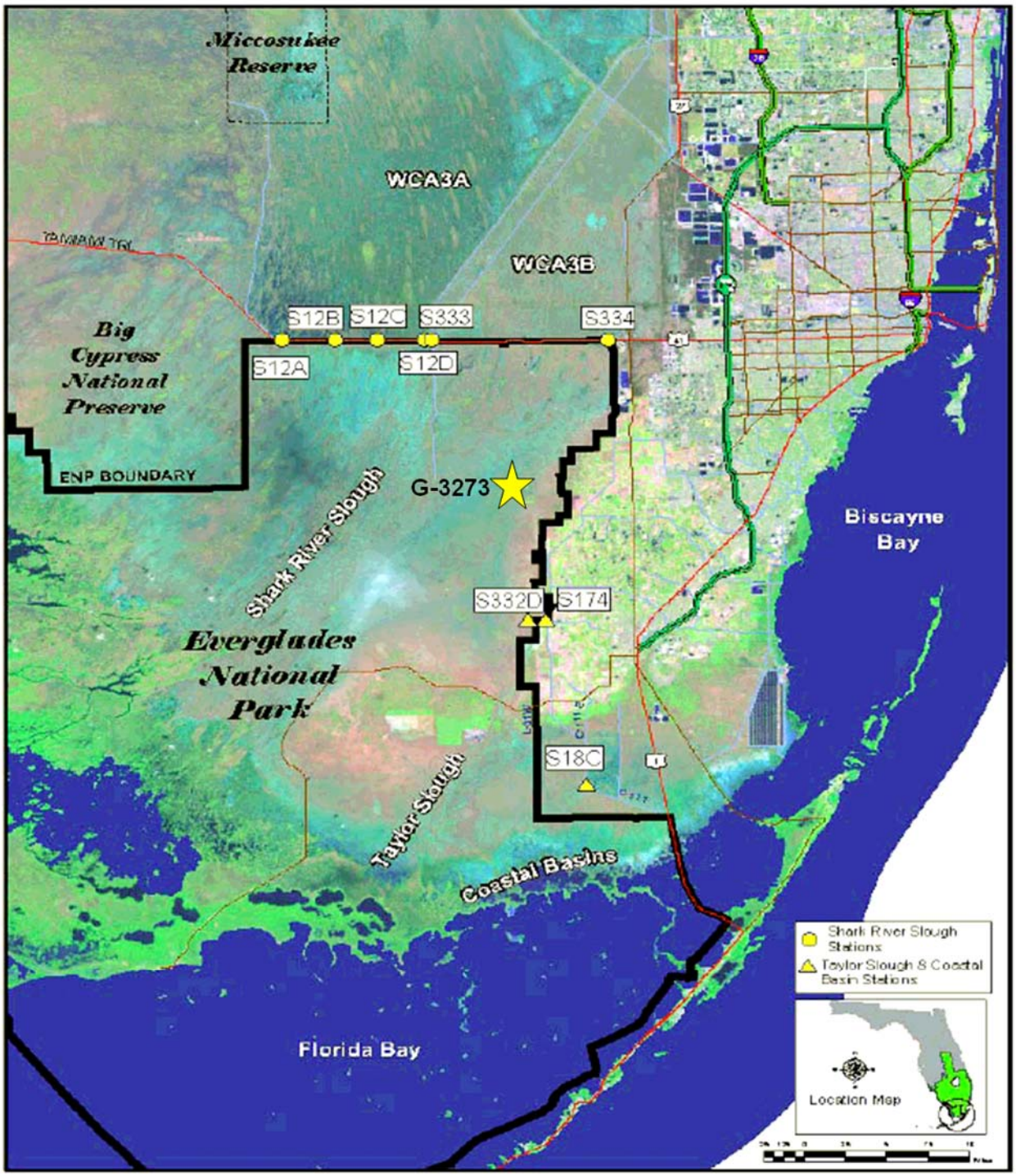

FIGURE 1-1. G-3273 PLANNED DEVIATION PROJECT LOCATION

1.3 PROJECT NEED OR OPPORTUNITY

The overarching project need is to increase flows through the S-333 structure (Figure 1-2) and utilize S-355A and S-355B to assist in lowering high water levels in WCA 3A and WCA 3B in response to a higher than normal rainfall in 2013 and future similar events. A small incremental step toward achieving that goal is to reduce the number of times S-333, S-355A, and S-355B discharges are limited by the existing G-3273 (Figure 1-2) stage constraint of 6.8 feet National Geodetic Vertical Datum (of 1929 (feet, NGVD). This Planned Deviation will provide some relief for the high water level in WCA 3A and may provide information necessary to move towards a permanent change in operations once the remaining MWD and Canal 111 South Dade (C-111) Project features are available.

The G-3273 constraint of 6.8 feet, NGVD exists as a flood protection measure. A stage of 6.8 feet, NGVD at this gage has been used since 1985 as a trigger to cease S-333 discharges from flowing south into NESRS as a protective measure for residential areas to the east, particularly the 8.5 SMA. Since many of the MWD features have been built, including the protective levee around the 8.5 SMA and much of the C-111 detention area to the south, there are more opportunities to begin limited relaxation of the G-3273 constraint.

The releases from S-333 are part of a regulation schedule for WCA 3A and are typically dependent on the Interim Operational Procedure for Restricted Rain-Driven Water Deliveries to ENP via NESRS (Rainfall Plan) outlined in the WCAs-ENP-SDCS WCP. This Rainfall Plan consists of a rainfall-based delivery formula that specifies the amount of water to be delivered to ENP in weekly volumes through the S-333 and S-12s. Currently, the flow distribution is 55% through S-333 into NESRS and 45% through the S-12s into ENP west of the L-67 Extension; however, during the dry season non-regulatory target flows are 80% through S-333 and 20% through the S-12 structures (ERTP 2011). Releases through the S-333 are limited by the constraint at G-3273 under the current 2012 WCAs-ENP-SDCS WCP. Therefore, when G-3273 is < 6.8 feet, NGVD, 55% of wet season and 80% of dry season Rainfall Plan target flow is released into NESRS. However, when G-3273 is > 6.8 feet NGVD, S-334 is used to pass all or partial S-333 flows through SDCS. When S-333 is closed and partial flows cannot be passed through S-334, the volume of flow that could not be delivered at S-333 shifts to the S-12s. In this manner, the G-3273 constraint limits the volume of water entering NESRS. The proposed modification to the G-3273 constraint is anticipated to reduce the number of times that S-333 discharge is reduced and increase the number of times the maximum (*i.e.* 55% of wet season or 80% of dry season) Rainfall Plan deliveries from WCA 3A and WCA 3B through S-333, S-355A, and S-355B into NESRS are achieved.

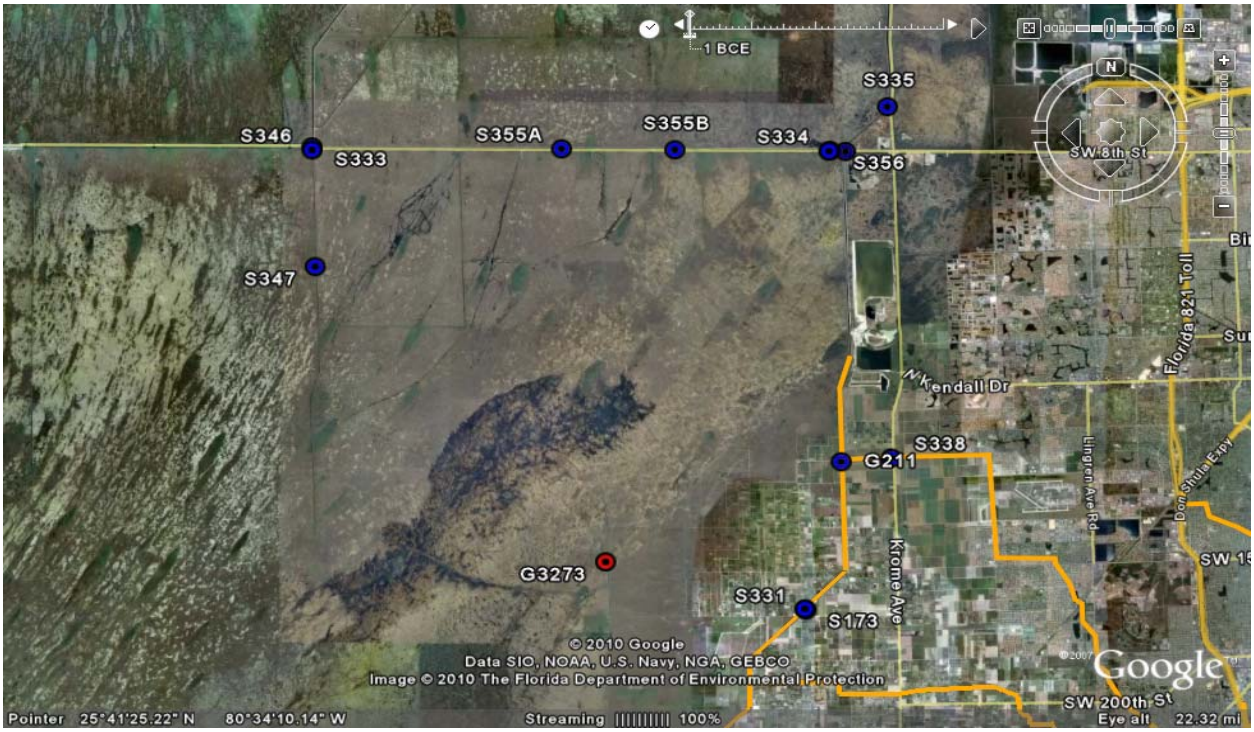

FIGURE 1-2. G-3273 PLANNED DEVIATION FEATURES AND STRUCTURES

1.4 AGENCY GOAL OR OBJECTIVE

The goal of this Planned Deviation is to temporarily utilize S-333, S-355A, and S-355B to achieve the objective of increasing releases from S-333 above those allowed by the 2012 WCAs-ENP-SDCS South Dade Conveyance System Water Control Plan (WCP) in order to manage the water level in WCA 3A so as to not exceed the Period of Record (POR) (1963-2000) maximum while maintaining flood protection levels to the east of NESRS. S-355A and S-355B will also be utilized to transfer water from WCA 3B into NESRS to assist in lowering water levels in WCA 3A. This temporary Planned Deviation is being proposed to manage water levels in WCA 3A and is consistent with the purposes of the C&SF Project.

1.5 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
- *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
- *Revised Draft Environmental Assessment; Proposed Interim Operating Criteria for 8.5 Square Mile Area Project Miami-Dade County, Florida,* U.S. Army Corps of Engineers, Jacksonville District, April 2009

- *Draft Environmental Assessment; Proposed Interim Operating Criteria for 8.5 Square Mile Area Project Miami-Dade County, Florida,* U.S. Army Corps of Engineers, Jacksonville District, November 2008
- *General Reevaluation Report and Final Supplemental Environmental Impact Statement, 8.5 Square Mile Area*, U.S. Army Corps of Engineers, Jacksonville District, July 2000
- *Draft Environmental Assessment; Design Modifications for the Canal 111 Project Miami-Dade County, Florida,* U.S. Army Corps of Engineers, Jacksonville District, June 2007
- *C-111 General Reevaluation Report and Supplemental Environmental Impact Statement,* U.S. Army Corps of Engineers, Jacksonville District, 1994
- *C-111 Engineering Documentation Report*, U.S. Army Corps of Engineers, May 2007
- *C-111, Central and Southern Florida Project for Flood Control and Other Purposes, Final GRR and Environmental Impact Statement, Dade County, Florida.* U.S. Army Corps of Engineers, Jacksonville District 1994.
- *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, Final Interim Operating Plan (IOP),* U.S. Fish and Wildlife Service, Vero Beach, Florida, November 17, 2006.
- *Biological Opinion, Everglades Restoration Transition Plan (ERTP)*, U.S. Fish and Wildlife Service, Vero Beach, Florida, November 17, 2010.
- *Everglades Restoration Transition Plan (ERTP) Final Environmental Impact Statement*, U.S. Army Corps of Engineers, Jacksonville District, October 19, 2012.
- *Programmatic Agreement Among the U.S. Army Corps of Engineers, the Advisory Council on Historic Preservation, and the Florida State Historic Preservation Officer Regarding the Everglades Restoration Transition Plan for Features of the Central and Southern Florida Project in Southern Florida.* U.S. Army Corps of Engineers, Jacksonville District, October 13, 2012.

Information contained within the previous National Environmental Policy Act (NEPA) documents listed above, as well as others described later, is incorporated by reference into this EA. These NEPA documents can be accessed via the internet from the evergladesplan.org website (http://www.evergladesplan.org/pm/projects/non_cerp_sf_projects.aspx).

1.6 DECISIONS TO BE MADE

This Environmental Assessment (EA) will evaluate whether to temporarily modify the G-3273 constraint for flood risk management purposes and, if so, evaluate alternatives to accomplish that goal. The adoption of the preferred alternative for the Planned Deviation from 2012 WCAs-ENP-SDCS WCP, G-3273 constraint is the primary decision that must be made. Alternative C has been identified as the recommended alternative for the Planned Deviation.

1.7 SCOPING AND ISSUES

In September 2010, a draft EA for a Temporary Deviation from IOP Table ES-1: S-333: G-3273 Constraint was released for public review. Significant comments were received from the Florida State Clearinghouse as part of the Coastal Zone Management Act (CZMA) Consistency

Coordination. The Florida Department of Environmental Protection (FDEP) had concerns regarding the water quality of flows passing into NESRS. Florida Department of Agriculture and Consumer Services (FDACS) and the Las Palmas Community (8.5 SMA) commented that the Temporary Deviation from IOP would threaten the agricultural community in South Dade by increasing seepage levels in L-31N and C-111 causing more water to flow into South Dade. Florida Fish and Wildlife Conservation Commission (FFWCC) was in support of the Temporary Deviation from IOP but suggested that the G-3273 constraint be increased to 7.2 feet, NGVD and be extended for a longer period. As a result of significant agency comments, the Corps decided to put the temporary deviation on hold in 2010; however, high water levels in WCA 3A and 3B in 2013 have identified the need for a deviation in the G-3273 constraint to allow S-333, S-355A, and S-355B to pass more flows into NESRS. Agency comments provided during the public review period for the August 2013 Proposed G-3273 Planned Deviation will be included in the final revised EA.

1.8 PERMITS, LICENSES, AND ENTITLEMENTS

No permits, licenses or entitlements are necessary for the modification of the G-3273 constraint. This EA will be routed through the State of Florida Clearinghouse for CZMA coordination; however, an operational permit will be needed for the use of S-355A and S-355B prior to the use of these structures.

2.0 ALTERNATIVES

2.1 DESCRIPTION OF ALTERNATIVES

Each of the following alternatives described below were considered and evaluated as the Planned Deviation for G-3273 was developed. Existing Operations in the project area are currently governed by the 2012 WCAs-ENP-SDCS WCP and potential environmental effects of operations are discussed within the 2011 ERTP FEIS. The current operations table is provided in Appendix A. Other potential deviations to the WCAs-ENP-SDCS WCP to lower water levels in WCA 3A, including raising the L-29 Canal constraint to 8.5 feet NGVD, proactive opening of S-197 structure, modification of the WCA 2A Regulation Schedule, and increasing the constraint in WCA 3B to 9.0 feet NGVD, will be addressed in subsequent EAs.

2.1.1 Alternative A – No Action Alternative

This alternative would continue current operations under the 2012 WCAs-ENP-SDCS WCP (USACE 2012). The G-3273 constraint would remain at 6.8 feet NGVD.

2.1.2 Alternative B – Modification of G-3273 constraint up to 7.5 feet, NGVD through January 2014

Current operations as defined under the 2012 WCAs-ENP-SDCS WCP would continue under Alternative B, with the exception of the G-3273 constraint. The current G-3273 constraint of 6.8 feet, NGVD would be raised 0.7 feet resulting in a stage limit of 7.5 feet, NGVD from the date of NEPA Conclusion through January 2014.

The Planned Deviation would only be implemented through June through January 2014[1] when:

- The water level in WCA 3A is in Zone A, above 12.0 feet (as measured by the 3 gage average which is the average of Site 63, 64 and 65), and expected to exceed the 3 gage average POR maximum; and
- WCA 3A releases to SDCS (Column 2) are being utilized (G-3273 is above 6.8 feet) but discharges from S-333 are being limited by the maximum capacity of the SDCS (maximum capacity of the SDCS is defined as S-331 fully utilizing all three pumping units).

S-333 releases to NESRS up to 7.5 feet NGVD at G-3273 would remain in effect from completion of NEPA until one of the following has occurred:

- The water level in WCA 3A is in Zone A, below 12.0 feet NGVD (3 gage average) and receding to achieve the environmental targets described in the 2011 ERTP FEIS;
- WCA 3A releases to SDCS (Column 2) are being utilized (G-3273 is above 6.8 feet NGVD) but discharges at S-333 are no longer being limited by the maximum capacity of the SDCS.
-

The S-355A and B structures may also be utilized to discharge flows into NESRS if the above G-3273 Deviation implementation criteria are reached. An operational permit for S-335A and B will be requested prior to utilization.

[1] The duration of this Planned Deviation is not contingent on a specific date; however, months and stage may be subject to system conditions in order to achieve the deviation objective.

2.1.3 Alternative C – Modification of G-3273 Constraint up to 7.5 feet NGVD through January 2015

Current operations as defined under the 2012 WCAs-ENP-SDCS WCP would continue under Alternative C, with the exception of the G-3273 trigger stage. The current G-3273 trigger stage of 6.8 feet NGVD would be raised 0.7 feet resulting in a stage limit of 7.5 feet NGVD from the time of completion of NEPA through January 2015 to ensure water levels in WCA 3A are adequately lowered in the event of a late wet season storm event.

The Planned Deviation would only be implemented through January 2015[2] when:

- The water level in WCA3A is in Zone A, above 12.0 feet (3 gage average), and expected to exceed the 3 gage average POR maximum; and
- WCA 3A releases to SDCS (Column 2) are being utilized (G-3273 is above 6.8 feet) but discharges from S-333 are being limited by the maximum capacity of the SDCS (maximum capacity of the SDCS is defined as S-331 fully utilizing all three pumping units).

S-333 releases to NESRS up to 7.5 feet, NGVD at G-3273 would remain in effect until one of the following has occurred:

- The water level in WCA 3A is in Zone A, below 12.0 feet (3 gage average) and receding to achieve the environmental targets described in the 2012 ERTP FEIS;
- WCA 3A releases to SDCS (Column 2) are being utilized (G-3273 is above 6.8 feet NGVD) but discharges at S-333 are no longer being limited by the maximum capacity of the SDCS; or
- Adjustments to durations and months are needed due to system conditions.

The S-355A and B structures may also be utilized to discharge flows into NESRS if the above G-3273 Deviation implementation criteria are reached. An operational permit for S-335A and B will be requested prior to utilization.

2.1.4 Alternative D – Removal of the G-3273 Constraint through January 2014

Current operations as defined under the 2012 WCAs-ENP-SDCS WCP would continue under Alternative D, with the exception of the G-3273 constraint. The current G-3273 constraint of 6.8 feet NGVD would be relaxed in 0.2 foot increments until adverse impacts were seen within the action area and a constraint could be determined. This alternative would be in effect through January 2014.

2.2 ISSUES AND BASIS FOR CHOICE

The alternatives were evaluated based on the ability to reduce limitations on S-333 flows while maintaining flood protection for urban areas to the east of NESRS in Miami-Dade County. Potential environmental effects (benefits and impacts) were also evaluated. The preferred alternative is expected to benefit ENP by increasing flows to NESRS and reduce water levels in WCA 3A. Water enters NESRS primarily from WCA 3A via S-333 to the L-29 Borrow Canal and subsequent passage through culverts under Tamiami Trail. Eastern portions of the ENP are

[2] The duration of this Planned Deviation is not contingent on a specific date; however, months and stage may be subject to system conditions in order to achieve the deviation objective.

also influenced by the system of canals and structures that provide flood control and water supply for the Lower East Coast (LEC) urban and agricultural areas. Efforts to provide flood control for the LEC have apparently resulted in over-drying and adverse ecological effects in eastern portions of the ENP (USACE 1999). Over-drainage in the peripheral wetlands along the eastern flank of NESRS has resulted in shifts in community composition, invasion by exotic woody species, and increased susceptibility to fire (USFWS 1999). By reducing limitations on S-333 and utilizing S-355A and S-355B, potentially more water will be delivered to NESRS, which will help to decrease the amount of over-drying within this region and reduce water levels in WCA 3A to meet performance objectives defined in the 2011ERTP FEIS..

2.3 PREFERRED ALTERNATIVE(S)

Based upon the impact analysis conducted within this EA, Alternative C is the preferred alternative. This plan is expected to best meet the objective of this Planned Deviation, reducing water levels for flood risk management purposes, while minimizing potential negative impacts. Please see **Appendix B** for a full description of this alternative. Summary details of the preferred alternative include:

- Changing the 2012 WCAs-ENP-SDCD WCP operational constraint that references G-3273 from elevation 6.8 to elevation 7.5 feet NGVD.
- The planned Deviation will be effective from the date of completion of NEPA compliance through January 2014 and June 2014 through January 2015 to ensure water levels are adequately lowered below 12.0 feet NGVD in WCA 3A should a late wet season storm event occur.
- The Rainfall Plan will continue to be utilized to determine S-333 target flows to be implemented during the Planned Deviation.
- The Corps Water Management Section assessment of hydrometeorological conditions and stakeholder or agency input may suspend or discontinue the Planned Deviation due to impacts greater than expected/discussed within this EA.
- All other operating criteria contained within the 2012 WCAs-ENP-SDCS WCP will continue to be used to perform water management operations.
- Maintain the multiple purposes of the C&SF Project to provide flood control, water supply for municipal, industrial, and agricultural uses, prevention of saltwater intrusion, water supply for ENP, and protection of fish and wildlife.

2.4 ALTERNATIVES ELIMINATED FROM DETAILED EVALUATION

The following alternatives were eliminated from detailed evaluation for the reasons outlined below:

- Alternative B: Modification of the G-3273 constraint through January 2014. Alternative B is very similar to Alternative C in the Planned Deviation; however, Alternative C would allow the deviation to continue through January 2015. Alternative B would limit the ability to lower stages in WCA 3A should water levels remain high late in the 2013 wet season. Extending the Planned Deviation through January 2015 will reduce uncertainties associated with rainfall conditions in the remaining 2013 and 2014 wet seasons and provide more flexibility to move water through S-333, S-355A, and S-355B if needed.

- Alternative D: Incremental Removal of the G-3273 constraint through January 2014. This alternative may not provide adequate assurance of flood protection to the east. With no limits on the G-3273 constraint, S-333 would continue to discharge into NESRS, causing potentially damaging high water levels to occur to the east before a new constraint is implemented. Without the use of the S-356 Pump Station to mitigate for any additional seepage out of ENP resulting from the relaxation of the G-3273 constraint, there would be substantial stakeholder concern regarding the maintenance of existing flood protection levels. A G-3273 Constraint Modification and S-356 Field Test will be important in gathering data to support the degree of the relaxation of the G-3273 constraint without causing adverse effects to flood protection levels in Miami-Dade County.

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

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

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

The remaining portions of the Everglades are stressed and exhibit levels of reduced aquatic function. The overall negative ecological trends in the remaining portions of the Everglades are expected to continue into the future, with additional loss of resources through landscape alterations and degradation of habitat. The effects of the existing infrastructure and future water

management practices will continue to cause dryouts in the natural system. The threat of extreme fires will persist, destroying peat that is necessary for plant growth and water retention. Although, less extreme, soil subsidence will also continue as dryouts, particularly extreme during periods of drought, contribute to further soil oxidation. Droughts may increase in frequency and intensity as a result of climate change as well. Unnatural shorter or longer hydroperiods will likely continue to cause detriment to remaining tree islands.

TABLE 3.1. EXISTING CONDITIONS SUMMARY

CONDITIONS	EXISTING CONDITION
Vegetative Communities	Sawgrass prairie, slough vegetation, tree islands, spike rush and beak rush flats, mangroves, freshwater wetlands, muhly prairie, cypress stands, native dominated forested wetlands, hydric hammocks and exotic-dominated forests.
Fish and Wildlife Resources	A great diversity of fish and wildlife species occur throughout south Florida including freshwater and saltwater species. Fish and wildlife resources include aquatic macroinvertebrates, small freshwater marsh fishes, larger predatory sport fishes, amphibians and reptiles, colonial wading birds and mammals.
Invasive and Nuisance Species	Existing resources indicate 163 species of non-native plants have been documented to occur within the project area; 123 of the plant species are considered invasive or noxious weeds. Existing information indicates 89 non-native animal species have been documented to occur within the project area.
Threatened and Endangered Species	A total of 40 federally protected species occur or have the potential to occur within the project area. Species include but are not limited to the Florida panther, Florida manatee, Everglade snail kite, wood stork, American alligator, American crocodile, and Eastern indigo snake. Designated critical habitat for the American crocodile, Everglade snail kite, West Indian manatee, smalltooth sawfish, and Cape Sable seaside sparrow also occurs within the project area. Many state listed species also occur throughout the project study area.
Climate (including Sea Level Rise)	The project area is characterized by a subtropical climate with distinct wet and dry seasons, high rates of evapotranspiration and floods, droughts, and hurricanes. The climate represents a major physical driving force that sustains the Everglades while creating water supply and flood control issues in the agricultural and urban segments. Of the 53 inches of annual average rain in south Florida, 75 percent falls during the wet season (May – October). Multi-year high and low rainfall periods often alternate on a time scale approximately on the order of decades. Average annual temperature for the southern Everglades is76°F (24° C).

CONDITIONS	EXISTING CONDITION
Geology and Soils	The regional geology of WCA 3 and ENP consists of (from youngest to oldest) recent fill material, undifferentiated sandy, clay materials, and limestone. Recent fill material consists of poorly graded gravel, sand, silt and minor shell. Layers of peat are embedded within the clay layers. Miami Limestone represents the upper portion of the Biscayne Aquifer. South Florida is underlain by Cenozoic age rocks to a depth of approximately 5,000 ft below land surface with various percentages of sand, limestone, clay and dolomite. The marl soils are typically characterized as silts with high concentrations of lime. Marl soils form under shallow water conditions and are an important constituent of the whole ecosystem, typically having standing water for short periods of time and are associated with thick algal mats and periphyton.
Municipal and Industrial (M&I) Water Supply/ Demand	Well fields in the surficial aquifer are the primary source of municipal water supplies and are recharged by surface water, rainfall and the WCAs. The WCAs maintain groundwater levels and canal stages in the coastal area for purposes of public water supply, irrigation (i.e. agricultural, industrial, landscape), and maintain a freshwater head along the lower east coast (LEC) to slow saltwater intrusion. The South Florida Water Management District (SFWMD) adopted a restricted allocation area rule for the Everglades and Loxahatchee River Water Bodies in 2007. The rule, in general, caps consumptive use withdrawals from the Everglades actual use as of April 1, 2006. The actual demand as of 2010 was 839 MGD for public water supply from all sources. Like public water supplies, industrial demands dependent on the surficial aquifer system have also been capped.
Flood Control	Areas may become flooded during heavy rainfall events due to antecedent conditions that cause saturation and high runoff from developed areas.
Water Quality	Existing water quality conditions within most of the WCAs and ENP are impaired mostly related to excessive nutrient concentrations. Total Phosphorus concentrations and loads to the Everglades Protection Area (WCAs, ENP) have been the subject of ongoing litigation between State, Federal and Tribal parties. The current total maximum daily load (TMDL) is dictated by the 1991 Consent Decree Appendix A calculations as incorporated into the Everglades Forever Act (373.4592 Florida Statutes).
Air Quality	Existing air quality in the affected environment is good to moderate. All areas of Florida, except one, are now attainment areas. Southeast Florida including Miami-Dade, Broward, and Palm Beach Counties continue to be classified by the United States Environmental Protection Agency (USEPA) as attainment/maintenance areas for the pollutant ozone.

CONDITIONS	EXISTING CONDITION
Hazardous, Toxic and Radioactive Waste (HTRW)	Lands potentially used for this project are very likely to have a past or present agricultural land use. Activities conducted over the past 100 years are likely to have resulted in the presence of some HTRW materials on some of this land. The likelihood of significant HTRW problems is very low in the WCA, ENP and former Ag lands. State and Federal databases include information on the known HTRW contamination sites.
Cultural Resources (includes Cultural and Historic Properties)	Several thousand historic properties exist within south Florida. Due to the existence of known historical properties within previously surveyed portions of the study area, there is a high probability of unrecorded sites within the project area of potential effect. Lands leased to the Miccosukee Tribe of Indians of Florida are experiencing long-term high water staging in the southern part of WCA 3A, which may affect culturally significant sites.
Populations	From 1950 to 2000, Florida achieved dynamic change in population. In relation to the remainder of the United States, Florida outgrew the other states by almost 500 percent. This growth can be attributed to Florida's desirable climate and historically low property costs. With population expansion comes the myriad of challenges related to infrastructure, land use/pattern changes, water demand, environmental impacts, depletion of resources, and health and human safety issues.
Economy	Generally, a strong wholesale and retail trade, government and service sectors characterize Florida's economy. Compared to the national economy, the manufacturing sector has played less of a role in Florida, but high technology manufacturing has begun to emerge as a significant sector over the last decade. Employment in the LEC when compared to employment in the rest of Florida and the region shows a greater emphasis toward service or tourism related industries.
Agriculture	Agricultural production is an important sector of the state's economy. Despite continued urban expansion, agriculture throughout south Florida remains a valuable industry and employer. South Florida is a major source of nuts and vegetables, tropical fruits (melons and berries), sugarcane, and other crops.
Study Area Land Use	The existing use of land within the study area varies widely from agriculture to high-density multi-family and industrial urban uses to natural areas for conservation. A large portion of south Florida remains natural, although much of it is disturbed land.
Recreation	Many areas throughout south Florida are used for recreational activities including hunting, camping, bicycling, hiking, horseback riding, canoeing, boating, and freshwater and saltwater fishing.

CONDITIONS	EXISTING CONDITION
Noise	Within natural areas, external sources of noise are limited. Existing sources of noise are mainly limited to recreational users including air boats, off road vehicles, swamp buggies, and motor boats. Existing sources of noise outside of the rural communities are limited to vehicular traffic, agricultural vehicles, etc. Within urban areas, existing sources of noise include noise associated with transportation arteries, operations of construction and landscaping equipment, and operations at commercial and industrial facilities.
Aesthetics	Natural areas within south Florida are comprised of a variety of wetlands, sawgrass marshes, wet prairies, and tree islands. The land is very flat, with slight topographic rises on some tree islands. Much of the visible topographic features are a result of human development, such as canals and levees. Views of much of the area offer pleasant perspectives of the Everglades and tree islands.

3.1.1 Vegetative Communities

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

Development and drainage over the last century have dramatically reduced the overall spatial extent of freshwater wetlands within the Everglades, with approximately half of the pre-drainage 2.96 million acres of wetlands being converted for development and agriculture (Davis and Ogden 1997). Alteration of the normal flow of freshwater through the Everglades has also contributed to conversions between community types, invasion by exotic species, and a general loss of community diversity and heterogeneity.

Many areas of WCA 3A still contain relatively good wetland habitat consisting of a complex of tree islands, sawgrass marshes, wet prairies, and aquatic sloughs. Water lilies (*Nymphaea alba*) were originally widespread in sloughs throughout many areas of WCA 3A (McVoy, et al. 2011). Reduced freshwater inflow and drainage by the Miami Canal have overdrained the northern portion of WCA 3A, resulting in increased fire frequency and the associated loss of tree islands, wet prairie, and aquatic slough habitat. Northern WCA 3A is currently dominated largely by mono-specific sawgrass stands with large areas of shrubs and monotypic cattail. Northern WCA 3A lacks the diversity of communities that exists in southern WCA 3A. In southern WCA 3A, Wood and Tanner (1990) documented the trend toward deep water lily dominated sloughs due to impoundment. In approximately 1991, the hydrology of southern WCA 3A shifted to the deeper

water and extended hydroperiods of the new, wet hydrologic era resulting in a northward shift in slough vegetation communities within the WCA 3A impoundment (Zweig and Kitchens 2008). Typical Everglades vegetation, including tree islands, wet prairies, sawgrass marshes, and aquatic sloughs also occur throughout WCA 3B. However, within WCA 3B, the ridge and slough landscape has been severely degraded by the virtual elimination of overland sheetflow due to the L-67 Canal and levee system. WCA 3B experiences very little overland flow and has become primarily a rain-fed system predominated by shorter hydroperiod sawgrass marshes with relatively few sloughs or tree islands remaining. Water levels in WCA 3B are also too low and do not vary seasonally, contributing to poor ridge and slough patterning. Loss of sheetflow to WCA 3B has also accelerated soil loss reducing elevations of the remaining tree islands in WCA 3B and making them vulnerable to high water stages.

Vegetative trends in ENP have included a substantial shift from the longer hydroperiod slough/open water marsh communities to shorter hydroperiod sawgrass marshes (Davis and Ogden 1997, Armenrano, et al. 2006). Flows through Shark River Slough (SRS) 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 dry downs in sloughs and reduction in extent of shallow water edges (McVoy, et al. 2011). Over-drainage in the peripheral wetlands along the eastern flank of Northeast Shark River Slough (NESRS) has resulted in shifts in community composition, invasion by exotic woody species and increased susceptibility to fire. Areas within the eastern marl prairies along the boundary of ENP suffer from over-drainage, reduced water flow, exotic tree invasion and frequent human-induced fires (Lockwood, Ross and Sah 2003, Ross, Sah and Snyder, et al. 2006). In addition, invasion of sawgrass marshes and wet prairies by exotic woody species has led to the conversion of some marsh communities to forested wetlands (Gunderson, et al. 1997).

The estuarine communities of Florida Bay have also been affected by upstream changes in freshwater flows through the Everglades. A reduction in freshwater inflows into Florida Bay and alterations of the normal salinity balance have affected mangrove community composition and may have contributed to a large-scale die-off of seagrass beds (USFWS 1999)

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

3.1.2 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 holbrookii*), and small sunfishes (*Lepomis* spp.) (USACE 1999). The density and distribution of marsh fish populations fluctuate with seasonal changes in water levels. Populations of marsh fishes increase during extended periods of continuous flooding during the wet season. As marsh surface waters recede during the dry season, marsh fishes become concentrated in areas that hold water through the dry season. Concentrated dry season assemblages of marsh fishes are more susceptible to predation and provide an important food source for wading birds (USACE 1999).

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

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

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

The alligator was historically most abundant in the peripheral Everglades marshes and freshwater mangrove habitats, but is now most abundant in canals and the deeper slough habitats of the central Everglades. Drainage of peripheral wetlands and increasing salinity in mangrove wetlands as a result of decreased freshwater flows has limited the occurrence of alligators in these habitats (Mazzotti and Brandt 1994).

The freshwater wetlands of the Everglades are noted for their abundance and diversity of colonial wading birds. Common wading birds include the white ibis (*Eudocimus albus*), glossy ibis (*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). The number of wading birds nesting in the Everglades has decreased by approximately 90 percent, and the distribution of breeding birds has shifted away from ENP into the WCAs (Bancroft, et al. 1994). The WCAs support fewer numbers of breeding pairs with relatively lower reproductive success (USACE 1999). Water management practices and wetland losses are believed to be the primary cause of the declines (Bancroft, et al. 1994).

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

Many of the fish and wildlife resources that inhabit the freshwater aquatic community of the Everglades are also common to Lake Okeechobee, the Northern Estuaries, and the EAA. Native habitat for fish and wildlife does not comprise a significant amount of the EAA as the alteration of the landscape for agricultural uses has resulted in the removal of nearly all historically occurring native vegetation. Although abundant wetland habitat has been replaced by agriculture, the creation of ditches, canals, and the flooding of fallow agricultural fields provides some habitat for fish and wildlife, particularly during the rainy season.

3.1.3 Invasive and Exotic Species

Executive Order (E.O.) 13112, entitled *Invasive Species*, states an "invasive species means an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health." Alien species (exotic) means, with respect to a particular ecosystem, any species, including its seeds, eggs, spores or other biological material capable of propagating that species and is not native to that ecosystem. Invasive species are broadly defined and can be a plant, animal, fungus, plant disease, livestock disease or other organism. A native species is defined as a species that historically occurred or currently occurs in a particular ecosystem and is not the result of an introduction.

Significant scientific evidence and research document that invasive non-native plants are degrading and damaging south Florida natural ecosystems (Doren, Ferriter and Hastings 2001). Many species are causing significant ecological impacts by crowding out and displacing native plants, altering soil types and soil/water chemistry, altering ecosystem functions such as carbon sequestration, nutrient cycling and fire regimes, and reducing gene pools and genetic diversity. Non-native invasive animal distribution, extent and impacts are not well understood, however implications of invasive animals are apparent in south Florida. In addition to environmental impacts, invasive species impact human health, reduce agricultural production and property values, degrade aesthetic quality, decrease recreational opportunities and threaten the integrity of human infrastructure such as waterways/navigation channels, locks, levees, dams and water control structures.

Florida is particularly vulnerable to the introduction, invasion and naturalization of non-native species. This is due to several factors including a subtropical climate, dense human population centers, major ports of entry and the pet, aquarium and ornamental plant industries. Major disturbance to the landscape has also increased Florida's vulnerability to invasive species. Alteration of the landscape for urban development, flood control and agricultural uses has exacerbated non-native plant and animal invasions. On average, 10 new organisms per year are introduced into Florida that are capable of establishing and becoming invasive and causing environmental harm. Approximately 90% of the plants and animals that enter the continental United States enter through the port of Miami (Cuda 2009). Stein, Kutner & Adams (2000) estimated that over 32,000 exotic species (25,000 plants and 7,000 animals) have been introduced into Florida. There are approximately 4,000-5000 native species of plants and animals in Florida. The number of non-native species that have been introduced is eight times the total number of native species in the entire state. The Atlas of Florida Vascular Plants (Wunderlin and Hansen 2008) documented 4,289 plant species in Florida. Of the 4,289 plant species, 1,419 were considered non-native and were naturalized (freely reproducing) populations. The Florida Exotic Pest Plant Council (FLEPPC) identifies 75 of the 1,419 species of non-native plants as Category I species in the 2011 Invasive Plant List. Searches through existing data and resources indicate 163 non-native plant species have been documented to occur within the project area. Other non-native species are probably present; however, documented citations could not be located. Of the 163 species of plants documented to occur within the project area, there are 70 FLEPPC Category I species, 29 FLEPPC Category II species, and 24 Florida Noxious Weed species.

According to the 2013 South Florida Environmental Report, there are four species of non-native invasive plants infesting more than 144,770 acres within the Everglades Protection Area (EPA). These species include Australian pine (*Casuarina equisetifolia*), Old World climbing fern (*Lygodium microphyllum*), melaleuca, and Brazilian pepper (*Schinus terebinthifolius*). The acreage of these plants was estimated by the South Florida Water Management District (SFWMD) and the National Park Service (NPS) through regional invasive plant surveys utilizing digital aerial sketch mapping (DASM). There were 224 surveys completed within the EPA, which is approximately 2.8 million acres in size, between March 2010 and February 2012. Management areas surveyed included Holeyland, Rotenberger and Southern Glades. Other areas surveyed included Big Cypress Seminole Indian Reservation, Loxahatchee National Wildlife Refuge (LNWR), Everglades Wildlife Management Area (WCAs 2 and 3), the Miccosukee Reservation, Big Cypress National Preserve (BCNP), ENP, East Coast Buffer Lands, South Dade Wetlands and several other areas (SFWMD 2013). Other non-native plant species of concern within the project area include torpedo grass, tropical American water grass (*Luziola subintegra*), roundleaf toothcup (*Rotala rotundifolia*), and cogon grass (*Imperata cylindrical*).

A primary native nuisance species within the project area is cattail. Many areas within the project area have been invaded by cattails. This is attributed to water with increased phosphorus being delivered to these areas beginning in the late 1950s. Areas where water control structures, conveyance features, and levees exist provide a suitable habitat for invasion and expansion of cattail. Examples of areas that have been impacted include WCA 2, WCA 3A, and ENP canal and levee banks.

Searches through existing data and resources indicate 89 non-native animal species have been documented to occur within the project area. Other non-native animal species are probably present however documented citations could not be located. Information regarding species presence and distribution is largely incomplete for most taxonomic groups of animals. Not all of the 89 non-native animal species identified and documented to occur in the action area will have a significant impact on the ecosystem.

Key species of carnivorous reptiles, such as the Argentine black and white tegu (*Tupinambis merianae*), the Burmese python *(Python molurus bivittatus*) and Nile monitor *(Varanus niloticus*) are currently present within the project area and have potential to cause significant impacts to the ecosystem. These species are among south Florida's most threatening invasive animals and are considered top predators and increase pressures on native wildlife populations, particularly threatened and endangered species (SFWMD 2013). Other species of concern include the island apple snail (*Pomacea insularum*), purple swamphen (*Porphyrio porphyrio*), Asian swamp eel (*Monopterus albus*), monk parakeet (*Myiopsitta monachus*), feral pig (*Sus scrofa*), and redbay ambrosia beetle (*Xyleborus glabratus*) *and* associated fungus (*Raffaelea lauricola*). The redbay ambrosia beetle and fungus are of special concern since they are killing bay species on tree islands in ENP and the WCAs.

3.1.4 Threatened and Endangered Species

3.1.4.1 Federally Protected Species

USACE has coordinated the existence of federally listed species with the United States Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS), as appropriate. Federally listed threatened and endangered species are either known to exist or potentially exist within the project area and, subsequently, may be affected by the proposed project. Many of these species have been previously affected by habitat impacts resulting from wetland drainage, alteration of hydroperiod, wildfire, and water quality degradation. A number of candidate animal and plant species are also known to exist or potentially exist within the project area. For a complete list of federally threatened and endangered species within the action area, their critical habitat, and candidate species refer to Table 3.2 and Table 3.3.

TABLE 3.2. THREATENED AND ENDANGERED SPECIES WITHIN THE ACTION AREA

E=Endangered; T=Threatened; SA=Similarity of Appearance; CH=Critical Habitat

Common Name	Scientific Name	Status	Agency
Mammals			
Florida panther	*Puma concolor coryi*	E	Federal
West Indian Manatee	*Trichechus manatus*	E, CH	Federal
Birds			
Cape Sable seaside sparrow	*Ammodramus maritimus mirabilis*	E, CH	Federal
Everglade snail kite	*Rostrhamus sociabilis plumbeus*	E, CH	Federal
Red-cockaded woodpecker	*Picoides borealis*	E	Federal
Roseate tern	*Sterna dougallii dougallii*	T	Federal
Wood stork	*Mycteria americana*	E	Federal
Reptiles			
American Alligator	*Alligator mississippiensis*	T, SA	Federal
American crocodile	*Crocodylus acutus*	T, CH	Federal
Eastern indigo snake	*Drymarchon corais couperi*	T	Federal
Green sea turtle	*Chelonia mydas*	E	Federal
Hawksbill sea turtle	*Eretmochelys imbricate*	E	Federal
Kemp's Ridley sea turtle	*Lipodochelys kempii*	E	Federal
Leatherback sea turtle	*Dermochelys coriacea*	E	Federal
Loggerhead sea turtle	*Caretta caretta*	E	Federal
Fish			
Smalltooth sawfish	*Pristia pectinata*	E, CH	Federal
Invertebrates			
Schaus swallowtail butterfly	*Heraclides aristodemus ponceanus*	E	Federal
Stock Island tree snail	*Orthalicus reses* (not incl. *nesodryas*)	T	Federal
Plants			
Crenulate lead plant	*Amorpha crenulata*	E	Federal
Deltoid spurge	*Chamaesyce deltoidea* spp. *deltoidea*	E	Federal
Garber's spurge	*Chamaesyce garberi*	T	Federal
Okeechobee gourd	*Cucurbita okeechobeensis* ssp. *okeechobeenis*	E	Federal
Small's milkpea	*Galactia smallii*	E	Federal
Tiny polygala	*Polygala smallii*	E	Federal

TABLE 3.3. LIST OF SPECIES WITHIN THE G-3273 CONSTRAINT MODIFICATION ACTION AREA THAT ARE CANDIDATE SPECIES FOR PROTECTION UNDER ESA

Common Name	Scientific Name	Federal Status
Mammals		
Florida bonneted bat	*Eumops floridamus*	C
Plants		
Big pine partridge pea	*Chamaecrista* var. *keyensis*	C
Blodgett's silverbush	*Argythamnia blodgettii*	C
Cape Sable thoroughwort	*Chromolaena frustrata*	C
Carter's small-flowered flax	*Linum carteri* var. *carteri*	C
Everglades bully	*Sideroxylon reclinatum* spp. *austrofloridense*	C
Florida brickell-bush	*Brickellia mosieri*	C
Florida bristle fern	*Trichomanes punctatum* spp. *floridanum*	C
Florida pineland crabgrass	*Digitaria pauciflora*	C
Florida prairie-clover	*Dalea carthagenensis* var. *floridana*	C
Florida semaphore cactus	*Consolea corallicola*	C
Pineland sandmat	*Chamaesyce deltoidea* spp. *pinetorum*	C
Sand flax	*Linum arenicola*	C
Invertebrates		
Bartram's hairstreak butterfly	*Strymon acis bartrami*	C
Florida leafwing butterfly	*Anaea troglodyta floridalis*	C
Miami blue butterfly	*Cyclargus thomasi bethunebakeri*	C

C=Candidate Species

3.1.4.2 State Listed Species

The action area provides habitat for several state listed species. For a complete list of state listed species please see Table 3.4.

TABLE 3.4. STATE LISTED OF SPECIES WITHIN THE G-3273 CONSTRAINT MODIFICATION ACTION AREA

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

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

3.1.5 Climate

The subtropical climate of south Florida, with its distinct wet and dry seasons, high rate of evapotranspiration, and climatic extremes of floods, droughts, and hurricanes, represents a major physical driving force that sustains the Everglades while creating water supply and flood control issues in the agricultural and urban segments.

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. During the wet season, thunderstorms that result from easterly tradewinds and land-sea convection patterns occur almost daily. Wet season rainfall follows a bimodal pattern with peaks during May through June and September through October. Tropical storms and hurricanes also provide major contributions to wet season rainfall with a high level of interannual variability and low level of predictability. During the dry season (November through April), rainfall is governed by large-scale winter weather fronts that pass through the region approximately weekly. However, due to the variability of climate patterns (La Niña and El Niño), dry periods may occur during the wet season and wet periods may occur during the dry season. Multi-year high and low rainfall periods often alternate on a time scale approximately on the order of decades (USACE 1999).

High evapotranspiration rates in south Florida roughly equal annual precipitation. Evapotranspiration removes between 70% and 90% of the rainfall in undisturbed south Florida wetlands (Duever, et al. 1994). Evaporation from open water surfaces peak annually in the late spring when temperatures and wind speeds are high and relative humidity is low. Evaporation is lowest during the winter when the temperatures and wind speeds are low (Duever, et al. 1994). Recorded annual rainfall averaging 53 inches in south Florida has varied from 37 to 106 inches, and interannual extremes in rainfall result in frequent years of flood and drought. Mean sea level is increasing an average of 2.2 mm/year or approximately nine inches over the last 100 years in Florida (NOAA 2001).

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). Mean monthly temperatures range from a low of 63° F (17 °C) in January to a high of 85 ° F (29 ° C) in August (Thomas 1974). Infrequently, freezing temperatures and frost occur when arctic air masses follow winter cold fronts into the area.

3.1.6 Geology and Soils

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

The discontinuous and locally productive water-bearing units of the surficial aquifer include the Biscayne aquifer, the undifferentiated surficial aquifer, the coastal aquifer of Palm Beach and

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

3.1.7 Hydrology

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

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

3.1.7.1 Water Conservation Areas 3A and 3B

The largest WCA is WCA 3, which is divided into two parts, 3A and 3B. It is approximately 40 miles long from north to south and covers approximately 915 square miles. Ground elevations slope southeasterly one to three feet in ten miles ranging from 13 feet, NGVD in northwest WCA_3A to six feet NGVD in southeast WCA 3B. The area is enclosed by approximately 111 miles of levees, of which 15 miles are common to WCA 2. An interior levee system across the southeastern corner of the area reduces seepage into an extremely pervious aquifer.

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

The outer perimeter levees of WCA 3 are the L-4, L-5, L-38 (separating WCA 3 from WCA 2A and WCA 2B), L-37, L-33, L-30, L-29 and L-28 (southern L-28, south of Mullet Slough, contains three gaps to allow for natural drainage from Collier County to the west). Interior parallel levees, L-67A and L-67C, along with their associated borrow canals subdivide WCA 3 into two parts: WCA 3A and WCA 3B. The L-67A and L-67C levees were originally constructed (completed in 1962 and 1966, respectively) for several reasons, including as a step-down system to reduce seepage to the east to allow for urban and agricultural developments in Miami-Dade County, and to increase storage of water in WCA 3A to provide water supply to an expanding urban population to the east. The construction of Tamiami Trail and WCA 3 impounded and altered the historic SRS, effectively creating a barrier through the Everglades, between the northern Everglades (i.e. WCAs) and ENP. The Miami Canal extends from Lake Okeechobee to the Atlantic Ocean and crosses WCA 3 from northwest to southeast. To remedy excessive drainage caused by the Miami Canal, two structures, S-339 and S-340, were built across the C-123 Canal to block water from flowing directly down the canal, except at times of extreme high water or when increased conveyance capacity is needed to deliver water for the ENP and/or the LEC. Upstream from each structure, water was expected to flow laterally from the canal into the marsh through 100 foot gaps that had been left at 500 foot intervals in the canal's spoil piles. South of WCA 3 and within ENP, the northern portion of SRS is also partially divided by the remaining 5.5 miles of the L-67 Extension Levee, which extends south from the southern terminus of L-67A at Tamiami Trail. Outflows from WCA 3A to ENP are regulated according to the WCA 3A Regulation Schedule, with some additional WCA 3A outflows to ENP from groundwater seepage across Tamiami Trail and seasonal surface water flows through the L-28 gaps, which then continue south along the L-28 Borrow Canal.

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). The cycle is primarily driven by rainfall, though it is also heavily influenced by water management operations designed to maintain congressionally-authorized project purposes, including water supply to the LEC and ENP and flood protection to the adjacent EAA and LEC, as well as protection for tropical cyclone events and other extreme storm events. The annual cycle permits the storage of runoff during the wet season and the release of stored water to ENP during the dry season and maintains elements of the habitat essential to fish and wildlife. The distribution of water for flood control and water supply varies

seasonally. The regulation schedules for the WCAs include a minimum water level, below which water releases are not permitted unless water is supplied from another source.

Overall, water stage decreases from northwest to southeast within WCA 3, consistent with the general direction of surface water flow and prevailing topography within WCA 3. Water depth is typically between one to two and a half feet, with the shallower waters in the higher elevation northwestern portion of WCA 3. Water stages and depths in WCA 3B are typically much lower than water stages and depths in WCA 3A, due to limited surface water inflows into WCA 3B and the reduction of seepage from WCA 3A to WCA 3B due to the design of 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 to the south towards the L-29 Canal.

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

If WCA 3A levels are at or below the 7.5 feet, NGVD minimum, or WCA 3A floor level, then water supply releases from WCA 3A must be offset by equivalent inflows to WCA 3A from another source, typically Lake Okeechobee (USACE 2006). The L-67 Borrow Canal is specified in the WCA 3A Interim Regulation Schedule, though the WCA 3A floor elevation is traditionally measured at the S-333 headwater gage; there is no requirement to maintain the L-67A Borrow Canal at or above the WCA 3A floor elevation during water supply deliveries. The SFWMD has indicated that drought year water supply deliveries from Lake Okeechobee can be problematic or extremely difficult if the lake stages are below the level at which pumping, rather than gravity, is needed to pass the water supply releases (typically at a lake stage of approximately 10.5 feet, NGVD). If Lake Okeechobee is at levels where water cannot physically be delivered south, then no deliveries will be made from Lake Okeechobee, and no water supply releases from WCA 3A below the floor elevation will be made. If water is available from Lake Okeechobee, then water may be delivered to WCA 3A using one of two routes (both routes may be utilized concurrently, depending on conditions within the system): (1) the western route through S-354, along the Miami Canal (within the EAA), and utilizing the S-8 Pump Station into WCA 3A to provide replacement water for the water supply delivery volume that will be delivered to C-6 and/or the SDCS once the replacement water at the north end of WCA 3A is provided; or (2) the eastern route through S-351 and along the North New River Canal (within the EAA), followed by utilizing either (a) the S-150 gated culvert structure to pass water into WCA 3A (into the L-38W Canal) or (b) utilizing the S-7 Pump Station to release into the L-38E Canal (within WCA 2A) for downstream release through the S-11s into WCA 3A

(into a more southerly portion of the L-38W Canal than the S-150 outlet). The eastern water supply deliveries route is directly connected to the S-151 structure in the Miami Canal by the L-38W Canal and the L-68A Borrow Canal, with the L-68 Borrow Canal tying into the L-67A Canal (slightly west of the S-9 Pump Station). These deliveries offset saltwater intrusion into the Biscayne aquifer system.

The most important component of the groundwater system within the study area is the Biscayne aquifer, an unconfined aquifer unit underlying an area of approximately 3,000 square miles in southeast Florida, from southern Palm Beach County southward through Broward County to South Dade County. This huge, freshwater, underground water body is highly productive along the coastal ridge and for a considerable distance to the west. Groundwater in WCA 3 generally flows from the northwest to the southeast, with extensive seepage across the eastern and southern levees, L-30 (southeast corner of WCA 3B) in particular. However, the direction of flow may be influenced by rainfall, drainage canals, or well fields. Fluctuations in groundwater levels are seasonal. Groundwater levels within WCA 3 are influenced by water levels in adjacent canals. Where there is no impermeable formation above the aquifer, surface water recharges the system and the groundwater level can rise freely. In times of heavy rainfall the aquifer fills and the water table rises above the land surface, contributing to seasonal inundation patterns throughout the area. Over much of its extent, the aquifer is covered by only a few inches of soil. The permeable limestone of the aquifer is shielded against upward intrusion of saline water from the Floridan aquifer by relatively impermeable beds of clay and marl.

The timing and distribution of water within WCA 3A, WCA 3B, and ENP is affected by direct rainfall, evapotranspiration, and regional water management operations. Specifics relating to the effects of inflows/releases on WCA 3A water level can be found in Table 3.5 below.

TABLE 3.5. EFFECTS OF INFLOWS/RELEASES ON WCA 3A WATER LEVEL

Inflow/Outflow WCA 3A (average daily cfs)	Duration (days)	Effect on WCA 3A (feet)*	Duration (days)	Effect on WCA 3A (feet)*
200	1	0.001	20	0.018
300	1	0.001	20	0.027
400	1	0.002	20	0.036
500	1	0.002	20	0.044
600	1	0.003	20	0.053
700	1	0.003	20	0.062
800	1	0.004	20	0.071
900	1	0.004	20	0.080
1000	1	0.004	20	0.089
1100	1	0.005	20	0.098
1200	1	0.005	20	0.107
1300	1	0.006	20	0.116
1400	1	0.006	20	0.125
1500	1	0.007	20	0.133
1600	1	0.007	20	0.142
1700	1	0.008	20	0.151
1800	1	0.008	20	0.160
1900	1	0.008	20	0.169
2000	1	0.009	20	0.178
2100	1	0.009	20	0.187
2200	1	0.010	20	0.196
2300	1	0.010	20	0.205
2400	1	0.011	20	0.214
2500	1	0.011	20	0.222
2600	1	0.012	20	0.231
2700	1	0.012	20	0.240
2800	1	0.012	20	0.249

3.1.7.2 Northeast Shark River Slough

NESRS is a complex area located in the northeast corner of ENP. It is currently the northern terminus of SRS, which is aligned from the northeast to southwest across ENP. Tamiami Trail is the northern boundary, the L-31N Canal the eastern boundary, and the L-67 Extension Canal the western boundary of the area. Historically, the area would be characterized as wet most of the year, but regional developments have impacted historic freshwater routes into the area. In addition, if historic levels are not maintained through the end of the wet season, significant reductions in surface water can occur during the dry season below historic dry season levels.

Water enters NESRS primarily from WCA-3A, via S-333, and then to the L-29 Borrow Canal and subsequent passage through culverts under Tamiami Trail. In addition, pending approval of an operational authorization, S-355A and S-355B may also be used to deliver water from WCA 3B to the L-29 Borrow Canal for subsequent passage through the culverts to NESRS. The discharges made from WCA 3A through the S-12s and S-333 are target flows determined from the Rainfall Plan (USACE 2006). Under the Rainfall Plan, water deliveries would be computed and operations adjusted weekly, if necessary based on the sum of two components: a rainfall

response component and a WCA 3A regulatory component. The normal operational target flow distribution is 55 percent through the S-333 into NESRS and 45 percent through the S-12s into ENP west of the L-67 Extension. Eastern portions of the ENP are also influenced by the system of canals and structures that provide flood control and water supply for the LEC urban and agricultural areas.

3.1.7.3 Western Shark River Slough

Western SRS, located to the west of L-67 Extension Levee and bounded on the north by Tamiami Trail, is primarily influenced by rainfall and water management operations at the S-12 structures (A, B, C and D). Under ERTP, the utilization of the S-12 structures and the seasonal sequential closure periods beginning from the west at S-12A (November 1 – July 15), S-12B (January 1 – July 15), respectively, is meant to move water from WCA 3A into SRS while providing conditions for Cape Sable seaside sparrow Subpopulation-A (CSSS-A) nesting and breeding. Although not required in water management operations, there is a rule-of-thumb that is often utilized that includes delivering the Rainfall Plan S-12 structure target flows from east to west with 40 percent, 30 percent, 20 percent, and 10 percent being discharged at S-12D, S-12C, S-12B, and S-12A, respectively. Releases from WCA-3A are part of a regulation schedule for WCA 3A and are typically dependent on a Rainfall Based Management Plan. This Rainfall Based Management Plan consists of a rainfall-based delivery formula that specifies the amount of water to be delivered to ENP in weekly volumes through the S-333 and S-12 structures. Under ERTP, the normal operational target flow distribution is 55 percent through S-333 into NESRS and 45 percent through the S-12 structures into ENP west of the L-67 Extension.

3.1.7.4 Taylor Slough

Taylor Slough is in the southeast quadrant of ENP. The area through the Rocky Glades and Taylor Slough is higher in elevation compared to ground levels north, south, or west. Because of this characteristic, the area is normally drier than other areas in the ENP. The Rocky Glades and Taylor Slough are somewhat like an island or a peninsula extending from the canals into the ENP. Under ERTP, specified C-111 basin canal water levels/ranges and S-332D pump station operations resulted in Taylor Slough being provided water from C-111 mainly during the wet season. During the dry season, under ERTP, water deliveries to Taylor Slough were limited to provide conditions conducive to CSSS nesting (325 cfs from December 1 – January 31; 165 cfs from February 1 – July 15).

3.1.7.5 Lower East Coast Area

The LEC area is located to the east of the L-31N, L-31W, and C-111 canals. Under ERTP, 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.

3.1.7.6 8.5 Square Mile Area

The 8.5 Square Mile Area (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 cell meant to collectively provide flood mitigation as part of the MWD Project (USACE 2000).

3.1.7.7 Biscayne Bay

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

3.1.7.8 Florida Bay

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

3.1.8 Regional Water Management (Operations)

3.1.8.1 Greater Everglades

The C&SF Project has numerous water management structures consisting of culverts, spillways, and pump stations that have specified operating criteria for managing or regulating water levels for Congressionally-authorized project purposes. The C&SF Project contains multiple water bodies created by the existing C&SF levee infrastructure and implementation of the water management operating criteria, including WCA 1, WCA 2, and WCA 3. Associated with the inflow to and discharge from the water bodies is an infrastructure of structures and canals that are managed by the implementation of water management operating criteria that can include specified water levels or ranges. The WCA 3A Interim Regulation Schedule is a compilation of water management operating criteria, guidelines, rule curves, and specifications that govern storage and release functions. Typically, a regulation schedule has water level thresholds which vary with the time of year and result in discharges. The threshold lines of regulation schedules define the discharge zones and are traditionally displayed graphically. Additionally, a corresponding table is typically used to identify the structure discharge rules for the zones. As with most regulation schedules, the WCA 1, WCA 2, and WCA 3A regulation schedules must take into account various, and often conflicting, project purposes.

The WCAs are regulated for the Congressionally-authorized C&SF Project purposes to provide: flood control; water supply for agricultural irrigation, municipalities and industry, and ENP; regional groundwater control and prevention of saltwater intrusion; enhancement of fish and wildlife; and recreation. An important component of flood control is the maintenance of marsh vegetation in the WCAs, which provide a dampening effect on hurricane-induced wind tides that have the potential to affect residential areas to the east of the WCAs. The marsh vegetation,

along with the east coast protection levee, also prevents floodwaters that historically flowed eastward from the Everglades from flowing into the developed areas along the southeast coast of Florida.

Water levels in WCA 3A are managed primarily by five gated spillways: the S-12 structures (S-12A, S-12B, S-12C, and S-12D) and S-333. Additionally, S-151, S-343A, S-343B and S-344 can also be utilized to discharge from WCA 3A. The S-12s and S-333 are utilized to provide water deliveries to ENP, in accordance with the 2012 ERTP FEIS. From July 2002 through October 2012, WCA 3A was regulated according to a seasonally varying 8.75 to 10.75 feet, NGVD regulation schedule and the Rainfall Plan (initiated in 1985), as per IOP (2006 IOP Supplemental Environmental Impact Statement [EIS]. The discharges made from WCA 3A through the S-12s and S-333 are target flows determined from the Rainfall Plan; when WCA 3A is in Zone A, these target flows are the maximum flow possible. Under the Rainfall Plan, water deliveries are computed and operations adjusted, weekly, if necessary based on the sum of two components: a rainfall response component and a WCA 3A regulatory component. The Rainfall Plan provides for the rainfall response component within all zones of the WCA 3A Regulation Schedule, with the additional regulatory release requirement added when the WCA 3A water levels fall within the higher regulation schedule zones above Zone E, including Zone E1. Under ERTP, the goal of the rainfall and regulatory components is to split the flows between the S-12 structures and S-333, with 45 percent of the total flow from WCA 3A passing through the S-12 structures to Western SRS and the remaining 55 percent to discharge through S-333 to NESRS unless in the dry season (80% to NESRS, 20% to Western SRS in dry season), establishing the target flows for both the S-12 structures and S-333. ERTP specifies seasonal closure of the S-12A and B structures, with the following rigid closure periods: November 1 – July 14 for S-12A; January 1 – July 14 for S-12B. There are no closing periods for S-12C or D.

Water deliveries to eastern ENP are controlled by the stage in L-29 Canal, as pressure from the water within the canal (hydraulic head), is required to force water through the Tamiami Trail culverts and bridge and into ENP. As canal stage increases, more water is forced beneath the road through 19 sets of culverts (55 total culverts, three culverts per set in most locations). The L-29 Canal stage is currently limited due to concerns regarding potential flooding and seepage effects within residential or agricultural areas of Miami-Dade County and potential damage to the Tamiami Trail roadway sub-base. The water management operating criteria for the L-29 Borrow Canal between S-333 and S-334 is meant to limit the L-29 Borrow Canal stage to no more than 7.5 feet NGVD in response to roadway sub-base concerns identified by the Florida Department of Transportation (FDOT), although short-term deviations have been previously implemented in response to specific hydrologic conditions. Higher water levels within the canal may erode the roadway sub-base and create a potential safety hazard, until completion of the Modified Water Deliveries (MWD) Tamiami Trail Modifications Project in 2013. In addition, the L-29 Borrow Canal water level has an additional constraint related to potential flooding and seepage effects within residential and/or agricultural areas of Miami-Dade County. When the G-3273 water level within NESRS reaches 6.8 feet NGVD, S-333 discharges to NESRS will be discontinued until G-3273 falls below 6.8 feet NGVD. Tamiami Trail roadway modifications, to accommodate potential maximum L-29 Borrow Canal water levels up to 8.5 feet, NGVD are currently in progress with the ongoing MWD Project.

When WCA 3A water levels are in Zone A of the WCA 3A Interim Regulation Schedule, S-343A, S-343B, and S-344 can be utilized to discharge from WCA 3A into BCNP. Discharges can also be made through S-343A, S-343B and S-344 when agreed to by SFWMD, USACE, and National Park Service (NPS) to extend hydroperiods within BCNP. The S-151 gated culvert structure, which is located along the Miami Canal and operated according to the WCA 3A Interim Regulation Schedule (USACE 2012), is the only existing surface water connection between WCA 3A and WCA 3B. S-151 discharges into C-304 in WCA 3B for flood diversion and for the purpose of providing water supply to LEC canals and the ENP SDCS. Under existing conditions, water does not flow directly from WCA 3B into the L-29 Borrow Canal. There are two discharge structures, S-355A and S-355B, along L-29 south of WCA 3B that are designed to move water from WCA 3B into the canal, although the operation of these structures has not been previously authorized for more than short-term, temporary operations. The S-355 structures are completed components of the MWD Project, intended to function in concert with the proposed MWD S-345 structures along L-67A/L-67C to address the MWD Project objective of restoring WCA 3B as a functioning component of the Everglades hydrologic system and restoration of water deliveries to NESRS.

3.1.9 Flood Control

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

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

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

County. This canal system was overlaid on the existing flood control system. Many of these canals are used to remove water from interior areas to tide in times of excess water.

3.1.10 Water Quality

Water quality in the study area is significantly influenced by development. The C&SF Project led to significant changes in the landscape by opening large land tracts for urban development and agricultural uses, and by the construction of extensive drainage networks. Natural drainage patterns in the region have been disrupted by the extensive array of levees and canals which has resulted in further water quality degradation. The water quality of the study area is largely controlled by Lake Okeechobee and the EAA. The northern WCAs are fed from the lake as well as runoff from the EAA. Water quality impairment within the study area can generally be attributed to nutrients and bioavailable forms of mercury. A short discussion of each of these water pollutants is provided below followed by a geographically referenced review of water quality within the study area.

3.1.10.1 Nutrients

Nutrients such as phosphorous and nitrogen compounds are a concern in the estuaries, WCAs, ENP, and Lake Okeechobee since they result in an imbalance of flora and fauna. Excess nutrients come primarily from agricultural fertilizers; the decomposition of the peat soils in the area also contributes to excess phosphorus in the system. Phosphorus is the limiting nutrient for Lake Okeechobee, the WCAs, and ENP; nitrogen is generally considered to be the limiting nutrient for the marine waters of south Florida. Prior to 1970, the background TP concentration in Lake Okeechobee was less than 0.040 milligrams per liter (mg/l) while at present it exceeds 0.090 mg/l. Within the remnant Everglades, the background phosphorus concentration in surface waters is between 0.004 mg/l and 0.006 mg/l TP. At the northern end of WCA 3, inflow TP concentrations exceed 0.020 mg/l resulting in undesirable changes to soil composition and vegetation coverage. Soil phosphorus concentrations in pristine areas of ENP are on the order of 100 to 200 milligrams per kilogram (mg/kg) while in impacted areas of the WCAs near canals, soil phosphorus concentrations exceed 500 mg/kg (Craft and Richardson 2007). The discharge of elevated concentrations of TP into the WCAs has resulted in sufficient soil phosphorus concentrations (< 650 mg/kg) to support cattail invasion into formerly sawgrass and bulrush dominated areas. An example of the impact of nutrient discharges is evident from the expansion of cattails south of the S-10 inflow gates to WCA 2A.

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

3.1.10.2 Bioavailable Mercury

Mercury is widely distributed in the environment and originates primarily from sources such as volcanoes and human-induced (anthropogenic) sources such as combustion. According to the United States Geological Survey (USGS 2010), mercury is deposited from the atmosphere primarily as inorganic mercury. Approximately 90% of atmospheric mercury in peninsular Florida is sourced internationally with the balance coming from local generators. Methylation, the conversion of inorganic mercury to organic methylmercury by naturally occurring sulfate-reducing bacteria, is the most important step in the mercury cycle because it greatly increases toxicity and potential for accumulation in aquatic biota. Nearly all of the mercury found in fish tissue is methylmercury.

Human exposure to mercury is primarily through the consumption of fish containing methylmercury. Exposure to mercury causes neurodevelopmental delays in children. Wildlife exposure to methylmercury through the consumption of fish results in reproductive, neurological, and immune system problems (SFWMD 2013). The United States Environmental Protection Agency (USEPA) has established that a concentration of mercury in fish tissue in excess of 0.3 mg/kg is detrimental to human health. Water quality impairment for mercury as measured by the incidence of fish tissue with mercury in excess of 0.3 mg/kg is found in all 50 states (USEPA 2010). Every county within Florida has at least one water body with a fish consumption advisory (Florida Department of Health 2013).

Over the past 15 years, researchers with the FDEP, USGS, and SFWMD have investigated trends in methylmercury bioaccumulation as well as identified the chemical precursors that play a role in the rate of mercury methylation and demethylation within south Florida wetland ecosystems. Between 1997 and 2012, fish tissue mercury content has fallen significantly in response to reductions in local contributions of atmospheric mercury. Within the Everglades ecosystem, these researchers have identified sulfate as the most important precursor regulating mercury methylation. Dissolved organic carbon and phosphorus were found to play lesser roles in regulating methylmercury production.

The relationship between surface water sulfate concentration and mercury methlyation rates within the Everglades marsh system is unimodal with peak methylation occurring at intermediate concentrations rather than at either lowest or highest sulfate concentrations. For instance, in WCA 3A, peak methylation occurs when water column sulfate concentrations are in the 10 to 20 mg/l range. In WCA 2A, peak methylation occurs when water column sulfate concentrations are in the 30 to 50 mg/l range. In northern ENP, peak methylation occurs when water column sulfate concentrations are in the 2 to 4 mg/l range (Orem 2013). Below the optimum ranges cited here, it is thought that sulfate is limiting. Above the optimum ranges, sulfide concentrations begin to inhibit methylation. Differences in the optimum ranges for ENP and the WCAs are thought to be due to the lower organic matter and metals available in ENP relative to the WCAs.

Sulfate concentrations within Lake Okeechobee, the EAA, WCAs, and portions of ENP are well above the natural background levels due to the use of agricultural amendments and drainage of the Everglades marsh. Figure 3-1 from Corrales et. al. (2011)**,** shows that Lake Okeechobee contributes approximately one third of sulfur loading to the WCAs while the remaining is the

result of agricultural practices, soil oxidation, groundwater, and atmospheric contributions. In 2012 it was estimated that the lake provides between 16 to 20 percent of the EAA sulfate load and thus a lower contribution of sulfate to the WCAs than estimated by Corrales et. al (2011). The average concentration of sulfate which is the predominant chemical form of sulfur in Lake Okeechobee has fallen from approximately 60 mg/l, to around 25 mg/l over the past 20 years as a direct result of reducing the amount of back pumping of agricultural stormwater runoff into the lake. The concentration of sulfate in discharges into the northern end of WCA 3A is significantly higher than that of the lake at around 40 to 50 mg/l.

In the WCAs organic matter and free metals tie up sulfide as organic sulfur and metal sulfides leaving less free sulfide to inhibit methylation (Orem 2013). The FDEP currently does not have a water quality standard for sulfate in surface waters. The USEPA has a secondary standard for sulfide in surface waters of 0.002 mg/l.

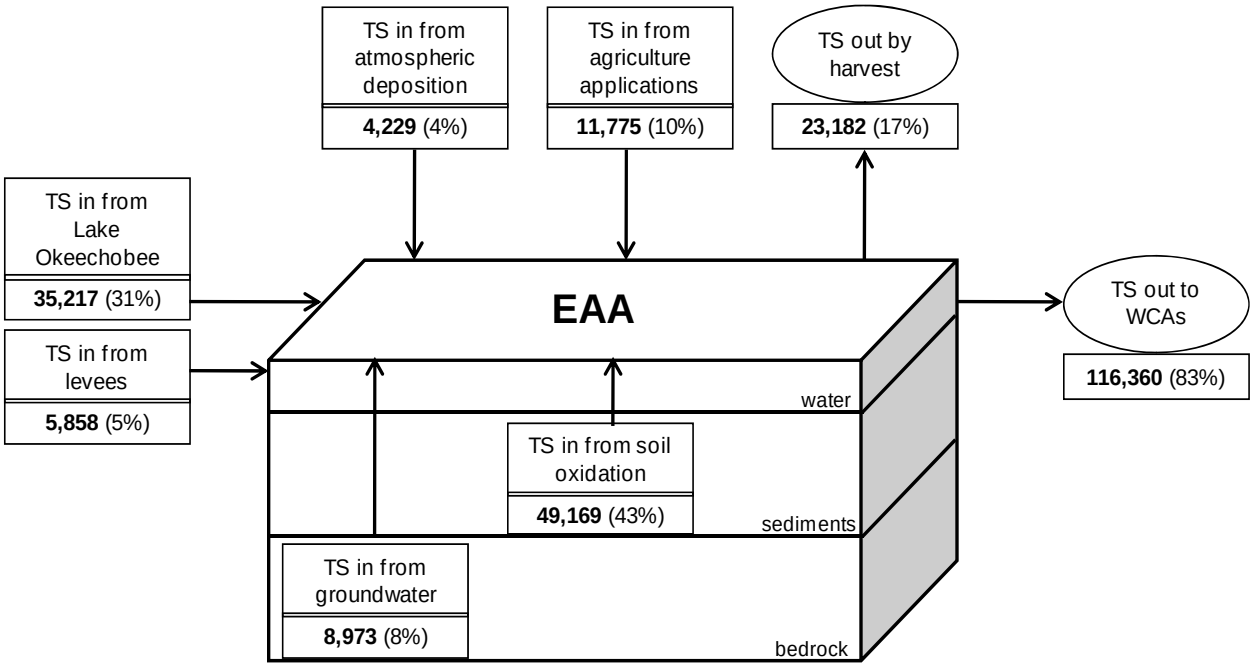

FIGURE 3-1. ESTIMATED AVERAGE ANNUAL TOTAL SULFUR (TS) LOAD IN METRIC TONS (CORRALES ET. AL. 2011)

The RECOVER CERP Performance Measure for sulfate recommended one part per million, 1 mg/L, as a goal for Greater Everglades wetlands. However, the 1 mg/L concentration was recommended as a background marsh concentration without detailed technical support. While concerns have been raised that concentrations above this level could stimulate significant mercury methylation, the 1 mg/L sulfate goal is not consistently associated with any particular level of mercury in the Everglades. The 1 mg/L goal should not be propagated, at this point in time, due to the lack of empirical evidence suggesting that 1 mg/L is protective or that higher levels are consistently associated with harm. Furthermore, to date, no studies have been documented to justify either a numeric sulfate criterion of 1 mg/L, or a site-specific alternative

criterion (SSAC) that incorporates other potential factors in the methylation process, for the protection of fish and wildlife in the EPA.

Sulfate arrives in Everglades marshes from several sources. These sources include agricultural and primary system water conveyance canals which deliver sulfate from soil oxidation, agricultural applications and groundwater inputs from the headwaters of the Everglades above Lake Okeechobee, down through the EAA. In addition to surface water, the atmosphere also provides sulfate in rainfall with a concentration of approximately 1 mg/L. More quantitative information is needed on regional sources and magnitudes of Everglades sulfur, and its major form sulfate, in order to determine the controllable and uncontrollable components associated with storage and export processes within the watersheds contributing to the Everglades.

Affecting significant reductions in sulfate concentrations emanating from controllable, including current anthropogenic activities, and uncontrollable sources requires further evaluation. While agricultural sulfur amendments (which lessen the amount of phosphorus needed in fertilizers) for crop production occurs throughout the various contributing watersheds at various levels, the overall contribution to the sulfur mass balance budget is likely a relatively small controllable portion. However, legacy sulfur stored in the soil will ostensibly continue to be released for many decades at significant rates within the Lake Okeechobee watershed and EAA. Therefore, reducing sulfate applications in the EAA, or in the Lake Okeechobee watershed, may not reduce sulfate loads to the Everglades substantially due to the high inventory of sulfur in EAA soils and elsewhere. While it may take several decades to see any significant reductions in the amount of sulfur stored in the soils, the combination of the many other sources (e.g., Lake Okeechobee, groundwater inputs, and rainfall) will likely remain at sufficient levels to collectively contribute toward stimulating mercury methylation in the EPA marshes.

Control of sulfur inputs has been suggested as a possible means to reduce mercury methylation rates in the Everglades. However, sulfate and mercury data from the Everglades are highly variable and provide few patterns with predictive value. Sulfur availability is only one of many factors that influence mercury methylation in Everglades marshes. Monitoring will facilitate tracking the status of sulfate levels but will not affect the rates of mercury methylation.

The draft total maximum daily load (TMDL) addresses mercury as a pollutant and the TMDL is set at levels that would protect all affected human populations and address Florida fish consumption advisories for fresh and marine waters. While source controls in Florida will minimally contribute to solving the mercury problem, international controls are more essential in the long-term. Over 90% of atmospheric mercury is from international sources. There are no guarantees that offshore (or U.S.) airborne mercury load sources will decrease resulting in less methylmercury bioaccumulation in aquatic species. It is also highly probable that reductions in mercury methylation will be mostly achieved through a reduction in atmospheric mercury load sources far in advance of any achievable reduction in sulfur levels.

3.1.11 Groundwater Resources

Groundwater in south Florida consists of the surficial Biscayne aquifer and the Floridan aquifer. Both are critical to the ecology and economy of south Florida. The Biscayne aquifer is highly permeable and is at or near the land surface in many locations and therefore readily susceptible to groundwater contamination. The Biscayne aquifer has been classified as a Sole Source

Aquifer for Broward and Miami-Dade Counties under the Federal Safe Drinking Water Act based on the aquifer's susceptibility to contamination and the fact that it is a principal source of drinking water. The Floridan aquifer system is one of the most productive aquifers in the world and is a multi-use aquifer system. North of Moore Haven and Port Mayaca, where it contains freshwater, the Floridan is the principal source of groundwater supply. South of Lake Okeechobee, the Floridan aquifer is generally brackish and historically has not been used as a primary source of drinking water though this may change in the future as water supplies become more scarce.

3.1.12 Air Quality

Legal limitations on pollutant concentration levels allowed to occur in the ambient air, or air quality standards, have been established by the USEPA and the FDEP for six criteria pollutants: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), particle pollution (10 microns or less in diameter (PM_{10}), and 2.5 microns or less in diameter ($PM_{2.5}$), and sulfur dioxide (SO_2). Primary sources of air pollution in south Florida are related to transportation, stationary fuel combustion sources, and solid waste disposal. In 2011, Florida continued to be in attainment for all criteria pollutants, except for the lead nonattainment area in Hillsborough County as noted in the FDEP 2011 Air Monitoring Report). Air monitoring reports are prepared annually by FDEP to inform the public of the air pollutant levels throughout the State of Florida. The report summarizes the results of monitoring that has been conducted to measure outdoor concentrations of those pollutants for which the USEPA and the State of Florida's Environmental Protection program have established ambient air quality standards. All areas within the state are designated with respect to each of the six pollutants as attainment (i.e., in compliance with the standards); non-attainment (i.e., not in compliance with the standards); or unclassifiable (i.e., insufficient data to classify). Attainment areas can be further classified as maintenance areas. Maintenance areas are areas previously classified as non-attainment which have successfully reduced air pollutant concentrations to below the standard. Maintenance areas must maintain some of the non-attainment area plans to stay in compliance with the standards.

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

3.1.13 Hazardous, Toxic or Radioactive Wastes

Engineering Regulation (ER) 1165-2-132 states that "construction of civil works projects in HTRW contaminated areas should be avoided where practicable." Compliance with the requirements of ER 1165-2-132 for the planning phase is demonstrated in this report. The USACE and SFWMD will continue to document HTRW conditions on the project lands such that the project will be in compliance with the ER and other applicable HTRW policies. In order to comply with the requirements of ER 1165-2-132, human health risks are typically evaluated by comparing chemical concentrations in all media (e.g., soil, groundwater, surface water, sediment) to human health-based cleanup target levels (CTLs) promulgated by FDEP in Chapter 62-777, F.A.C. Ecological risks are typically evaluated by comparing chemical concentrations to the Sediment Quality Assessment Guidelines (SQAGs) developed by FDEP for inland waters and to ecological restoration targets established by the USFWS. If warranted, lands within the project boundary are investigated in accordance with the jointly developed (FDEP, USFWS, and SFWMD) protocol, entitled "Protocol for Assessment, Remediation and Post-remediation

Monitoring for Environmental Contaminants on Everglades Restoration Projects." The protocol, which is commonly referred to as the Ecological Risk Assessment (ERA) Protocol, is intended to provide guidance on conducting environmental site assessments on agricultural lands proposed for use in projects to be inundated with water, such as for conversion to storm water treatment areas, wetlands, reservoirs, and other aquatic features.

The ERA Protocol requires that relevant data collected during the Phase II ESA initially be compared to the human health Soil Cleanup Target Levels (SCTLs) from 62-777 F.A.C. and the ecological risk SQAG thresholds. While the SCTL's are promulgated standards under Florida law, the SQAG guidelines are not standards as defined in Section 403.803, F.S. where the results exceed the SCTLs, a risk-based approach is used by the regulator to determine if corrective action is required or if an alternative target level is appropriate based on projected exposure. Where the results exceed the SQAG screening criteria, a Screening Level Ecological Risk Assessment (SLERA) is performed as part of the Phase II ESA. The purpose of the SLERA is to evaluate potential ecological risks to benthic invertebrates and higher trophic species, particularly USFWS trust species protected under the Endangered Species Act or the Migratory Bird Treaty Act, associated with exposure to the chemicals present in the soils, after the project is constructed and the property is inundated.

3.1.14 Cultural Resources

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

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

After the Archaic period, the region became incorporated into what is known as the Glades region and remained inhabited until European contact, when Old World diseases and slave raiding heavily reduced the Native populations during the late 1500s-1700s. Many of the tree islands through this region sites associated to the Glades period. This period has been broken down into successive stages starting with Glades I, which dates from 500 B.C .to 750 A.D., Glades Period II dating from 750 to 1200 A.D., and Glades Period III dating from 1200 A.D. to European contact in the 1500s. The hallmark of Glades Period sites is the presence of sand tempered pottery. The separate periods are distinguished by temporally diagnostic decorations. It should be noted that recent investigations have resulted in the recovery of sand tempered pottery in association with Lake Archaic sediments and fiber tempered pottery. Typical habitation sites through this region are commonly referred to as middens, which are the

accumulation of daily life activities on these tree islands. Material remains can stretch from the surface to well over one meter below the surface on certain islands. Native American burials can also be found among these habitation sites (Milanich 1994).

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

Within WCA 3 and NESRS area there are a number of identified archeological sites. Site testing has identified the occupation started by the Late Archaic and continuing through present. A significant number of the sites have recorded Seminole and Miccosukee occupations (Schwadron 2009). A few have been associated with events of the Third Seminole War.

The Corps had determined that fluctuation of water levels prescribed in the ERTP has the potential to adversely affect historic properties within WCA 3 and the Everglades National Park. Because of uncertainties about the affect from the ERTP water management plan the Corps has entered into a Programmatic Agreement (PA) with the Advisory Council on Historic Preservation and the Florida State Historic Preservation Officer. In addition to specifying research on the effects of the fluctuating water levels on historic properties, the PA specifies the use of the Everglades Depth Estimation Network (EDEN) (http://sofia.usgs.gov/eden/) to monitor water levels throughout WCA 3 and the ENP. If water levels exceed 90% of the period of record (i.e. IOP operations 2002-2012) the Corps will investigate to determine whether the increase is caused by natural phenomena or by a failure in water management operations. Planned deviations from the operations established by the ERTP EIS are identified as "new undertakings" requiring additional Section 106 of the National Historic Preservation Act coordination.

Starting in April 2013 and continuing through July 2013, South Florida and especially WCA 3 and the ENP have received unusually high rainfall ranging from 160% to 230% of average each month. This high rainfall has resulted in water levels throughout the system above 90% of the period of record; in many areas, including the NESRS, the water levels have exceeded the period of record.

3.1.15 Socioeconomics

Florida's economy is characterized by strong wholesale and retail trade, government, and service sectors. The 2010 population estimates for each of the Lower East Coast (LEC) Planning Area counties are as follows: Palm Beach County (1,340,134 residents), Broward County (1,748,066 residents), and Miami-Dade County (2,496,435 residents). The economy of south Florida is based on services, agriculture, and tourism. Florida's warm weather and extensive coastline attract vacationers and other visitors and help make the state a significant retirement destination. The three counties that comprise the LEC (Palm Beach, Broward, and Dade) are heavily populated, and it is estimated that over 6.9 million people will reside in this region by the year 2050. A complete socioeconomic description of the C&SF Project area was completed in the Comprehensive Review Study (USACE 1999) and is incorporated into this document by reference.

3.1.16 Study Area Land Use

The existing land use within the study area varies widely from agricultural to high-density multi-family and industrial urban uses. Much of the land use/cover change occurring in south Florida over the past several years can be categorized as either the creation of new developments in previously natural or agricultural areas, or the change in the types of agriculture practiced. Much of the land used for agriculture is likely categorized as unique farmland based upon its location, growing season, and high value crops.

Generally, urban development is concentrated along the LEC from Palm Beach County to Dade County. The LEC extends approximately 100 miles through the coastal portions of Palm Beach, Broward, and Dade Counties. As the most densely populated sub-region in the state, the LEC is home to one-third of the state's population, more than 4.5 million people. The sub-region is primarily an urban megalopolis, but it also contains substantial agricultural acreage, particularly in southwestern Dade County (90,000 acres). Rapid population growth and land development practices have resulted in notable western urban sprawl; the predominant land use is single-family residential. The once significant rural population in the western areas of Broward County has practically disappeared, resulting in an urbanized makeup in population.

A large portion of south Florida remains natural, although much of it is disturbed land. The dominant natural features within the study area include two major management areas located south of Lake Okeechobee. These include the Everglades Complex of Wildlife Management Areas (ECWMA) and ENP. The ECWMA includes three adjacent Wildlife Management Areas (WMAs). These include the: (1) Rotenberger WMA, (2) Holey Land WMA, and (3) Everglades (WCA 3A) and Francis S. Taylor (WCA 3B) WMAs. The ECWMA is described in the next section. The Rotenberger and Holey Land WMAs are located north of WCA 3A and south of Lake Okeechobee between the Miami and North New River Canals.

3.1.17 Public Land Management

Lands in the ECWMA are managed by the FWC under 2 leases from the State of Florida and through a 1952 cooperative management agreement with the SFWMD. An agreement was also formed among the State of Florida, the FWC, the SFWMD, and the Miccosukee Tribe in 1982 granting a perpetual lease to the Miccosukee Tribe for approximately 189,000 acres of WCA 3A.

The FWC has outlined a conceptual management plan for the ECWMA (FFWCC 2007) providing general information on resource management goals and objectives. Management activities within the ECWMA include the maintenance and restoration of plant and animal communities, public education, recreation, and habitat protection. Management emphases by the FWC consists of the development and recommendation of water regulation schedules to address hydrological restoration, improvement of the quality of existing habitats to benefit native fish and wildlife species through prescribed burns, control of exotic species, and plantings of native trees and shrubs. Recreational hunting is used as the primary management tool to maintain resident game populations in the ECWMA. The FWC also manages the sport fishery within the ECWMA by providing regulations pertaining to size and possession limits. The FWC also coordinates with cooperating agencies to maintain access to the canal system and public use areas to maximize boat and bank fishing opportunities.

ENP spans nearly 1.5 million acres of wetlands, uplands, and submerged lands at the southern end of the Florida peninsula. ENP, authorized by Congress in 1934 and established in 1947, was established to protect the unique tropical biological resources of the southern Everglades system. It was the first national park to be established to preserve purely biological (versus geological) resources. The Park's authorizing legislation mandated that it be managed as "wilderness, [where] no development … or plan for the entertainment of visitors shall be undertaken which will interfere with the preservation intact of the unique flora and fauna and the essential primitive natural condition now prevailing in this area." This mandate to preserve wilderness is one of the strongest in the legislative history of the National Park System. ENP has been designated a World Heritage Site, an International Biosphere Reserve, and a Wetland of National Significance. In addition, 86 % of ENP is designated wilderness under the Wilderness Act of 1964. ENP is managed by the NPS.

3.1.18 Recreation

There are many recreational opportunities throughout south Florida, however, with the dense urban surroundings demand often exceeds availability. Rotenberger and Holey Land WMAs are open to public access year round. Primary recreational opportunities include hunting, fishing, camping, hiking, and bicycling. Game species occurring in the WMAs include white-tailed deer, common snipe (*Gallinago gallinago*), feral hog (*Sus scrofa*), marsh rabbit (*Sylvilagus palustris*), blue-winged teal (*Anas discors*), mottled ducks (*Anas fulvigula*), and other game. Alligator hunting is also currently administered on Holey Land WMA. The Everglades (WCA 3A) and Francis S. Taylor (WCA 3B) WMA lands have been used for recreational activities including hunting, fishing, frogging, boating, camping, and off-road vehicle use. Fishing is a popular recreational activity and also holds numerous tournaments each year. The majority of fishing activity occurs in the canals along Interstate75, Highway 41 (Tamiami Trail), and in the Miami, L-67A, and L-67C Canals. These canals support many species of game fish. Private camps are located throughout WCA 3. These permitted camps are primarily used as weekend retreats and hunting camps. A variety of other nature-based recreational opportunities are also provided to the public within WCA 3A and WCA 3B. These activities include wildlife viewing and nature photography. Hiking and bicycling are also permitted on existing levees within the project area where appropriate. Though hiking and bicycling opportunities are available they lack sufficient facilities and markers. There are also several recreation areas at locations along the boundary of WCA 3 including the Sawgrass Recreation Area, Everglades Holiday Park, Thompson Park and Mac's Fish Camp. These facilities, along with several on Highway 41 (Tamiami Trail), provide boat ramps, camping facilities, boat rentals, airboat tours, fishing guides, bait and tackle supplies, and food. Some of these areas are privately owned, while others are public properties leased to private providers of services.

Similar recreational opportunities are provided in ENP. ENP provides high-quality fishing, boating, camping, wildlife viewing, hiking, bicycling, and nature interpretation activities. One third of ENP is covered by water, creating excellent boating and fishing opportunities. Saltwater fishing includes Florida Bay, Ten Thousand Islands, and elsewhere in the park's coastal zone. Marinas and boat ramps are located throughout the park. Day use and camping (front and back country) facilities are also available. There are also a number of elevated camping platforms (chickees) available in various locations throughout the Park. Regularly scheduled concession or ranger guided tours are also available.

3.1.19 Noise

Noise levels are associated with surrounding land use. Within the major natural areas of south Florida, external sources of noise are limited and of low occurrence. There is no significant noise generating land users within these areas. Existing sources of noise are limited to the vehicular traffic travelling on roads adjacent to and cutting through the project area. Other sources of noise which may occur within these natural areas include air boats, off road vehicles, swamp buggies, motor boats, and occasional air traffic. Sound levels are typically in the range of 85 to 105 decibels (dB) for motorboats and air boats, respectively. Wilderness ambient sound levels are typically in the range of 35 dB and should not be an issue for wildlife.

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

Within the rural municipalities and urban areas, sound levels would be expected to be of greater intensity, frequency, and duration. Noise associated with transportation arteries, such as highways, railroads, primary and secondary roads, airports etc., inherent in areas of higher population would be significant and probably override those sounds associated with natural emissions. Other sources of noise might be expected to include noise from everyday social and human communication and activity, operations of construction and landscaping equipment, and operations at commercial and industrial facilities. In general, urban emissions would not be expected to exceed 60 dB, but may attain 90 dB or greater in busier urban areas or near to frequently used, high volume transportation arteries.

3.1.20 Aesthetics

The visual characteristics of south Florida can be described according to the three dominant land use categories: natural areas, agricultural lands, and urban areas. The natural areas consist of a variety of upland and wetland ecosystems, including lakes, ponds, vast expanses of marsh and wet prairie, with varying vegetative components. Uplands are often dominated by pine, although other sub-tropical and tropical hardwoods such as fig, gumbo limbo, and cypress do occur. Overall, the land is extremely flat, with few natural topographic features such as hills or other undulations. Much of the visible topographic features within the natural areas are man-made, including canals and levees. Additional man-made features include pump stations, navigation locks, secondary and primary roads, highways, electrical wires, communication towers, occasional buildings, borrow pits and other features which may or may not detract from the regional aesthetic. Visual aesthetics when possible from a high perspective such atop a levee, offer pleasant and unspoiled perspectives of Everglades's marsh with numerous birds and other wildlife. Agricultural lands are cultivated for citrus, sugarcane, vegetables, sod, and greenhouse/nursery. Generally, urban development is concentrated along the LEC from Palm Beach County to Dade County. Major cities are visually congested with residential communities, major transportation arteries (i.e. heavily used roads and highways), and intensively developed commercial and industrial facilities. Visual aesthetics are marginal. Development is typically immediately adjacent to or nearby protected natural areas.

3.1.21 Existing Conditions of Native Americans

The information below is a summary compiled from the Seminole Tribe of Florida website http://www.semtribe.com/History/ and from the Ah-Tah-Thi-Ki website http://www.ahtahthiki.com/History-Seminole-Tribe-FL-Ah-Tah-Thi-Ki-Museum.html

The tribes known today as the Seminole Tribe of Florida and Miccosukee Tribe of Indians of Florida are both descendents of the Muscogee Creek people, a diverse confederation that encompassed people speaking seven languages and spread over much of the southeast. The encroachment of white settlers from the north pushed the first group of around 1200 Creek people into the peninsula of Florida around 1760 to an area east of Orlando. These Seminoles, as they all came to be known, (possibly a derivation of the Spanish cimarron, meaning runaway) were primarily seeking a solitary place to subsistence farm and raise cattle.

Beginning with the War of 1812 and ending with the Third Seminole War in 1858, the native people in Florida were subjected to an intensive effort by the U. S. Government to eradicate or remove them from the region. The U.S. Government reportedly spent more than $20 million on this effort and sent more than 52,000 troops to fight fewer than 2,000 Seminoles in Florida. At the end of these efforts, most of the southeastern tribes were removed west to Indian Territory and fewer than 300 Seminoles survived in the Everglades. Their descendants make up the populations of both tribes today.

The remaining native people lived a subsistence existence in the Florida Everglades for the next century. Again encroachment from white settlers by the early 1900s forced them to approach the Secretary of the Interior to request reservation lands. This request for Federal reservations and other services led to the split between the Seminoles and the Miccosukees. The Miccosukees, who spoke Hitchiti and lived primarily along Tamiami Trail, objected to the acceptance of Federal monies and services in exchange for land. Despite their objections, they were removed from ENP and confined to the Reserved Area, a narrow strip of land along Tamiami Trail. Although additional lands were designated and compensation money was paid to the tribe by the U.S., the money remains unclaimed by the tribe to this day.

In the 1950s when many tribes were facing the Indian Termination Act, the Seminoles again had to fight the government for Federal recognition and services to continue their existence. The Miccosukees instead sought and received recognition as a sovereign nation from Fidel Castro and Cuba, forcing the U.S. Government to recognize them.

During this time, both tribes lived in relative poverty, continuing their subsistence lifestyle in the Everglades, and relying on the tourist trade to supplement their incomes. In 1979, the Seminoles established the first high stakes bingo operation in the nation. The passage of the Indian Gaming Rights Act in 1988 allowed them to expand into other high stakes gambling, and both tribes have financially prospered as a result.

4.0 ENVIRONMENTAL EFFECTS

This section is the anticipated environmental effects of the recommended alternative versus the no action alternative. The following includes anticipated changes to the existing environment including direct, indirect, and cumulative effects.

4.1 GENERAL ENVIRONMENTAL EFFECTS

The general environmental effect of the G-3273 Planned Deviation would be minimal, due to the limited relaxation and remaining constraints in the system. Currently, approximately 1,000 cfs passes through the S-333 into NESRS. S-333 discharge is limited by the G-3273 constraint of 6.8 feet NGVD. Under the No Action Alternative, flows through S-333 into NESRS would remain the same. However, Alternative C should allow up to 1,350 cfs to pass through S-333 and into NESRS until the temporarily modified G-3273 constraint of 7.5 feet NGVD is reached. Generally under Alternative C, more water should move through S-333, S-355A, and S-355B, than would have if the relaxation did not occur. Thus, it is anticipated that more water would be delivered to NESRS. Potentially, this may cause a slight increase in seepage from ENP into the L-31N Canal. The limited nature of the relaxation will allow the Corps to test operations to determine how much additional water can be moved through S-333, S-355A, and S-355B to lower water levels in WCA 3A. All structure flows and canal levels will be monitored to ensure that no significant impacts occur to flood protection levels. In addition, this Planned Deviation will also afford the Corps an opportunity to collect data for use in a G-3273 Constraint Modification and S-356 Field Test.

4.2 HYDROLOGY

4.2.1 Alternative A - No Action

Under the No Action Alternative, water will potentially continue to rise in WCA 3A with very limited courses of action to alleviate the high water conditions. Additional deviation are being explored concurrently through subsequent NEPA actions, including raising the L-29 Canal constraint to 8.5 feet NGVD, proactive opening of S-197, modification of the WCA 2A Regulation Schedule, and raising the constraint in WCA 3B to 9.0 Feet NGVD.

4.2.2 Alternative C – Modification of G-3273 Constraint up to 7.5 feet NGVD through January 2015

Alternative C would provide an additional tool for Corps' water managers to use to move more water from WCA 3A through S-333, S-355A, and S-355B and into NESRS. The goal of this Planned Deviation is to maximize use of S-333, S-355A, and S-355B by reducing the number of times S-333 flow is constrained by the G-3273 constraint. By doing so, approximately 100 to 300 cubic feet per second (cfs) of water would be allowed to move through S-333, S-355A, and S-355B to the east. This should move more water into NESRS, although it is important to note that the L-29 Borrow Canal stage constraint of 7.5 feet will remain, acting as an additional constraint on water movement through S-333, S-355A, and S-355B unless a deviation to the L-29 Borrow Canal constraint is approved through a separate NEPA process. The L-29 Borrow Canal constraint cannot be raised until the completion of the Tamiami Trail Bridge construction project.

Potential adverse impacts of this action include additional seepage from ENP to the east, resulting in the potential of additional seepage water in the L-31 Canal. Because of this

potential, the G-3273 constraint deviation is being proposed for the 2013 and 2014 wet season and will only be implemented when the water level in WCA 3A is in Zone A, above 12.0 feet (as measured by the 3 gage average which is the average of Site 63, 64 and 65), and WCA 3A releases to SDCS (Column 2) are being utilized (G-3273 is above 6.8 feet NGVD) but discharges at S-333 are no longer being limited by the maximum capacity of the SDCS (Appendix B). No significant effects to flood protection level of service are anticipated by this action. The S-331 and S-357 Pump Stations will provide flood protection service for areas east of NESRS.

4.3 VEGETATION

4.3.1 Alternative A - No Action

Under the No Action Alternative, no additional impacts to vegetation within NESRS would be expected to occur. High water in WCA 3A, which has caused a gradual transition to open water sloughs in the southern portion of WCA 3A, would continue to occur during the wet season. Prolonged high water conditions within WCA 3A have the potential to negatively affect tree islands. Extended ponding of deep water, most notably within southern WCA 3A, has resulted in a lack of seedling establishment on tree islands due to stress from prolonged inundation (McKelvin, Hook and Rozelle 1998). According to Wu et al. (2002), when water depths on tree islands exceed one foot for greater than 120 days, even the most water tolerant species are affected. Therefore, due to current conditions (2013 wet season) causing higher stages in WCA 3A, negative effects are expected.

4.3.2 Alternative C – Modification of G-3273 Constraint up to 7.5 feet NGVD through January 2015

Alternative C would have the potential to minimally improve high water conditions in WCA 3A, possibly bringing some relief to the flooded habitats in the southern portion of WCA 3A. Lowering of water levels within WCA 3A would aid in reducing future tree island degradation due to prolonged inundation and high water depths. Likewise, temporarily increasing water deliveries to NESRS could have a beneficial impact on vegetation in ENP which has not received as much water under recent water management regimes as it did historically.

4.4 THREATENED AND ENDANGERED SPECIES

Potential environmental effects of current water management operations as described in the 2012 WCAs-ENP-SDCS WCP are thoroughly described within the 2011 ERTP FEIS and are hereby incorporated by reference. The Corps has determined that this limited relaxation of G-3273 may affect, but is not likely to adversely affect Florida panther, Cape Sable seaside sparrow, Everglade snail kite, and wood stork; and will have no effect on the other species listed within Table 4.1 and Table 4.2. This determination is based on the limited duration, limited operational changes, and the generally beneficial nature of this action. Below is a more detailed explanation of potential effects on the CSSS, since the limited habitat of this highly endangered species is directly in the action area of this effort.

TABLE 4.1. THREATENED AND ENDANGERED SPECIES WITHIN THE ACTION AREA AND DETERMINATION

E=Endangered; T=Threatened; SA=Similarity of Appearance; CH=Critical Habitat

Common Name	Scientific Name	Status	Agency	May Affect, Likely to Adversely Effect	May Affect, Not Likely to Adversely Effect	No Effect
Mammals						
Florida panther	*Puma concolor coryi*	E	Federal		X	
West Indian Manatee	*Trichechus manatus*	E, CH	Federal			X
Birds						
Cape Sable seaside sparrow	*Ammodramus maritimus mirabilis*	E, CH	Federal		X	
Everglade snail kite	*Rostrhamus sociabilis plumbeus*	E, CH	Federal		X	
Red-cockaded woodpecker	*Picoides borealis*	E	Federal			X
Roseate tern	*Sterna dougallii dougallii*	T	Federal			X
Wood stork	*Mycteria americana*	E	Federal		X	
Reptiles						
American Alligator	*Alligator mississippiensis*	T, SA	Federal			X
American crocodile	*Crocodylus acutus*	T, CH	Federal			X
Eastern indigo snake	*Drymarchon corais couperi*	T	Federal			X
Green sea turtle	*Chelonia mydas*	E	Federal			X
Hawksbill sea turtle	*Eretmochelys imbricate*	E	Federal			X
Kemp's Ridley sea turtle	*Lipodochelys kempii*	E	Federal			X
Leatherback sea turtle	*Dermochelys coriacea*	E	Federal			X
Loggerhead sea turtle	*Caretta caretta*	E	Federal			X
Fish						
Smalltooth sawfish	*Pristia pectinata*	E, CH	Federal			X
Invertebrates						
Schaus swallowtail butterfly	*Heraclides aristodemus ponceanus*	E	Federal			X
Stock Island tree snail	*Orthalicus reses* (not incl. *nesodryas*)	T	Federal			X
Plants						
Crenulate lead plant	*Amorpha crenulata*	E	Federal			X
Deltoid spurge	*Chamaesyce deltoidea* spp. *deltoidea*	E	Federal			X
Garber's spurge	*Chamaesyce garberi*	T	Federal			
Okeechobee gourd	*Cucurbita okeechobeensis* ssp. *okeechobeenis*	E	Federal			X
Small's milkpea	*Galactia smallii*	E	Federal			X
Tiny polygala	*Polygala smallii*	E	Federal			X

TABLE 4.2. STATE LISTED OF SPECIES AND DETERMINATION WITHIN THE G-3273 CONSTRAINT MODIFICATION ACTION AREA

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

Common Name	Scientific Name	Status	Agency	May Affect, Likely to Adversely Effect	May Affect, Not Likely to Adversely Effect	No Effect
Mammals						
Florida black bear	*Ursus americanus floridanus*	T	State			X
Everglades mink	*Mustela vison evergladensis*	T	State			X
Florida mouse	*Podomys floridanus*	SC	State			X
Florida mastiff bat	*Eumops glaucinus floridanus*	E	State			X
Birds						
Piping plover	*Charadrius melodus*	T	State			X
Snowy plover	*Charadrius alexandrinus*	T	State			X
American oystercatcher	*Haematopus palliates*	E	State			X
Brown pelican	*Pelecanus occidentalis*	SC	State			X
Black skimmer	*Rynchops niger*	SC	State			X
Least tern	*Sterna antillarium*	T	State			X
White-crowned pigeon	*Columba leucocephalus*	T	State			X
Least tern	*Sterna antillarum*	T	State			X
Limpkin	*Aramus guarauna*	SC	State			X
Little blue heron	*Egretta caerulea*	SC	State			X
Tricolored heron	*Egretta tricolor*	SC	State			X
Snowy egret	*Egretta thula*	SC	State			X
Reddish egret	*Egretta rufescens*	SC	State			X
White ibis	*Eudocimus albus*	SC	State			X
Roseate spoonbill	*Ajaja ajaja*	SC	State			X
Mangrove rivulus	*Rivulus marmoratus*	SC	State			X
Invertebrates						
Miami blue butterfly	*Cyclargus [=Hermiargus] thomasi bethunebakeri*	E	State			
Florida tree snail	*Liguus fasciatus*	SC	State			X
Plants						
Pine-pink orchid	*Bletia purpurea*	T	State			X
Lattace vein fern	*Thelypteris reticulate*	E	State			X
Eatons spikemoss	*Selaginella eatonii*	E	State			X
Wright's flowering fern	*Anemia wrightii*	E	State			X
Tropical fern	*Schizaea pennula*	E	State			X
Mexican vanilla	*Manilla mexicana*	E	State			X

4.4.1 Alternative A – No Action

No effect is anticipated to the CSSS under the No Action Alternative. Please see 2011 ERTP FEIS for full discussion of effects to this species.

4.4.2 Alternative C – Modification of G-3273 Constraint up to 7.5 feet NGVD through January 2015

The G-3273 Planned Deviation will be conducted from June through January and will not affect the CSSS breeding window. CSSS may breed between February and August but breeding is generally not initiated until early April with the highest nest success during the early portion of the breeding season (*i.e.* April through May) (Virzi 2009).

Presently, the known distribution of the CSSS is restricted to two areas of marl prairies east and west of Shark River Slough in the Everglades region (within ENP and BCNP) and the edge of Taylor Slough in the Southern Glades Wildlife and Environmental Area in Miami-Dade County. CSSS surveys resulted in a range map that divided the CSSS into six separate subpopulations, labeled as A through F (Figure 4-1), with CSSS-A as the only subpopulation west of SRS (Curnutt, et al. 1998).

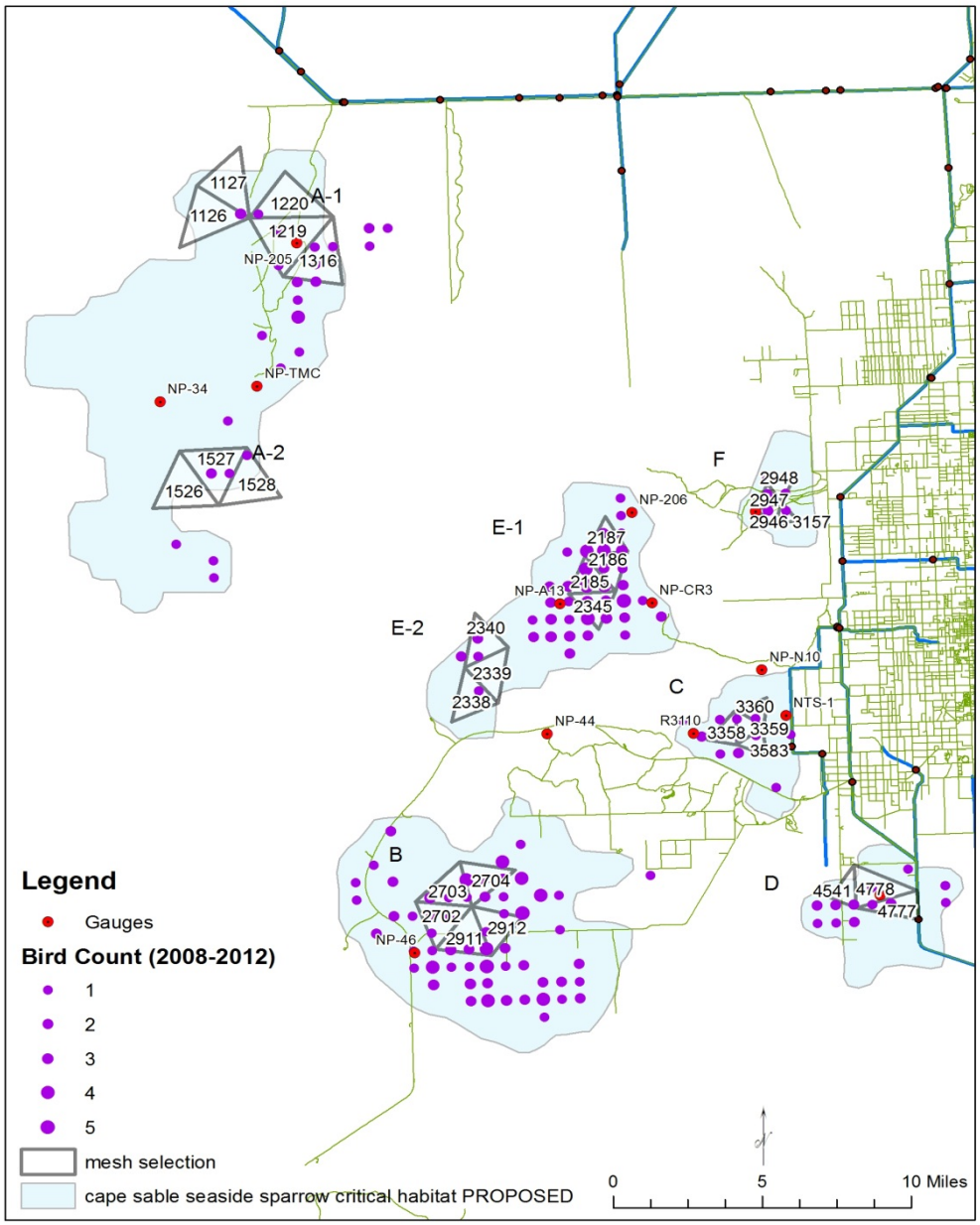

FIGURE 4-1. RANGE OF CSSS SUB POPULATIONS.

1. Subpopulation A (CSSS-A) - Increased water in NESRS or within the C-111 detention area may potentially affect CSSS habitat by increasing hydroperiod. The western marl prairies, where CSSS-A resides may experience a backwater effect due to increased flows in NESRS with the Comprehensive Everglades Restoration Plan (CERP) (Corps 2007). This temporary deviation increases the G-3273 constraint from 6.8 feet, NGVD to 7.5 feet, NGVD, potentially allowing the S-333 flow volume to meet the Rainfall Plan Target of 55%, just a small fraction of the anticipated flows under the CERP. Based upon the temporary nature of the deviation and the small increase in the G-3273 constraint, the

Corps has concluded that this temporary deviation would have little, if any impact, on CSSS-A.

2. Subpopulation B (CSSS-B/Unit 1) - No effect would be anticipated. CSSS-B represents the largest sparrow subpopulation and has remained relatively stable since implementation of IOP operations in 2002. Wet prairie vegetation predominates within this unit (Ross, Sah and Snyder, et al. 2006). Due to its location downstream of the elevated pine rocklands, Unit 1 is relatively well protected from the managed water releases under ERTP. Consequently, implementation of the G-3273 Temporary Deviation is not expected to alter designated critical habitat within Critical Habitat Unit 1 or affect the status of CSSS-B.

3. Subpopulation C (CSSS-C/Unit 2) – IOP and subsequent ERTP Operations improved the hydrologic and habitat conditions within Unit 2. Through a reduction of seepage out of ENP, use of the S-332 Detention Areas has lessened the over-drying of potential sparrow habitat within Unit 2 (CSSS-C).

4. Subpopulation D (CSSS-D/Unit 3) – Varying affects on CSSS-D could potentially occur under this temporary deviation and would be dependent upon whether ERTP Column 1 or Column 2 operations are implemented. When using Column 2 operations, S-333 flows and S-334 flows are matched thereby routing water through the SDCS. With a lower Operation Range between 4.5 and 4.7 feet NGVD in the SDA, pumping at S-333D may increase, resulting in more water in the vicinity of Critical Habitat Unit 3. However, due to the temporary nature of the deviation and the fact that it would only occur in June through January, water levels would not be affected during the CSSS breeding season.

5. Subpopulation E (CSSS-E/Unit 4) - Located along the eastern edge of Shark River Slough, Critical Habitat Unit 4 encompasses approximately 66 km^2. The Rocky Glades separate Unit 4 and CSSS-E from the other eastern subpopulations. Unit 4 holds the second greatest number of sparrows among all subpopulations. Due to its location, Unit 4 is relatively well protected from the managed water releases that occur under ERTP. Effects of IOP operations on Unit 4 have been relatively small and are expected to continue to be minor under relaxation of the G-3273 constraint. Therefore, this temporary deviation is not expected to alter the status of CSSS-E or its designated critical habitat.

6. Subpopulation F (CSSS-F/Unit 5) - The most easterly of all the Cape Sable seaside sparrow critical habitat units, Unit 5 is located at the ENP boundary in close proximity to agricultural and residential development. Habitat within this critical habitat unit suffers from over-drainage, reduced water flow, exotic tree invasion and frequent human-induced fires (Ross, Sah and Snyder, et al. 2006, Lockwood, Ross and Sah 2003). To alleviate the perpetual drier conditions and its associated problems, increased water flows within this area are required. Increased water into NESRS of the volume anticipated by this temporary deviation will not significantly improve conditions within Critical Habitat Unit.

4.5 FISH AND WILDLIFE RESOURCES

4.5.1 Alternative A – No Action

The No Action Alternative is not anticipated to have any additional impacts to fish and wildlife resources within NESRS, however, negative impacts associated with prolonged high water levels within WCA 3A may adversely affect fish and wildlife in this area, particularly within southern WCA 3A.

4.5.2 Alternative C – Modification of G-3273 Constraint up to 7.5 feet NGVD through January 2015

Alternative C may have a minimal beneficial effect on fish and wildlife resources. Moving additional water out of WCA 3A could allow mammals that might have trouble in high water better survive a very wet season in 2013. In addition, keeping water at lower levels could allow water managers to more easily meet recession rates of 0.06 to 0.07 per week needed for wading birds, snail kites and apple snails in WCA 3A during the spring breeding season.

Performance measures described in the 2011 ERTPF EIS specifically for tree islands in WCA 3A prescribe keeping high water peaks less than 10.8 feet NGVD, not to exceed 10.8 feet for more than 60 days per year, and reach water levels less than 10.3 feet NGVD by December 31 (USACE 2012). Raising the constraint of 6.8 feet NGVD at G-3273 to 7.5 feet NGVD would increase the amount of water that S-333, S-355A, and S-355B would move from WCA 3A and 3B into NESRS.

4.6 HISTORIC PROPERTIES

4.6.1 Alternative A-No Action

The No Action Alternative may result in continued higher than POR levels in WCA 3. The POR for the ERTP Cultural Resources Programmatic Agreement is from July 2002 through the initiation of ERTP in 2012. Continued high water levels in WCA 3A may have an adverse effect on historic properties located throughout WCA 3A.

4.6.2 Alternative C – Modification of G-3273 Constraint up to 7.5 feet NGVD through January 2015

The current high water levels in WCA 3 and the ENP is directly associated with unusual high 2013 dry season rainfall. This has resulted in water levels above 90% of POR throughout the system, including within the NESRS. Modification of the G-3273 constraint to reduce water levels in WCA 3 for the 2013 event as well as potential additional wet season rain fall may result in water levels above the 90% of the POR within the NESRS. Since this is directly related to reducing the excessively high water levels on historic properties within WCA 3 and is associated with the high rain events of 2013, a modification of the G-3273 constraint through January 2014 in accordance with the Programmatic Agreement high water levels that are a result of natural events are acceptableand a onetime deviation will have no adverse effect on historic properties. Any modification of the G-3273 constraint after January 2014 that will result in exceeding 90% of the period of record will require additional consultation under Section 106 of the National Historic Preservation Act. Consultation is ongoing with the State Historic Preservation Officer (SHPO) and appropriate federally recognized tribes and federal agencies for the 2013 modification of the G-3273 constraint.

4.7 SOCIO-ECONOMIC

No socioeconomic effects are expected under the No Action or Preferred Alternative.

4.8 AESTHETICS

No effects to aesthetics are anticipated under the No Action or Preferred Alternatives. Any change in water levels, if achieved, is not likely to be noticeable by an observer.

4.9 RECREATION

No effects to recreation are anticipated under the No Action or Preferred Alternative.

4.10 WATER QUALITY

Since water levels within the Everglades have historically fluctuated on a seasonal, annual and interannual basis, deviations in operations may be necessary and unavoidable particularly in times of extreme weather or extraordinary water volumes. Under the Central and Southern Florida (C&SF) Project Everglades Restoration Transition Plan (ERTP), it was recognized that until existing water quality is improved within the system, there are limited opportunities to move water within the greater Everglades system to achieve restoration goals. It is also true that changing operations for flood control purposes may have impacts.

This deviation from the 2012 WCAs-ENP-SDCS WCP is proposed for flood control purposes due to the extraordinary high water levels in the C&SF system, particularly WCA 3A. This action would provide a limited means for reducing high water periods and prolonged flooding within WCA 3A. While not anticipated because of the small magnitude of the deviation, unavoidable potentially adverse impacts on water quality could occur with implementation of the recommended deviation; however, we believe this risk is minimal and acceptable. Phosphorus is the primary nutrient of concern for the Everglades, which historically has been a phosphorus limited system. The Corps' water quality analysis within the 2011 ERTP FEIS evaluated potential changes to phosphorus loading, shift of loading, and exceedance of the Settlement Agreement Consent Decree flow weighted annual mean long term target. Based upon the Corps' water quality analysis, the recommended plan for ERTP, Alternative 9E1, resulted in no additional Consent Decree long-term limit exceedance as compared with the previous operational plan; however, the analysis predicted between one and seven percent total phosphorus Total Load increase to Shark River Slough. The Corps acknowledged that the water quality criterion for ENP is flow dependent and generally, a higher volume of water entering ENP results in a more stringent criterion. As recognized for ERTP, the predictive tools available to evaluate the potential for water quality impacts resulting from modified flows are limited causing a level of uncertainty with the analysis. The Corps recognized a risk for exceedance under ERTP. The Corps, working collaboratively with other state and federal agencies and tribes, committed to implementing ERTP in an adaptive manner that is consistent with the objectives of the C&SF Project.

With regard to this deviation, the Corps will use all available relevant data and supporting information to inform operational decision making, document decisions made, and evaluate the resulting information from those decisions to determine effects and avoid adverse impacts to water quality where practicable. Given the historically high water levels and potential for flooding, the Corps must make every effort to mitigate potential flood damage. The Corps will

continue to work cooperatively with the SFWMD to identify methods to optimize achievement of flood control while minimizing effects on water quality. Though existing phosphorous levels in the system pose some water quality compliance risk, the Corps has determined that the recommended deviation plan is consistent to the maximum extent practicable with the enforceable policies of Florida's approved Coastal Zone Management Programs.

4.10.1 Alternative A – No action

The No Action Alternative would have no impacts on water quality. A full discussion of water quality can be found in the 2011 ERTP FEIS.

4.10.2 Alternative C – Modification of G-3273 Constraint up to 7.5 feet NGVD through January 2015

Water quality compliance at Shark River Slough is determined by the 1991 Consent Decree Appendix A calculations as incorporated into the Everglades Forever Act (373.4592 Florida Statutes). Under Appendix A, the Shark River Slough Long-Term-Limit (LTL) is determined based upon the total flow at the S12 structures and the net S-333 / S-334 flow. Higher total flow results in a lower LTL. Increasing the G-3273 constraint from 6.8 to 7.5 feet NGVD may result in additional flow passing through the S-333 structure since this structure would remain open for a longer period of time. To some extent, increasing flows through the S-333 structure will result in a reduction in flow at the S-12D structure since these two structures are relatively close geographically (1/2 mile apart) and are primarily fed water from the L-67A canal and the marsh located immediately north of the L-29 borrow canal. Generally, the phosphorus concentrations in the water discharged by these two structures are similar with the S-12D structure having slightly lower concentrations in comparison to the S-333 structure. To evaluate the effects of increased flows on compliance requirements, the effects associated with the proposed deviation and the Shark River Slough LTL during Water Year (WY) 2013 (Oct 1, 2012- Sep 30 2013) were evaluated. The Corps determined that the G-3273 deviation, if implemented Aug 9, 2013, would not cause a reduction in WY 2013 Shark River Slough LTL phosphorus concentration limit as compared to the No Action Alternative. This is because the predicted flow used to determine the Shark River Slough FWM limit would have been reached without the additional S-333 flows expected to result from the implementation of the G-3273 deviation.

In WY 2014, if Shark River Slough inflows increase by 100 cfs on a continuous basis for a period of 3 months from November 1st through January 31st, the total increase in Shark River Slough flows will be approximately 20,000 ac-ft. This would reduce the annual LTL compliance limit by 0.1 ppb. If the total increase in annual Shark River Slough flows is 40,000 acre-feet (ac-ft), the LTL compliance limit would be decreased by 0.2 ppb TP. However if the flow for WY 2014 reaches 1061 K ac-ft without the deviation being implemented, the additional Shark River Slough inflows expected from the deviation will have no effect on the annual LTL compliance limit. The effect of the additional flows on the calculated Shark River Slough FWM TP concentration is likely to be either neutral or result in a slight reduction in the annual FWM concentration. This is because the additional water represents a small fraction of the total annual flow and it would be released during the late fall under high stage conditions in WCA 3A. These conditions typically have relatively low TP concentrations at the S12x and S333 structures particularly when the WCA 3A stage (3-gauge average) is above 11 feet NGVD as shown in Figure 4-2. It is possible that a lower LTL combined with the changed Shark River Slough FWM TP concentration may result in a decrease in the difference between the Shark River

Slough FWM and the LTL, however, since this deviation will occur at the start of the water year, for the remaining eight months of the water year, managers can use the flexibility within the authorized water management operations plan to minimize the chance that the Shark River Slough LTL will be exceeded for the reporting period (October through September). The Corps recognizes that the proposed G-3273 deviation may present an increased risk of Shark River Slough water quality exceedance; however we believe this risk is minimal and acceptable. To mitigate this potential risk, the Corps will work with the state and federal partners to assess water stage and quality data as it comes available during the 2014 water year.

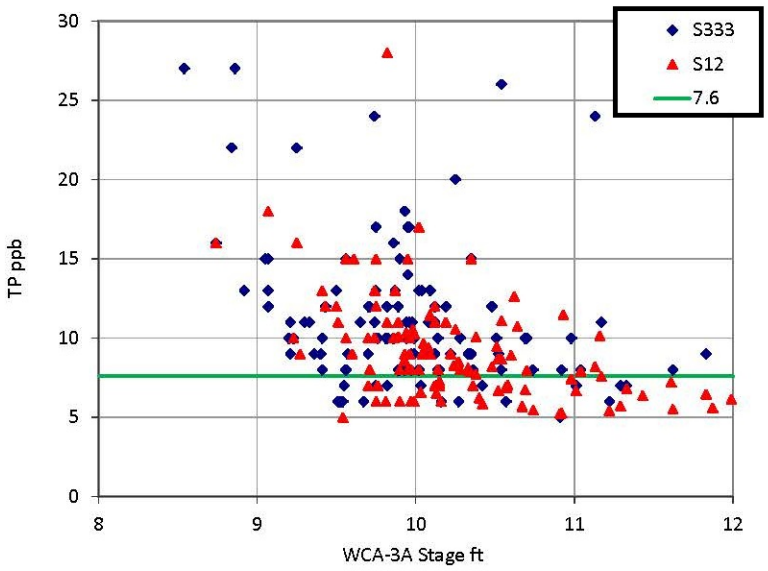

FIGURE 4-2. TOTAL PHOSPHORUS CONCENTRATIONS AT S-333 AND S12X FOR 2007 TO 2013 PERIOD.

Federal and state water managers have recognized that variations in the amount of water in the system would occur due to natural phenomena, such as weather. As a result, accompanying variations in operations are necessary to maintain and achieve the original purposes of the C&SF project, such as flood control. During formulation of Central Everglades Planning Project (CEPP), as part of preparing the draft Project Implementation Report for CEPP, the Corps and state parties agreed to draft language which would address the additional amount of water to be reserved and delivered to the natural system. To address this increase in restoration flows, the partners crafted draft language which reiterates the commitment of the parties to collaborate if an exceedance of Appendix A compliance limits occurs due to a change in operations. As relevant here, that draft language which is pending the finalization of the draft PIR and public comment is listed below.

> *"Variations in flows of the Central and South Florida ("C&SF") system may result from a variety of reasons. These reasons include natural phenomena (e.g. weather) and updates to the operating manuals to achieve the purposes of the C&SF project such as flood control and water supply.*

One goal of the Consent Decree[3] is to restore and maintain water quality within ENP. The Consent Decree established, among other things, long-term water quality limits for water entering ENP to achieve this goal. The existing limits for ENP are flow dependent and, generally, increased volume of water results in a lower allowable concentration of phosphorus to maintain the overall load of phosphorus entering the ENP…. The Corps and its Federal and state partners recognize that to achieve long-term hydrologic improvement, water quality may be impacted, particularly as measured by the current Consent Decree Appendix A compliance methodology. The Corps and the state partners agree that the monitoring locations/stations for inflows to ENP will require revision. An evaluation of this and other aspects of the compliance methodology are currently being conducted by the Technical Oversight Committee ("TOC").

In an effort to address these potential impacts and determine updates to Appendix A to reflect increased inflows and new discharges into ENP since the Consent Decree was entered, the parties to the Consent Decree have established a process and scope for evaluating and identifying necessary revisions to the Appendix A compliance methodology utilizing the scientific expertise of the TOC. The TOC may consider all relevant data, including the 20 years of data collected since Appendix A was implemented. Ultimately, such evaluations and changes to the Appendix A compliance methodology would be recommended by the Consent Decree's TOC for potential agreement by all parties.

All parties are committed to…operational plans, in an adaptive manner that is consistent with the objectives of the underlying C&SF Project. The Corps and the state will use all available relevant data and supporting information to inform operational planning and decision making, document decisions made, and evaluate the resulting information from those decisions to avoid adverse impacts to water quality where practicable and consistent with the purposes of the C&SF Project…. If there is an exceedance of the Appendix A compliance limits, which results from a change in operation of a Federal project, and it has been determined that an exceedance cannot be remedied without additional water quality measures, the federal and state partners agree to meet to determine the most appropriate course of action, including what joint measures should be undertaken as a matter of shared responsibility."

It must be noted that the deviation to the 2012 WCAs-ENP-SDCS WCP being proposed is not a permanent increase in water volume entering ENP as it is the result of extraordinary weather and it is a fraction of the volume of that being contemplated by the additional water which CEPP will provide. Given the temporary nature of this deviation, it is not expected to require any additional water quality measures. The Corps as part of the 2012 ERTP ROD committed to collaborate and

[3] United States v. South Florida Water Management District, et al., Case No. 88-1886-CIV-Moreno (U.S.D.C., S.D. Fla.).

work with the state to manage changes in operations as a result of ERTP. The Corps reiterates that commitment for this deviation. Any exceedance as a result of this temporary deviation would likely be reviewed by the Technical Oversight Committee under the Consent Decree in the context of all potentially relevant factors, including its likely temporary nature, the extraordinary water volumes resulting from unusual weather patterns, the existing Restoration Strategies being implemented by the state, and any other pertinent factors to consider.

4.11 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE

No HTRW issues are anticipated under the No Action or Preferred Alternative.

4.12 AIR QUALITY

No air quality issues are anticipated under the No Action or Preferred Alternative..

4.13 NOISE

No noise impacts are anticipated under the No Action or Preferred Alternative.

4.14 PUBLIC SAFETY

Public safety will not be affected by the No Action or Preferred Alternative.

4.15 NATIVE AMERICANS

4.15.1 Alternative A – No Action

The No Action Alternative would have no effects on Tribal resources.

4.15.2 Alternative C – Modification of G-3273 Constraint up to 7.5 feet NGVD through January 2015

Alternative C could have potentially beneficial effects on Tribal lands. The Miccosukee Tribe has a perpetual lease on most of the lands within WCA 3A. Any ability to move additional water out of WCA 3A as a result of the G-3273 Planned Deviation would potentially help to alleviate high water conditions and therefore be a benefit to Tribal interests. However, project restrictions are in place to alleviate these concerns and create conditions for an overall net benefit.

4.16 CUMULATIVE EFFECTS

A cumulative impact, according to the Council on Environmental Quality's (CEQ's) NEPA-implementing regulations, is "the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 Code of Federal Regulation [CFR] 1508.7).

The G-3273 Planned Deviation is one deviation proposed in lower high water levels in South Florida. Additional deviations to the 2012 WCAs-ENP-SDCS WCP may also be proposed. These deviations may include, but are not limited to, delaying closure of the S-12A, S-12B, S-343A/B and S-344 structures, reducing pump restrictions at S-332D, raising the L-29 canal constraint to 8.5 feet, raising the stage in WCA 3B to 9.0 feet, and/or modifying the regulation schedule of WCA 2A. These deviations would act in conjunction with the proposed G-3273 Planned Deviation to reduce high water levels in south Florida and maintain levee integrity in the event of a storm or continued high water conditions. The release of more water moving south

through the system could cause water levels to increase in the L-31N Canal and potentially increase ground water levels in the 8.5 SMA; however, current conditions require preemptive action to ensure water levels do not reach emergency conditions in the C&SF system. In addition, the G-3273 Planned Deviation would only be used when the S-331 Pump Station is operating at full capacity and insuring flood protection to the 8.5 SMA.

Cumulative environmental effects for the proposed action were assessed in accordance with guidance provided by the President's Council on Environmental Quality (CEQ). The primary goal of cumulative effects analysis is to determine the magnitude and significance of the environmental consequences of the proposed action in the context of the cumulative effects of other past, present, and future actions. Table 4.3 shows the net cumulative effects of the various resources which are directly or indirectly impacted.

TABLE 4.3. SUMMARY OF CUMULATIVE EFFECTS

Hydrology	
Past Actions	Flood and water control projects have greatly altered the natural hydrology.
Present Actions	Federal and state agencies are coordinating on and implementing projects to improve hydrology.
Proposed Action	Improved hydrologic conditions will result from lowering current high water depths in WCA 3A and increasing flows into NESRS. Increased seepage into the L-31 Canal may occur as a result of raising the G-3273 Constraint to 7.5 feet; however, S-357 and S-331 Pump Stations will ensure flood protections levels are maintained in areas adjacent to ENP.
Future Actions	Additional CERP projects propose to restore hydrology to more natural conditions.
Cumulative Effect	Although it is unlikely that natural hydrologic conditions would be fully restored to pre-drainage conditions, improved hydrology would occur. CERP is expected to improve the quantity, quality, timing and distribution of freshwater flow.
Threatened and Endangered Species	
Past Actions	Water management practices and urbanization have resulted in the degradation of existing habitat function and direct habitat loss leading to negative population trends of threatened and endangered species.
Present Actions	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 CSSS populations. The FWS recovery plan is used as a management tool.
Proposed Action	The proposed action "may affect, but is not likely to adversely affect" the eastern indigo snake, Florida panther, wood stork, Everglade snail kite, Everglade snail kite critical habitat, CSSS, and CSSS critical habitat.
Future Actions	Ongoing projects would be implemented to maintain threatened and endangered species within the project area. ERTP implementation represents a paradigm shift from single species to multi-species management. ERTP includes performance measures specifically directed at managing water levels and releases for the protection of multiple species and their habitats within the project area.
Cumulative Effect	Habitat improvement, monitoring and management of threatened and endangered species are anticipated to allow populations to be maintained. Improvement of degraded populations is expected to be facilitated by the restoration and enhancement of suitable habitat through efforts to restore more natural hydrologic conditions within the project area.

Fish and Wildlife Resources	
Past Actions	Water management practices have resulted in aquatic vegetation community changes and a resultant disruption of aquatic productivity and function that has had repercussions through the food web, including effects on wading birds, large predatory fishes, reptiles and mammals.
Present Actions	Ongoing efforts have been made by Federal and state agencies to implement projects to improve hydrology within the project area to restore habitat conditions for fish and wildlife resources.
Proposed Action	Rehydration within previously dry areas within NESRS would increase the spatial extent of suitable habitat. 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 improved. Increased freshwater flows to Florida Bay would aid in improving suitable habitat for pink shrimp, juvenile spotted sea trout, sea turtles, manatee and crocodiles among other species.
Future Actions	Some level of improvement to fish and wildlife resources is expected to occur as a result of implementation of projects with the capability of improving the timing, quantity, quality and distribution of freshwater flow to the study area. Hydrologic restoration planned as part of CERP would further improve fish and wildlife habitat.
Cumulative Effect	Habitat improvement efforts are anticipated to benefit fish and wildlife resources.
Vegetation and Wetlands	
Past Actions	Drainage of Florida's interior wetlands, conversion of wetlands to agriculture, and urban development has reduced the spatial extent and quality of wetland resources.
Present Actions	Efforts are being taken by state and Federal regulatory agencies to reduce wetland losses.
Proposed Action	Improved hydroperiods and sheetflow within NESRS would result in reduced soil oxidation, promoting 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.
Future Actions	Some level of improvement to vegetative communities is expected to occur as a result of implementation of projects with the capability of improving the timing, quantity, quality and distribution of freshwater flow to the study area. More natural hydrology as part of the CERP would assist in restoring natural plant communities.
Cumulative Effect	While the spatial extent of natural plant communities would not be restored to historic proportions, the quality of vegetative communities would be improved.

Cultural Resources	
Past Actions	Flood and water control projects, conversion of wetlands into agriculture and urban development have had adverse unmitigated effects to cultural resources either directly or indirectly.
Present Actions	The Corps is presently evaluating the effects of water management activities on archeological sites located on Everglades tree islands.
Proposed Action	he proposed action should reduce high water conditions in WCA-3 and thereby reduceeffects on historic properties located within WCA-3. It may result in higher than the 10 year period of record water levels on historic properties located within the NESRS. The 2013 rain fall has resulted in these sites being inundated the 2013 deviation will not result in new impacts. However, the proposed 2014 deviation may be considered an adverse effect on historic properties located in NESRS. Consultation with stakeholders, including the State Historic Preservation Office, Advisory Council on Historic Preservation, Seminole Tribe of Florida and the Miccosukee Tribe of Indians of Florida is currently ongoing.
Future Actions	The proposed 2014 deviation may be considered an adverse effect on historic properties located in NESRS. Investigations mandated in the Programmatic Agreement for ERTP are in the process of being completed and will determine the effects of fluctuating water on subsurface historic properties. The results of this study will be used to evaluate future projects
Cumulative Effect	Cumulative effects to historic properties may have long-term adverse effects. Mitigation measures for effects to historic properties could potentially reduce the cumulative effect to minor long-term adverse effects. The ERTP Programmatic Agreement archeological investigation is designed to evaluate the potential cumulative effects of inundation on Everglades archeological sites.
Water Quality	
Past Actions	Water quality has been degraded from urban, suburban, commercial, industrial, recreational and agricultural development.
Present Actions	Efforts to improve water quality from agricultural areas are ongoing. Federal and state projects would temporarily elevate localized levels of suspended solids and turbidity.
Proposed Action	Changes in the quantity and distribution of flows into NESRS may result in temporary increases in phosphorus concentrations at some TP Rule monitoring stations; however, this should not significantly affect TP Rule compliance. There is a reduced risk for water quality concerns when stages in WCA 3A are at or above 12.0 feet NGVD.

Future Actions	Actions by the State of Florida's Restoration Strategies would decrease pollutant concentration and loadings to the project area. If authorized in the next Water Resources Development Act (WRDA), the Broward County WPA Project, (report approved in 2007) would reduce storm runoff deliveries to WCA 3 and improve water quality coming across Tamiami Trail.
Cumulative Effect	While anthropogenic effects on water quality are unlikely to be eliminated, water quality is expected to slowly improve over existing and recent past conditions.
Water Supply/Flood Control	
Past Actions	Water supply and flood control for agricultural and urban users has benefited from construction and operation of the C&SF project.
Present Actions	Availability of water from Lake Okeechobee for agricultural users was recently diminished through implementation of LORS 2008. Availability of water for urban and agricultural users was recently diminished through implementation of ERTP. The SFWMD has implemented Restricted Allocation Area Rules to cap users dependent on water supplies from Lake Okeechobee and the regional system (the Everglades).
Proposed Action	Increasing the G-3273 Constraint to 7.5 feet NGVD will not have an effect on water supplies to agricultural users in South Dade County. Increased seepage in the L-31 Canal may occur; however, the S-331 and S-357 Pump Stations will provide flood protection for the areas adjacent to NESRS.
Future Actions	Future supplies would not change in the future unless additional CERP storage or hydrologic improvements to the Everglades are implemented and increase water availability.
Cumulative Effect	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.

Collectively, all of the above actions are needed to reach the fullest possible rehydration of the southern Everglades. This Planned Deviation is not expected to have any permanent impact on the above-listed projects. The very limited nature of this deviation ensures that it will not have a cumulative impact on the region. A short-term beneficial impact is expected, and the data collected during this deviation may be useful as the Corps moves forward on other restoration efforts, specifically future revisions to operational guidance in the area.

4.17 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

4.17.1 Irreversible

An irreversible commitment of resources is one in which the ability to use and/or enjoy the resource is lost forever. One example of an irreversible commitment might be the mining of a mineral resource. No irreversible commitment or resources would occur as part of this action. This is a short duration Planned Deviation only.

4.17.2 Irretrievable

An irretrievable commitment of resources is one in which, due to decisions to manage the resource for another purpose, opportunities to use or enjoy the resource as they presently exist are lost for a period of time. An example of an irretrievable loss might be where a type of vegetation is lost due to road construction. No such irretrievable resource would be lost as a part of this action.

4.18 UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS

While not anticipated because of the small magnitude of the deviation, unavoidable potentially adverse impacts on water quality could occur with implementation of the recommended deviation; however, we believe this risk is minimal and acceptable.

4.19 CONFLICTS AND CONTROVERSY

Most issues which would cause conflicts or controversy were intentionally excluded from this deviation. Usage of S-356 to remove any additional seepage from ENP into the L-31N Canal is not being recommended. This deviation will not change operations of system structures as defined in the 2012 WCAs-ENP-SDCS WCP. There are remaining concerns regarding flood protection to the east, but they have been minimized by the temporary nature of this deviation and operational constraints built into the deviation.

4.20 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

4.20.1 National Environmental Policy Act of 1969

Environmental information on the project has been compiled and this EA has been prepared. The project is in compliance with the National Environmental Policy Act. Comments received during public review will be included in the Final EA.

4.20.2 Endangered Species Act of 1973

Consultation with National Marine Fisheries Service (NMFS) was not necessary, as no species under their purview are expected to be affected. Consultation was initiated with the U.S. Fish and Wildlife Service (USFWS) in August 2013. Agency coordinations letters will be included in the Final EA.

4.20.3 Fish and Wildlife Coordination Act of 1958, as amended

This proposed deviation has been coordinated with the USFWS. This project is in full compliance with the Act.

4.20.4 National Historic Preservation Act of 1966 (INTER ALIA)

The proposed action is in compliance with Section 106 of the National Historic Preservation Act, as amended (PL89-665). 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 (PL93-29), Archeological Resources Protection Act (PL96-95), American Indian Religious Freedom Act (PL 95-341), Executive Order 11593, 13007, and 13175, the Presidential Memo of 1994 on Government to Government Relations and appropriate Florida Statutes. Consultation with the Florida SHPO, appropriate federally recognized tribes, and other interested parties was initiated in August 2013 and is ongoing. The proposed action will be in compliance with the goals of this Act upon completion of coordination as stated above.

4.20.5 Native American Graves Protection and Repatriation Act as Amended

Federal agencies must make an inventory of all Indian human remains and funerary objects in its possession and control, attempt to identify the affiliated tribe, and repatriate the items to the appropriate group. This Act also applies to inadvertent discoveries on federal lands. The proposed action is in compliance with this Act.

4.20.6 Clean Water Act of 1972

The project is in compliance with this Act. A Section 401 water quality certification is not needed for the planned deviation action related to G-3273. An FDEP operational authorization for the use of the S-355A and B structures will be obtained prior to operation of these structures. This test will be coordinated with the State of Florida to determine CZMA consistency. The proposed operations are just a slight variation on current operations. It is unlikely that State water quality standards will be negatively impacted by this deviation; however conditions outside of this test (upstream water routing and weather conditions) will strongly influence if State water quality standards will be met. This test will not cause a change in those conditions (weather or upstream water routing).

4.20.7 Clean Air Act of 1972

No air quality permits would be required for this project. The project is in compliance with this Act.

4.20.8 Coastal Zone Management Act of 1972

A Federal consistency determination in accordance with 15 CFR 930 Subpart C is included in this report as Appendix C. State consistency review will be performed following the public coordination of the EA.

4.20.9 Farmland Protection Policy Act of 1981

No prime or unique farmland would be impacted by implementation of this project. This act is not applicable.

4.20.10 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.

4.20.11 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 project is in compliance with this Act.

4.20.12 Estuary Protection Act of 1968

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

4.20.13 Federal Water Project Recreation Act of 1965, as amended

The principles of the Federal Water Project Recreation Act, (Public Law 89-72) as amended, are not applicable to this project. The project is in compliance with this Act.

4.20.14 Fishery Conservation and Management Act of 1976

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

4.20.15 Submerged Lands Act of 1953

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

4.20.16 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 this project. These acts are not applicable.

4.20.17 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

There are no HTRW sites located within the project area. Areas of previous concern were previously remediated. This project is in compliance with these Acts.

4.20.18 Rivers and Harbors Act of 1899

The proposed work would not obstruct navigable waters of the United States. The project is in full compliance.

4.20.19 Safe Drinking Water Act of 1974, As Amended

The proposed work would not impact safe drinking water standards. The project is in full compliance.

4.20.20 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.

4.20.21 Anadromous Fish Conservation Act

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

4.20.22 Migratory Bird Treaty Act and Migratory Bird Conservation Act

No migratory birds would be affected by project activities. The project is in compliance with these acts.

4.20.23 Marine Protection, Research and Sanctuaries Act

The Marine Protection, Research and Sanctuaries Act do not apply to this project.

4.20.24 Magnuson-Stevens Fishery Conservation and Management Act

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

4.20.25 E.O. 11990, Protection of Wetlands

The proposed action is expected to have beneficial effects on wetlands. This project is in compliance with the goals of this Executive Order (E.O.).

4.20.26 E.O. 11988, Floodplain Management

This E.O. instructs Federal agencies to avoid development in floodplains to the maximum extent possible. The proposed action is a deviation to an operational construct; therefore, no construction is proposed within this action. This action is consistent with the intent of this E.O. and in compliance.

4.20.27 E.O. 12898, Environmental Justice

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

4.20.28 E.O. 13175, Consultation and Coordination with Indian Tribal Governments

E.O. 13175 sets forth fundamental principles to guide agencies in formulating and implementing policies that have tribal implications. The E.O. goes on to set forth policymaking criteria to which agencies must adhere to the extent permitted by law. These principles an policymaking criteria apply to an agency's "regulations, legislative comments or proposed legislation, and other policy statements or actions" that have "substantial direct effects on one or more Indian tribes, on the relationship between the Federal Government and Indian tribes, or on the distribution of power and responsibilities between the Federal Government and Indian tribes" (Sec.1(a)). The project is in compliance with this E.O.

4.20.29 E.O. 13089, Coral Reef Protection

No coral reefs would be impacted by this project. This E.O. does not apply.

4.20.30 E.O. 13112, Invasive Species

The G-3273 Planned Deviation would have no significant impact on invasive species. The project is in compliance with the goals of this E.O.

4.20.31 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 project is in compliance.

4.20.32 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 project is not expected to destroy migratory birds, their active nests, their eggs, or their hatchlings. The proposed project is expected to benefit migratory birds by improving habitat and increasing availability of forage species (amphibians, fish, aquatic and invertebrates) for wading birds. The project is in compliance with the goals of this E.O.

4.20.33 Memorandum on Government-to-Government Relations with Native American Tribal Governments 1994

This Presidential Memorandum directs the Federal government to operate within a government-to-government relationship with federally recognized Native American tribes. The head of each executive department and agency shall be responsible for ensuring that the department or agency operates within a government-to-government relationship with federally recognized tribal governments. Each executive department and agency shall apply the requirements of the E.O. 12875 ("Enhancing the Intergovernmental Partnership") and E.O. 12866 ("Regulatory Planning and Review") to design solutions and tailor Federal programs, in appropriate circumstances, to address specific or unique needs of tribal communities. The USACE has consulted with the Miccosukee Indian Tribe of Florida and the Seminole Tribe of Florida during the NEPA process for this Planned Deviation. The proposed action is in compliance with the goals of this memorandum.

4.20.34 Seminole Indian Lands Claim Settlement Act of 1987

The Florida Indian (Seminole) Land Claims Settlement Act of 1987 directed the SFWMD the State of Florida, and the Seminole Tribe to execute an agreement for the purposes of resolving tribal land claims and settling the lawsuit filed by the Seminole Tribe, which involved certain land claims within the State. Agreements to resolve tribal land claims were executed between the three parties, which included conveyance of land and payment of consideration to the tribe, and implementing legislation by the Congress of the United States and Legislature of the State of Florida. An agreement known as the Water Rights Compact (Compact) was executed between the State of Florida, the District, and the Seminole Tribe of Indians of Florida. The Compact specifically defined tribal water rights. This Compact was adopted into Federal and state law. It includes a series of provisions establishing the Tribe's rights and creating several '"entitlements" to water for each of the Tribe's reservations. Water supply deliveries to the two Seminole reservations within the area are not significantly affected by this Planned Deviation. Any "modeled" decreases in water supply deliveries would not be expected under real-world

conditions due to the Compact requirements. This proposed action is in compliance with this Act.

5.0 LIST OF PREPARERS

TABLE 5.1. TABLE OF PREPARERS

Name	Organization	Role in EA
Gina Ralph	USACE	Biologist
Amy Thompson	USACE	Biologist
Anthony Rodino	USACE	Hydrologist
John Zediak	USACE	Hydrologist
Jim Riley	USACE	Water Quality
Mark Shafer	USACE	Water Quality
Grady Caulk	USACE	Archeologist

6.0 PUBLIC INVOLVEMENT

6.1 SCOPING AND DRAFT EA

The EA and draft Finding of No Significant Impact (FONSI) will be made available to the public by notice of availability in August 2013.

6.2 AGENCY COORDINATION

The Corps is in continuous coordination with other Federal and state resource agencies, business organizations, environmental organizations, and private citizens groups. This extensive coordination is a result of the magnitude of Corps efforts underway to implement water management strategies in south Florida. Previous related coordination undertaken for the modification of the G-3273 constraint occurred in September 2010. Agency coordination letters will be included in Appendix D, Pertinent Correspondence following review of the draft EA.

6.3 LIST OF RECIPIENTS

Copies of the Draft EA will be available on the Jacksonville District website:

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

Notices of availability of the Draft EA were mailed to the following parties:

Native American Tribes
Miccosukee Tribe of Indians
Seminole Tribe of Florida

Federal Agencies
National Center for Environmental Health
U.S. Department of Agriculture
- U.S. Forest Service

U.S. Department of Commerce
- National Oceanic and Atmospheric Administration
  - Florida Keys National Marine Sanctuary
  - National Marine Fisheries Service

U.S. Department of Housing and Urban Development
U.S. Department of the Interior
- Bureau of Indian Affairs
- National Park Service
  - Biscayne National Park
  - Everglades National Park
- U.S. Fish and Wildlife Service
- U.S. Geological Survey
- Office of Environmental Policy and Compliance

U.S. Department of Justice
U.S. Department of Transportation
- Federal Highway Administration

U.S. Environmental Protection Agency

Federal Government
U.S. Congressmen
Florida Districts 17, 18, 21, 25
U.S. Senators, Florida

State Agencies
Florida Department of Agriculture, Office of Agricultural Water Policy
Florida Department of Environmental Protection
Florida Department of Transportation
Florida Fish and Wildlife Conservation Commission
Florida Keys Aqueduct Authority
Florida State Clearinghouse
South Dade Soil and Water Conservation District
South Dade Government Center
South Florida Regional Planning Council
Southwest Florida Regional Planning Council
South Florida Water Management District
State Historic Preservation Office
University of Florida Cooperative Extension Office, Homestead, Florida

State Government
Governor's Office

State Representatives
Districts 102, 103, 104, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117 118, 119, 120

State Senators
Districts 33, 34, 35, 36, 38, 39, 40

County Agencies
Miami-Dade County Department of Environmental Resources Management
Miami-Dade County Park & Recreation
Miami-Dade County Water & Sewer
Miami-Dade Water Resources

County Government
Miami-Dade County Board of Commissioners

Municipalities
City of Florida City
City of Homestead
Miami-Dade City Planning Department

Libraries
Miami-Dade Public Library, Homestead Branch
Miami-Dade Public Library, Main Branch

Post Offices
Florida City Post Office
Homestead Post Office

Groups and Organizations
1000 Friends of Florida
Airboat Association of Florida
Audubon of Florida
Audubon of the Everglades
Broward County Airboat Association
Clean Water Action
Coopertown Airboat
Dade County Farm Bureau
Defenders of Wildlife
Environmental & Land Use Law Center
Everglades Coordinating Council
Everglades Foundation
Everglades Protection
Florida Atlantic University
Florida Biodiversity Project
Florida International University
Florida Keys Fishing Guides
Florida Wildlife Federation
Friends of the Everglades
Greater Homestead/Florida City Chamber of Commerce
Izaak Walton League
Las Palmas Homeowners Association
National Parks Conservation Association
Natural Resources Defense Council
The Nature Conservancy
Tropical Audubon Society, Inc.
Trust for Public Land
Reef Relief
Sierra Club
Sierra Club of South Florida
Sierra Club, Miami Group
South Florida Ecosystem Restoration Task Force
Trail Glades Bassmasters
Wildlife Foundation of Florida
World Wildlife Federation
World Wildlife Fund

Businesses
Florida Power and Light
Everglades Research Group, Inc
Everglades Safari Park
Gator Park
Lehtinen, Vargas and Riedi
Lewis, Longman and Walker
MacVicar, Frederico and Lamb
Milian-Swain and Associates
Radio One, Pepper Hamilton
South Dade News Leader

Individuals
A list of individuals who received notification of the release of the EA and Proposed FONSI is on file in the Jacksonville District, Planning and Policy Division.

7.0 REFERENCES

Armenrano, T.V., J.P Sah, M.S. Ross, D.T. Jones, H.C. Colley, and C.S. Smith. "Rapid Responses of Vegetation to Hydrological Changes in Taylor Slough, Everglades National Park, Florida." *Hydrobiologia* 569 (2006): 293-309.

Bancroft, G.T., A.M. Strong, R.J. Sawicki, W. Hoffman, and S.D. Jewell. "Relationships Among Wading Bird Foraging Patterns, Colony Locations, and Hydrology in the Everglades." In *Everglades: The Ecosystem and its Restoration*, by S.M. Davis and J.C. Ogden, 615-657. Delray Beach, Florida, USA: St. Lucie Press, 1994.

Bernhardt, C.E., and D.A. Willard. *Marl Prairie Vegetation Response to 20th Century Hydrologic Change.* U.S. Geological Survey Open-File Report 2006-1355, Reston, Virginia, USA: U.S. Geological Survey, Eastern Earth Surface Processes Team, 926A National Center, 2006.

Corrales, J., G.M. Naja, C. Dziuba, R.G. Rivero, and W. Orem. "Sulfate Threshold Target to Control Methylmercury levels in Wetland Ecosystems." *Science of the Total Environment* 409 (2011): 2156-2162.

Craft, C.B., and C. Richardson. "Soil Characteristics of the Everglades Peatland." In *The Everglades Experiments*, by Richardson, 59. Springer 2008, 2007.

Cuda, J.P. *Invasive Species A Florida Perspective.* Entomology and Nematology Department, University of Florida, Institute of Food and Agricultural Sciences, 2009.

Cunningham, K.J., M.A. Wacker, E. Robinson, J.F. Dixon, and G.L. Wingard. *A Cyclostratigraphic and Borehole-geophysical Approach to Development of a Three-Dimensional Conceptual Hydrogeologic Model of the Karstic Biscayne Aquifer, Southeastern Florida.* Scientific Investigations Report 2005-5235, U.S. Geological Survey, 2006.

Curnutt, J.L., et al. "Population Dynamics of the Endangered Cape Sable Seaside Sparrow." *Animal Conservation* 1 (1998): 11-21.

Davis, S.M., and J.C. Ogden. *Everglades: the Ecosystem and its Restoration.* Delray Beach, Florida, USA: St. Lucie Press, 1997.

Davis, S.M., and J.C. Ogden. "Towards Ecosystem Restoration." In *Everglades: The Ecosystem and Its Restoration*, by S.M Davis and J.C. Ogden, 769-796. Delray Beach, Florida, USA: St. Lucie Press, 1994.

Davis, S.M., L.H. Gunderson, W.A. Park, J.R. Richardson, and J.E. Mattson. "Landscape Dimension, Composition and Functioning in a Changing Everglades Ecosystem." In *Everglades: The Ecosystem and its Restoration*, by S.M. Davis and J.C. Ogden, 419-444. Delray Beach, Florida, USA: St. Lucie Press, 1994.

Doren, R.F., A.P. Ferriter, and H. Hastings. "Weeds Won't Wait!: The Strategic Plan for Managing Florida's Invasive Exotic Plants, Part One: An Assessment of Invasive Plants in Florida." Report to the South Florida Ecosystem Restoration Task Force and Working Group, Florida, 2001.

Duever, M.J., J.F. Meeder, L.C. Meeder, and J.M. McCollom. "The Climate of South Florida and its Role in Shaping the Everglades Ecosystem." In *Everglades: the Ecosystem and its*

Restoration, by S.M. Davis and J.C. Ogden, 225-248. Delray Beach, Florida, USA: St. Lucie Press, 1994.

FDEP. *Bureau of Air Monitoring and Mobile Sources Air Monitoring Report.* Division of Air Management, 2010.

FFWCC. "A Conceptual Management Plan for the Everglades Complex of Wildlife Mangement Areas (Everglades/Francis S. Taylor/Holy Land and Rotenberger Wildlife Management Areas)." 2002-2007, 2007.

Florida Department of Health. *Fish Advisory List.* 2013. http://www.doh.state.fl.us/floridafishadvice/Working.html.

Florida Natural Areas Inventory. "Guide to Natural Communities of Florida." 1990.

Gunderson, L.H., C.S. Holling, G. Peterson, and L. Pritchard. *Resilience in Ecoystems, Institutions and Societies.* Bejer Discussion Paper Number 92, Stockholm, Sweden: Bejer International Institute for Ecological Economics, 1997.

Holling, C.S., L.H. Gunderson, and C.J. Walters. "The Structure and Dynamics of the Everglades System: Guidelines for Ecosystem Restoration." In *Everglades: The Ecosystem and Its Restoration*, by S.M. Davis and J.C. Ogden, 741-756. Delray Beach, Florida, USA: St. Lucie Press, 1994.

Kushlan, J.A., and M.S. Kushlan. "Observations on Crayfish in the Everglades, Florida." *Crustaceana* Supplement, No. 5, Studies on Decapoda (Biology, Ecology, Morphology, and Systematics) (1979): 155-120.

Lockwood, J.L., M.S. Ross, and J.P. Sah. "Smoke on the Water: the Interplay of Fire and Water Flow on Everglades Restoration." *Frontiers in Ecology and the Environment* 1, no. 9 (2003): 462-468.

Mazzotti, F.J., and L.A. Brandt. "Ecology of the American Alligator in a Seasonally Fluctuating Environment." In *Everglades: The Ecosystem and its Restoration*, by S.M. Davis and J.C. Ogden, 485-505. Delray Beach, Florida, USA: St. Lucie Press, 1994.

McVoy, C., W.P. Said, J. Obeysekera, J. VanArman, and T.W. Dreschel. *Landscapes and Hydrology of the Predrainage Everglades.* Gainesville, Florida, USA: South Florida Water Management District, University Press of Florida, 2011.

Milanich, J.T. *Archeology of Precolumbian Florida.* University of Florida Press, 1994.

Miller, J.A. *Ground Water Atlas of the United States - Segment 6, Alabama, Florida, Georgia, and South Carolina.* Atlas No. HA-730G, U.S. Geological Survey, 1990, 28.

National Research Council. "Progress Toward Restoring the Everglades: The Fourth Biennial Review." 2012.

NOAA. *Sea Level Variations of the United States 1854-1999.* Technical Report NOS CO-OPS 36, National Atmospheric and Oceanic Administration, 2001.

Orem, B. "Email to Mark Shafer (USACE)." Reston, Virginia, USA: U.S. Geological Survey, January 31, 2013.

Patterson, K., and R. Finck. *Tree Islands of the WCA 3 Aerial Photointerpretation and Trend Analysis Project Summary Report.* Report to the South Florida Water Management District, St. Petersburg, Florida, USA: Geonex Corporation, 1999.

RECOVER. *System Status Report.* Restoration, Coordination, and Verification Program, Jacksonville and West Palm Beach, Florida, USA: U.S. Army Corps of Engineers, Jacksonville District and South Florida Water Management District, 2009.

Reese, R.S., and K.J. Cunningham. *Hydrogeology of the Gray Limestone Aquifer in Southern Florida.* Water Resources Investigations Report 99 4213, U.S. Geological Survey, 2000, 244.

Reese, R.S., and M.A. Wacker. *Hydrogeologic and Hydraulic Characterization of the Surficial Aquifer System, and Origin of High Salinity Groundwater, Palm Beach County, Florida.* Investigations Report 2009-5113, U.S. Geological Survey, 2009, 42.

Ross, M.S., J.P. Sah, P.L. Ruiz, D.T. Jones, R. Travieso, and D. Hagayari. *Effect of Hydrology Resotation on the Habtiat of the Cape Sable Seaside Sparrow: Annual Report of 2004-2005.* Homestead, Florida, USA: Report to Everglades National Park, 2006.

Schwadron, M. *Archeological Assessment of the Eastern Everglades Expansion Lands, Everglades National Park, Florida.* Tallahassee, Florida: Southeast Archeological Center, National Park Service, 2009.

SFWMD. "South Florida Environmental Report." 2013.

Sklar, F., and A. van der Valk. "Tree Islands of the Everglades: an Overview." In *Tree Islands of the Everglades*, by F. Sklar and A. Van der Valk, 1-18. Dordrecht, Netherlands: Kluwer Academic Publishers, 2002.

Stein, B.A., L.S. Kutner, and J.S. Adams. *Precious Heritage: the Status of Biodiversity in the United States.* Oxford, England: Oxford University Press, 2000.

Thomas, T.M. "A Detailed Analysis of Climatological and Hydrological Records of South Florida with Reference to Man's Influence upon Ecosystem Evolution." In *Environments of South Florida: Present and Past, Memoir No. 2*, by P.J. Gleason, 81-122. Coral Gables, Florida, USA, 1974.

Tropical BioIndustries Inc. *Hydroperiod Conditions of Key Environmental Indicators of Everglades National Park and Adjacent East Everglades Area as a Guide to Selection of an Optimum Water Plan for Everglades National Park, Florida.* Jacksonville Florida, USA: Final Report for Contract from U.S. Army Corps of Engineers, Jacksonville District, 1990.

Troxler, T.G., and D.L. Childers. "Biogeochemical Contributions of Tree Islands to Everglades Wetland Landscape Nitorgen Cycling during Seasonal Inundation." *Ecosystems* 13, no. 1 (2010): 78-89.

USACE. "Central and South Florida Project, Modified Water Deliveries to Everglades National Park, Florida: 8.5 Square Mile Area." General Reevaluation Report, Jacksonville, Florida, USA, 2000.

USACE. *Central and South Florida Project: Water Control Plan for Water Conservation Areas, Everglades National Park, and ENP-South Dade Conveyance System.* Jacksonville, Florida, USA: Jacksonville District, 2012.

USACE. *Central and Southern Florida Project Comprehensive Review Study, Final Integrated Feasibility Report and Programmatic Environmental Impact Statement.* Jacksonville, Florida, USA: Jacksonville District, 1999.

USACE. *Everglades Restoration Transition Plan Final Environmental Impact Statement.* Jacksonville, Florida, USA: Jacksonville District, 2012.

USACE. *Interim Operational Plan for the Protection of the Cape Sable Seaside Sparrow.* Final Supplemental Environmental Impact Statement, Jacksonville, Florida, USA: Jacksonville District, 2006.

USEPA. *Guidance for Implementing the January 2001 Methylmercury Water Quality Criterion.* Office of Science and Technology, 2010.

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

USGS. 2010. http://water.usgs.gov/nawqa/mercury/MercuryFAQ.htm.

Virzi, T. "Recovering Small Cape Sable Seaside Sparrow Populations." *Cape Sable Seaside Sparrow Fire Symposium.* Everglades National Park, 2009.

Walters, C.L, and L.H. Gunderson. "A Screening of Water Policy Alternatives for Ecological Restoration in the Everglades." In *Everglades: The Ecosystem and Its Restoration*, by S.M. Davis and J.C. Ogden, 757-767. Delray Beach, Florida, USA: St. Lucie Press, 1994.

Wetzel, P.R., et al. "Biogeochemical Processes on Tree Islands in the Greater Everglades: Initiating a New Paradigm." *Critical Reviews in Environmental Science and Technology* 41, no. 6 (2011): 670-701.

Wetzel, P.R., et al. "Heterogeneity of Phosphorus Distribution in a Patterned Landscape, the Florida Everglades." *Plant Ecology* 200 (2009): 89-90.

Wood, J.M., and G.W. Tanner. "Graminoid Community Composition and Structure within Four Everglades Management Areas." *Wetlands* 10, no. 2 (1990): 127-149.

Wunderlin, R.P., and B.F. Hansen. *Atlas of Florida Vascular Plants.* Edited by University of South Florida, Tampa Institute for Systematic Botany. S.M. Landry and K.N. Campbell. 2008. http://www.plantatlas.usf.edu/.

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

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APPENDIX A – WATER CONSERVATION AREAS, EVERGLADES NATIONAL PARK, AND ENP-SOUTH DADE CONVEYANCE SYSTEM OPERATIONAL GUIDANCE

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Table 7-5

Water Conservation Area No. 3, Everglades National Park, and ENP-South Dade Conveyance System Operational Guidance

Structure/ Operational Component	Column 1: No WCA-3A Regulatory Releases to SDCS or SRS	Column 2: WCA-3A Releases to SDCS	WCA-3A Ecological Intent (defined at bottom of Table)
Note: Column 1 is the desired column to send releases to ENP. Column 2 would be used when constraints (such as but not limited to L-29, G-3273, or capacity in the SDCS) and considerations (such as but not limit to anticipated rainfall events, water quality, and other ecological benefits) exist. Transition to or from columns will be based on both current and anticipated conditions.			
WCA-3A Interim Regulation Schedule	WCA-3A Interim Regulation Schedule shown on ***Figure 7-5A, Figure 7-5B,* and *Figure 7-5C.*** **When in Zone A** S-12s, S-333, S-343A&B, and S-344 subject to conditions below, otherwise, S-12s open full, S-151 make discharges to the East Coast and ENP-SDCS as needed and make maximum allowable discharge when WCA-3B stage (Site 71) is below 8.5 feet, NGVD. S-343A&B and S-344, if non-nesting season (15 July through 31 October), make maximum allowable discharge if downstream conditions permit. **When in Zone D** S-12s, S-333, S-343A&B, and S-344 subject to conditions below, otherwise, S-12s discharge Rainfall Plan target flow for S-12s. If S-333 is closed or discharging less than 28 percent of computed flow for SRS, S-12 must discharge at least 73 percent and up to 100 percent of the computed flow for SRS, if capacity is available. S-333 make water supply discharges to the East Coast and ENP-SDCS as needed, discharge Rainfall Plan target flow for S-333 when permitted by downstream conditions. S-151 makes water supply discharges to the East Coast and ENP-SDCS as needed. S-343A&B and S-344 normally closed in this Zone unless water is needed for environmental reasons. **When in Zone E** S-12s, S-333, S-151, S-343A&B, and S-344 subject to conditions below, otherwise, S-12s discharge Rainfall Plan target flow for S-12s. S-333 make water supply discharges to the East Coast and ENP-SDCS as needed, discharge Rainfall Plan target flow for S-333 when permitted by downstream conditions. S-151 makes water supply discharges to the East Coast and	WCA-3A Interim Regulation Schedule shown on ***Figure 7-5A, Figure 7-5B,* and *Figure 7-5C.*** **When in Zone A** S-12s, S-333, S-343A&B, and S-344 subject to conditions below, otherwise, S-12s open full, S-151 make discharges to the East Coast and ENP-SDCS as needed and make maximum allowable discharge when WCA-3B stage (Site 71) is below 8.5 feet, NGVD. S-343A&B and S-344, if non-nesting season (15 July through 31 October), make maximum allowable discharge if downstream conditions permit. **When in Zone D** S-12s, S-333, S-343A&B, and S-344 subject to conditions below, otherwise, S-12s discharge Rainfall Plan target flow for S-12s. If S-333 is closed or discharging less than 28 percent of computed flow for SRS, S-12 must discharge at least 73 percent and up to 100 percent of the computed flow for SRS, if capacity is available. S-333 make water supply discharges to the East Coast and ENP-SDCS as needed, discharge Rainfall Plan target flow for S-333 when permitted by downstream conditions. S-151 makes water supply discharges to the East Coast and ENP-SDCS as needed and make up to maximum allowable discharge when WCA-3B stage (Site 71) is below 8.5 feet, NGVD. S-343A&B and S-344 normally closed in this Zone unless water is needed for environmental reasons. **When in Zone E** S-12s, S-333, S-151, S-343A&B, and S-344 subject to conditions below, otherwise, S-12s discharge Rainfall Plan target flow for S-12s. S-333 make water supply discharges to the East Coast and ENP-SDCS as needed, discharge Rainfall Plan target flow for S-333 when permitted by downstream conditions. S-151 makes water supply discharges to the East Coast and	These operations are recommended to support the following performance measures: A, B, E, F, G, H, I

Note: All elevations are in feet NGVD 1929 unless otherwise stated. Revised April 2012

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Structure/ Operational Component	Column 1: No WCA-3A Regulatory Releases to SDCS or SRS	Column 2: WCA-3A Releases to SDCS	WCA-3A Ecological Intent (defined at bottom of Table)
	ENP-SDCS as needed. S-343A&B and S-344 normally closed in this Zone unless water is needed for environmental reasons. The L-67A Borrow Canal stage (S-333 headwater) should not be drawn down below 7.5 feet, NGVD unless water is supplied from another source. **When in Zone E1**, make up to maximum practicable releases at S-12C, S-12D, S-142, S-151, S-31, S-337, S-335, S-333, S-355 A/B, and S-334 when permitted by downstream conditions. S-12s, S-333, S-151, S-343A&B, and S-344 subject to conditions below, otherwise, S-12s discharge Rainfall Plan target flow for S-12s. Revert to Zone E rules if the FWS has determined that nesting for the CSSS-A has ended, or if the headwater at S-333 falls below 8.25 feet, NGVD.	ENP-SDCS as needed. S-343A&B and S-344 normally closed in this Zone unless water is needed for environmental reasons. The L-67A Borrow Canal stage (S-333 headwater) should not be drawn down below 7.5 feet, NGVD unless water is supplied from another source. **When in Zone E1**, make up to maximum practicable releases at S-12C, S-12D, S-142, S-151, S-31, S-337, S-335, S-333, S-355 A/B, and S-334 when permitted by downstream conditions. S-12s, S-333, S-151, S-343A&B, and S-344 subject to conditions below, otherwise, S-12s discharge Rainfall Plan target flow for S-12s. Revert to Zone E rules if the FWS has determined that nesting for the CSSS-A has ended, or if the headwater at S-333 falls below 8.25 feet, NGVD.	
Rainfall Plan	Rainfall Plan located in Table 7-1. S-12s/S-333 pre-emptive/proactive releases to better manage high stages in WCA-3A. S-12s and/or S-333 release up to projected WCA-3A inflow based upon system water management operations and/or rainfall to create storage in WCA-3A for expected inflow. Regulatory component of the Rainfall Plan determined by multiplying the distance (in feet) the WCA-3A water level is above Zone E/E1 by 2,500 cfs from 1 January through 30 June and by 5,000 cfs from 1 July through 31 December. Calculate Modified Rainfall Plan to gather comparison and historical information.		Ability to match inflow with S-12s and/or S-333 releases intended to avoid damaging high water levels in WCA-3A. This Modified Rainfall Plan calculation and comparison with Rainfall Plan in Annex A is recommended in order to identify and keep a record of the difference in the Rainfall Plan in Table 7-1 versus the Modified Rainfall Plan, to aid future Rainfall Plan studies.
Pre-Storm/ Storm/and Storm Recovery Operations for the SDCS prior to the 2011 8.5 SMA Project EA FONSI	Pre-Storm/Storm/and Storm Recovery Operations for the SDCS in Table 7-6.		

Note: All elevations are in feet NGVD 1929 unless otherwise stated. Revised April 2012

T7-9

Structure/ Operational Component	Column 1: No WCA-3A Regulatory Releases to SDCS or SRS	Column 2: WCA-3A Releases to SDCS	WCA-3A Ecological Intent (defined at bottom of Table)
Pre-Storm/ Storm/and Storm Recovery Operations for the SDCS resulting from the 2011 8.5 SMA Project EA FONSI	Pre-Storm/Storm/and Storm Recovery Operations for the SDCS in Table 7-6, which references Angel's Well, will be revised to reference LPG1 and LPG2 not Angel's Well.		
S-343 A/B and S-344	Closed from 1 November through 14 July independent of WCA-3A levels.		
S-12 A/B/C/D	S-12A closed from 1 November through 14 July; S-12B closed from 1 January through 14 July; S-12C no closure period. S-12D no closure period. S-12A closed from 1 November through 14 July, S-12B closed from 1 January through 14 July subject to below unless FWS has determined that nesting season for the CSSS-A has ended. WCA-3A water levels may require the opening of S-12A and/or S-12B during the period from 1 November through 14 July (additional NEPA documentation) to avoid unacceptable risk of failure of WCA-3A levees and/or outlet structures. **S-12A Year-round**: To provide access to cultural areas, when Rainfall Plan results in S-12 target flows, S-12A up to 100 cfs release. **S-12A Cultural Access Release:** S-12A up to 100 cfs release available when Rainfall Plan results in S-12 target flows. From 1 November through 14 July, USACE must request informal consultation with FWS to avoid impacts on CSSS-A. During this time, the duration of this release will not exceed five consecutive days. S-12A up to 100 cfs release may only occur when WCA-3A 3-gage average (WCA-3AVG - Sites 63, 64, 65) is greater than 8.4 feet, NGVD. During S-12A up to 100 cfs release, data such as but not limited to NP-205 and area rainfall will be monitored with NP-205 increase or anticipated increase above 5.7 feet, NGVD resulting in closing of S-12A. **S-12C/D Year-round**: S-12C and/or S-12D release up to WCA-3A Regulation Schedule (Zone A maximum) or Rainfall Plan (target flow). **S-12s Flow Distribution:** S-12 opening sequence to meet Target Flows is from east (S-12D) to west (S-12A); S-12s flow distributions would not be limited to the historical percentage distribution of flow from the S-12s (10 percent at S-12A, 20 percent at S-12B, 30 percent at S-12C, 40 percent at S-12D). **S-12A/B/C/D Headwater greater than 11.0 feet, NGVD:** Open an amount only enough to stop overtopping of gates.	These operations are recommended to support the following performance measures: **S-12C/D Year-round**: A, B, E, F, G, H, I **S-12s Flow Distribution:** Due to the position of S-12D near the center of SRS, S-12D should generally pass the most water, with less water passed to the west.

Note: All elevations are in feet NGVD 1929 unless otherwise stated. Revised April 2012

T7-10

Structure/ Operational Component	Column 1: No WCA-3A Regulatory Releases to SDCS or SRS	Column 2: WCA-3A Releases to SDCS	WCA-3A Ecological Intent (defined at bottom of Table)
	DOI Sandbag culverts under Tram Road by February 1 if necessary.		
S-333: G-3273 less than or equal to 6.8 feet, NGVD	Rainfall Plan target flow for S-333 (to NESRS). When WCA-3A is in Zone E1 or Zone A, maximum practicable through S-333 to NESRS. Note: If FDOT has no roadway subbase concerns S-333 will be closed when the tailwater is above 9.0 feet, NGVD. However, when FDOT has roadway subbase concerns, S-333 will be closed when the tailwater is above 7.5 feet, NGVD. However, upon completion of the Tamiami Trail Bridge Modification these concerns may no longer exist.	Rainfall Plan target flow for S-333 (to NESRS), plus as much of the remaining Rainfall Plan target flow that the S-12s cannot discharge to be passed through S-334 and subject to capacity constraints, which are 1,350 cfs at S-333, L-29 maximum stage limit, and canal stage limits downstream of S-334. When WCA-3A is in Zone E1 or Zone A, maximum practicable through S-333 to NESRS. Note: If FDOT has no roadway subbase concerns S-333 will be closed when the tailwater is above 9.0 feet, NGVD. However, when FDOT has roadway subbase concerns, S-333 will be closed when the tailwater is above 7.5 feet, NGVD. However, upon completion of the Tamiami Trail Bridge Modification these concerns may no longer exist.	
S-333: G-3273 greater than 6.8 feet, NGVD	Closed	Match S-333 with S-334 flows.	
L-29 Borrow Canal	9.0* feet, NGVD * In order to raise the L-29 Borrow Canal above 7.5 feet, NGVD additional NEPA would need to be completed. Note: Refer to S-333 operations which address FDOT roadway subbase concerns.		
S-355A and S-355B	Follow the same constraints as S-333. Open whenever gradient allows southerly flow.		
S-337	Water supply	Regulatory releases pursuant to WCA-3A Interim Regulation Schedule.	
S-151	Water supply	Regulatory releases pursuant to WCA-3A Interim Regulation Schedule.	
S-335	Water supply The intent is to limit the volume of water passed at S-335 to pre-ISOP conditions and not use S-332B, S-332C, or S-332D or other triggers to pass additional flows. Note: It is recognized that under these conditions operations of S-335 would be infrequent.	When making regulatory releases through S-151, limit S-335 outflows to not exceed inflows from the S-151/S-337 path. Use S-333/S-334 before S-151/S-337/ S-335	
S-334	Water supply	Pass all or partial S-333 flows depending on stage at G-3273.	

Note: All elevations are in feet NGVD 1929 unless otherwise stated. Revised April 2012

T7-11

Structure/ Operational Component	Column 1: No WCA-3A Regulatory Releases to SDCS or SRS	Column 2: WCA-3A Releases to SDCS	WCA-3A Ecological Intent (defined at bottom of Table)
S-338	Open 5.8 feet, NGVD Close 5.5 feet, NGVD	Open 5.8 feet, NGVD Close 5.4 feet, NGVD	
G-211	Open 6.0 feet, NGVD Close 5.5 feet, NGVD Note: If S-331 pumping is limited and the G-211 tailwater rises above 5.3 feet, NGVD then close G-211.	Open 5.7 feet, NGVD Close 5.3 feet, NGVD Note: If S-331 pumping is limited and the G-211 tailwater rises above 5.3 feet, NGVD then close G-211.	
S-331 resulting from the 2011 8.5 SMA Project EA FONSI	"High Range": When LPG2 is less than 5.5 feet, NGVD, the "high range" applies and S-331 headwater will have no limit. "Intermediate Range": When LPG2 is between 5.5 and less than 6.0 feet, NGVD, the "intermediate range" applies and S-331 average-daily headwater will be maintained between 4.5 and 5.0 feet, NGVD to the extent allowable by downstream conditions. "Low Range": When LPG2 is at or above 6.0 feet, NGVD and S-357 constraints are limiting the ability of maintaining C-357 average-daily water level below 6.2 feet, NGVD, the "low range" applies and S-331 average-daily headwater will be maintained between 4.0 and 4.5 feet, NGVD to the extent allowable by downstream conditions and for a minimum of 24 hours. "Low Range Adjustment": When LPG2 is at or above 6.0 feet, NGVD and S-357 constraints are not limiting the ability of maintaining C-357 average-daily water level below 6.2 feet, NGVD, the "low range adjustment" applies and S-331 average-daily headwater will be maintained between 4.5 and 5.0 feet, NGVD to the extent allowable by downstream conditions. Additional Operating Information: 1. When operating near range limits operations may be adjusted to the nearest range without reaching the range. This allows a transition to the next projected range or to avoid rapid changes in operating ranges. 2. S-331 "Low Range" may be used instead of the "Low Range Adjustment" to further the understanding of the hydrology and hydraulics of the 8.5 SMA conditions during ideal or acceptable meteorological and climate conditions, in order to provide data to help define a long-term solution to issues related to the S-357 pump station or during times of construction. 3. If the USACE determines the use of the "Low Range" instead of the "Low Range Adjustment" reduces or prevents undesirable seepage effects within the flood mitigation area due to S-357 operations, then the "Low Range" will be used instead of the "Low Range Adjustment" until the undesirable seepage effects from S-357 are modified by other operational or structural changes. 4. Evaluation to use the "Low Range Adjustment" instead of the "Low Range" should be done on a daily basis. 5. The operational ranges may be changed immediately in response to the trigger stage. Note: If S-331 tailwater is above 6.0 feet, NGVD or the S-176 headwater is above 5.5 feet, NGVD then no pumping at S-331. Under normal conditions, pumping at S-331 should be limited to two pumps or less.		
S-357	S-357 will be operated to maintain an average-daily water level in C-357 at LPC1 or S-357 headwater between 5.7 to 6.2 feet, NGVD. Note: DELTA is defined as the north to south groundwater gradient between Angel's Well water level and LPG1's water level. DELTA equals (Angel's Well water level) minus (LPG1's water level). On Criteria:		

Note: All elevations are in feet NGVD 1929 unless otherwise stated. Revised April 2012

T7-12

Structure/ Operational Component	Column 1: No WCA-3A Regulatory Releases to SDCS or SRS	Column 2: WCA-3A Releases to SDCS	WCA-3A Ecological Intent (defined at bottom of Table)
	When C-357 measured at LPC1 or S-357 headwater is at or above 5.7 feet, NGVD, S-357 may be operated with pump constraints. Off Criteria: 1. When C-357 measured at LPC1 or S-357 headwater is below 5.7 feet, NGVD. 2. When DELTA is less than 0.1 feet, then S-357 will remain off for a minimum of 24 hours and until DELTA is equal to or larger than 0.2 feet 3. When Las Palmas Detention Cell Gage 1 (LPDC1) is above 10 feet, NGVD. Pumping Constraints: C1: If DELTA is equal to or larger than 0.2 feet then S-357 can be operated up to maximum capacity. C2: If (DELTA is between 0.1 feet and 0.2 feet) then S-357 is limited to a maximum of 250 acre-feet per day. C3: If (DELTA is less than 0.1 feet) then S-357 will remain off for a minimum of 24 hours and until DELTA is equal to or larger than 0.2 feet. Additional Operating Information: 1. S-357 pumps will be turned off to prevent overflow of the detention cell. 2. These criteria do not preclude the exercising of pumps or the testing of repairs, provided that the pumps are run individually and that the run time does not exceed two hours per pump per month. 3. These criteria will not preclude field tests of S-357 to further the understanding of the hydrology and hydraulics of the 8.5 SMA conditions during ideal or acceptable meteorological and climate conditions. 4. If the USACE determines that detrimental seepage is occurring into the 8.5 SMA due to operations of S-357 then additional S-357 pumping constraints may be added including suspending S-331 "Low Range Adjustment". 5. Operations of S-357 may be suspended during times of construction. 6. Under normal conditions, the intent is to limit the pumping capacity of S-357 to 250 acre feet per day.		
S-332B	Pumped up to 575 cfs* On 5.0 feet, NGVD Off 4.7 feet, NGVD *Pump to capacity if limiting conditions within the Sparrow habitat are not exceeded. There will be no overflow into ENP. Note: There are two 125-cfs pumps and one 75-cfs pump directed to the Southern Detention Area. The remaining two 125-cfs pumps are directed to the north seepage reservoir.	Pumped up to 575 cfs* On 4.8 feet, NGVD Off 4.5 feet, NGVD *Pump to capacity if limiting conditions within the Sparrow habitat are not exceeded. There will be no overflow into ENP. Note: There are two 125-cfs pumps and one 75-cfs pump directed to the Southern Detention Area. The remaining two 125-cfs pumps are directed to the north seepage reservoir.	
S-332B North Seepage Reservoir	The north reservoir is a 240-acre reservoir located to the north of the pump station with a weir discharging to the east. This seepage reservoir will have a normal maximum water depth of 2.0 feet. This 2.0 feet depth corresponds to 8.8 feet, NGVD at S-332B (North) tailwater. However, if USACE determines that a flood emergency exists similar to an event like the "No Name" storm, the depth of water would be increased to 4.0 feet, when possible.		

Note: All elevations are in feet NGVD 1929 unless otherwise stated. Revised April 2012

T7-13

Structure/ Operational Component	Column 1: No WCA-3A Regulatory Releases to SDCS or SRS	Column 2: WCA-3A Releases to SDCS	WCA-3A Ecological Intent (defined at bottom of Table)
Northern Detention Area	The future Northern Detention Area (NDA) is planned to contain the 8.5 Square Mile Area (SMA) Detention Cell, S-332B North Seepage Reservoir, and the area connecting the two. This seepage reservoir will have a normal maximum water depth of 2.0 feet. However, if the USACE determines that a flood emergency exists similar to an event like the "No Name" storm, the depth of water would be increased to 4.0 feet, when possible.		
Southern Detention Area	The Southern Detention Area (SDA) is the result of combining the S-332B West Seepage Reservoir, the S-332C Seepage Reservoir, and the S-332B/C Connector and raising the western levee of the previous reservoirs. It is very unlikely that there will be overflow from the SDA. This seepage reservoir will have a normal maximum water depth of 2.0 feet. However, if USACE determines that a flood emergency exists similar to an event like the "No Name" storm, the depth of water would be increased to 4.0 feet, when possible.		
S-332C	Pumped up to 575 cfs* On 5.0 feet, NGVD Off 4.7 feet, NGVD *Pump to capacity unless habitat conditions are not being achieved within the Rocky Glades. There will be no overflow into ENP.	Pumped up to 575 cfs* On 4.8 feet, NGVD Off 4.5 feet, NGVD *Pump to capacity unless habitat conditions are not being achieved within the Rocky Glades. There will be no overflow into ENP.	
S-332D	Pump up to 500 cfs from 15 July (or the end of the breeding season, as confirmed by FWS) through 30 November; 325 cfs from 1 December through 31 January; and 250 cfs from 1 February through 14 July. On 4.85 feet, NGVD Off 4.65 feet, NGVD	Pump up to 500 cfs from 15 July (or the end of the breeding season, as confirmed by FWS) through 30 November; 325 cfs from 1 December through 31 January; and 250 cfs from 1 February through 14 July. On 4.7 feet, NGVD Off 4.5 feet, NGVD	
S-332DX1	Open when stage difference between RG4 and NTS18 exceeds 1.0 foot and CR2 stage is higher than NTS18 stage (Gage locations shown on ***Figure 7-7***). RG4 and CR2 typically have higher water levels than NTS18. Utilize RG4 water level gage located in northern portion of the SDA, NTS18 water level gage located in southern portion of the SDA, and CR2 water level gage located in ENP west of the SDA. Close when stage difference between RG4 and NTS18 is less than 0.25 feet or NTS18 stage is 0.75 feet greater than CR2 stage. ENP may make a recommendation to USACE to adjust the open/close criteria by + or – 0.5 feet.		
Frog Pond Seepage Reservoir (S-332D Detention Area)	810 acres with overflow into Taylor Slough This seepage reservoir will have a normal maximum water depth of 2.0 feet. However, if USACE determines that a flood emergency exists similar to an event like the "No Name" storm, the depth of water would be increased to a maximum of 4.0 feet. However, a depth of 4.0 feet in the Frog Pond is not possible at this time due to the constraint of the S-332D pump station outlet elevation.		
S-194	Open 5.5 feet, NGVD Close 4.8 feet, NGVD	Operated to maximize flood control discharges to coast Open 4.9 feet, NGVD Close 4.5 feet, NGVD	
S-196	Open 5.5 feet, NGVD	Operated to maximize flood control discharges to coast	

Note: All elevations are in feet NGVD 1929 unless otherwise stated. Revised April 2012

T7-14

Structure/ Operational Component	Column 1: No WCA-3A Regulatory Releases to SDCS or SRS	Column 2: WCA-3A Releases to SDCS	WCA-3A Ecological Intent (defined at bottom of Table)
	Close 4.8 feet, NGVD	Open 4.9 feet, NGVD Close 4.5 feet, NGVD	
S-176	Open 5.0 feet, NGVD Close 4.75 feet, NGVD	Open 4.9 feet, NGVD Close 4.7 feet, NGVD	
S-177	Open 4.2 feet, NGVD (see S-197 open) Close 3.6 feet, NGVD		
S-18C	Open 2.6 feet, NGVD Close 2.3 feet, NGVD	Open 2.25 feet, NGVD Close 2.0 feet, NGVD	
S-197	If S-177 headwater is greater than 4.1 feet, NGVD or S-18C headwater is greater than 2.8 feet, NGVD, open 3 culverts. If S-177 headwater is greater than 4.2 feet, NGVD for 24 hours or S-18C headwater is greater than 3.1 feet, NGVD; open 4 more culverts for a total of 7 culverts open. If S-177 headwater is greater than 4.3 feet, NGVD or S-18C headwater is greater than 3.3 feet, NGVD, then open 6 more culverts for a total of 13 culverts open. Close gates when all the following conditions are met: 1. S-176 headwater is less than 5.2 feet, NGVD and S-177 headwater is less than 4.2 feet, NGVD. 2. Storm has moved away from the basin 3. After Conditions 1 and 2 are met, keep the number of S-197 culverts open necessary only to match residual flow through S-176. All culverts should be closed if S-177 headwater is less than 4.1 feet, NGVD after all conditions are satisfied.		
S-356	When conditions permit (i.e., G-3273 and L-29 constraints), discharges from S-356 will go into L-29. Pumping will be limited to the amount of seepage into L-31N in the reach between S-335 and G-211. A technical team will evaluate pumping limits and operations. The pumps will be operated accordingly.	When conditions permit (i.e., no S-334 regulatory releases and G-3273 and L-29 constraints), discharges from S-356 will go into L-29. Pumping will be limited to the amount of seepage into L-31N in the reach between S-335 and G-211. A technical team will evaluate pumping limits and operations. The pumps will be operated accordingly.	
S-346	Normally, this structure can be open when S-12D is open and is closed when all S-12 structures are closed. S-346 can be open to increase the capacity of S-12D.		
S-174	Closed.		
S-175	Closed.		
S-332	Inoperable.		
Note: SDCS pre-storm drawdown water management operations to be implemented consistent with IOP 2006 Pre-Storm / Storm / and Storm Recovery Operations for SDCS and is contained in Table 7-6. Water management operations for other than named events: SFWMD will monitor antecedent conditions, groundwater levels, canal levels, and rainfall. If these conditions indicate a strong likelihood of flooding, SFWMD will make a recommendation to USACE to initiate pre-storm operations. USACE will review the data, advise ENP and FWS of the conditions, consult with the Miccosukee Tribe of Indians of Florida, and make a decision whether to implement pre-storm drawdown or otherwise alter system wide operations from those contained in the table.			
Note: The Chairman of the Miccosukee Tribe of Indians of Florida or his designated representatives will monitor the conditions in WCA-3A and other tribal lands and predicted rainfall. If the Tribe determines these conditions indicate jeopardy to the health or safety of the Tribe, the Chairman or his designated representative will make a recommendation to USACE to change the operations of the S-12 structures or other parts of the system. USACE will review the data and advise appropriate agencies of the conditions, and the District Commander will personally consult with the Chairman or his designated representative prior to making a decision whether to implement changes to the S-12 operations.			
Note: Ecological Intent and/or Performance Measures			

Note: All elevations are in feet NGVD 1929 unless otherwise stated. Revised April 2012

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Structure/ Operational Component	Column 1: No WCA-3A Regulatory Releases to SDCS or SRS	Column 2: WCA-3A Releases to SDCS	WCA-3A Ecological Intent (defined at bottom of Table)
Cape Sable Seaside Sparrow			
Performance Measure A. NP-205 (CSSS-A): Provide a minimum of 60 consecutive days at NP-205 below 6.0 feet, NGVD beginning no later than March 15. Ecological Targets 1. NP-205 (CSSS-A): Strive to reach a water level of less than or equal to 7.0 feet, NGVD at NP-205 by December 31 for nesting season water levels to reach 6.0 feet, NGVD by mid-March. 2. CSSS: Strive to maintain a hydroperiod between 90 and 210 days (three to seven months) per year throughout sparrow habitat to maintain marl prairie vegetation.			
Everglade Snail Kite/Apple Snail (Note: All stages for WCA-3A are WCA-3A 3-gage average of Sites 63, 64, 65) Performance Measures B. WCA-3A: For snail kites, strive to reach waters levels between 9.8 and 10.3 feet, NGVD by December 31, and between 8.8 and 9.3 feet, NGVD between May 1 and June 1. C. WCA-3A: For apple snails, strive to reach water levels between 9.7 and 10.3 feet, NGVD by December 31 and between 8.7 and 9.7 feet, NGVD between May 1 and June 1. D. WCA-3A (Dry Season Recession Rate): Strive to maintain a recession rate of 0.05 feet per week from January 1 to June 1 (or onset of the wet season). This equates to a stage difference of approximately 1.0 feet between January and the dry season low. E. WCA-3A (Wet Season Rate of Rise): Manage for a monthly rate of rise less than 0 .25 feet per week to avoid drowning of apple snail egg clusters. Ecological Target 3. WCA-3A (Dry Years): Strive to maintain optimal snail kite foraging habitat by allowing water levels to fall below ground surface level between one in four and one in five years (208 to 260 weeks average flood duration) between May 1 and June 1 to promote regenerations of marsh vegetation. Do not allow water levels below ground surface for more than four to six weeks to minimize adverse effects on apple snail survival.			
Wood Stork/Wading Birds (Note: All stages for WCA-3A are WCA-3A 3-gage average of Sites 63, 64, 65) **Performance Measures** F. WCA-3A (Dry Season Recession Rate): Strive to maintain a recession rate of 0.07 feet per week, with an optimal range of 0.06 to 0.07 feet per week, from January 1 to June 1. G. WCA-3A (Dry Season): Strive to maintain areas of appropriate foraging depths (5 to 25 cm) within the Core Foraging Area (18.6 mile radius, CFA) of any active wood stork colony. H. WCA-3A (Dry Season): Strive to maintain areas of appropriate foraging depths (5 to 15 cm) within the Core Foraging Area (seven to nine mile radius) of any active white ibis or snowy egret colony.			
Tree Islands (Note: All stages for WCA-3A are WCA-3A 3-gage average of Sites 63, 64, 65) **Performance Measures** I. WCA-3A: For tree islands, strive to keep high water peaks less than 10.8 feet, NGVD, not to exceed 10.8 feet, NGVD for more than 60 days per year, and reach water levels less than 10.3 feet, NGVD by December 31.			

Note: All elevations are in feet NGVD 1929 unless otherwise stated. Revised April 2012

T7-16

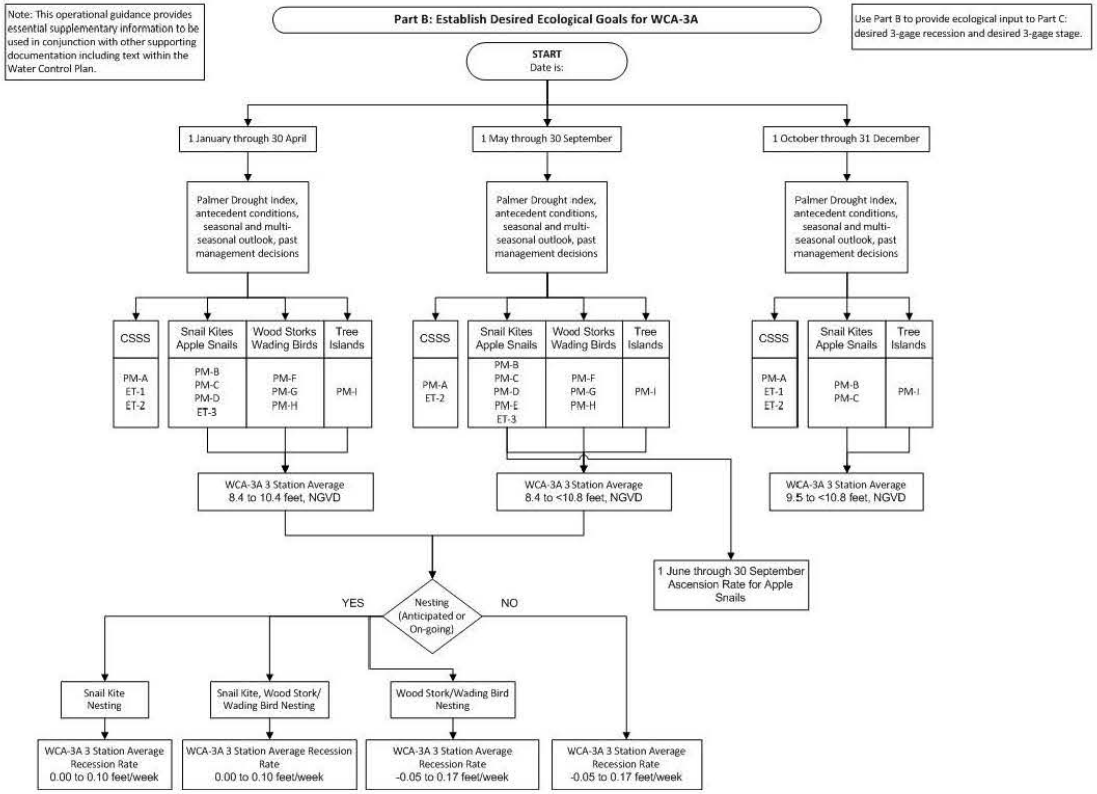

FIGURE A-2: WATER CONSERVATION AREA-3A INTERIM REGULATION SCHEDULE PART B

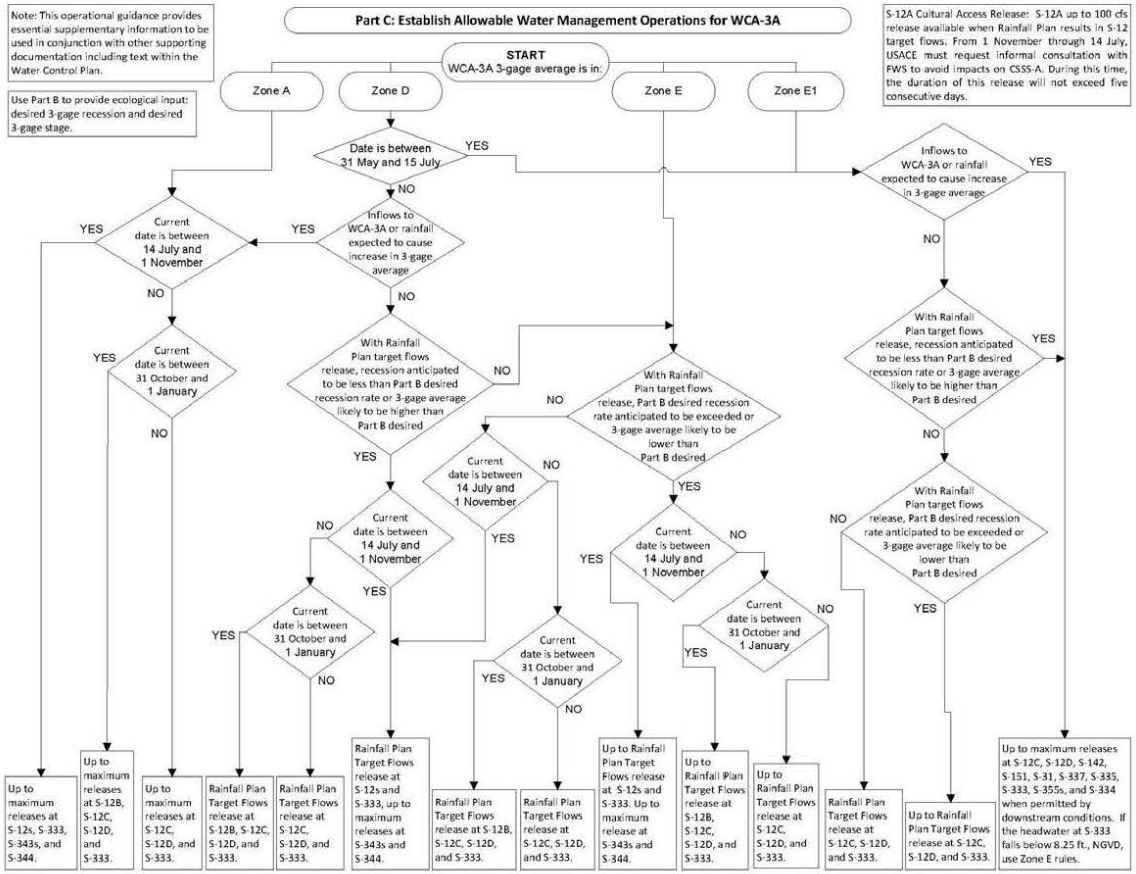

FIGURE A-3: WATER CONSERVATION AREA-3A INTERIM REGULATION SCHEDULE PART C

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APPENDIX B – PROPOSED G-3273 PLANNED DEVIATION

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INTENT OF PLANNED DEVIATION

The intent of water management operations in this Planned Deviation is to temporarily utilize S-333, S-355A, and S-355B to best achieve the objective of increasing releases from S-333 above those allowed by the 2012 Water Conservation Areas, Everglades National Park, and ENP-South Dade Conveyance System Water Control Plan (WCP) in order to manage the water level in WCA 3A so as not to exceed the Period of Record (POR) maximum. The WCP includes operating criteria that constrains S-333 releases when a water level of 6.8 feet at G-3273 occurs, preventing S-333 releases to Northeast Shark River Slough (NESRS). The Planned Deviation will provide the ability to make S-333 releases to NESRS when the water level at G-3273 is between 6.8 and 7.5 feet.

The WCP, including the WCA 3A Interim Regulation Schedule (Zone A), will continue to govern water management operations during the Planned Deviation with the exception of a modified G-3273 stage constraint.

The Planned Deviation does not preclude S-334 from being used for existing project functions, including but not limited to:

- Conveying excess water from WCA 3A to the C-111 Detention Areas and the C-111 as required by Column 2 within the WCP.
- Water supply to Taylor Slough, the L-31N Canal, and C-111.

Although not an objective, data from this Planned Deviation will be available for future analysis as described in the Data Collection and Performance Measures section included below.

IMPLEMENTATION OF PLANNED DEVIATION

A Planned Deviation will be implemented according to Table 1 when:

- The water level in WCA 3A is in Zone A, above 12.0 feet (3 gage average), and expected to exceed the 3 gage average POR maximum and
- WCA 3A Releases to SDCS (Column 2) are being utilized (G-3273 is above 6.8 feet) but discharges from S-333 are being limited by the maximum capacity of the SDCS. (Note: Maximum capacity of the SDCS is defined as S-331 fully utilizing all three pumping units.

Table 1: G-3273 Targeted Criteria

January	February	March	April	May	June	July	August	September	October	November	December
7.5*	6.8*	6.8*	6.8*	6.8*	7.5*	7.5*	7.5*	7.5*	7.5*	7.5*	7.5*

* The duration of this planned deviation is not contingent on a specific date; however, months and stage listed may be subject to change due to system conditions in order to achieve the deviation objective.

ADJUSTMENT/DISCONTINUATION OF PLANNED DEVIATION

S-333 releases to NESRS up to 7.5 feet at G-3273 will remain in effect until one of the following conditions has occurred:

- The water level in WCA 3A is in Zone A, below 12.0 feet (3 gage average), and receding to achieve the environmental targets described in the WCP
- WCA 3A Releases to SDCS (Column 2) are being utilized (G-3273 is above 6.8 feet), but discharges from S-333 are no longer being limited by the maximum capacity of the SDCS.
- Adjustments to Table 1, as noted, due to system conditions.

OPERATING CRITERIA FOR L-29 BORROW CANAL

The L-29 Borrow Canal will be maintained at the same levels as those intended in the WCP unless the L-29 Borrow Canal operating criteria in the WCP has been superseded.

Maintain the L-29 Borrow Canal stage at 7.5 feet (average of S-333 tailwater and S-334 headwater). To achieve this, the priority listed below will be followed.

1. Utilize S-333 up to maximum releases.

2. Subject to obtaining FDEP permit, utilize S-355A and S-355B in addition to S-333 whenever S-355A or S-355B headwater exceeds L-29 Borrow Canal stage (average of S-333 tailwater and S-334 headwater) by at least 0.2 feet. General equation is as follows: S-355A/B headwater $\geq$ L-29 canal stage + 0.2 feet.

If L-29 Borrow Canal stage exceeds 7.5 feet due to rainfall, the priority listed below will be followed (based upon the features being utilized at the time).

1. Close S-355A and S-355B

2. Match S-333 with S-334 flows

3. Close S-333

OPERATING CRITERIA FOR L-31N CANAL

The L-31N Canal will be maintained at the same levels as those intended in the WCP.

Utilize WCP to maintain L-31N and SDCS canal levels including both Column 1 and 2. Operational flexibility is anticipated to be used as needed within the bounds of the WCP to adjust to resulting local conditions. Existing WCP operational criteria along the SDCS (i.e. L-31N and C-111) will remain unchanged.

WATER SUPPLY OPERATIONS

No changes to water supply operations are proposed. It is anticipated that water supply deliveries to the SDCS will not be needed.

DATA COLLECTION & PERFORMANCE MEASURES

A. The volume of water sent to NESRS (S-333, S-355A, S-355B) during this Planned Deviation (G-3273 above 6.8) will be compared to the historical volume (G-3273 above 6.8) of water that was sent to NESRS (S-333, S-355A, S-355B).

B. The volume of water sent to the 8.5 SMA detention cell/STA (S-357) and L-31N/C-1W (S-331, S-338) during this Planned Deviation (G-3273 above 6.8) will be compared to the historical volume (G-3273 above 6.8) of water that was sent to L-31N/C-1W (S-331, S-338).
Note: Use of S-357 is contingent upon the receipt of a FDEP permit for operations.

C. In addition, the effect of the Planned Deviation on 8.5 SMA detention cell/STA water level and the western portion of 8.5 SMA will be assessed for determination of the implementable extent of G-3273 modification/removal.

D. The historic rainfall as measured at S-331 will be compared to the rainfall at S-331 during this Planned Deviation.

E. The list of gages to be used for data collection is shown in Table 2. A map of the gages and structures is shown in Figure 1.

Table 2: Gages for surface water hydrologic monitoring of the G-3273 Planned Deviation.

Feature	**Parameter**	**Purpose**	**Performance Measure**
S-333	HW, TW, Q	Determine volume	A, B
S-334	HW, TW, Q	Determine volume	A, B
S-355A	HW, TW, Q	Determine volume	A, B
S-355B	HW, TW, Q	Determine volume	A, B
G-3273	Stage	Determine duration, recession rate	A, B, C
S-357	HW, TW, Q	Determine volume, frequency of use	A, B, C
S-331	HW, TW, Q, Precipitation	Determine volume, frequency of use	A, B, C, D
S-338	HW, TW, Q	Determine volume, frequency of use	B
G-3574	Stage	Determine duration, recession rates	A, B, C
G-3576	Stage	Determine duration, recession rates	A, B, C
G-3577	Stage	Determine duration, recession rates	A, B, C
G-3578	Stage	Determine duration, recession rates	A, B, C
G-3272	Stage	Determine duration, recession rates	A, B, C

G-596	Stage	Determine duration, recession rates	A, B, C, D
G-3626	Stage	Determine duration, recession rates	A, B, C, D
G-3627	Stage	Determine duration, recession rates	A, B, C, D
G-3628	Stage	Determine duration, recession rates	A, B, C, D
LPG1	Stage	Determine duration, recession rates	A, B, C, D
LPG2	Stage	Determine duration, recession rates	A, B, C, D
LPG3	Stage	Determine duration, recession rates	A, B, C, D
LPG5	Stage	Determine duration, recession rates	A, B, C, D
LPG7	Stage	Determine duration, recession rates	A, B, C, D
LPG8	Stage	Determine duration, recession rates	A, B, C, D
NE1	Stage	Determine duration, recession rates	A, C
NE2	Stage	Determine duration, recession rates	A, C
NE4	Stage	Determine duration, recession rates	A, C
G-3557	Stage	Determine duration, recession rates	A, B, C
G-3558	Stage	Determine duration, recession rates	A, B, C

Notes:
HW – Headwater stage
TW – Tailwater stage
Q – Discharge (cfs)

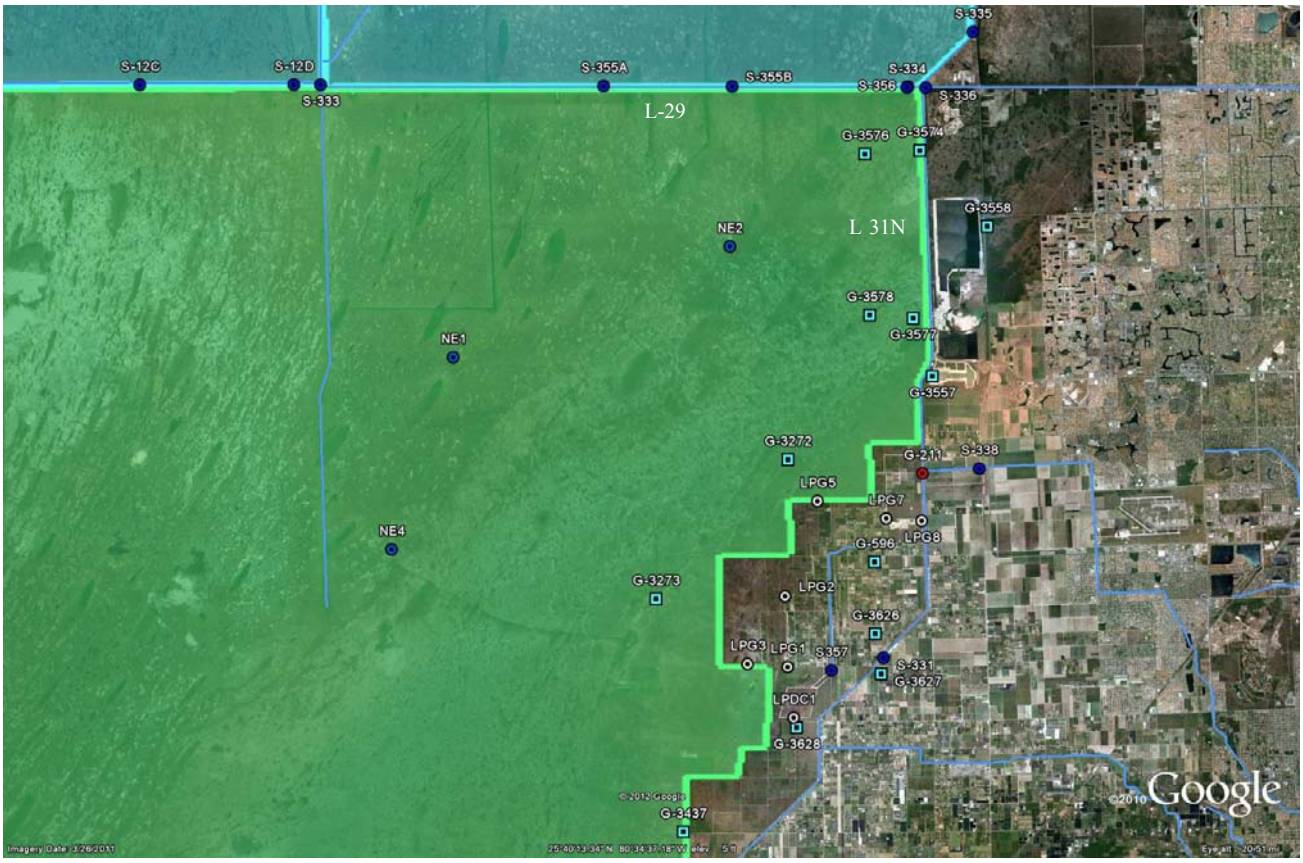

Figure 1: Surface water hydrologic monitoring gage locations for the G-3273 Constraint Deviation.

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APPENDIX C - COASTAL ZONE MANAGEMENT ACT CONSISTENCY

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FLORIDA COASTAL ZONE MANAGEMENT PROGRAM
FEDERAL CONSISTENCY EVALUATION PROCEDURES

G-3273 Planned Deviation
Miami-Dade County, Florida

1. Chapter 161, Beach and Shore Preservation. The intent of the coastal construction permit program established by this chapter is to regulate construction projects located seaward of the line of mean high water and which might have an effect on natural shoreline processes.

Response: Coastal construction is not proposed as a part of this project

2. Chapters 163(part II), 186, and 187, County, Municipal, State and Regional Planning. These chapters establish the Local Comprehensive Plans, the Strategic Regional Policy Plans, and the State Comprehensive Plan (SCP). The SCP sets goals that articulate a strategic vision of the State's future. Its purpose is to define in a broad sense, goals, and policies that provide decision-makers directions for the future and provide long-range guidance for an orderly social, economic and physical growth.

Response: The proposed project has been coordinated with various Federal, State and local agencies during the planning process. The project meets the primary goal of the State Comprehensive Plan through preservation and protection of the environment.

3. Chapter 252, Disaster Preparation, Response and Mitigation. This chapter creates a state emergency management agency, with the authority to provide for the common defense; to protect the public peace, health and safety; and to preserve the lives and property of the people of Florida.

Response: The proposed project involves the Planned Deviation of the G-3273 constraint in the WCAs-ENP-SDCS WCP from 6.8 feet to 7.5 feet, NGVD. Flood protection provided by the project will not be affected by the Planned Deviation of the G-3273 constraint. Therefore, this project would be consistent with the efforts of Division of Emergency Management.

4. Chapter 253, State Lands. This chapter governs the management of submerged state lands and resources within state lands. This includes archeological and historical resources; water resources; fish and wildlife resources; beaches and dunes; submerged grass beds and other benthic communities; swamps, marshes and other wetlands; mineral resources; unique natural features; submerged lands; spoil islands; and artificial reefs.

Response: The proposed G-3273 Planned Deviation will not affect flood protection provided by the project. There is no dredge or fill as part of this project. The proposed project would comply with the intent of this chapter.

5. Chapters 253, 259, 260, and 375, Land Acquisition. This chapter authorizes the state to acquire land to protect environmentally sensitive areas.

Response: Since this action includes only slight operational changes, this chapter does not apply.

6. Chapter 258, State Parks and Aquatic Preserves. This chapter authorizes the state to manage state parks and preserves. Consistency with this statute would include consideration of projects that would directly or indirectly adversely impact park property, natural resources, park programs, management or operations.

Response: The proposed project area is located within Everglades National Park (ENP). The G-3273 Planned Deviation will not adversely impact and may provide some hydrologic benefits to ENP. The project is consistent with this chapter.

7. Chapter 267, Historic Preservation. This chapter establishes the procedures for implementing the Florida Historic Resources Act responsibilities.

Response: This project will be coordinated with the State Historic Preservation Officer (SHPO). The project is consistent with the goals of this chapter.

8. Chapter 288, Economic Development and Tourism. This chapter directs the state to provide guidance and promotion of beneficial development through encouraging economic diversification and promoting tourism.

Response: The proposed action is not anticipated to have a negative impact on recreation in the project area. This would be compatible with tourism for this area and therefore, is consistent with the goals of this chapter.

9. Chapters 334 and 339, Transportation. This chapter authorizes the planning and development of a safe balanced and efficient transportation system.

Response: No public transportation systems would be impacted by this project.

10. Chapter 370, Saltwater Living Resources. This chapter directs the state to preserve, manage and protect the marine, crustacean, shell and anadromous fishery resources in state waters; to protect and enhance the marine and estuarine environment; to regulate fishermen and vessels of the state engaged in the taking of such resources within or without state waters; to issue licenses for the taking and processing products of fisheries; to secure and maintain statistical records of the catch of each such species; and, to conduct scientific, economic, and other studies and research.

Response: No saltwater resources should be impacted by the G-3273 Planned Deviation; therefore the project is consistent with the goals of this chapter.

11. Chapter 372, Living Land and Freshwater Resources. This chapter establishes the Game and Freshwater Fish Commission and directs it to manage freshwater aquatic life and wild animal life and their habitat to perpetuate a diversity of species with densities and distributions which

provide sustained ecological, recreational, scientific, educational, aesthetic, and economic benefits.

Response: The project will not negatively impact freshwater aquatic life or wild animal life. The project is consistent with the goals of this chapter

12. Chapter 373, Water Resources. This chapter provides the authority to regulate the withdrawal, diversion, storage, and consumption of water.

Response: This project is intended to lower water stages in WCA 3A and 3B in anticipation of a very wet wet season. Existing levels of flood protection will not be affected by this Planned Deviation. The project may also provide some environmental benefits. Therefore, this project is consistent with the goals of this chapter.

13. Chapter 376, Pollutant Spill Prevention and Control. This chapter regulates the transfer, storage, and transportation of pollutants and the cleanup of pollutant discharges.

Response: This chapter is not applicable as no storage or transfer of pollutants will result from the project.

14. Chapter 377, Oil and Gas Exploration and Production. This chapter authorizes the regulation of all phases of exploration, drilling, and production of oil, gas, and other petroleum products.

Response: This project does not involve the exploration, drilling or production of gas, oil or petroleum product and therefore, this chapter does not apply.

15. Chapter 380, Environmental Land and Water Management. This chapter establishes criteria and procedures to assure that local land development decisions consider the regional impact nature of proposed large-scale development. This chapter also deals with the Area of Critical State Concern program and the Coastal Infrastructure Policy.

Response: The proposed Planned Deviation will not have any regional impacts on resources in the area. Therefore, the project is consistent with the goals of this chapter.

16. Chapters 388 (selected subsections on on-site sewage treatment and disposal systems) and 388 (Mosquito/Arthropod Control). Chapter 388 provides for a comprehensive approach for abatement or suppression of mosquitoes and other pest arthropods within the state.

Response: The proposed action would not further the propagation of mosquitoes or other pest arthropods.

17. Chapter 403, Environmental Control. This chapter authorizes the regulation of pollution of the air and waters of the state by the Florida Department of Environmental Regulation (now a part of the Florida Department of Environmental Protection).

Response: An Environmental Assessment addressing project impacts has been prepared and will be reviewed by the appropriate resource agencies including the Florida Department of Environmental Protection. Environmental protection measures will be implemented to ensure that no lasting adverse effects on water quality, air quality, or other environmental resources will occur. The project complies with the intent of this chapter.

18. Chapter 582, Soil and Water Conservation. This chapter establishes policy for the conservation of the state soil and water through the Department of Agriculture. Land use policies will be evaluated in terms of their tendency to cause or contribute to soil erosion or to conserve, develop, and utilize soil and water resources both onsite or in adjoining properties affected by the project. Particular attention will be given to projects on or near agricultural lands.

Response: The proposed G-3273 Planned Deviation would not cause or contribute to soil erosion and is related to the larger WCAs-ENP-SDCS WCP to better utilize water resources in the region. The project complies with the intent of this chapter.

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Jacksonville District