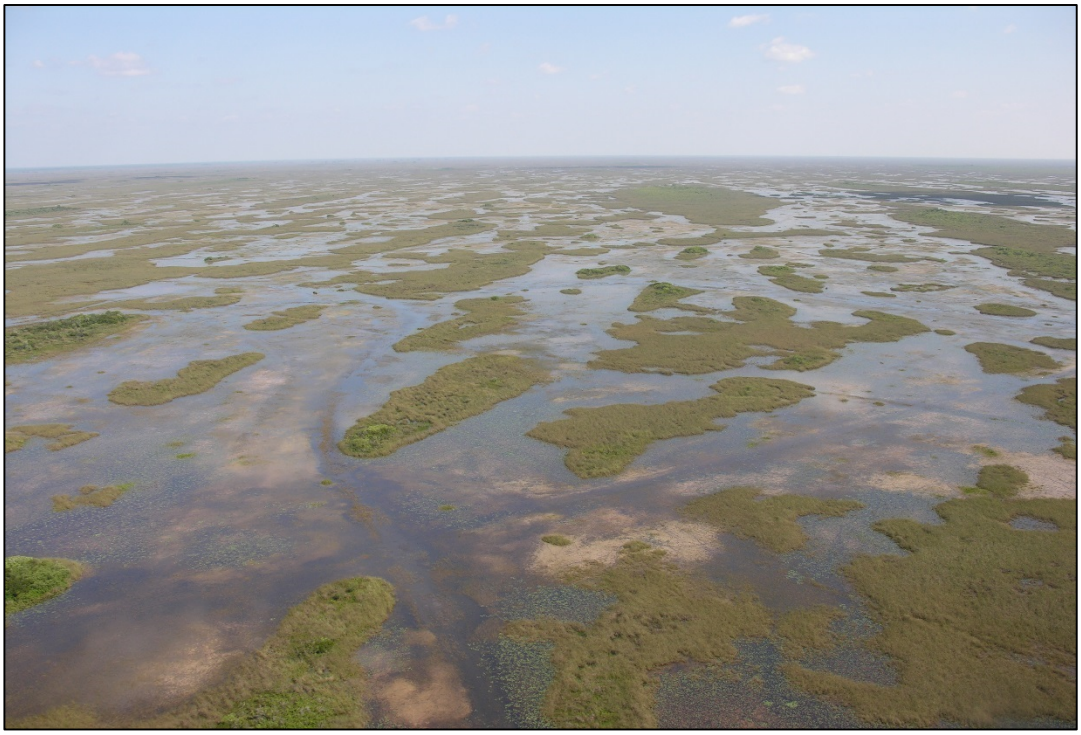
April 2016

Environmental Assessment and Finding of No Significant Impact

TEMPORARY EMERGENCY DEVIATION TO ALLEVIATE HIGH WATER LEVELS IN WATER CONSERVATION AREA 3A (S-344 DEVIATION)



Broward, Collier, and Miami-Dade Counties, Florida

US Army Corps of Engineers ®
Jacksonville District

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DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
701 San Marco Boulevard
JACKSONVILLE, FLORIDA 32207-8175

REPLY TO
ATTENTION OF

FINDING OF NO SIGNIFICANT IMPACT

TEMPORARY EMERGENCY DEVIATION TO ALLEVIATE HIGH WATER LEVELS IN WATER CONSERVATION AREA 3A (S-344 DEVIATION)

BROWARD, COLLIER, AND MIAMI-DADE COUNTIES, FLORIDA

I have reviewed the Environmental Assessment (EA) for the Federal Action. This Finding incorporates by reference all discussions and conclusions contained in the attached EA. 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 Federal Action will not significantly affect the quality of the human environment and does not require an Environmental Impact Statement. The following supports this conclusion:

a. Operations in the project area have been governed by Increment 1 (G-3273 Constraint Relaxation/S-356 Field Test and S-357N Operational Strategy) which is a deviation to the 2012 Water Conservation Areas (WCAs), Everglades National Park (ENP) and the ENP to South Dade Conveyance System (SDCS) Water Control Plan. The EA and Finding of No Significant Impact (FONSI) for that action is dated May 27, 2015. The U.S. Army Corps of Engineers (Corps), Jacksonville District, initiated a temporary emergency deviation to the current Increment 1 operating limit constraint of 7.5 feet National Geodetic Vertical Datum (of 1929 NGVD) in the L-29 Canal for purposes of providing high water relief in WCA 3A. National Environmental Policy Act (NEPA) documentation to support the temporary emergency deviation was completed on February 12, 2016 with signing of a FONSI, incorporating an EA. A Supplemental EA and Proposed FONSI is currently available to the public to provide further documentation of the potential environmental effects resulting from the alternatives considered and the action taken. Implementation of the temporary emergency deviation occurred on February 15, 2016.

b. The WCAs continue to be flooded in a manner that inundates tree islands and other wildlife habitat, and if sustained will negatively impact birds and mammals dependent on that habitat. Sustained flooding of natural habitat, especially tree islands, will negatively impact white-tailed deer and wading birds by eliminating foraging and nesting opportunities. These species support and encourage substantial outdoor recreational opportunities in this region.

Due to the critical nature of elevated water levels in WCA 3A and in compliance with the existing request by the Governor of Florida to maximize water releases, a second emergency NEPA document has been prepared to deviate from the current water control plan for Structure 344 (S-344) on the L-28 Levee. The purpose of S-344 and associated features located along the L-28 Levee and Borrow Canal, are to restore overland flow to an area of Big Cypress National Preserve (BCNP) just south of the L-28 Tieback; prevent over drainage of the eastern BCNP under dry conditions; and provide a means of making regulatory releases from WCA 3A into BCNP. This deviation would open S-344 immediately instead of waiting for July 15, 2016 which is the normal opening date in the approved water control plan. The criteria include full operational flexibility, subject to downstream constraints, to partially or completely open S-344, allowing up to ~ 200 cubic feet per second (cfs) to be released from WCA 3A into BCNP and the L-28 Canal. The temporary emergency deviation is expected to benefit natural resources within WCA 3A and BCNP and would expire on July 15, 2016. It is important to note that the S-344 structure would be allowed to continue to release water from WCA 3A in accordance with the approved water control plan until November 1, 2016.

c. Expedited coordination of this temporary measure was coordinated with various Federal and state agencies as well as federally recognized tribes. The Federal Action is in full compliance with the Endangered Species Act (ESA) and the Fish and Wildlife Coordination Act. Emergency consultation pursuant to Section 7 of the ESA is on-going, however, the U.S. Fish and Wildlife Service (USFWS) provided a letter of support for this action dated April 08, 2016. The Federal Action would not adversely affect protected species. The Corps agrees to maintain open and cooperative communication with the USFWS and Florida Fish and Wildlife Conservation Commission during the emergency operations.

d. The Corps has determined that the Federal Action is consistent to the maximum extent practicable with the enforceable policies of the Florida's approved Coastal Zone Management Act (CZMA) Program, per ongoing coordination with the Florida Department of Environmental Protection (FDEP). However, FDEP will need to review the EA to fully confirm that this action is consistent with the CZMA. The Corps will not proceed with this state proposed action until FDEP provides a CZMA consistency.

e. The Federal Action has been coordinated with the Florida State Historic Preservation Officer and the appropriate federally recognized Tribes in accordance with the National Historic Preservation Act and consideration given under the NEPA.

The Corps has determined that the Federal Action will have no adverse effect to historic properties eligible or potentially eligible for listing in the National Register of Historic Places. The State Historic Preservation Officer has concurred with the determination of no adverse effect. The Miccosukee Tribe of Indians of Florida and the Seminole Tribe of Florida's Tribal Historic Preservation Office have not provided comments on the determination of no adverse effect; however, consultation and coordination is ongoing. The Miccosukee Tribe of Indians have expressed support of the relief of high water in WCA 3A and will be included in the ongoing communication regarding the operations of S-344. Operations may be altered to avoid any adverse effects to lands utilized by the Tribe.

f. The Federal Action is not anticipated to adversely affect water quality. The FDEP will review the EA for CZMA consistency. The Federal Action is in compliance with the Clean Water Act.

g. The Federal Action will maintain the authorized purposes of the Central and Southern Florida Project, which include flood control, navigation, preservation of fish and wildlife, drainage, salinity control and water supply.

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

JASON A. KIRK, P.E.
Colonel, Corps of Engineers
Commanding

14 APRIL 2016
Date

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ENVIRONMENTAL ASSESSMENT
ON
TEMPORARY EMERGENCY DEVIATION TO ALLEVIATE HIGH WATER LEVELS IN WATER CONSERVATION AREA 3 A (S-344 DEVIATION)
BROWARD, COLLIER, AND MIAMI-DADE COUNTIES, FLORIDA

TABLE OF CONTENTS

APPENDICES

LIST OF FIGURES

LIST OF TABLES

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ENVIRONMENTAL ASSESSMENT
ON
TEMPORARY EMERGENCY DEVIATION TO AFFECT RELIEF OF HIGH WATER LEVELS WITHIN WCA 3A (S-344 DEVIATION)

BROWARD, COLLIER AND MIAMI-DADE COUNTIES, FLORIDA

1.0 PROJECT PURPOSE AND NEED

1.1 PROJECT AUTHORITY

The first phase of the Central & Southern Florida (C&SF) Project was authorized by the Flood Control Act of 1948, Public Law 80-858, approved June 30, 1948. The remaining works of the C&SF Project were authorized by the Flood Control Act of 1954, Public Law 83-780, approved September 3, 1954. In 1983, works along the L-29 and L-28 were proposed in lieu of the L-28 Extension authorized by the Flood Control Act of 1954. The L-28 Extension was to be part of the S-12 getaway system described in House Document No. 369 authorized by the Flood Control Act of 1968 (Public Law 90-483, 90th Cong., 2d Sess).

1.2 PROJECT LOCATION

The water management operating criteria relating to the Federal Action affects an area within the C&SF Project located in south Florida and includes Water Conservation Area 3 (WCA 3), Big Cypress National Preserve (BCNP), and western Everglades National Park (ENP). Features of the Federal Action are located in Broward, Collier and Miami-Dade Counties (**Figure 1**). Structure S-344 is located on the L-28 Levee adjacent to BCNP and WCA 3A (**Figure 1**).

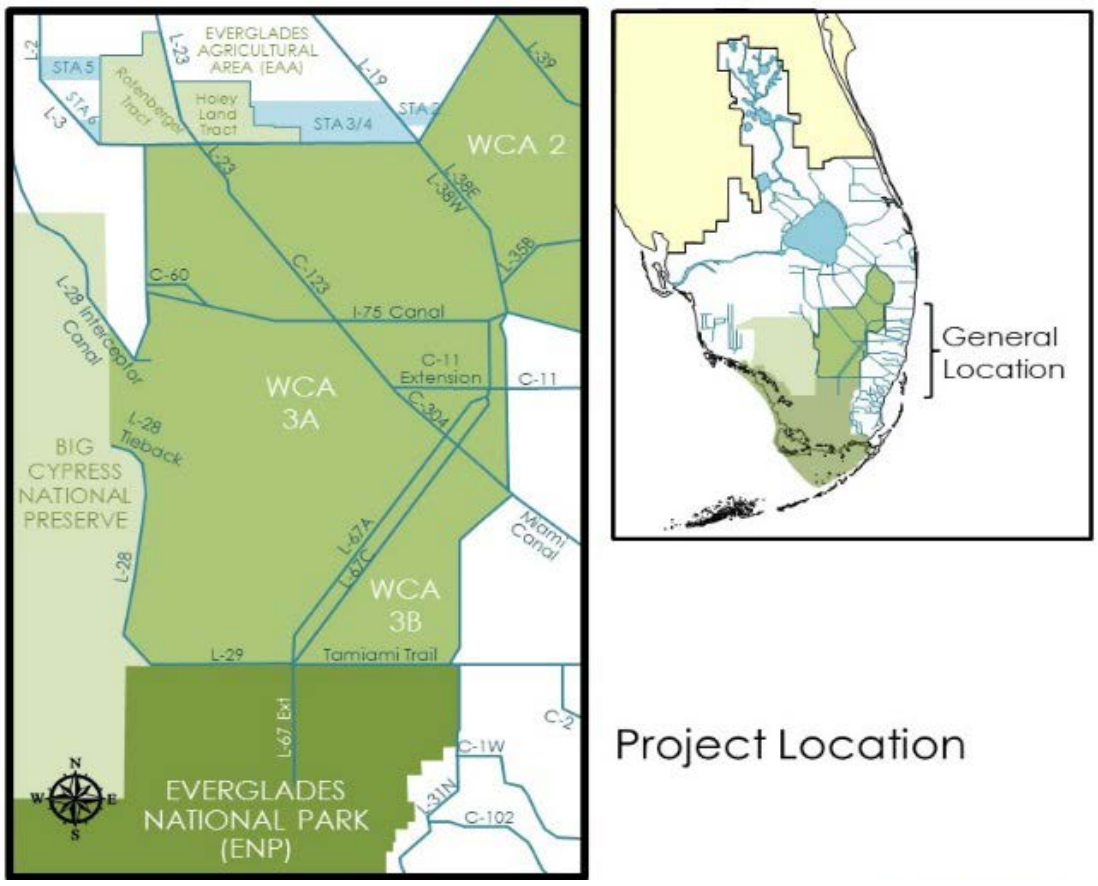


FIGURE 1. PROJECT LOCATION

1.3 PROJECT NEED OR OPPORTUNITY

The C&SF Project currently functions, and was originally authorized to function, as a multi-purpose water management system. The Congressionally-authorized purposes of the C&SF Project include flood control, navigation, preservation of fish and wildlife, drainage, salinity control and water supply.

The highest January rainfall on record has occurred within the South Florida Ecosystem during the month of January 2016. The first half of the dry season (November 2015-January 2016) was the wettest for this period since record keeping began in 1932. All areas of South Florida are inundated with water restricting the ability to safely move water to alleviate the effects of flooding. The WCAs continue to be flooded in a manner that inundates tree islands and other wildlife habitat, and if sustained will negatively impact birds and mammals dependent on that habitat. Sustained flooding of natural habitat, especially tree islands, will negatively impact white-tailed deer by eliminating upland refugia and will negatively impact wading birds by eliminating foraging and nesting opportunities. These species support and encourage substantial outdoor recreational opportunities in this region. There is an immediate threat and impact to valuable natural resources that underpin local economies, in addition to potential impacts to land under lease to both the Miccosukee Tribe of Indians and Seminole Tribe within WCA3A.

Operations in the project area have been governed by Increment 1 (G-3273 Constraint Relaxation/S-356 Field Test and S-357N Operational Strategy) which is a deviation to the 2012 WCAs, ENP and the ENP to South Dade Conveyance System (SDCS) Water Control Plan (USACE 2012). The U.S. Army Corps of Engineers (Corps), Jacksonville District, initiated a temporary emergency deviation to the current operating constraint of 7.5 feet National Geodetic Vertical Datum (of 1929 NGVD) in the L-29 Canal for purposes of providing high water relief in WCA 3A at the request of the Governor of Florida. National Environmental Policy Act (NEPA) documentation to support the temporary emergency deviation was completed on February 12, 2016 with signing of a Finding of No Significant Impact (FONSI), incorporating an EA. Implementation of the temporary emergency deviation occurred on February 15, 2016. A Supplemental EA and Proposed FONSI is currently available to the public to provide further documentation of the potential environmental effects resulting from the alternatives considered and the action taken.

Due to the critical nature of elevated water levels in WCA 3A and in compliance with the existing request by the Governor to maximize water releases, a second emergency NEPA document is being prepared to evaluate a deviation from the current water control plan for Structure 344 (S-344) on the L-28 Levee. The purpose of S-344 and associated features located along the L-28 Levee and Borrow Canal is to restore overland flow to an area of BCNP just south of the L-28 Tieback; prevent over drainage of the eastern BCNP under dry conditions; and provide a means of making regulatory releases from WCA 3A into BCNP. This deviation would open S-344 immediately instead of waiting for July 15, 2016 which is the normal opening date in the approved water control plan. The opening would allow up to approximately 200 cubic feet per second (cfs) to be released from WCA 3A into BCNP and the L-28 Canal. The temporary emergency deviation is expected to benefit natural resources within WCA 3A and BCNP. It is important to note that the S-344 structure would be allowed to continue to release water from WCA 3A in accordance with the approved water control plan until November 1, 2016.

1.4 AGENCY GOALS AND OBJECTIVES

The objective of the Federal Action is to mediate high water levels in WCA 3A by allowing up to the full discharge capacity through S-344 into BCNP.

1.5 RELATED ENVIRONMENTAL DOCUMENTS

The Corps has identified a number of environmental documents relevant to the Federal Action. Please reference the *Supplemental EA and Proposed FONSI for the L-29 Canal and South Dade Conveyance System Temporary Emergency Deviation to Affect Relief of High Water Levels within WCA 3A* (dated March 2016) for a list of associated documents (USACE 2016). In addition, a *Letter Report and EA on S-343A, S-344, and Modification of L-28 and L-67 Extension* was prepared by the Corps (dated April 13, 1983), which proposed structural modifications to the C&SF Project to improve the capability of the project to provide water supply to ENP and benefit BCNP. Information contained within the identified environmental documents is incorporated by reference into this EA.

1.6 DECISIONS TO BE MADE

Please reference **Section 1.4**.

1.7 SCOPING AND ISSUES

The Corps has been in communication with other Federal and state agencies, and tribal representatives regarding the Federal Action. Parties include the South Florida Water Management District (SFWMD), Florida Department of Environmental Protection (FDEP), U.S. Environmental Protection Agency (USEPA), U.S. Fish and Wildlife Service (USFWS), Florida Fish and Wildlife Conservation Commission (FWC), Everglades National Park (ENP), Florida Department of Agriculture and Consumer Services (FDACS), State Historic Preservation Office (SHPO), Seminole Tribe of Florida (Seminole) staff, and the Miccosukee Tribe of Indians of Florida (Miccosukee) staff. This coordination is a result of the magnitude of Corps efforts underway to implement water management strategies in south Florida. Correspondence is summarized in **Section 6.2** and **Appendix C**.

1.8 PERMITS, LICENSES, AND ENTITLEMENTS

The FDEP issued an Emergency Final Order (Emergency Authorization for Temporary Operational Changes to Address High Water Conditions in the South Florida Region, OGC case Nos.: 00-0889) waiving the requirement for state water quality certification for the L-29 temporary emergency deviation. See Appendix B of the February 12, 2016 EA and FONSI for the L-29 emergency deviation. The EFO issued by FDEP for the high water conditions is apparently applicable, based on the preliminary information provided to the FDEP, to the Federal Action associated with the operation of the S-344. This preliminary evaluation was confirmed with FDEP staff on April 7, 2016, however FDEP must review the EA to confirm that this action is covered by the EFO addressing high water conditions. The Corps will not proceed with this state proposed action until FDEP confirms that this action is covered by the EFO addressing high water conditions or otherwise consistent with the state's enforceable policies of its Coastal Zone Management Program.

2.0 ALTERNATIVES

2.1 DESCRIPTION OF ALTERNATIVES

2.1.1 Alternative A: No Action Alternative

The S-344 structure is a two-barreled, 72 inch diameter corrugated metal culvert, with slide gates, which is constructed through the L-28 Borrow Canal, approximately 9 miles north of U.S. 41. The structure, which has a design discharge rate of 135 cfs (assumed 0.2 feet difference between the headwater and tailwater water levels), was intended to discharge from WCA 3A during periods of excessively high stages, and to extend the hydroperiod in the Big Cypress Basin during dry periods. Under the current approved water control plan this structure remains closed during certain periods of the year from 1 November through 14 July for the protection of the endangered Cape Sable Seaside Sparrow sub-population A (CSSS-A) located in western ENP. The No Action Alternative would continue current C&SF water management operations at S-344 as defined in the 2012 WCAs, ENP and the ENP to SDCS Water Control Plan (USACE 2012). Reference Table 7-5 of the WCA 3A, ENP, and ENP-SDCS Water Control Plan (USACE 2012) for a complete description of S-344 operational guidance.

2.1.2 Alternative B: Temporary Emergency Deviation at S-344 and Plug Rehabilitation

The SFWMD plans to rehabilitate six earthen plugs in the lower L-28 Borrow Canal in conjunction with the S-344 deviation (i.e. Federal Action) (**Figure 2**). The operation of the S-344 structure is expected to work in concert with the rehabilitation of the canal plugs and aid in relieving high water levels within WCA 3A on a temporary emergency basis. The temporary emergency operations at S-344 will allow flows to be removed from WCA 3 via gravity and be distributed, through the aid of rehabilitated canal plugs, as sheetflow to BCNP. The SFWMD submitted a request to the Corps on April 1, 2016, requesting the deviation.

The L-28 Canal earthen plugs, which have partially eroded, were originally installed under the authority described within the *Letter Report on S-343A, S-344, and Modification of L-28 and L-67 Extension* prepared by the Corps, dated April 13, 1983. The purpose of the L-28 Borrow Canal plugs are to prevent the borrow canal from over draining the eastern portions of BCNP during dry conditions (USACE 1983). The plug rehabilitation is to be performed by the SFWMD. Design features of the plugs are described within the 1983 letter report. Specifically, each of the plugs are approximately 150 feet long with upstream and downstream slopes of approximately 4:1 (horizontal: vertical), and a crest elevation not to exceed 10.0 feet NGVD 1929. The source of fill for plug rehabilitation is surplus fill from portions of the levee which currently lie above elevation 17.0 feet NGVD.

WCA 3A provides water supply to the Lower East Coast (LEC), as well as the SDCS, in accordance with the WCA 3A Regulation Schedule. In addition, WCA 3A provides water deliveries to ENP in accordance with the Rainfall Formula and the WCA 3A Regulation Schedule, collectively referred to as the Rainfall Plan (USACE 2006). The normal operational criteria for S-344 is to open the structure when the available capacity of S-333, S-12D, S-12C, S-12B, and S-12A is insufficient to provide the discharges prescribed by WCA 3A's Rainfall Plan. The combined discharges through S-343A, S-343B, and S-344 are reduced as required to maintain the Loop Road 1 gage (LOOP1) below 8.5 feet NGVD (closed when LOOP1 above 8.5 feet NGVD under normal conditions). When the stage at LOOP1 exceeds 8.5 feet NGVD, portions of the Loop Road (County Road 94) begin to flood. The current approved water control plan also requires closure of S-344 from 01 November through 14 July independent of WCA 3A water levels. The criteria is to have full operational flexibility, subject to downstream constraints, to partially or completely open S-344 until July 15, 2016. It is important to note that the S-344 structure would be allowed to continue to release water from WCA 3A in accordance with the approved water control plan until November 1, 2016.

The following scenario describes the range of operation for S-344 likely to be required to balance the objectives of efficiently rehabilitating the six 150 feet long plugs in the L-28 Borrow Canal while providing high water relief to WCA 3A. The actual number of gate changes and the magnitude of their opening will be determined based on the stage response to S-344 discharges with consideration for the status and pace of repair of the six 150 foot long plugs. The control gates for the two 72-inch culverts at S-344will be opened as described in the sequencing below:

1. Both gates opened about one to two feet when the first (northern most) plug is fully rehabilitated.
2. Both gates opened about two to four feet when the second plug is fully rehabilitated

3. Both gates opened about three to six feet when the third plug is fully rehabilitated
4. Both gates opened about three to six feet when the fourth plug is fully rehabilitated
5. Both gates opened about three to six feet when the fifth plug is fully rehabilitated
6. Both gates opened about three to six feet when the sixth plug is fully rehabilitated

It is intended that the above incremental approach will result in steady and sustainable S-344 openings. However, the S-344 gates openings may be reduced if the flow or stages along the L-28 need to be moderated or reduced based on observed monitoring as specified in the operational strategy (**Appendix A)**.

Structure Closings: S-344 closure will begin when one of the following conditions is met:

1) During the construction phase of the rehabilitation of L-28 plugs, the construction sites experience high water levels that cause the construction sites to be flooded.
2) The Loop Road gauge 1 (LOOP1) exceeds 8.5 feet NGVD.
3) If there is an increase of the water level at the identified sparrow target location (s) that is not caused by rainfall..
4) Regular coordination for ongoing operations results in a request to adjust operations.

A complete description of Alternative B can be found in **Appendix A**. Reference **Appendix** A for coordination to take place with the SFWMD, USFWS, and Miccosukee Tribe of Indians to address concerns and monitoring to take place within the project area as a result of the Federal Action. Rehabilitation of the earthen plugs work is proposed in conjunction with but is independent from the temporary emergency deviation to the water control plan. All required permits and/or modifications to existing permits related to the rehabilitation of the earthen plugs would be the responsibility of the State of Florida.

2.1.3 Alternative C: Temporary Emergency Deviation at S-344 Without Plug Rehabilitation

Under Alternative C, S-344 would be operated outside of the current closure period from 1 November through 14 July. The criteria under Alternative C is to have full operational flexibility to partially or completely open S-344 until July 15, 2016, but does not include rehabilitation of the earthen plugs to be performed by the SFWMD.

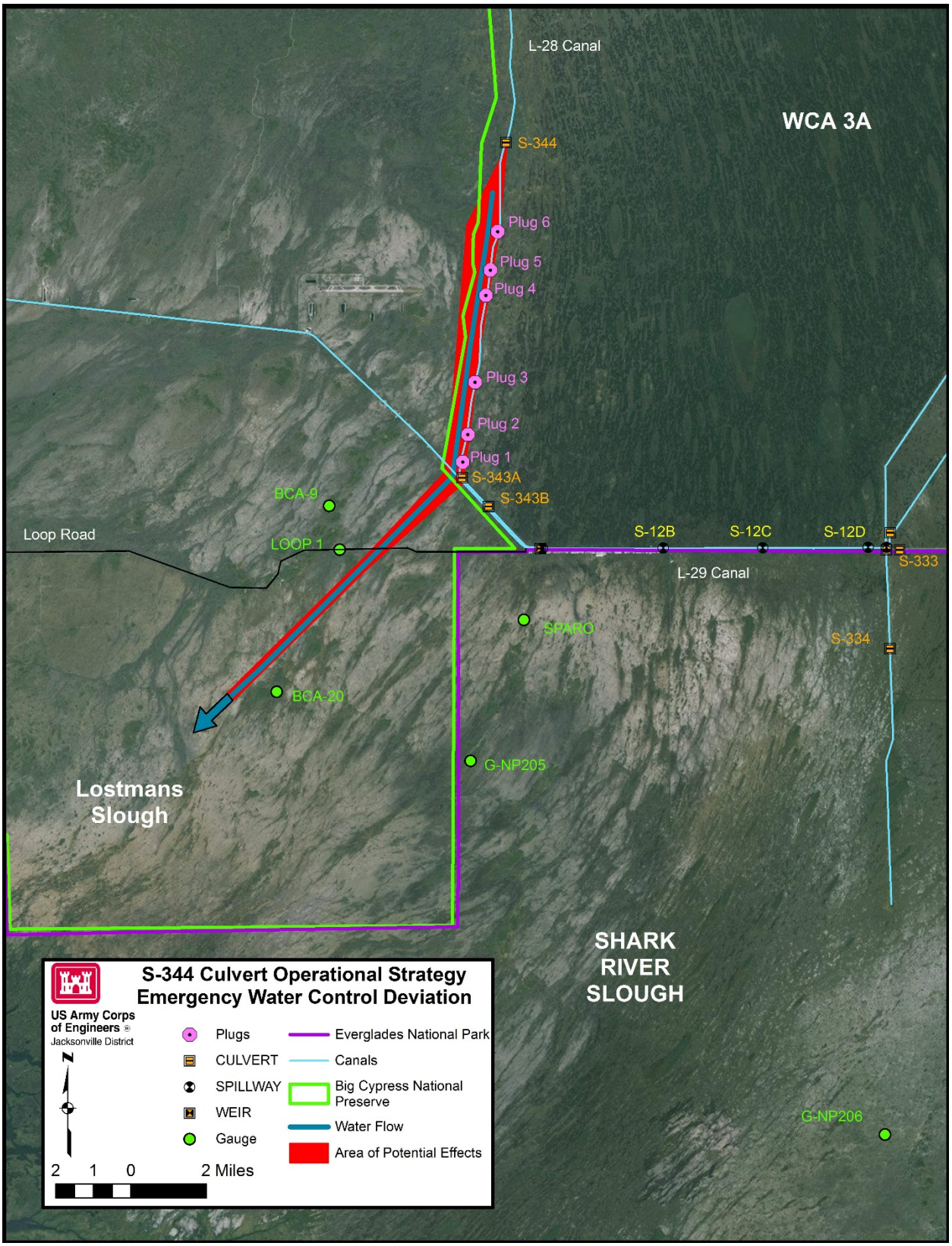


FIGURE 2. L-28 PLUG LOCATION MAP AND AREA OF POTENTIAL EFFECTS DOWNSTREAM OF S-344

2.2 ISSUES AND BASIS FOR CHOICE

The alternatives described in **Section 2.0** were formulated, considered, and evaluated based on achievement of agency goals and objectives (**Section 1.4**). Potential environmental effects and effects to other resources outlined in **Section 4.0** were also evaluated.

2.3 ALTERNATIVES ELIMINATED FROM DETAILED EVALUATION

Alternative C was eliminated from further consideration. Alternative C would result in similar effects to WCA 3A as discussed in Alternative B (Reference **Section 4.0**). However, the temporary emergency operations at S-344 under Alternative C does not allow flows from WCA 3A to be removed and distributed as sheetflow to BCNP, through the aid of the rehabilitated canal plugs. The *Letter Report and EA on S-343A, S-344, and Modification of L-28 and L-67 Extension* prepared by the Corps in 1983 indicated that the six plugs along the L-28 Borrow Canal were to be located adjacent to tree islands or other areas of high ground to the west in order to force water from the canal over a greater area, preventing the over drainage of the eastern portion of Big Cypress. Effects of the plugs were estimated to extend about 3,000 feet to the west of L-28 for a distance of about 9.6 miles north of Tamiami Trail (about 3,500 acres) (USACE 1983). Hydration of this area may not be achieved with Alternative C in the absence of the rehabilitated plugs.

Potential effects from western flows (from eastern BCNP, west of WCA 3A and the L-28 Levee) on downstream areas including CSSS-A in western ENP, have been discussed and analyzed under prior Corps planning efforts including the Combined Structural and Operation Plan (CSOP) Endangered Species Act (ESA) coordination with USFWS during 2006-2007, and under ESA consultation for the Everglades Restoration Transition Plan (ERTP) during 2010-2011 and 2015-2016. During consultation with USFWS and BCNP, it was suggested that the L-28 Borrow Canal is responsible for direct delivery of water flow into western CSSS-A. During development of the operational strategy for the S-344 temporary emergency deviation, the USFWS expressed concerns relating to the hydroperiod within the western marl prairies and potential effects on marl prairie vegetation within ENP. March 1 through early August is the only time that the endangered CSSS can breed and nest. During this time, water levels should be able to naturally recede with dry habitat coverage increasing during the nesting season. Alternative C was eliminated from further consideration due to USFWS concerns relating to the hydroperiod within the western marl prairies and potential effects on marl prairie vegetation within ENP and CSSS-A.

Alternative B was considered feasible and was carried forward for detailed evaluation within **Section 4.0**.

2.4 PREFERRED ALTERNATIVE

Based upon the effect analysis conducted within this EA, Alternative B is the Preferred Alternative. Due to the very strong El Niño this dry season, WCA 3A has experienced unseasonably high water levels. Implementation of the L-29 temporary emergency deviation as outlined in the February 12, 2016 EA and FONSI have improved conditions within WCA 3A; however WCA 3A continues to be flooded in a manner that inundates tree islands and other wildlife habitat, and if sustained, these conditions will negatively affect birds and mammals dependent on that habitat. Alternative B best utilizes the additional available capacity within the C&SF Project to alleviate high water levels in WCA 3A while providing potential benefits to

BCNP. The primary impact of Alternative B within BCNP will be to lengthen the hydroperiod in the area immediately south and west of the S-344 structure, aiding in the restoration of historic hydrologic conditions for the duration of the temporary emergency deviation.

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 (SRS) in ENP. The ridge and slough wetlands drain into tidal rivers that flow through mangrove estuaries into the Gulf of Mexico. Higher elevation wetlands that flank either side of SRS are characterized by marl substrates and exposed limestone bedrock. Those wetland areas located to the east of SRS include the drainage basin for Taylor Slough, which flows through an estuary of dwarf mangrove forests into northeast Florida Bay. The Everglades wetlands merge with the forested wetlands of BCNP to the west of WCA 3. Construction of canals and levees by the C&SF Project has resulted in the creation of artificial impoundments and has altered hydroperiods and depths within the project area. The result has been substantially altered plant community structures, reduced abundance and diversity of animals and spread of non-native vegetation.

3.2 CLIMATE

The climate of south Florida is subtropical. Seasonal rainfall patterns in south Florida resemble the wet and dry season patterns of the humid tropics more than the winter and summer patterns of temperate latitudes. Of the 53 inches of rain that south Florida receives on average annually, 75% falls during the wet season months of May through October. Tropical storms and hurricanes also provide major contributions to wet season rainfall. During the dry season (November through April), rainfall is governed by large-scale winter weather fronts that pass through the region approximately weekly. However, due to the variability of climate patterns (La Niña and El Niño), dry periods may occur during the wet season and wet periods may occur during the dry season. 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. 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). Infrequently, freezing temperatures and frost occur when arctic air masses follow winter cold fronts into the area.

There is now evidence of anthropogenic changes to global climate patterns that will likely have an impact on south Florida in terms of rainfall, evapotranspiration, and temperature. Increases in air temperature are expected to increase evapotranspiration. More frequent intense rainfall events will occur coupled with longer dry periods in between. Future rates of sea level change are expected to result in significant impacts on coastal canals and communities, with loss of flood protection and increased saltwater intrusion being the primary effects.

3.3 GEOLOGY AND SOILS

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

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

BCNP is underlain by a shallow aquifer extending from the vicinity of Forty Mile Bend to the west coast of Florida and covering almost all of Collier County and the upper part of Monroe County. The aquifer is the prime source of freshwater for human use in Collier County and adjoining parts of Lee and Hendry counties. It is about 130 feet thick in western Collier County and becomes progressively thinner to the east, where it eventually disappears in the vicinity of Forty Mile Bend. Throughout much of BCNP, the limestone of this shallow aquifer is within 10 feet of the surface.

3.4 STUDY AREA LAND USE

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

The Miccosukee Tribe of Indians and Seminole Tribe of Florida also lease lands within the project area. Reference **Sections 3.13**, **3.14,** and **Figure 4** for a map outlining the location of tribal reservations, leased, and easement lands within the project area. The L-28 Levee is often used as a point of access to Tribal lands by the Miccosukee Tribe. The Miccosukee Reserve Area is also located directly south of Tamiami Trail and west of the L-67 Extension, in the vicinity of S-343 A and S-343 B.

3.5 HYDROLOGY

3.5.1 Water Conservation Areas 3A and 3B

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

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

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

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

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

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

3.5.2 Western Shark River Slough

Western SRS located to the west of L-67 Extension Levee and bounded on the north by Tamiami Trail, is primarily influenced by rainfall and water management operations at the S-12 structures (A, B, C and D). Under the Everglades Restoration Transition Plan (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) and S-12B (January 1 – July 15) is meant to move water from WCA 3A into SRS while providing conditions for CSSS-A nesting and breeding. Releases from WCA 3A are specified by the Rainfall Plan, which includes the regulation schedule for WCA 3A and the Rainfall Formula. This Rainfall Based Management Plan consists of a rainfall-based delivery target and a supplemental regulatory component that specifies the 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% through S-333 into northeast Shark River Slough (NESRS) and 45% through the S-12 structures into ENP west of the L-67 Extension.

3.5.3 Big Cypress National Preserve

BCNP spans approximately 1,205 square miles from southwest of Lake Okeechobee to the Ten Thousand Islands in the Gulf of Mexico. The BCNP was originally created in 1974 by Public Law 93-440 and subsequently expanded in 1988 by the Big Cypress National Preserve Addition Act. Thus, BCNP was established to protect natural and recreational values of the Big Cypress watershed to allow for continued traditional uses, such as hunting, fishing, and oil and gas production, and to provide an ecological buffer zone and protect the water supply to ENP. BCNP

is a large, flat area with maximum elevations of 22 feet NGVD in the northern region which gradually slope south to sea level in the BCNP coastal region along the Gulf of Mexico.

The Big Cypress swamp is a source of recharge for the shallow aquifers of south Florida and is important to the integrity of the water resources in the western part of ENP. The Big Cypress region is essentially a rain-driven hydrologic unit, and for the most part it is not dependent on adjacent land for water flow. Only three small areas (approximately 5 percent of the BCNP) receive flows from external drainages. These areas include less than 5 square miles in the Okaloacoochee Slough, about 30 square miles in the Mullet Slough component of the Everglades drainage, and approximately 40 square miles in the southeastern corner of the BCNP along the western boundary of Shark River Slough.

Much of BCNP is flooded during the rainy season, generally May through October, when nearly 80 percent of the rain falls. During the rainy season, shallow depressions fill with water. Because of the poor drainage, water stands on the land until it evaporates, infiltrates to the underlying aquifer, or slowly drains off through sloughs and strands. Thus at the peak of the rainy season, as much as 90 percent of BCNP is inundated to depths ranging from a few inches to more than 3 feet. When the dry season begins, the water level starts to recede. The recession normally continues into May, when perhaps only 10 percent of the BCNP is covered by water in ponds, cypress domes, and sloughs.

Flows generally follow bedrock undulations, which run mostly to the northeast and range in relief from approximately 1 foot to as much as 10 feet. Marshy sloughs occupy the shallower undulations, and cypress strands and mixed hardwood swamps grow in the deeper ones. These relatively low channels control surface water flows because the water table is below the crests of the undulations most of the time; even during high water, the bedrock channels still carry a relatively large volume of water.

The L-28 Levee presently separates WCA 3A and the BCNP. The L-28I drainage system (*i.e.* L-28 Interceptor Canal, West Feeder Canal and North Feeder Canal*)* is a major disturbance to a number of natural flow ways (*i.e.* Kissimmee Billy Strand, Cowbell Strand, Dark Strand, Canoe Lake Strand and California slough) within the Northeast Addition Lands of BCNP that lie directly south of the West Feeder Canal and west of the L-28 Interceptor Canal. Sobczak (2002) suggests that these natural areas experience shallower and less frequent surface water inundation relative to pre-drainage conditions.

Surface water flows from BCNP are introduced to WCA 3A from Mullet Slough. WCA 3A is also hydrologically connected to BCNP through three constructed gaps along the northern tie-back of the L-28 Levee and seasonally through water management operations of S-343A, S-343B and S-344 along the southern L-28 Levee. Surface water flows are introduced to the L-28 Canal from these three structures with the upstream inflows to BCNP from the L-28 gaps are directed south to the Tamiami Trail section between the Forty-mile bend (located west of S-12A) and Fifty-mile bend. Tamiami Trail and Loop Road (Country Road 94), which include bridges and culvert connections to allow southerly flow west of Forty-mile bend, also affect surface water flows within southern BCNP and western ENP (in the vicinity of CSSS-A).

3.6 REGIONAL WATER MANAGEMENT (OPERATIONS)

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

Besides releases from WCA 2A via the S-11 structures, WCA 3A receives inflow from pumping stations S-8, S-9, and S-140. The S-9 pump station removes runoff in the area west of Ft. Lauderdale known as Western C-11. The S-9A pump station, located adjacent to the S-9 pump station, returns seepage water from WCA 3A and WCA 3B collected in the L-37, L-33 and the US 27 borrow canals. The S-140 pump station serves the 110 square mile area north and east of the interceptor canal and west of L-28. S-140 is used to maintain canal levels below 10.5 feet NGVD unless gravity flow into WCA 3A is possible at an adequate rate. Water also enters northeastern WCA 3A by gravity through the S-150 gated culvert. Discharges at S-142 are made from WCA 3A into the North New River Canal. The SFWMD can pump runoff from the North New River Canal and the C-13 Canal into WCA 3A through S-142 by operating their pump station, G-123.

Water levels in WCA 3A are managed primarily by five gated spillways: the S-12 structures (S-12A, S-12B, S-12C, and S-12D) and S-333. Additionally, the S-151, S-343A, S-343B and S-344 gated culvert structures can be utilized to discharge from WCA 3A. From July 2002 through October 2012, WCA 3A was regulated according to a seasonally varying 8.75 to 10.75 feet NGVD regulation schedule and the Rainfall Plan (initiated in 1985), as per IOP (2002 IOP EIS and 2006 IOP Final Supplemental EIS). The discharges made from WCA 3A through the S-12s and S-333 are target flows determined from the Rainfall Plan; when WCA 3A is in Zone A, these target flows are the maximum flow possible based on structure design capacities and consideration of downstream operational constraints. Under the Rainfall Plan, water deliveries are computed and operations adjusted weekly, if necessary based on the sum of two components: a rainfall response component and a WCA 3A supplemental regulatory component. The Rainfall Plan provides for the rainfall response component within all zones of the WCA 3A Regulation Schedule, with the

additional regulatory release requirement added when the WCA 3A water levels fall within the higher regulation schedule zones above Zone E, including Zone E1. Under ERTP, the goal of the rainfall and regulatory components is to split the flows between the S-12 structures and S-333, with 45% of the total flow from WCA 3A passing through the S-12 structures to Western SRS and the remaining 55% 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 (NESRS) are controlled by the stage in L-29 Canal, as pressure from the water within the canal (hydraulic head), is required to force water through the Tamiami Trail culverts and the one mile bridge and into ENP. As the L-29 Canal stage increases, more water is forced beneath the road through 17 sets of culverts (49 total culverts, three culverts per set in most locations) and the one mile bridge. The L-29 Canal maximum operating stage has been limited under ERTP and previous regional operating plans due to concerns regarding: (1) potential flooding and seepage effects within residential or agricultural areas of Miami-Dade County; (2) potential damage to the Tamiami Trail roadway sub-base; and (3) potential flooding effects to privately-owned real estate adjacent to Tamiami Trail and within eastern ENP. The MWD Tamiami Trail Modifications (TTM) Project, which was completed in December 2013, included construction of the one mile bridge and Tamiami Trail roadway reconstruction/resurfacing to allow for the maximum operating stage in the L-29 Canal to be raised from 7.5 feet to 8.5 feet NGVD following the acquisition of the required real estate interests by the Corps and ENP. Following completion of the MWD TTM Project, the current ERTP water management operating criteria for the L-29 Canal between S-333 and S-334 is meant to limit the L-29 Canal stage to no more than 7.5 feet NGVD in response to potential flooding effects to privately-owned real estate adjacent to Tamiami Trail and within eastern ENP which may result from extended durations with higher operating stages in the L-29 Canal (above 7.5 feet NGVD). ERTP also included an additional operational constraint for the L-29 Canal water level related to potential flooding and seepage effects within residential and/or agricultural areas of Miami-Dade County; this constraint, which is removed during implementation of the two-year Increment 1 field test planned deviation, required S-333 discharges to NESRS will be discontinued when the G-3273 water level within NESRS reaches 6.8 feet NGVD during the normal Column 1 mode of operations, or S-333 discharges into the L-29 Canal to be matched with S-334 discharges out of the L-29 Canal when operating under the Column 2 mode of operations.

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

WCA 3B into the L-29 Canal. The S-355 structures are completed components of the MWD Project, intended to function in concert with the proposed MWD S-345 structures along L-67A/L-67C to address the MWD Project objective of restoring WCA 3B as a functioning component of the Everglades hydrologic system and restoration of water deliveries to NESRS.

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

The G-3273 Constraint Relaxation/S-356 field test (Increment 1) is a deviation from the ERTP. ERTP was implemented in October 2012 through utilization of the 2012 Water Control Plan. The 2012 Water Control Plan includes the required S-12A, S-343A, S-343B and S-344 seasonal closure periods of 1 November through 14 July and the S-12B closure period of 1 January through 14 July, respectively, to protect CSSS sub-population A within western ENP. The 2012 Water Control Plan, which includes the WCA 3A Regulation Schedule, Rainfall Plan, and the Interim Operating Criteria for the 8.5 SMA Project will continue to govern water management operations during Increment 1, with the exception of operating criteria for S-333, S-334, S-356, S-197 and S-357N as contained in the 2015 EA and operational strategy (USACE 2015).

Increment 1, which was initiated on October 15, 2015, maintains the ERTP operating limit constraint of 7.5 feet in L-29, while relaxing the G-3273 constraint for S-333, and utilizing S-356

for control of the seepage to the L-31N Canal. It is anticipated that during Increment 1, the combined flows through S-333 and S-356 will be more than what would have been discharged through these features under ERTP operations. Additionally, it is expected that during implementation of Increment 1 water management operations under typical hydro-meteorological conditions, the combined flows through S-173 and S-331 to the C-111 Basin will be less than what would have been discharged through these features under ERTP operations due to the reduction in flow from S-333/S-334 to the SDCS with relaxation of the G-3273 constraint. S-173 and S-331 releases are the result of water management operations to: 1) maintain target L-31N Canal stages; 2) provide flood mitigation to the 8.5 SMA eastern areas when sufficient capacity is available at S-357 and maintain flood mitigation for the 8.5 SMA when S-357 operational capacity is limited; and 3) WCA-3A regulatory releases to the SDCS from S-334 during Column 2 operations. In addition, Increment 1 water management operations will likely result in increased seepage to the L-31N Canal as the increased flow into NESRS will likely increase stages along the west side of L-31N. Increment 1 includes additional water management operating criteria for S-197 (in addition to the S-197 operating criteria defined in the 2012 Water Control Plan) to mitigate for potential risks to flood protection for areas within South Miami-Dade County.

The Corps initiated a temporary emergency deviation to the current operating constraint of 7.5 feet NGVD in the L-29 Canal up to 8.5 feet NGVD for purposes of providing high water relief in WCA 3A. The temporary emergency deviation increases the operational trigger level in the L-29 Borrow Canal to elevation 8.5 feet, NGVD between structure S-333 and S-334 and includes other necessary changes to C&SF Project operations that are required to support this change. To the extent that the raised L-29 Canal stage limit allows, S-333 discharges will be sent to NESRS. S-334 will only be used to the extent that is required to maintain the L-29 Canal stage below the temporary stage limit of 8.5 feet NGVD while operating S-333 within its limits (maximum of 1,350 cfs). S-152 is used in conjunction with S-151 to release water from WCA 3A into WCA 3B to the extent that the trigger stage (measured at Site 71 of 8.5 feet NGVD) allows. The L-29 temporary emergency deviation also includes the use of S-337. If the L-29 Canal stage peaks well below the 8.5 feet NGVD limit, with S-333 discharging at the maximum rate, water from WCA 3A could be delivered through the manual route of S-151, S-337, and S-356 under the deviation as long as the pumping rate at S-356 exceeds the discharge rate at S-335. Reference the *Supplemental Environmental Assessment and Proposed FONSI for the L-29 Canal and South Dade Conveyance System Temporary Emergency Deviation to Affect Relief of High Water Levels within WCA 3A* (dated March 2016) for a complete description of the L-29 temporary emergency deviation (USACE 2016).

3.7 FLOOD CONTROL

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

3.8 VEGETATIVE COMMUNITIES

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

Development and drainage over the last century have dramatically reduced the overall spatial extent of freshwater wetlands within the Everglades, with approximately half of the pre-drainage 2.96 million acres of wetlands being converted for development and agriculture (Davis and Ogden 1997). Alteration of the normal flow of freshwater through the Everglades has also contributed to conversions between community types, invasion by exotic species, and a general loss of community diversity and heterogeneity. Vegetative trends in ENP have included a substantial shift from the longer hydroperiod slough/open water marsh communities to shorter hydroperiod sawgrass marshes (Davis and Ogden 1997; Armentano et al. 2006). In addition, invasion of sawgrass marshes and wet prairies by exotic woody species has led to the conversion of some marsh communities to forested wetlands (Gunderson et al. 1997).

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

In contrast to the vast extent of wetland communities, upland communities comprise a relatively small component of the Everglades landscape and are largely restricted to Long Pine Key, the

northern shores of Florida Bay, and the many tree islands scattered throughout the region. Vegetative communities of Long Pine Key include rockland pine forest and tropical hardwood forest. In addition, substantial areas of tropical hardwood hammock occur along the northern shores of Florida Bay and on elevated portions of some forested islands.

The Big Cypress region is characterized by a variety of upland and wetland plant communities, including hardwood hammock, pine forests, low density woodlands, hardwood scrub, herbaceous prairie, cypress prairie, mixed-hardwood cypress strand, graminoid marsh, exotic vegetation assemblages and others. The majority of BCNP lands are classified as wetlands. The extreme eastern portion of Big Cypress is wetland habitat consisting of extensive wet prairie with small amounts of sawgrass, scattered hardwood hammocks, and numerous cypress trees.

3.9 FISH AND WILDLIFE RESOURCES

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

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

Within south Florida, 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 also represent an important forage base for wading birds, alligators, and larger predatory fishes (USACE 1999).

Common reptiles of freshwater wetlands include the American alligator (*Alligator mississippiensis*), snapping turtle (*Chelydra serpentina*), striped mud turtle (*Kinosternon bauri*),

mud turtle (*Kinosternon subrubrum*), cooter (*Chrysemys floridana*), Florida chicken turtle (*Deirochelys reticularia*), Florida softshell turtle (*Trionys ferox*), water snake (*Natrix sipidon*), green water snake (*Natrix cyclopion*), mud snake (*Francia abacura*), and Florida cottonmouth (*Agkistrodon piscivorus*) (USACE 1999).

Common wading birds include the white ibis (*Eudocimus albus*), glossy ibis (*Plegadus falcenellus*), great egret (*Casmerodius albus*), great blue heron (*Ardea herodius*), little blue heron (*Egretta caerulea*), tricolored heron (*Egretta tricolor*), snowy egret (*Egretta thula*), green-backed heron (*Butorides striatus*), cattle egret (*Bubulcus ibis*), black-crowned night heron (*Nycticorax nycticorax*), yellow-crowned night heron (*Nycticorax violacea*), roseate spoonbill (*Ajaia ajaja*), and wood stork (*Mycteria americana*) (USACE 1999).

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

3.10 THREATENED AND ENDANGERED SPECIES

3.10.1 Federally Protected Species

The Corps has coordinated with the United States Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS), in accordance with Section 7 of the Endangered Species Act, to determine federally listed threatened and endangered species that are either known to occur or are likely to occur within the project area (See **Appendix C**). For a complete list of federally threatened and endangered species within the project area, their critical habitat, and candidate species refer to **Table 1**.

TABLE 1. FEDERALLY THREATENED AND ENDANGERED SPECIES WITHIN THE PROJECT AREA

Common Name	Scientific Name	Status
Mammals		
Florida panther	*Puma concolor coryi*	E
Florida manatee	*Trichechus manatus latirostris*	E, CH
Florida bonneted bat	*Eumops floridanus*	E
Birds		
Cape Sable seaside sparrow	*Ammodramus maritimus mirabilis*	E, CH
Everglade snail kite	*Rostrhamus sociabilis plumbeus*	E, CH
Piping plover	*Charadrius melodus*	T
Red-cockaded woodpecker	*Picoides borealis*	E
Roseate tern	*Sterna dougallii*	T
Wood stork	*Mycteria americana*	T
Reptiles		
American Alligator	*Alligator mississippiensis*	T, SA
American crocodile	*Crocodylus acutus*	T, CH
Eastern indigo snake	*Drymarchon corais couperi*	T
Gopher tortoise	*Gopherus polyphemus*	C
Invertebrates		

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

E=Endangered; T=Threatened; SA=Similarity of Appearance; CH=Critical Habitat; Candidate Species, Pr CH = Proposed Critical Habitat

3.10.2 State Listed Species

The project area provides habitat for several state listed species. For a complete list of state listed species please see **Table 2**.

TABLE 2. STATE LISTED SPECIES WITHIN THE PROJECT AREA

Common Name	Scientific Name	Status
Mammals		
Everglades mink	*Mustela vison evergladensis*	T
Florida mouse	*Podomys floridanus*	SC
Birds		
Snowy plover	*Charadrius nivosus*	T
American oystercatcher	*Haematopus palliates*	SC
Brown pelican	*Pelecanus occidentalis*	SC
Black skimmer	*Rynchops niger*	SC
Least tern	*Sterna antillarium*	T
White-crowned pigeon	*Patagioenas leucocephala*	T
Least tern	*Sterna antillarum*	T
Limpkin	*Aramus guarauna*	SC
Little blue heron	*Egretta caerulea*	SC

Tricolored heron	*Egretta tricolor*	SC
Snowy egret	*Egretta thula*	SC
Reddish egret	*Egretta rufescens*	SC
White ibis	*Eudocimus albus*	SC
Roseate spoonbill	*Platalea ajaja*	T
Fish		
Mangrove rivulus	*Rivulus marmoratus*	SC
Invertebrates		
Florida tree snail	*Liguus fasciatus*	SC
Plants		
Pine-pink orchid	*Bletia purpurea*	T
Lattace vein fern	*Thelypteris reticulate*	E
Eatons spikemoss	*Selaginella eatonii*	E
Wright's flowering fern	*Anemia wrightii*	E
Tropical fern	*Schizaea pennula*	E
Mexican vanilla	*Manilla mexicana*	E

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

3.11 ESSENTIAL FISH HABITAT

The Magnuson-Stevens Fishery Conservation and Management Act, 16USC 1801 et seq. Public Law 104-208 reflects the Secretary of Commerce and Fishery Management Council authority and responsibilities for the protection of essential fish habitat (EFH). There is no EFH, as designated by the NMFS, within the project area immediately affected by the Federal Action.

3.12 WATER QUALITY

Water quality in the study area is significantly influenced by development. The C&SF Project led to significant changes in the landscape by opening large land tracts for urban development and agricultural uses, and by the construction of extensive drainage networks. Natural drainage patterns in the region have been disrupted by the extensive array of levees and canals which has resulted in further water quality degradation. The water quality of the study area is largely controlled by Lake Okeechobee and the EAA to the north and urban and agricultural development southeast of ENP. The northern WCAs are fed from 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 review of water quality within the project area. The area in the direct vicinity of the S-344 structure has no development (no agriculture or residential use).

3.12.1 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. To address nutrient discharges the FDEP has recently established surface water quality numeric nutrient criteria for all Florida water bodies and developed National Pollution Discharge Elimination (NPDES) Total Maximum Daily Loads (TMDLs) for many watersheds with excessive nutrient

pollution. TMDLs for phosphorus and/or nitrogen currently exist for Lake Okeechobee. Additional information on the status and implementation of TMDLs within the study area can be found at http://www.dep.state.fl.us/water/tmdl/.) Within the Everglades Protection Area (EPA), phosphorus concentrations are regulated by the "Phosphorus Rule" 62-302.540 F.A.C. and are subject to the terms of the 1992 Consent Decree in United States v. South Florida Water Management. District (S.D. Fla No. 88-1886-CIV-MORENO).

For the project area affected by this Federal Action, total phosphorus is the nutrient of concern. Under the current conditions, total phosphorus concentrations at the structures involved in this project area are within the low range for the entire water year and expected to stay in that range for the duration of this federal action. No negative impacts related to nutrient loading are expected to occur from this action.

See below graph for background information on total phosphorus concentrations for inflows into ENP which is downstream of the S-344. Due to the long duration of the upstream wet season conditions in the WCA's and the expectation that these conditions will continue, water quality is expected to continue to be good (low phosphorus concentrations) for the water routed through the S-344.

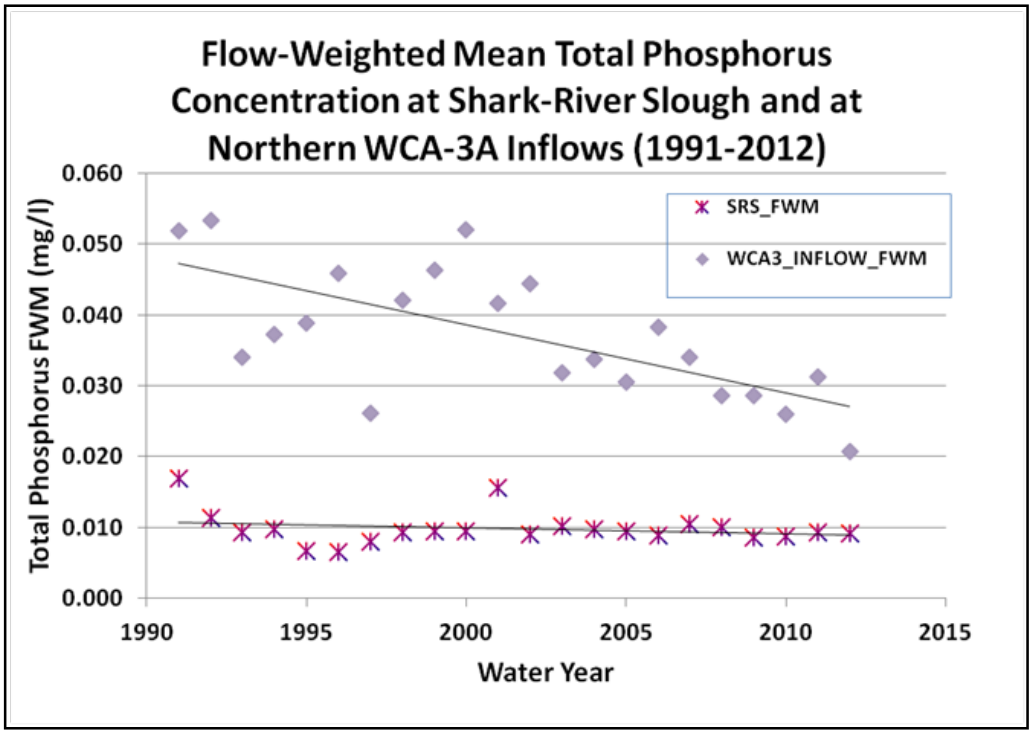


FIGURE 3. FLOW-WEIGHTED MEAN TOTAL PHOSPHOROUS CONCENTRATION AT SHARK RIVER SLOUGH AND NORTHERN WCA 3A INFLOWS

3.13 NATIVE AMERICANS

There are two federally recognized tribes (Miccosukee Tribe of Indians of Florida and the Seminole Tribe of Florida) that are located within the project region (**Figure 4**). Both tribes

maintain a strong connection to the project area through continued use and regard the indigenous populations of Florida as their ancestors. The project area is also within close proximity to the Miccosukee Tribe's Alligator Alley Reservation, which spans portions of WCA 3A, and the Tamiami Trail Reservation area, located along the forty mile bend of Tamiami Trail.

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

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

Today, the Tamiami Trail Reservation is the center of the Miccosukee Indian population, while many of the Seminole tribal members live on various reservations, including the Big Cypress, Hollywood, and Brighton reservations. In addition to the Federal reservation, the Miccosukee Tribe has established a perpetual lease from the State of Florida to large portions of the WCA 3A area while the Seminole Tribe have a lease within the northwestern portion of WCA 3A. The members of both groups maintain a traditional lifestyle that is intricately connected to the Everglades. Traditional practices of hunting, fishing and general living are still maintained, along

with modern entrepreneurship through various enterprises such as cattle ranching and with tourism related businesses along Tamiami Trail. Today, both tribes have vibrant, thriving cultures based within the Everglades region. These practices continue to tie the tribes to the Everglades is such a way that careful consideration of effects is warranted.

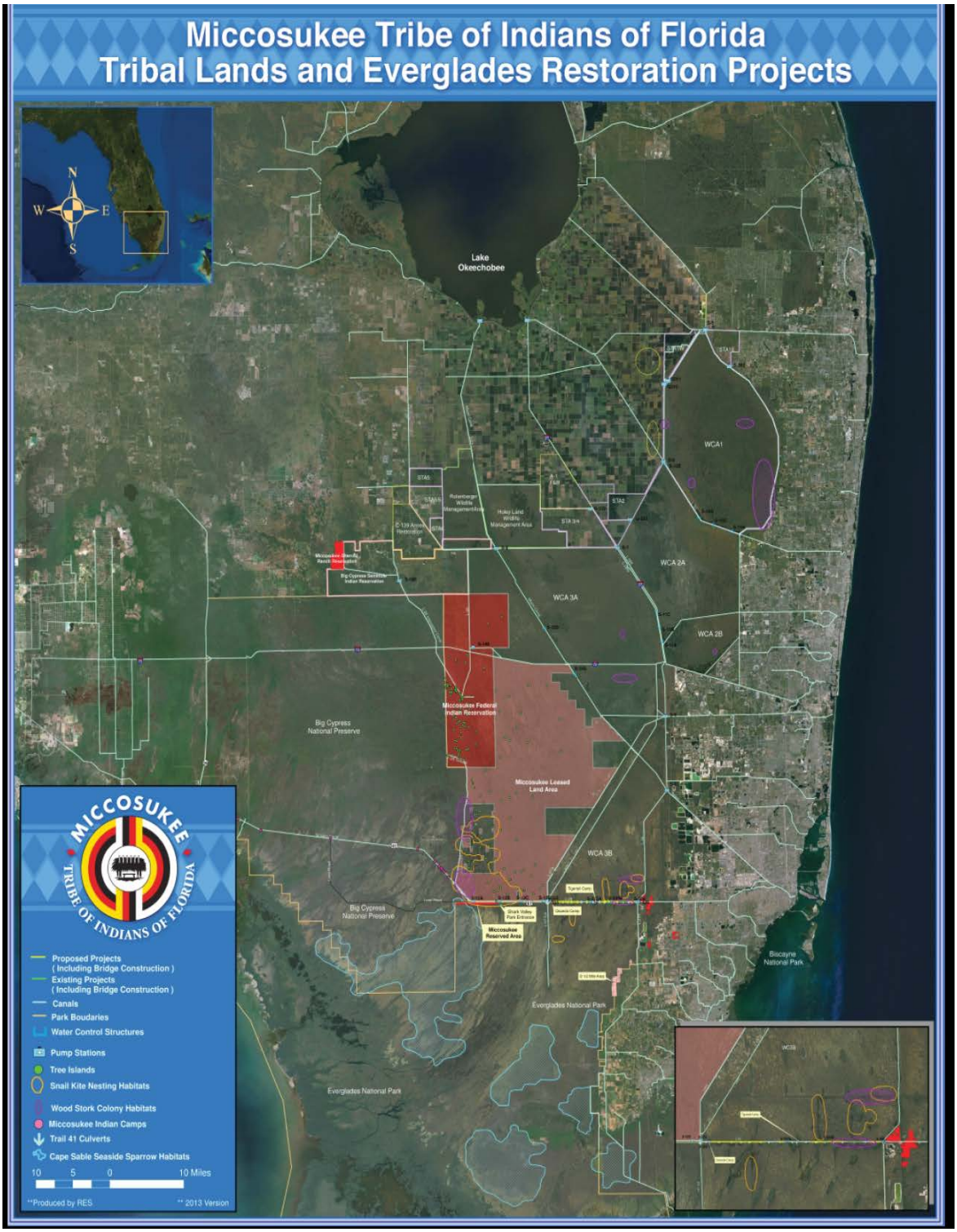


FIGURE 4. MAP OUTLINING THE LOCATION OF TRIBAL RESERVATIONS, LEASED AND EASMENT LANDS

3.14 CULTURAL RESOURCES

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

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

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

The broad region of ENP and BCNP has been subject to numerous cultural resource investigations and have been found to contain a wide variety of cultural resources that vary within their significance. There are archaeological resources associated with some of the earliest habitation sequences within south Florida and relatively recent sites directly associated with modern Native American tribes who were removed from ENP shortly after its creation. A total of four cultural resources are located within the specific area of potential effects (APE) related to the S-344 Deviation. These resources consist of archaeological sites dating from the Glades and Seminole periods and have not been evaluated regarding their eligibility for listing in the National Register of Historic Places (NRHP). Although the APE has been previously surveyed by the National Park Service (Ehrenhard et al. 1979; 1980), it is important to note that based on the methodology detailed in the survey reports, previously unrecorded sites not noted above may be present.

3.15 AIR QUALITY

The existing air quality within south Florida is considered good, as outlined within the FDEP 2010 Air Monitoring Report (FDEP 2010). 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 (carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), particle pollution (10 microns or less in diameter (PM_{10}), and 2.5 microns or less in diameter ($PM_{2.5}$), and sulfur dioxide (SO_2) as attainment (*i.e.*, in compliance with the standards); non-attainment (*i.e.*, not in compliance with the standards); or unclassifiable (*i.e.*, insufficient data to classify). Attainment areas can be further classified as maintenance areas. Maintenance areas are areas previously classified as non-attainment which have successfully reduced air pollutant concentrations to below the standard. Florida counties are in attainment for all pollutants with the exception of Orange County, Duval County, the Tampa Bay area including Hillsborough and Pinellas Counties, and Southeast Florida including Miami-Dade, Broward, and Palm Beach Counties which continue to be classified by the USEPA as attainment/maintenance areas for the pollutant ozone and a portion of Hillsborough County which is classified as a nonattainment area for lead (FDEP 2012). Florida remains designated as unclassifiable for PM_{10}. Although sufficient data have been collected for attainment determinations, USEPA has not considered PM_{10} for attainment determinations in Florida yet.

3.16 HAZARDOUS, TOXIC OR RADIOACTIVE WASTES

Within the WCA 3A and BCNP, there are levees and canals constructed in the 1950s and 1960s that limit vehicle access to the interior. Activity within the WCA's and BCNP is generally limited to fishing, hunting, and birding, though there may be some illegal dumping of solid wastes (household wastes, appliances) along the perimeter where there is access from public roads. No soil testing for residual contaminants has been conducted within WCA 3A and BCNP as part of the Federal Action since the lands have no history of prior agricultural or industrial use that would cause such contamination.

There are no known contamination sites in the vicinity of the S-344. This project area, the WCA's and Big Cypress, have a very low risk for hazardous, toxic or radioactive wastes (HTRW) due to lack of residential, industrial or agricultural activity.

3.17 NOISE

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

commercial and industrial facilities etc., inherent in areas of higher population would be significant and probably override those sounds associated with natural emissions.

3.18 AESTHETICS

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

3.19 RECREATION

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

4.0 ENVIRONMENTAL EFFECTS

4.1 GENERAL ENVIRONMENTAL EFFECTS

The general environmental effect of the Federal Action would be beneficial. The following includes anticipated changes to the existing environment including direct, indirect, and cumulative effects. Potential environmental effects of current water management operations (No Action Alternative) are thoroughly evaluated within the *Supplemental EA and Proposed FONSI for the L-29 Canal and South Dade Conveyance System Temporary Emergency Deviation to Affect Relief of High Water Levels within WCA 3A* (dated March 2016) and are hereby incorporated by reference.

4.2 CLIMATE

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

4.3 GEOLOGY AND SOILS

Implementation of the No Action Alternative and Alternative B would not result in significant impacts to the geology and soils within the project area. Alternative B consists of operational changes to C&SF Project features and does not include construction of permanent structures or structural modifications to existing C&SF Project features. Geologic impacts resulting from removal of surface cover (*i.e.* vegetation and soil), or removal of cap rock from blasting and/or removal of limestone would not occur.

4.4 STUDY AREA LAND USE

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

4.5 HYDROLOGY

WCA 3A continues to remain above Zone A of the current regulation schedule as measured by the average stage elevations of Site 63, Site 64, and Site 65 (**Figure 5**). **Figure 5** depicts conditions within WCA 3A as of April 4, 2016. During the months of January, February, and March, stage elevations within WCA 3A were above the 10% exceedance value based on a period of record from 1962 to 2013. The maximum exceedance value was surpassed in WCA 3A during portions of the months of February through March (**Figure 6**). Implementation of the L-29 temporary emergency deviation was expected to result in a potential decrease in water levels ranging from 0.2 feet up to 0.5 feet with implementation of the 90-day deviation (USACE 2016). Implementation of the No Action Alternative, is expected to continue to alleviate high water levels in WCA 3A by allowing for the full discharge capacity through S-333 into the L-29 Canal.

The temporary emergency operations at S-344 under Alternative B will allow flows to be removed from WCA 3 via gravity and be distributed, through the aid of rehabilitated canal plugs, as sheetflow to BCNP. Implementation of Alternative B will facilitate additional regulatory releases from WCA 3A during the current period of extreme high water. This will relieve provide an additional outlet for WCA 3A to complement the deliveries into SRS and ENP, while providing additional water to BCNP. Implementation of Alternative B is anticipated to result in the reduction of water levels within WCA 3A by approximately 0.1 feet. This estimate is based on the assumption of S-344 operating at a capacity of 200 cfs for a period of 100 days (5 April to 15 July). The resulting discharge into BCNP would be approximately 40,000 acre feet of water over the time frame from 5 April to 15 July. The primary impact of Alternative B within BCNP will be to lengthen the hydroperiod in the area immediately south and west of the S-344 structure, aiding in the restoration of historic hydrologic conditions for the duration of the temporary emergency deviation.

Potential effects from western flows (from eastern BCNP, west of WCA 3A and the L-28 Levee) on downstream areas including CSSS-A in western ENP, have been discussed and analyzed under prior Corps planning efforts including CSOP ESA coordination with USFWS during 2006-2007, and under ERTP during 2010-2011 and 2015-2016. During consultation with USFWS and BCNP, it was suggested that the L-28 Borrow Canal is responsible for direct delivery of water flow into western CSSS-A (**Figure 7**).

Due to regional topographic gradients, when WCA 3A is high, water from western WCA 3A flows south through gaps previously constructed in the L-28 Tieback Levee and a portion of the surface water drainage from eastern BCNP (Mullet Slough) flows south from areas west of the L-28 Tieback Levee. Under these conditions, the southerly flow is most likely funneled east of the Dade-Collier Training and Transition Airport (JetPort) towards the 40-mile bend area, with the L-28 Borrow Canal (located on the west side of the L-28 Levee) facilitating water conveyance south towards western ENP. In addition, the L-28 Borrow Canal receives inflows from the S-344, S-343A, and S-343B structures when these structures are operated under the current water control

plan. Surface water flows moving south in this area of eastern BCNP, along with other BCNP basin runoff from areas to the immediate south of the JetPort, may be collected by the Tamiami Trail Borrow Canal (north side of road) and directed through Tamiami Trail bridges and Loop Road bridges into ENP near CSSS-A. Hydrograph responses at NP-205 demonstrate a high degree of correlation to upstream hydrographs at Gauge BCNP A-9 during periods of S-12 closures (**Figure 2** and **Figure 8**). Vegetation mapping also indicated a transition from prairie-marsh to marsh vegetation as more prevalent along western CSSS-A and this information coincides with additional vegetation studies within CSSS habitat (Ross et al. 2003, 2004, 2006; Sah et al. 2007, 2008, 2009).

Staff from BCNP have further characterized existing hydrologic issues and water management challenges based on direct observations within the project area (**Figure 9**). Within BCNP, the L-28 Tieback Levee and L-28 Canal contributes to prevention of the natural flow ways within BCNP as a result of current topography and water management operations. Areas south of the L-28 Tieback Levee are currently deemed too dry. The L-28 Canal is a major disturbance to a number of natural flow ways within BCNP and is deemed responsible for draining water south from the existing landscape. Flow currently bypasses the existing plugs within the borrow canal, instead of being redistributed as sheet flow onto the landscape. Portions of BCNP located south of Tamiami Trail are also characterized as being too dry. In addition, seepage may occur through and around the S-343A and S-344B structures, flowing under the levee and potentially into western ENP.

The USFWS has studied aerial photos and cypress strand topography within the project area to determine potential flow paths of S-344 discharges in combination with rehabilitation of the six plugs in the L-28 Borrow Canal. Flows from S-344 may enter the L-28 Borrow Canal and travel southward until reaching the northern most plug located approximately 2 miles downstream of S-344. Once the water is stopped by the plug and is able to overtop the canal bank, depending on the bank elevation, water may begin to move towards the west into eastern BCNP. Some of the water may remain along the western banks of the L-28 Borrow Canal and reenter the next segment of canal until reaching the fifth plug and so on and so forth southward until the entire L-28 Borrow Canal (north of Tamiami Trail) is full. The westward moving water will encounter a slight topographic ridge and small amounts of the water may continue moving southward along this ridge. Other portions of the water may travel southwestward within the cypress strand and slough microtopography. The majority of flows may reach the Tamiami Canal mid-way between 40- and 50-mile bend, near the junction with the L-28 Borrow Canal. However; the USFWS, noted that this flow path needs the proper outlet capacity along the canal to insure that flows are able to continue southwestward into Lostman's Slough and not end up back in the Tamiami Canal or southern end of the L-28 Borrow Canal, where these flows may move eastward then southward into CSSS-A. Reference **Figure 2** and **Figure 7** prepared by the Corps, for the area of potential effects and estimated trajectories of flow as a result of the Federal Action.

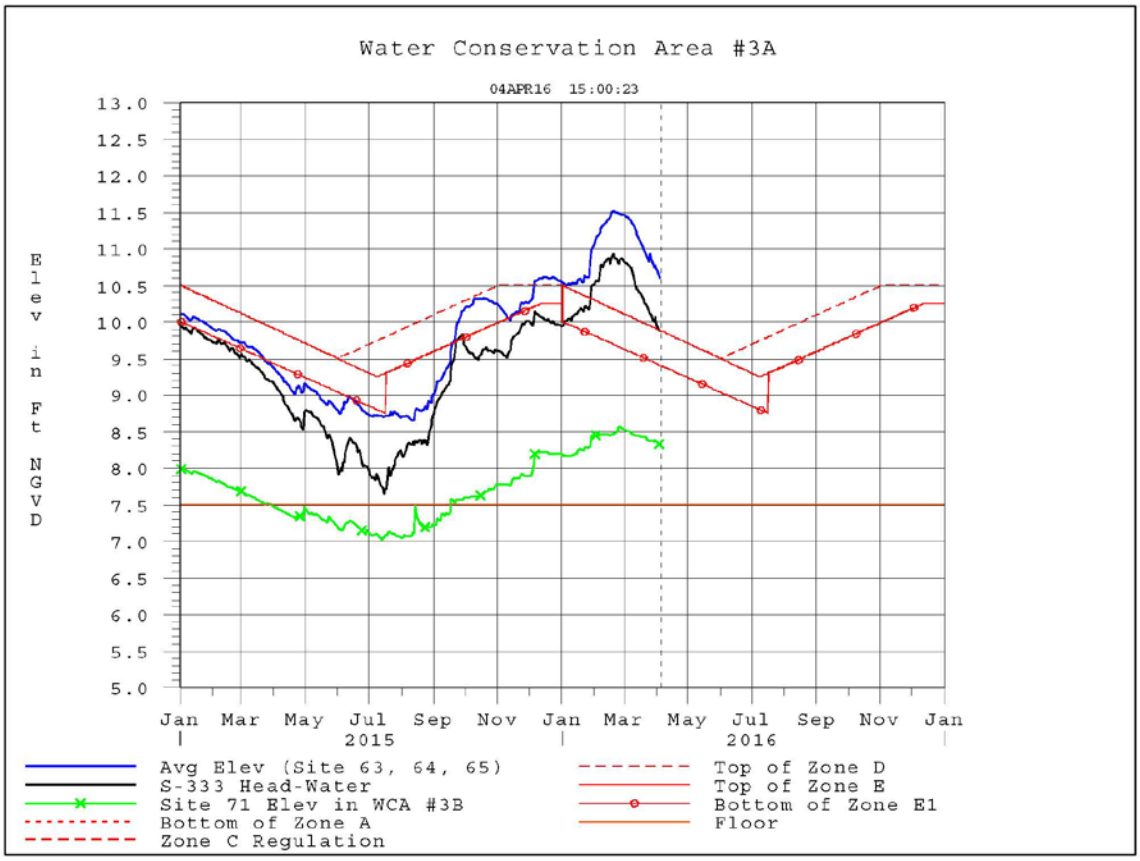


FIGURE 5. WATER CONSERVATION AREA 3 STAGE ELEVATION (DATE APRIL, 4, 2016)

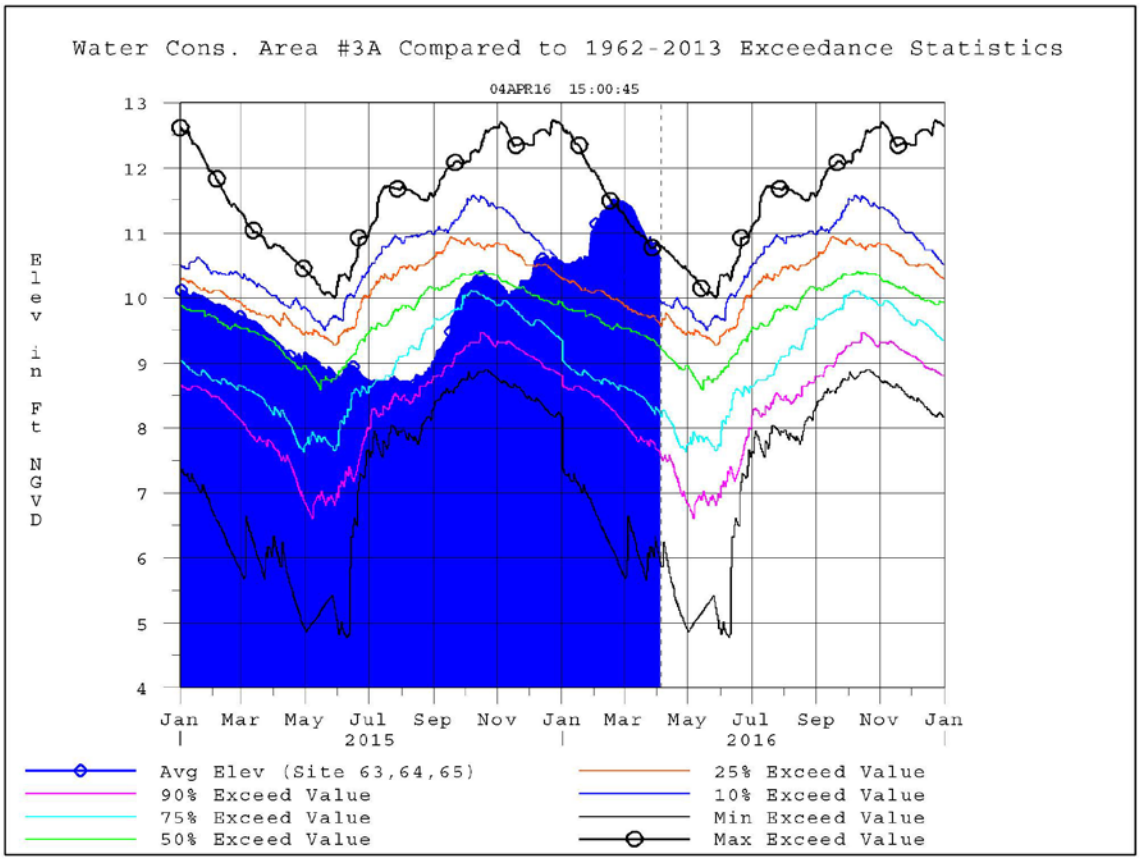


FIGURE 6. WATER CONSERVATION AREA 3A STAGE ELEVATION COMPARED TO 1962-2013 EXCEEDANCE STATISTICS (DATE APRIL 4, 2016)

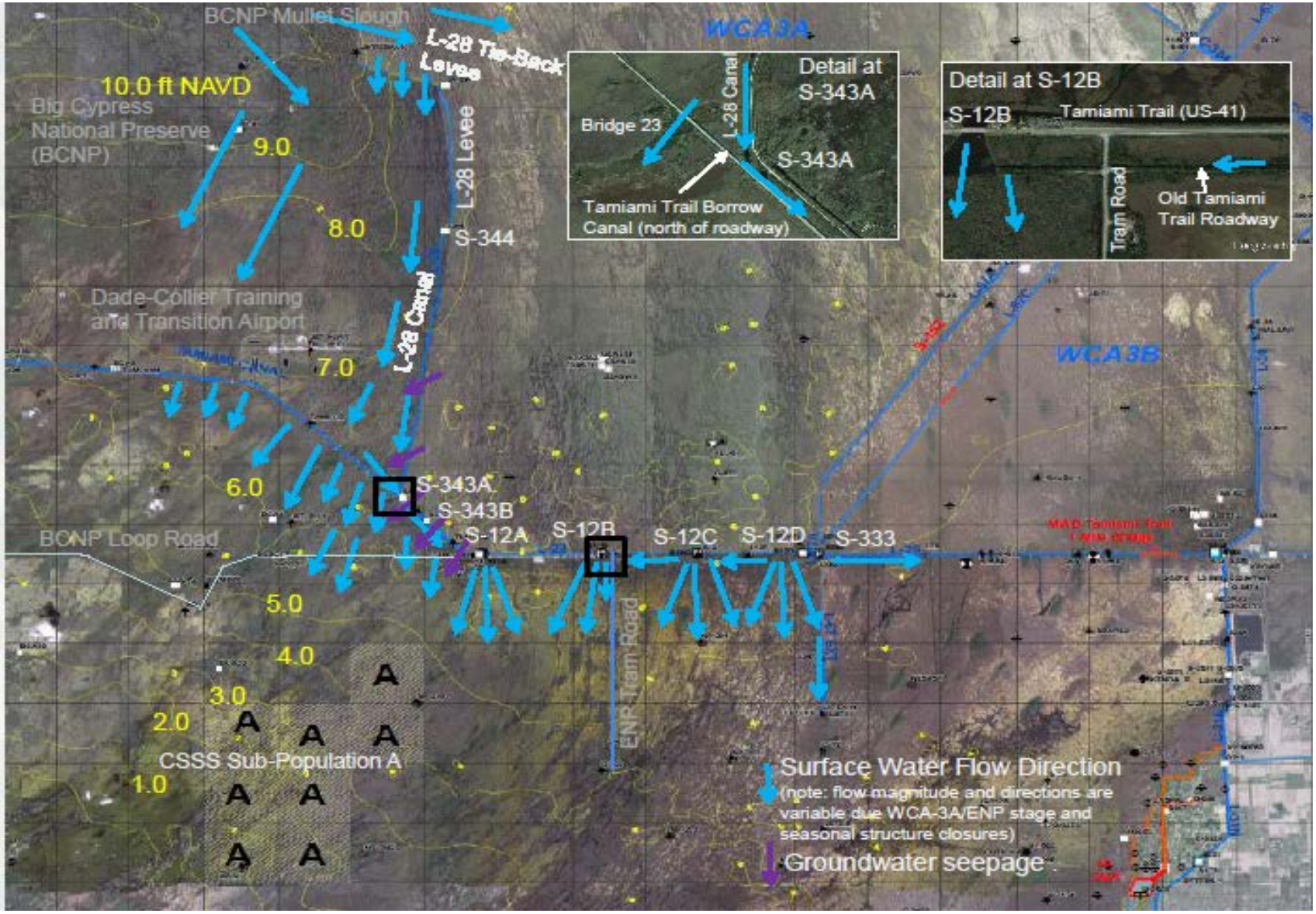
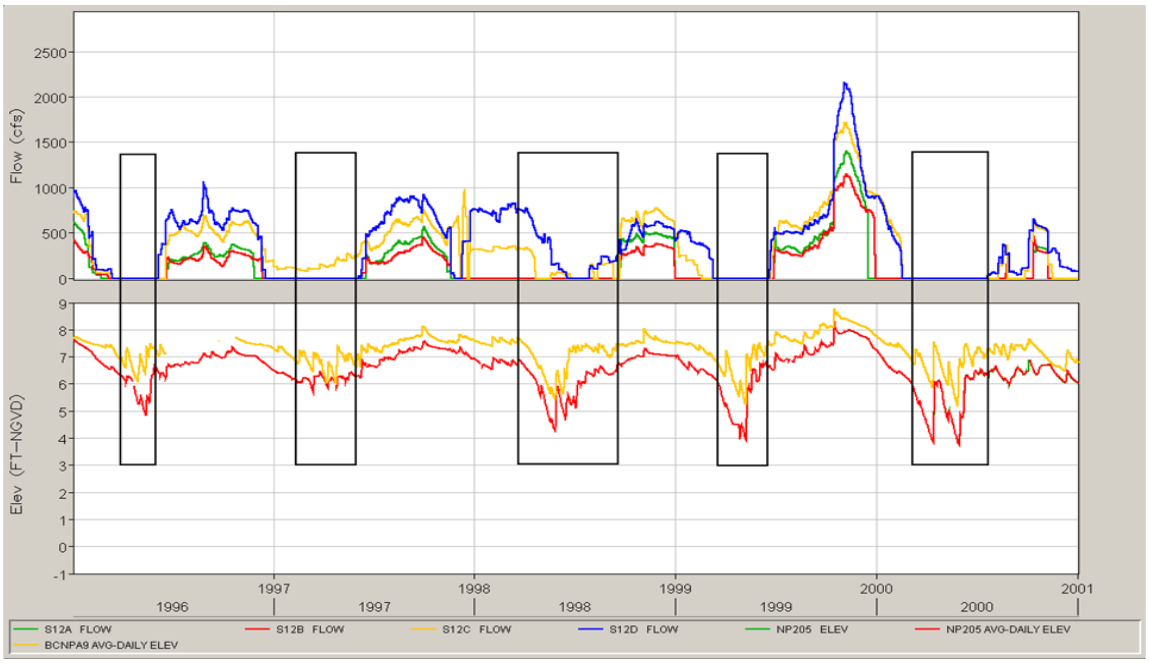


FIGURE 7. REGIONAL HYDROLOGY



Flow: S-12A; S-12B; S-12C; S-12D Gauge: BCNP A-9; NP-205

FIGURE 8. COMPARISON OF STRUCTURE FLOW AND STAGES AT GAUGE NP-205 AND BCN A- 9 BETWEEN 1996 AND 2001

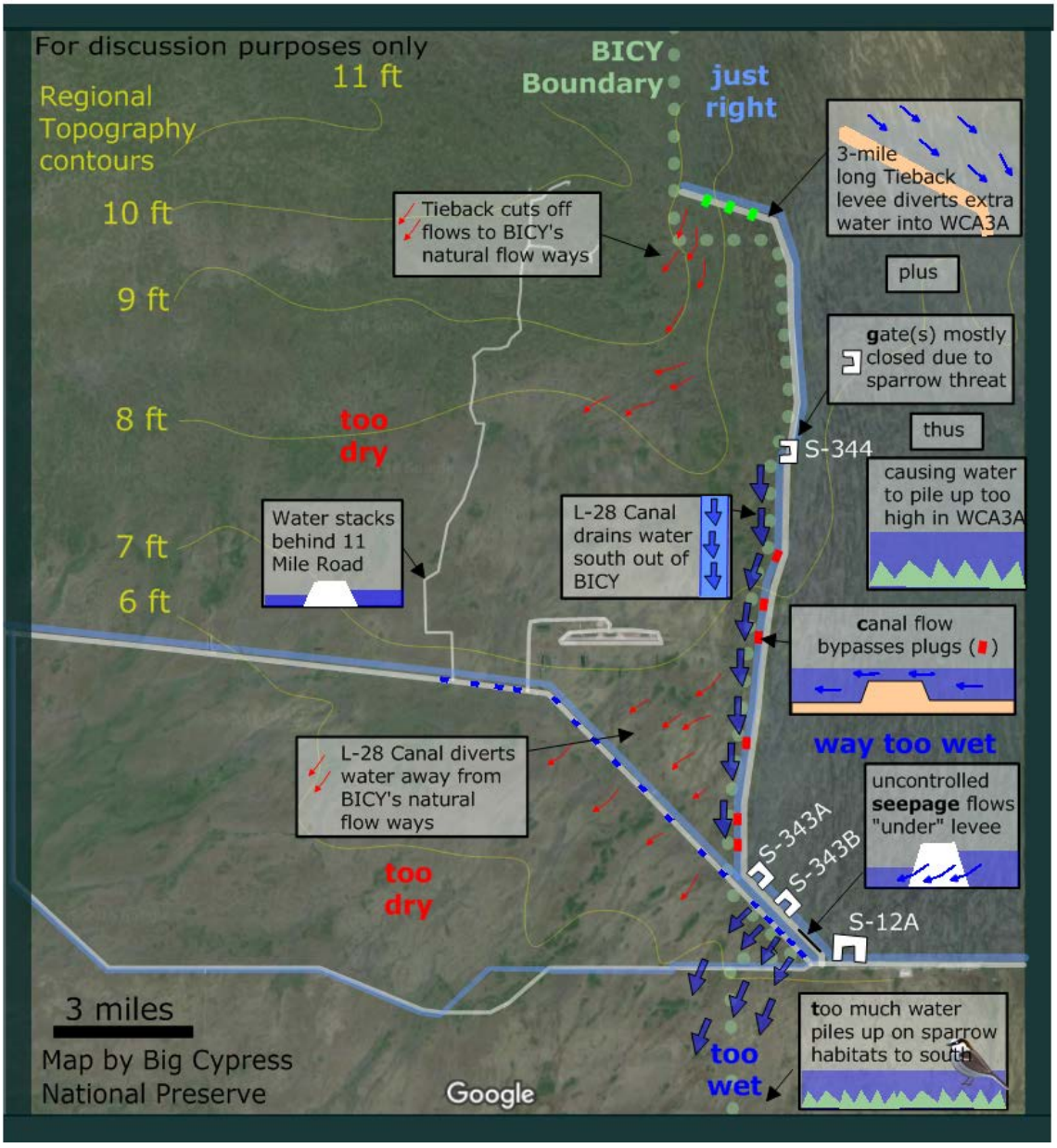


FIGURE 9. DEPICTION OF EXISTING HYDROLOGIC ISSUES WITHIN AND ADJACENT TO BCNP AND THE L-28 LEVEE (SOURCE BCNP STAFF MEMBERS)

4.6 VEGETATIVE COMMUNITIES

Implementation of the L-29 Canal temporary emergency deviation, estimated a potential decrease in water levels ranging from 0.2 feet up to 0.5 feet within WCA 3A (USACE 2016). Implementation of the No Action Alternative, is expected to continue to alleviate high water levels in WCA 3A by allowing for the full discharge capacity through S-333 into the L-29 Canal. The continued implementation of the No Action Alternative has the potential for negative impacts to occur on vegetation primarily within WCA 3A where high water levels and prolonged inundation periods are expected to continue.

Vegetative communities within WCA 3A are expected to benefit with implementation of Alternative B. The temporary emergency operations at S-344 under Alternative B will allow flows to be removed from WCA 3 via gravity and be distributed, through the aid of rehabilitated canal plugs, as sheetflow to BCNP. Implementation of Alternative B is anticipated to result in the reduction of water levels within WCA 3A by approximately 0.1 feet (Reference **Section 4.5**). A potential decrease in high water levels in WCA 3A may provide an overall net benefit for tree islands currently experiencing prolonged periods of inundation. A potential decrease in drying event severity would aid in restoration of historic wetland vegetation communities. Alternative B may have a temporary minor beneficial effect on wetland vegetation and tree islands; however, due to the short duration of the temporary emergency deviation, significant vegetation changes are not anticipated.

The primary impact of Alternative B within BCNP will be to lengthen the hydroperiod in the area immediately south and west of the S-344 structure, aiding in the restoration of historic hydrologic conditions for the duration of the temporary emergency deviation. Temporary minor beneficial effects on wetland vegetation are also expected within portions of BCNP south of Tamiami Trail which are also currently characterized as too dry (**Figure 9**). Vegetation communities adjacent to Loop Road and in the vicinity of Forty-mile bend include sloughs, hammocks, cypress swamp, and pinelands.

4.7 FISH AND WILDLIFE RESOURCES

Implementation of the L-29 Canal temporary emergency deviation, estimated a potential decrease in water levels ranging from 0.2 feet up to 0.5 feet within WCA 3A (USACE 2016). Implementation of the No Action Alternative, is expected to continue to alleviate high water levels in WCA 3A by allowing for the full discharge capacity through S-333 into the L-29 Canal.

The continued implementation of the No Action Alternative has the potential for negative impacts to occur on fish and wildlife resources primarily within WCA 3A where high water levels and prolonged inundation periods are expected to continue. Several species of wading birds nest during the dry season, and rely on the drying wetlands to concentrate prey items. However, frequent heavy rains during nesting can cause water levels to increase rapidly, reducing foraging opportunities. Abrupt increases in water levels during nesting, termed reversals, may cause wading bird nest abandonment, re-nesting, late nest initiation, and poor fledging success. Prolonged inundation periods are also of particular concern for mammals dependent on upland habitat, particularly for deer populations within northern WCA 3A that utilize tree islands for refugia.

Fish and wildlife resources within WCA 3A are expected to benefit with Alternative B. The proposed temporary emergency operations at S-344 under Alternative B will allow flows to be removed from WCA 3 via gravity and be distributed, through the aid of rehabilitated canal plugs, as sheetflow to BCNP. Alternative B is anticipated to result in the reduction of water levels within WCA 3A by approximately 0.1 feet (Reference **Section 4.5**). A potential decrease in high water levels and prolonged periods of inundation in WCA 3A may provide an overall net benefit for wading bird foraging suitability and nesting opportunities.

Crayfish are important components within the Everglades food web, serving as primary dietary components of higher trophic level species including fish, amphibians, alligators, wading birds and mammals such as raccoons and river otters (Kushlan and Kushlan 1979). Crayfish species composition and abundance within the Greater Everglades are linked to hydroperiod. Increases in hydroperiod associated with implementation of the Action Alternatives may provide temporary, minor beneficial effects to crayfish within areas of WCA 3A. Increases in forage prey availability (*i.e.* crayfish and other invertebrates, fish) resulting from improved hydroperiods would in turn provide beneficial effects for amphibian, reptile, small mammal, and wading bird species.

The primary impact of Alternative B within BCNP will be to lengthen the hydroperiod in the area immediately south and west of the S-344 structure, aiding in the restoration of historic hydrologic conditions for the duration of the temporary emergency deviation. Temporary minor beneficial effects on fish and wildlife resources are also expected within portions of BCNP south of Tamiami Trail and adjacent to Loop Road.

4.8 THREATENED AND ENDANGERED SPECIES

4.8.1 Federally Protected Species

Effects determinations for federally threatened and endangered species within the project area are listed within **Table 3**. Informal consultation with the USFWS has been initiated with submission of a complete initiation package (**Appendix C**). These determinations are based on the short duration of the temporary emergency deviation and the generally beneficial nature of this action.

TABLE 3. FEDERALLY THREATENED AND ENDANGERED SPECIES WITHIN THE PROJECT AREA AND SPECIES DETERMINATION FOR THE FEDERAL ACTION

Common Name	Scientific Name	Status	May Affect, Likely to Adversely Affect	May Affect, Not Likely to Adversely Affect	No Effect
Mammals					
Florida panther	*Puma concolor coryi*	E			X
Florida manatee	*Trichechus manatus latirostris*	E, CH			X
Florida bonneted bat	*Eumops floridanus*	E		X	
Birds					
Cape Sable seaside sparrow	*Ammodramus maritimus mirabilis*	E, CH		X	
Everglade snail kite	*Rostrhamus sociabilis plumbeus*	E, CH		X	
Piping plover	*Charadrius melodus*	T			X
Red-cockaded woodpecker	*Picoides borealis*	E			X
Roseate tern	*Sterna dougallii*	T			X
Wood stork	*Mycteria americana*	T		X	
Reptiles					
American Alligator	*Alligator mississippiensis*	T, SA			X

American crocodile	*Crocodylus acutus*	T, CH			X
Eastern indigo snake	*Drymarchon corais couperi*	T			X
Gopher tortoise	*Gopherus Polyphemus*	C			X
Invertebrates					
Bartram's hairstreak butterfly	*Strymon acis bartrami*	E			X
Florida leafwing butterfly	*Anaea troglodyta floridalis*	E			X
Miami blue butterfly	*Cyclargus thomasi bethunebakeri*	E			X
Schaus swallowtail butterfly	*Heraclides aristodemus ponceanus*	E			X
Stock Island tree snail	*Orthalicus reses* (not incl. *nesodryas*)	T			X
Plants					
Crenulate lead plant	*Amorpha crenulata*	E			X
Deltoid spurge	*Chamaesyce deltoidea* spp. *Deltoidea*	E			X
Garber's spurge	*Chamaesyce garberi*	T			X
Okeechobee gourd	*Cucurbita okeechobeensis* ssp. *Okeechobeenis*	E			X
Small's milkpea	*Galactia smallii*	E			X
Tiny polygala	*Polygala smallii*	E			X
Big pine partridge pea	*Chamaecrista lineata* var. *keyensis*	Pr E			X
Blodgett's silverbush	*Argythamnia blodgettii*	Pr T			X
Cape Sable thoroughwort	*Chromolaena frustrate*	E, CH			X
Carter's small-flowered flax	*Linum carteri* var. *carteri*	E, CH			X
Everglades bully	*Sideroxylon reclinatum* spp. *Austrofloridense*	C			X
Florida brickell-bush	*Brickellia mosieri*	E, CH			X
Florida bristle fern	*Trichomanes punctatum* spp. F*loridanum*	E			X
Florida pineland crabgrass	*Digitaria pauciflora*	C			X
Florida prairie-clover	*Dalea carthagenensis* var. *floridana*	C			X
Florida semaphore cactus	*Consolea corallicola*	E, CH			X
Pineland sandmat	*Chamaesyce deltoidea* ssp. *Pinetorum*	C			X

Sand flax	*Linum arenicola*	Pr E			X

E=Endangered; T=Threatened; SA=Similarity of Appearance; CH=Critical Habitat; Candidate Species, Pr E = Proposed Endangered, Pr CH = Proposed Critical Habitat

4.8.2 State Listed Species

Implementation of the Federal Action would not result in significant impacts to state listed species. State listed species determinations are provided in **Table 4**. Impacts to state listed species would be similar to those outlined for fish and wildlife resources in **Section 4.8**. Potential impacts to these species would be similar to those outlined for the wood stork in **Appendix C**.

TABLE 4. STATE LISTED SPECIES WITHIN THE PROJECT AREA AND SPECIES DETERMINATION FOR THE FEDERAL ACTION

Common Name	Scientific Name	Status	May Affect, Likely to Adversely Affect	May Affect, Not Likely to Adversely Affect	No Effect
Mammals					
Everglades mink	*Mustela vison evergladensis*	T			X
Florida mouse	*Podomys floridanus*	SC			X
Birds					
Snowy plover	*Charadrius alexandrines*	T			X
American oystercatcher	*Haematopus palliates*	SC			X
Brown pelican	*Pelecanus occidentalis*	SC			X
Black skimmer	*Rynchops niger*	SC			X
Least tern	*Sterna antillarium*	T			X
White-crowned pigeon	*Columba leucocephalus*	T			X
Limpkin	*Aramus guarauna*	SC			X
Little blue heron	*Egretta caerulea*	SC		X	X
Tricolored heron	*Egretta tricolor*	SC		X	X
Snowy egret	*Egretta thula*	SC		X	X
Reddish egret	*Egretta rufescens*	SC			X
White ibis	*Eudocimus albus*	SC		X	
Roseate spoonbill	*Ajaja*	T			X
Fish					
Mangrove rivulus	*Rivulus marmoratus*	SC			X
Invertebrates					
Florida tree snail	*Liguus fasciatus*	SC			X
Plants					
Pine-pink orchid	*Bletia purpurea*	T			X
Lattace vein fern	*Thelypteris reticulate*	E			X
Eatons spikemoss	*Selaginella eatonii*	E			X

Wright's flowering fern	*Anemia wrightii*	E			X
Tropical fern	*Schizaea pennula*	E			X
Mexican vanilla	*Manilla Mexicana*	E			X

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

4.9 ESSENTIAL FISH HABITAT

Implementation of the No Action Alternative and Alternative B are not expected to adversely affect EFH as no EFH as designated by the NMFS occurs within the project area.

4.10 WATER QUALITY

This structure does not directly discharge into ENP and there are no state or federal water quality compliance issues with the opening of this structure as it is only routing water from one part of the system to another part of the system which are all within the historic everglades flow areas. Typically water quality (total phosphorus concentration) is good (low concentrations) in the WCAs after long periods of high water conditions, which we have been currently experiencing. The average TP value at S-344 for flow and none flow events over the past two years (2014 to present) has been 20 ppb. There are no expected water quality issues to result from the opening of this structure.

4.11 NATIVE AMERICANS

As part of this project, consultation has been initiated and is ongoing between the Corps and appropriate federally recognized tribes. Informal coordination through phone calls and emails with staff members of the Miccosukee and the Seminole Tribes was conducted March 23, 2016 for notification purposes and to solicit comments regarding the temporary emergency deviation and the potential effects of flood waters released from WCA 3A. Letters requesting consultation were sent to both the Miccosukee and Seminole Chairmen on April 11, 2016 (See **Appendix C**).

Initial comments from staff members of the Miccosukee Tribe included concern for the preservation of access to tribal lease and camp locations during plug maintenance and the request to monitor culturally sensitive areas to ensure continued access. Mr. James Erskine, the Acting Water Resources Director of the Miccosukee Tribe, requested that coordination between the Tribe, SFWMD, and the Corps continue to ensure that tribal activities would not be hindered during the deviation. Both Mr. Erskine and Mr. Fred Dayhoff, Section 106 Tribal Representative, expressed support of the deviation to relieve high water levels in WCA 3A. Additionally, Mr. Ron Clark, Chief of Resource Management Division at BCNP, coordinated with staff members of the Miccosukee Tribe and concluded that the deviation should not impact the Tribe; however, water levels should be monitored during the action to address unexpected or undesired outcomes. Pursuant to 36 CRF Part 800.12(b) (Emergency Situations) of the National Historic Preservation Act (NHPA), a letter requesting consultation and a concurrence of the Corp's determination of effects on cultural resources was sent to the Miccosukee Tribal Representative on April 12, 2016. Consultation is ongoing.

In response to the initial coordination of the action with the Seminole Tribe, staff members requested more information regarding the change of operations and the anticipated effects. As

requested, additional information was provided on April 8, 2016. Pursuant to 36 CRF Part 800.12(b) (Emergency Situations) of the NHPA; Part XIV, Deviations of the ERTP Programmatic Agreement (PA); and in accordance with the emergency procedures outlined in the Burial Resources Agreement between the Corps and the Seminole Tribe; the Corps notified the Seminole Tribe of the Federal Action and its determination of effects to cultural resources on April 12, 2016. Consultation is ongoing throughout this process to provide information and ongoing dialog with both tribes.

The Miccosukee and Seminole Tribes rely upon the Everglades in its natural state to support their religious, subsistence, and commercial activities. Portions of both the Seminole Big Cypress Reservation and the Miccosukee Reservation are located within WCA 3A. The continued implementation of the No Action Alternative has the potential for negative impacts to occur on resources utilized by the tribes within WCA 3A where high water levels and prolonged inundation periods are expected to continue. Implementation of the Action Alternatives would act to reduce water levels within WCA3A. This reduction of El Niño associated high water levels will help to improve environmental conditions for many of the tree islands, plants, and animals that the Tribes rely on to practice traditional and commercial activities. Additionally, as inundation is not expected as a result of the Action Alternative, other than those typically experienced during seasonal operations, potential effects within BCNP would be minimal.

4.12 CULTURAL RESOURCES

As part of this project, consultation has been initiated and is ongoing between the Corps and the State Historic Preservation Officer (SHPO) and appropriate federally recognized tribes. Informal coordination through phone calls and emails with SHPO staff members, the Seminole Tribal Historic Preservation Office (THPO), and the Miccosukee Tribal Representative were conducted March 23, 2016 for notification purposes and to solicit comments regarding the temporary emergency deviation and the potential effects of flood waters released from WCA 3A. The Seminole THPO requested more information regarding the change of operations and the anticipated effects. As requested, additional information was provided on April 8, 2016.

Pursuant to 36 CRF Part 800.12(b) (Emergency Situations) of the NHPA and Part XIV, Deviations of the Everglades Restoration Transition Plan Programmatic Agreement (PA), the SHPO, Seminole THPO, and all PA signatories were notified of the Federal Action and its determination of effects to cultural resources by email on March 28, 2016. Formal letters and emails requesting a concurrence of the Corp's determination of effects was sent to the SHPO, Seminole THPO, and Miccosukee Tribal Representative on April 12, 2016. The SHPO concurred with the Corps determination of no adverse effect in an email dated April 12, 2016 (**Appendix C**). No comments have been received from the Miccosukee or Seminole staff regarding the determination of effects; however, consultation and coordination are ongoing.

Consultation with BCNP regarding cultural resources was undertaken on April 1, 2016 and resulting in the determination by the Chief of Resource Management Division that the Action Alternative would not impact cultural resources within the Preserve. Consultation was sought with the Bureau of Indian Affairs, the Advisory Council on Historic Preservation (ACHP), and Everglades National Park as signatories of the ERTP PA. Staff members of the Everglades

National Park and the ACHP have confirmed receipt of the information provided by the Corps; however, consultation is ongoing.

Since water levels within the Everglades are below the maximum high elevation that has been experienced when the S-344 culvert is typically open under both the Everglades Restoration Transition Plan and Integrated Operations Plan, cultural resources within the project area have been previously exposed to natural hydrological conditions that may be experienced under this deviation. However, continued increasing high water levels associated with the El Niño weather pattern as observed in the No Action Alternative has the potential for negative impacts on some cultural resources within WCA 3A where high water levels and prolonged inundation periods are expected to continue. Implementation of the Action Alternative would reduce water levels in WCA 3A and help to control flooding at cultural resources locations.

Implementation of the Action Alternative would result in the early discharge of water into BCNP. The result of this discharge would be a maximum of approximately 40,000 acre feet of water over the time frame from April 5 to July 15, 2016. Due to the minimal duration of the discharge (maximum of 100 days) effects of the action would be difficult to establish. The primary impact of the Action Alternative within BCNP will be to lengthen the hydroperiod for the duration of the temporary emergency deviation. As the Action Alternative will not raise the maximum elevation of the water table throughout the system, effects to historic properties listed or eligible for listing in the NRHP are not anticipated. The Chief of Resource Management Division at BCNP has concurred that implementation of the planned operations should not impact cultural resources within BCNP. Additionally, restrictions on water levels and flows for the protection of endangered species will provide additional protection should water levels deviate from predicted amounts. If undesirable flows should occur, the S-344 would be restricted further ensuring the deviations ability to cause any adverse effects to cultural or Tribal resources within the area of potential effect. As no inundation of cultural resources is expected during the temporary emergency deviation of the S-344 operational strategy, other than those typically experienced during seasonal operations, the Corps believes that this will have no adverse effect to historic properties listed or eligible for listing in the NRHP.

4.13 AIR QUALITY

Air quality within the project area would not be expected to change from current conditions under implementation of the No Action Alternative. Alternative B would not result in significant impacts to air quality since no construction activities are being proposed. Increased air emissions (diesel exhaust) is not expected with operation of S-344, as S-344 is a two-barreled, 72 inch diameter corrugated metal culvert, with slide gates.

4.14 HAZARDOUS, TOXIC OR RADIOACTIVE WASTES (HTRW)

Implementation of the No Action Alternative would not alter the HTRW conditions within the project area. Alternative B would not result in the discovery of HTRW since there is no excavation or other construction activities being proposed. The project has a very low risk for increased mobilization of existing HTRW where it might exist within the study area. This is an undeveloped marsh area with very low potential for HTRW discovery.

4.15 NOISE

Noise levels within the project area would not be expected to change from current conditions with implementation of the No Action Alternative. Alternative B would not result in significant impacts to the noise environment since no construction activities are being proposed.

4.16 AESTHETICS

Implementation of the L-29 Canal temporary emergency deviation, estimated a potential decrease in water levels ranging from 0.2 feet up to 0.5 feet within WCA 3A (USACE 2016). Implementation of the No Action Alternative, is expected to continue to alleviate high water levels in WCA 3A by allowing for the full discharge capacity through S-333 into the L-29 Canal.

Alternative B consists of an operational change to the current water control plan and does not include construction of permanent structures or structural modifications to existing C&SF Project features. As such, the existing landscape profile would not be altered. Further reductions in high water levels and decreased periods of prolonged flooding within WCA 3A as a result of Alternative B is expected to provide benefits to vegetation fish and wildlife resources, positively contributing to maintaining a healthy and aesthetically pleasing ecosystem. Additional flow to BCNP as a result of the S-344 temporary emergency deviation will assist in making the Preserve more drought-resistant and less vulnerable to fires.

4.17 RECREATION

High water levels are currently limiting access to recreational opportunities (hunting, fishing, frogging, boating, camping, and off-road vehicle use etc) within the project area. Due to high water conditions and subsequent wildlife concerns, special regulations have been in effect since January 30, 2016, restricting public access within the Everglades and Francis S. Taylor, Holey Land, and Rotenberger Wildlife Management Areas. Implementation of the L-29 Canal temporary emergency deviation, estimated a potential decrease in water levels ranging from 0.2 feet up to 0.5 feet within WCA 3A (USACE 2016). Implementation of the No Action Alternative, is expected to continue to alleviate high water levels in WCA 3A by allowing for the full discharge capacity through S-333 into the L-29 Canal. Alternative B would improve stages in WCA 3A relative to the No Action Alternative; lessening the potential impacts to recreation by further alleviation of high water levels in WCA 3.

4.18 CUMULATIVE EFFECTS

Cumulative effects are defined in 40 CFR 1508.7 as those effects that result from: the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. The following summarizes past, present, and projected Corps efforts that cumulatively affect the regional environment of south Florida (**Table 5**). The general environmental effect of the Federal Action would be beneficial and any downstream impacts would be of short duration.

TABLE 5. PAST, PRESENT, AND REASONABLY FORESEEABLE ACTIONS AND PLANS AFFECTING THE PROJECT AREA

	Past Actions/Authorized Plans	Current Actions and Operating Plans	Reasonably Foreseeable Future Actions and Plans
Status of Non-CERP Projects	- C&SF Project (1948) - ENP Protection and Expansion Act (1989) - MWD GDM and Final EIS (1992) - C-111 South Dade GRR (1994)	- MWD 8.5 SMA GRR (2000) - MWD Tamiami Trail Modifications Limited Reevaluation Report (2008) - MWD 8.5 SMA Interim Operating Criteria EA (2011) and Design Refinement EA (2012) - C&SF C-51 West End Flood Control Project - Kissimmee River Restoration - Seepage Barrier near the L-31 N Levee (Miami-Dade Limestone Products Association)	- Tamiami Trail Modifications Next Steps (TTMNS) Project - SFWMD Restoration Strategies Project - MWD Closeout - C-111 South Dade Project (Contracts 8 and 9)
Operations Plan for Lake Okeechobee, WCA 3A, ENP and the SDCS	- Water Supply and Environment (WSE) Lake Okeechobee Regulation Schedule (2000) - IOP 2002 to Present	- Lake Okeechobee Regulation Schedule (LORS 2008) - SFWMD LEC Regional Water Supply Plan - ERTP October 2012 to 2015 - Increment 1 2015 to present	- LORS 2008 to be replaced by revised Lake Okeechobee Regulation Schedule - SFWMD periodically revises the LEC Regional Water Supply Interim Plan - ERTP to be replaced by COP to be completed to include MWD and C-111 components.
CERP Projects		Congressional Authorization Received: - Biscayne Bay Coastal Wetlands Project - Broward County Water Preserve Areas Project - Caloosahatchee River (C-43) West Basin Storage Reservoir - C-111 Spreader Canal Western Project. Congressional Authorization Received and Construction in Progress: - Indian River Lagoon-South Project - Picayune Strand Restoration Project - Site 1 Impoundment Project	- Future CERP Projects

4.19 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The Preferred Alternative consists of an operational change to the current C&SF Project operations and does not include construction of permanent structures or structural modifications to existing C&SF Project features. The Federal Action would not cause the permanent removal or consumption of any natural resources.

4.20 UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS

Environmental effects for each resource are discussed in **Section 4.0**. Potential adverse environmental effects associated with implementing the Federal Action are expected to be minimal based on the short duration and the generally beneficial nature of the action.

4.21 CONFLICTS AND CONTROVERSY

Over the lifetime of the C&SF Project, considerable interest has been generated among local and regional stakeholders. The Corps continually strives to include all interested parties in its decision making process and will continue to consider all issues that arise. No known conflicts or controversy are known at this time with regard to the S-344 emergency deviation.

4.22 ENVIRONMENTAL COMMITMENTS

The Corps commits to avoiding, minimizing or mitigating for adverse effects. All practicable means to avoid or minimize environmental effects were incorporated into the Federal Action. **Appendix A** outlines conditions that will result in the closing of the S-344 gates. Flow and stage will be monitored to provide representative information on potential flows south towards CSSS-A. The Corps and SFWMD plan to meet regularly with USFWS to communicate concerning operations. The incremental opening of the structure and adaptive approach as outlined in **Appendix A**, will assist in minimizing potential environmental effects resulting from implementation of the Federal Action. Reference **Appendix A** for a description of monitoring to occur.

4.23 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

4.23.1 National Environmental Policy Act of 1969

Environmental information on the project has been compiled in this document. This emergency EA and FONSI has been prepared and is being coordinated for public, state, and Federal agency review. The Emergency NEPA will be amended or supplemented, as applicable, after implementation of the Federal Action to further document the environmental effects of the deviation and/or incorporate potential concerns resulting from the public comment period. The Federal Action is in compliance with the NEPA.

4.23.2 Endangered Species Act of 1973

USFWS was contacted March 24, 2016 for notification of the S-344 deviation and to solicit comments regarding the action. The USFWS indicated support for the effort. Reference **Section 6.2.5**. Further correspondence was received from USFWS on April 8, 2016. The Corps requested written confirmation of federally listed threatened and endangered species that are either known to occur or are likely to occur within the project area from the USFWS by letter dated March 31,

2016. Concurrence was received on April 7, 2016. Informal consultation was initiated on April 12, 2016 with submittal of a Complete Initiation Package. The Federal Action is being fully coordinated under the ESA and will be in full compliance with the Act. The USFWS provided a letter of support for this action dated April 08, 2016.

4.23.3 Fish and Wildlife Coordination Act of 1958, as amended

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

4.23.4 National Historic Preservation Act of 1966

The Federal Action is in compliance with Section 106 of the National Historic Preservation Act, (Public Law 89-665), as amended. As part of the requirements and consultation process contained within the National Historic Preservation Act implementing regulations of 36 CFR 800, this project is also in compliance through ongoing consultation with the Archaeological and Historic Preservation Act (Public Law 93-29), as amended, Archeological Resources Protection Act (Public Law 96-95), American Indian Religious Freedom Act (Public Law 95-341), Native American Graves Protection and Repatriation Act (NAGPRA) (Public Law 101-701), Executive Order 11593, 13007, and 13175, the Presidential Memo of 1994 on Government to Government Relations and appropriate Florida Statutes. Additionally, the Federal Action is in compliance with Part XIV, Deviations of the ERTP PA and consultation with the Seminole Tribe be has been consistent with the emergency procedures discussed within the Burial Resources Agreement between the Corps and the Seminole Tribe. Consultation with the Florida SHPO, appropriate federally recognized tribes, and other interested parties has been initiated and is ongoing.

4.23.5 Clean Water Act of 1972

The Federal Action is in compliance with this Act. The Corps will not proceed with this state proposed action until final FDEP confirmation that this activity is consistent with its Coastal Zone Management Program.

4.23.6 Clean Air Act of 1972

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

4.23.7 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 B**. The FDEP issued an EFO waiving water quality certification for the L-29 temporary emergency deviation. See Appendix B of the February 12, 2016 EA and FONSI. Coastal Zone Consistency concurrence for the L-29 deviation was received from the Department on February 11, 2016. Based on the preliminary information provided to the FDEP, FDEP considers this action to be covered under the EFO addressing high water conditions. However, the FDEP must review the EA to confirm this position. The Corps has determined that the Federal Action is consistent to the maximum extent practicable with the enforceable policies of the

Florida's approved Coastal Zone Management Act Program. However the Corps will not proceed with this state proposed action until FDEP provides final CZMA consistency for this activity.

4.23.8 Farmland Protection Policy Act of 1981

Correspondence with the USDA-NRCS occurred on April, 8, 2016 (**Appendix C**). Significant portions of the project area have not been mapped. Most areas remain in a native plant communities. Conversion of Prime and Unique Farmland as a result of the Federal Action is not anticipated based on the expected change in hydrology and short duration of the temporary emergency deviation.

4.23.9 Wild and Scenic River Act of 1968

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

4.23.10 Marine Mammal Protection Act of 1972

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

4.23.11 Estuary Protection Act of 1968

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

4.23.12 Federal Water Project Recreation Act of 1965, as amended

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

4.23.13 Fishery Conservation and Management Act of 1976

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

4.23.14 Submerged Lands Act of 1953

Significant effects to fish and wildlife resources and vegetative communities within submerged lands of the State of Florida are not expected. No construction is proposed. The Federal Action is in compliance with the Act.

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

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

4.23.16 Resource Conservation and Recovery Act (RCRA), As Amended by the Hazardous and Solid Waste Amendments (HSWA) of 1984, Comprehensive

Environmental Response Compensation and Liability Act (CERCLA), Toxic Substances Control Act (TSCA) of 1976

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

4.23.17 Rivers and Harbors Act of 1899

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

4.23.18 Safe Drinking Water Act of 1974, As Amended

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

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

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

4.23.20 Anadromous Fish Conservation Act

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

4.23.21 Migratory Bird Treaty Act and Migratory Bird Conservation Act

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

4.23.22 Marine Protection, Research and Sanctuaries Act

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

4.23.23 Magnuson-Stevens Fishery Conservation and Management Act

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

4.23.24 E.O. 11990, Protection of Wetlands

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

4.23.25 E.O. 11988, Floodplain Management

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

4.23.26 E.O. 12898, Environmental Justice

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

4.23.27 E.O. 13089, Coral Reef Protection

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

4.23.28 E.O. 13112, Invasive Species

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

4.23.29 E.O. 13045, Protection of Children

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

4.23.30 E.O. 13186, Responsibilities of Federal Agencies to Protect Migratory Birds

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

4.23.31 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 Corps has initiated consultation with the Miccosukee Indian Tribe of Florida and the Seminole Tribe of Florida during the NEPA process for the Federal Action, and consultation is ongoing. The Federal Action is in compliance with the goals of this memorandum.

5.0 LIST OF PREPARERS

TABLE 6. TABLE OF PREPARERS

Name	Organization	Role in EA
Melissa Nasuti	USACE	Biologist
Olice Williams	USACE	Water Manager
Jim Riley	USACE	Water Quality
Meredith Moreno	USACE	Archeologist

6.0 PUBLIC INVOLVEMENT

6.1 SCOPING AND EA

Please refer to **Section 1.7**.

6.2 AGENCY COORDINATION

The Corps is in continuous coordination with other Federal and state agencies, tribal representatives, and members of the general public. The following summarizes comments received on the Federal Action.

6.2.1 BCNP

BCNP was contacted on March 23, 2016 for notification of the S-344 deviation and to solicit comments regarding the action. BCNP is in support of the S-344 deviation and the separate but parallel effort by the SFWMD to re-construct six plugs in the L-28 Canal stating that water released into the Preserve will assist in making the Preserve more drought-resistant and less vulnerable to fires. The S-344 deviation is perceived by BCNP as an incremental step to mitigating the effects of the L-28 Canal on historic sheet flow into the southern basins. BCNP suggested that while implementing the emergency measure, the effects of raising the plugs be conducted to confirm whether and to what degree water flows either over or around the elevated plugs. BCNP also noted that based upon their collaboration with the USFWS, it is their understanding that re-construction of the plugs will help to protect the western CSSS population by reducing the drainage capacity of the L-28 Canal.

6.2.2 Miccosukee Tribe of Indians of Florida

Reference **Section 4.11**.

6.2.3 Seminole Tribe of Florida

Reference **Section 4.11**.

6.2.4 USEPA

USEPA Region 4 was contacted on March 25, 2016 for notification of the S-344 deviation and to solicit comments regarding the action. The USEPA requested that the Corps contact the Office of Federal Activities to notify them that the Corps is conducting emergency NEPA. USEPA headquarters was contacted and notified of the pending action on March 30, 2016. The Corps has determined to conduct a simple EA and to consider the applicability of a FONSI to address the Federal Action. Once the release occurs, a supplemental EA may be generated as appropriate, discussing and disclosing all impacts and affects to the human environment.

6.2.5 USFWS

USFWS was contacted March 24, 2016 for notification of the S-344 deviation and to solicit comments regarding the action. Further correspondence from the USFWS was received on April 8, 2016. USFWS supports the temporary emergency deviation (from ERTP) as long as the opening of the S-344 is done in concert with the reconstruction of the 6 plugs in the L-28 Canal. USFWS realizes that there are some answered questions at this time, but support the overall effort. USFWS biggest concern is for the protection of CSSS-A. The USFWS is working with several agencies, including the SFWMD, BCNP, ENP and the Corps to develop Operational Guidelines. As part of the Operational Guidelines, the USFWS recommends that water level triggers be employed that will be used to inform adjustments to the S-344 operations if unacceptable adverse effects to CSSS are detected. USFWS is fully supportive in moving forward with emergency efforts to reduce the impacts of high water to listed and non-listed species within WCA 3A and recognizes that the S-344 deviation is a step to restoring the natural hydrology within BCNP.

6.2.6 FDEP

The FDEP was coordinated with regarding the Federal Action for the operation of the S-344 on April 7, 2016. The FDEP issued an EFO waiving water quality certification for the high water temporary emergency deviation and considers this action to be covered under that EFO based on the preliminary information provided to the FDEP by the Corps. However FDEP needs to review this EA before providing their final determination that this action is covered by the EFO addressing high water conditions. CZMA consistency concurrence for the L-29 deviation was received from the Department on February 11, 2016. The Corps will not proceed with this state proposed action until FDEP provides confirmation of CZMA consistency for this activity. See Appendix B of the February 12, 2016 EA and FONSI. FDEP is expected to provide confirmation that this action is covered by CZMA after review of the Final EA.

6.2.7 SFWMD

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

6.2.8 State of Florida-State Historic Preservation Officer

Reference **Section 4.12**.

6.2.9 FDACS

The FDACS was coordinated with regarding the Federal Action on March 30, 2016. The representative stated that agricultural lands are not anticipated to be impacted by the Federal Action. FDACS does not object to the proposal at this time.

6.3 LIST OF RECIPIENTS

A notice of availability for this document was mailed to Federal and state agencies, tribal representatives and members of the general public. A complete mailing list is available upon request. The document was also posted to the internet at the following address for a 30 day review period:

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

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INDEX

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