CANAL 111 (C-111) BASIN
SOUTH DADE COUNTY, FLORIDA

ENVIRONMENTAL ASSESSMENT AND PROPOSED FINDING OF NO SIGNIFICANT IMPACT

MODIFICATIONS TO THE C-111 SOUTH DADE NORTH AND SOUTH DETENTION AREAS AND ASSOCIATED FEATURES

US Army Corps of Engineers
Jacksonville District

January 2016

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PROPOSED FINDING OF NO SIGNIFICANT IMPACT

Modifications to the C-111 North and South Detention Areas and Associated Features Environmental Assessment
Miami Dade County, Florida

Based on the information analyzed and presented in the Environmental Assessment (EA) attached hereto, dated January 2016, reflecting pertinent information obtained from agencies having jurisdiction by law and/or special expertise, I conclude that the proposed action will not significantly impact the quality of the human environment and does not require an Environmental Impact Statement. Reasons for this conclusion are, in summary:

- The project will not adversely affect existing fish and wildlife habitat.

- Adverse impacts to protected species are not anticipated. Special measures will be incorporated during project construction to avoid or minimize adverse effects to any listed endangered, threatened, or species of special concern that may be present (see Environmental Compliance and Commitments in Section 4). Consultation began May 1, 2015 on a list of threatened, endangered and state Special Concern species. No incidental take of protected species is anticipated.

- Coordination with the Florida State Historic Preservation Officer and appropriate federally recognized tribes is ongoing. It is anticipated that the proposed project will cause no adverse effect on any sites of cultural or historic significance and prior to implementation this project will be fully in compliance with the National Historic Preservation Act through finalized consultation.

- The project is in compliance with the Clean Water Act. A Water Quality Certificate for this project will be acquired from Florida Department of Environmental Protection. All State water quality requirements will be followed.

- The U.S. Army Corps of Engineers (Corps) is coordinating a consistency determination under the guidelines of the Coastal Zone Management Act (CZMA) through the circulation of this Environmental Assessment. The Corps has determined that the proposed action is consistent with the State of Florida CZMA programs. The Florida CZMA Evaluation can be referenced in Appendix D of this report.

- The project will benefit wetlands, along with fish and wildlife habitat, in Everglades National Park, including Taylor Slough and Shark River Slough. Wetlands in Northeast Shark River Slough, the Rocky Glades, and the western marl prairies will benefit from the maintenance of a hydraulic ridge just east of the eastern ENP boundary, which should partially restore more natural hydroperiods resulting in a more historic coverage of vegetation.

- This finding is being coordinated with the public and agencies in accordance with 40 CFR 1501.4(e) and Engineer Regulation ER 200-2-2 (part 11 and Appendix A). The

point of contact is Stacie Auvenshine at 904-232-3694 or stacie.j.auvenshine@usace.army.mil.

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In view of the above, and after consideration of public and agency comments received on the project, I have concluded that the proposed action for modifications to the North and South Detention Area and associated features will not result in a significant adverse effect on the human environment. This finding incorporates by reference all discussions and conclusions contained in the Environmental Assessment attached hereto.

_____ _____

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

Date

ENVIRONMENTAL ASSESSMENT
MODIFICATIONS TO THE C-111 SOUTH DADE NORTH AND SOUTH DETENTION AREAS AND ASSOCIATED FEATURES
MIAMI DADE COUNTY, FLORIDA

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ENVIRONMENTAL ASSESSMENT FOR MODIFICATIONS TO THE C-111 SOUTH DADE CANAL NORTH AND SOUTH DETENTION AREAS AND ASSOCIATED FEATURES MIAMI DADE COUNTY, FLORIDA

1 PROJECT PURPOSE AND NEED

1.1 PROJECT PURPOSE

The purpose of this project is to create a hydrologic connection between the 8.5 Square Mile Area (8.5 SMA) Detention Cell and the C-111 South Dade North Detention Area (NDA) and to create a continuous hydrologic ridge along the eastern boundary of Everglades National Park (ENP) that extends from the 8.5 SMA to Taylor Slough, to provide restoration within ENP while maintaining flood damage reduction for areas east of the L-31N and C-111 Canals.

This Environmental Assessment (EA) is to update National Environmental Policy Act (NEPA) documentation of construction for the C-111 Canal, South Miami-Dade County, Florida; part of the Central and Southern Florida (C&SF) Project. Initial NEPA documentation was provided in the Final Integrated General Reevaluation Report (GRR) and Environmental Impact Statement (EIS) dated 1994 (hereinafter referred to as the 1994 GRR), and further documented in the Interim Operating Plan for Protection of the Cape Sable Seaside Sparrow (IOP) Final supplemental Environmental Impact Statement (FSEIS 2006, ROD 2007) and the EA/FONSI for Expansion of the C-111 South Dade North Detention Area (NDA) and Associated Features, 2012 (herein referred to as the 2012 NDA EA). The 2012 NDA EA recommended refinements to the original 1994 GRR/EIS design and evaluated options for a hydrologic connection between the 8.5 SMA Detention Cell, authorized and built under the authority of the Modified Water Deliveries to Everglades National Park Project (USACE, 8.5 SMA GRR, 2000) and the C-111 South Dade Project's NDA. The expansion of the NDA has already undergone NEPA analysis (Expansion of the C-111 Detention Area and Associated Features EA/FONSI 2012 (2012 NDA EA)). The Modified Water Deliveries Project (MWD) requires future connection of the 8.5 SMA Detention Cell to the C-111 South Dade system, which was described in the 8.5 SMA GRR (USACE, 2000) and further discussed in the 2012 NDA EA/FONSI titled "Design Refinement for the 8.5 Square Mile Area." The Alternatives analysis in this EA will discuss the effects of construction options to connect the 8.5 SMA Detention Cell to the C-111 South Dade NDA and the evolution of the hydrologic ridge concept identified in the 1994 GRR.

1.2 PROJECT AUTHORITY

The C-111 South Dade Project was built as part of the Everglades National Park–South Dade Conveyance Canals Project authorized by the Flood Control Act (FCA) of 1968 (Public Law (PL) 90-483). This Act authorized modifications to the existing Central and Southern Florida (C&SF) Project as previously authorized by the FCAs of 1948 (PL 80-858) and 1962 (PL 87-874). The original purpose of the C-111 Canal project was to reduce or mitigate flooding in the agricultural drainage basin immediately east of ENP, to provide agricultural and other water supply, and to favor habitat restoration in the Park. Further modifications to the C-111

as described in the 1994 GRR were authorized as part of the C&SF Project in the Water Resources Development Act (WRDA) of 1996 (PL 104-303). The 1994 GRR/EIS added a major additional purpose of restoration of the ecosystem of Taylor Slough and eastern ENP, largely in response to the addition of nearly 200,000 acres of former agricultural lands and wetlands to the eastern side of ENP, and recognition that this area was over-drained. The 1989 Everglades National Park Protection and Expansion Act (PL 101-229) authorized acquisition of the nearly 100,000 acres of ENP from approximately the location of the L-67 Extension Levee/Canal eastward to the current ENP boundary. By the early 1990s it was recognized that it was no longer desirable to drain lands directly adjacent to ENP. Rather, it was desirable to maintain their wetland character, while maintaining flood damage reduction on adjacent agricultural and residential lands in the eastern basin. The 1994 GRR described a conceptual plan for five pump stations and a levee-bounded water retention/detention area (currently referred to as the C-111 South Detention Area, or SDA) to be built west of the L-31N East Coast Protective Levee and the adjacent L-31N Borrow Canal, extending between the current C-111 South Detention Area and the S-332D Detention Area to its south. Water storage within these water retention areas would generate a localized "mound" or "hydrologic ridge" of water and thereby reduce seepage out of ENP, with the inflow pump stations operated to maintain target L-31N Canal stages to maintain the pre-project flood protection to agricultural lands east of the L-31N Canal. The then-proposed configuration of these structural features is described in detail in the 1994 GRR. Modifications to increase pump station capacity and detain additional water were built as described in the 2006 IOP Final Supplemental EIS (Alternative 7R). The plan as proposed in the 1994 GRR included infrastructure to enable direct discharge westward from the retention/detention area to ENP through a series of culverts and an emergency discharge weir. The IOP included operation of expanded detention areas located north (215-acre Partial NDA), east (200-acre Partial Connector) and south (800-acre S-332D Detention Area) of the 1994 GRR SDA (approximately 1300 acres, with operations retained under IOP), with recognition that the full detention area build-out would be completed in phases.

1.3 PROJECT LOCATION

The project is located in southern Miami-Dade County in southeastern Florida (Figure 1-1), and adjoins ENP, located to its west. It is situated within the C-111 basin, consisting of both natural wetlands and agricultural and residential lands in the Homestead/Florida City area.

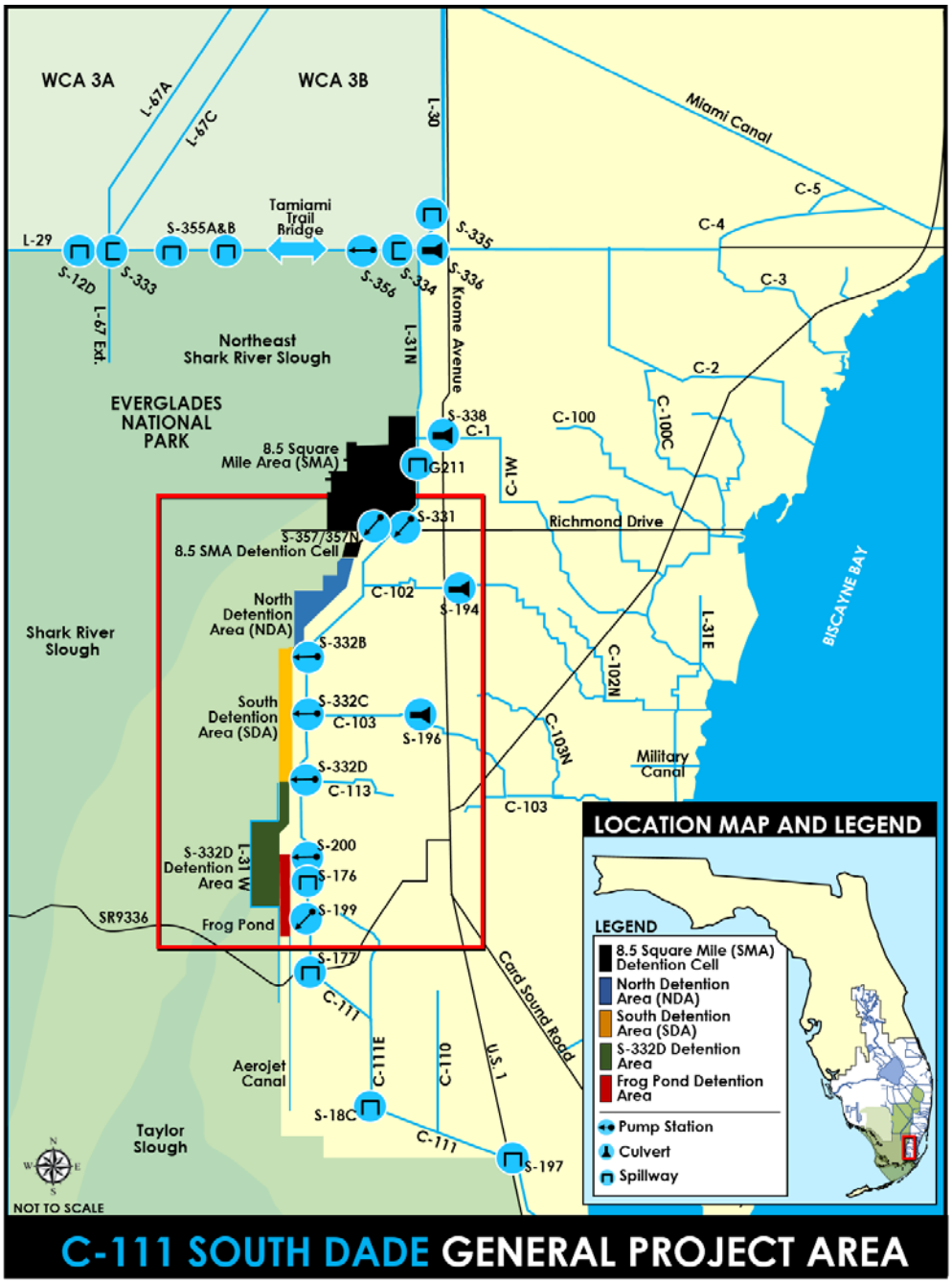

Figure 1-1. Project Location Map

1.4 HISTORY OF THE PROJECT SINCE THE 1994 GRR/EIS

The U.S. Army Corps of Engineers (Corps) completed the 1994 GRR/EIS as a result of continued project design and reformulation efforts to reconcile the desires of the non-Federal sponsor and private stakeholders, including farmers, with the legislative directive from the Everglades National Park Protection and Expansion Act of 1989 to "take all measures which are feasible and consistent with the purposes of the (C-111) project to protect natural values associated with the Everglades National Park". The 1994 GRR/EIS project features are described in the 1994 GRR/EIS and located at the following website:

http://www.saj.usace.army.mil/Portals/44/docs/Planning/EnvironmentalBranch/EnvironmentalDocs/C-111_FinalGRRandEIS_MainText_May1994.pdf.

Congress authorized the changes proposed in the 1994 GRR under Section 316 of the Water Resources Development Act (WRDA) of 1996. Construction on the project began in 1997. A series of project features were built prior to 2015 under a total of seven construction contracts. C-111 South Dade construction Contract 8, which will complete the North Detention Area south of the 8.5 Square Mile Area (SMA) and its detention cell, is underway as this document circulates.

When the C-111 1994 GRR was approved and authorized, regional C&SF water management operations followed an Experimental Program of Water Deliveries to Everglades National Park, an iterative operational testing program initiated in 1985 to test alternative plans for delivering water to ENP. In February 1999, the U.S. Fish and Wildlife Service (USFWS) determined that continued operations under Test 7, Phase 1 of the Experimental Program were likely to cause "jeopardy" to the endangered Cape Sable seaside sparrow (CSSS). The USFWS issued a Final Biological Opinion (BO) under provisions of the Endangered Species Act (ESA) that presented a Reasonable and Prudent Alternative (RPA) to avoid jeopardizing the CSSS during the interim period leading up to the completion of the MWD Project. The USFWS RPA recommended that certain hydrologic conditions be maintained in the sparrow breeding habitat, including breeding populations near the eastern side of ENP, to avoid jeopardizing the continued existence of the species.

The Corps of Engineers and the South Florida Water Management District (SFWMD) entered into agreements under the BO with USFWS to proceed with construction of the C-111 South Dade project detention areas and change operations in the C-111 South Dade Project Area. The first new plan was the Interim Structural and Operational Plan (ISOP) (USACE 2000). The ISOP was designed to meet the conditions of the USFWS RPA included in the USFWS BO beginning in March 2000 until implementation of the Interim Operational Plan (IOP) for the Protection of the CSSS in 2002. The Record of Decision (ROD) for the IOP EIS was signed in July 2002, and IOP was implemented to continue USFWS RPA protective measures for the CSSS. Components within IOP included a 215 acre North Detention Area (S-332B NDA). The Miccosukee Tribe filed a lawsuit regarding National Environmental Policy Act (NEPA) compliance and other matters related to IOP. An order issued in March 2006 by the U.S. District Court for the Southeastern District of Florida, Miami Division, required the Corps to issue a supplement to its 2002 IOP Final EIS. In response, the USFWS prepared a new BO in November 2006, and this BO was incorporated into the December 2006 Final Supplemental EIS (FSEIS) for IOP for the Protection of the CSSS. A ROD for the December 2006 FEIS was signed in May of 2007. The BO has been revised several times, most recently in 2010 (with an addendum dated 2012) with the development of the Everglades Restoration Transition Plan (ERTP).

ERTP is a modification of the IOP to provide more flexible operations of Water Conservation Area (WCA) 3A and regular collaborative interagency meetings. ERTP was developed as an Operational Plan for the constructed features of MWD and C-111 South Dade projects until those projects are fully completed, resulting in a gradual increase in water deliveries into ENP

across Tamiami Trail. The 2010-2012 BO concluded that operations, if all USFWS requirements were followed, would not result in jeopardy to the endangered species in the operational area. This BO was scheduled to expire in January 2016, but USFWS recently granted an extension until April 2016. Active consultation among the USFWS, Army Corps of Engineers, and ENP is underway, and the Corps has submitted a new Biological Assessment under ERTP. ERTP incorporated operational flexibility and adaptive management to better manage WCA 3A for the benefit of multiple species, including the endangered snail kite and threatened wood stork. Construction after 1999 has been structural modifications undertaken to improve habitat conservation and endangered species protection in ENP in compliance with the cited Biological Opinions, and to allow integration of the MWD Project with the C-111 South Dade Project.

ERTP will be the operating plan until another operating plan is authorized, likely to be called a Combined Operational Plan (COP) because it will cover operations to combine the completed features of both the MWD and C-111 South Dade projects. A new operating plan will develop alternatives based on new information developed under temporary planned deviations to the ERTP in the MWD Increment 1 field test and the future MWD Increment 2 field test. This EA assumes that ERTP is the current approved operating plan and addresses only construction features. The evaluation within this EA considers the fact that the future could contain planned incremental development of the COP, including planned future construction and including interim operations under the Increment 1 field test that was recently initiated in October 2015.

The 1994 GRR planned for twenty–four (24) 36-inch diameter culverts with risers to convey water from the retention/detention area westward through the L-31W tieback levee (currently the western levee of the SDA) towards ENP, and one emergency overflow weir 300 feet in length. The NDA and SDA emergency overflow weirs included in the No Action Alternative will direct the potential discharges from the NDA and/or SDA away from ENP, due to potential concerns raised during prior evaluation and design of these features related to the quality of water that may discharge into ENP. Stakeholder concerns have more recently been identified regarding the potential effects from water retention within the NDA and SDA that may reduce the effectiveness of the S-332B, S-332C, and S-332D pump stations to maintain and/or lower L-31N Canal stages to provide flood protection to the adjacent agricultural areas to the east.

The MWD Increment 1 field test, which was initiated in October 2015, includes a robust hydrologic monitoring plan that will aid in quantifying both long-term and intra-annual/seasonal effects of increased stages within NESRS on the urban and agricultural areas east of ENP in Miami-Dade County. The 2015 MWD Increment 1 EA recognized that under certain hydrologic and operational conditions during the field test, increased risk to flood protection for South Dade areas may result from a combination of the following water management factors during the field test: increased seepage to the L-31N Canal south of S-331 prior to completion of C-111 South Dade NDA; increased discharges from S-331 for 8.5 SMA flood damage reduction (potentially offset by reduced S-331 discharges with limited WCA 3A regulatory releases to the South Dade Conveyance System); and/or operation of the downstream S-332D pump station and/or the C-111 South Dade SDA to manage L-31N Canal stages during periods of increased inflows. The SFWMD also initiated a 6-month evaluation and modeling study in September 2015 to provide additional information regarding the current

flood protection challenges and potential short- and long-term solutions. Information from these studies, along with ongoing SFWMD monitoring and analysis of the C-111 Spreader Canal Project operations, will need to be further analyzed to determine whether western outlets from the NDA and/or SDA are needed to meet the objective of the C-111 South Dade project to maintain the pre-project levels of flood protection within the C-111 Basin. Further detailed analysis of recent water quality data will also be conducted, along with detailed assessment of potential environmental effects of additional surface water discharges from the NDA and/or SDA to ENP.

New discharge structures from the NDA and/or SDA to ENP are not included in the action alternatives considered in this EA, pending collection of additional monitoring data and further evaluations, but it may be appropriate to reconsider these proposed GRR features at some time in the future. Additional analysis will be conducted prior to and during the development of the MWD Increment 2 field test, for which interagency coordination is anticipated to initiate in late 2016. Further evaluation of western discharges from the NDA and SDA will be included as part of the future C-111 South Dade NEPA documents and the development of a new operational plan.

1.5 CURRENT RELATED STUDIES

1.5.1 Combined Operating Plan

The operations of the C-111 South Dade Project features are integrally linked with the MWD Project to provide benefits to Everglades National Park. The 1994 GRR identified a need for a refined operation plan to be developed in coordination with ENP, FWS, SFWMD and other agencies prior to project construction. The future Combined Operating Plan (COP) study will result in a comprehensive integrated water control plan for the operation of the water management infrastructure associated with the MWD and C-111 South Dade Projects. The performance of the C-111SD project features, with respect to both project objectives and constraints, is dependent on the outcome of the COP, including details of the operational plans and operational constraints within WCA 3A, ENP, and the 8.5 SMA. Interagency coordination efforts to develop the next regional operations plan were re-initiated in June 2014 with the start of the scoping process for the MWD Increment 1 field test and are further described in the associated EA/FONSI (signed in May 2015) called the G-3273 Constraint Relaxation/S-356 Field Test and S-357N Operational Strategy. More information on the MWD Increment 1 field test can be found on the Corps website under Dade County (http://www.saj.usace.army.mil/Portals/44/docs/Planning/EnvironmentalBranch/EnvironmentalDocs/G-3273relax_EA_FinalFONSImay2015.pdf) or on www.evergladesrestoration.gov under Modified Water Deliveries (http://nps.maps.arcgis.com/apps/MapJournal/index.html?appid=d20284a2ff50461e9ad440dce640aeb1).

The MWD Increment 1 field test is the first increment in a series of three related, sequential efforts that will result in a comprehensive integrated water control plan (COP) for the operation of the water management infrastructure associated with the MWD and C-111 South Dade Projects fully integrated with the C&SF Project. The incremental approach to the development of COP will 1) allow interim benefits towards restoration of the natural systems, 2) reduce uncertainty of operating the components of the MWD and C-111 South Dade Projects, and 3)

provide information to complete COP efficiently. The increments include conducting field tests for ultimately updating the WCAs-ENP-SDCS Water Control Plan.

1.5.2 Modified Water Deliveries to Everglades National Park

The MWD purpose is to improve water deliveries into ENP and, to the extent practicable, restore the natural hydrological conditions within ENP. MWD includes modifications to the C&SF Project to provide a system of water deliveries to ENP across the full width of the historic Shark River Slough (SRS) flowway and originally consisted of four main components: (1) conveyance and seepage control features to facilitate flow through the system from WCA 3A to WCA 3B and to limit seepage eastward from WCA 3B and ENP; (2) modifications to Tamiami Trail to facilitate flow under the road to SRS; (3) flood damage reduction for the developed East Everglades area (also referred to as the 8.5 SMA); and (4) project implementation support, which includes monitoring and operational changes.

Much of the MWD Project has been completed, including the 8.5 SMA Project (as described in the 2000 GRR and Final Supplemental EIS for the 8.5 SMA), construction of S-355A and B, S-333 and S-334 modifications, S-356, Tigertail camp raising, removal of four miles of the L-67 Extension Levee, and Tamiami Trail modifications. A design refinement for the 8.5 SMA was identified in an EA completed in August of 2012, based on results from the 2009 operational test which indicated that the S-357 pump station and other 8.5 SMA features may not adequately mitigate flooding in the southwest corner of the 8.5 SMA. To ensure utilization of the S-357 pump station at maximum design capacity following completion of the NDA, new hydrologic modeling identified an additional east-west seepage collection canal (C-358) was needed to properly mitigate groundwater stages in the southwest corner (east of L-357W). A gated control structure (S-357N), currently planned to be constructed by November 2016, will connect the completed C-358 seepage collection canal to the existing C-357 Canal, upstream of S-357.

In coordination with the Department of the Interior (DOI) and SFWMD, the Corps, both Jacksonville District and South Atlantic Division, have determined that the previously constructed MWD features and the MWD features currently under construction (C-358 and S-357N), along with the acquisition of remaining real estate interests and completion of a project Water Control Plan, will achieve the statutory charge to improve water deliveries into the ENP and, to the extent practicable, to restore the natural hydrological conditions within the ENP.

1.5.3 Comprehensive Everglades Restoration Plan

The Comprehensive Everglades Restoration Plan (CERP) provides a framework and guide to restore, protect, and preserve the water resources of central and southern Florida, including the Everglades, and was authorized under WRDA 2000. It covers 16 counties over an 18,000-square-mile area and centers on an update of the C&SF Project. The goal of CERP is to restore the Everglades by capturing fresh water that currently flows unused to the ocean and the gulf and redirect it to areas that need it the most. The majority of the water will be devoted to environmental restoration, reviving a degenerating ecosystem. The remaining water will benefit cities and farmers. It includes more than 60 elements, will take more than 30 years to construct and will cost an estimated $10.4 billion (2015 Price Levels). There are several

elements in CERP that are inter-related with some of the features of the C-111 South Dade Project.

The closest element involves the CERP C-111 Spreader Canal Western Project, documented in a Project Implementation Report (PIR) dated 2011 and authorized under the 2014 Water Resources Reform and Development Act (WRRDA 2014). Components of the project include construction of a six-mile hydraulic ridge between Taylor Slough and the C-111 Canal to reduce seepage loss from Taylor Slough and its headwaters. Implementation of the project is expected to improve the quantity, timing, and distribution of water delivered to Florida Bay via Taylor Slough; improve hydroperiods and hydropatterns in south Florida; and return coastal salinities to historical recorded conditions though the redistribution of fresh water that is currently discharged to the Atlantic Ocean and Gulf of Mexico. The hydraulic ridge will be created by constructing a 590 acre above ground detention area in the Frog Pond area (south of S-332D) and by installing two 225 cubic feet per second (cfs) pump stations (S-199 and S-200), and integrating other C-111 Spreader Canal Western Project features. The SFWMD has implemented features of the C-111 Spreader Canal Western Project, and the project features have been operated by the SFWMD since June 2012. See http://141.232.10.32/pm/projects/proj_29_c111.aspx for more information on the CERP C-111 Spreader Canal.

1.5.4 Central Everglades Planning Project (CEPP)

Another CERP project, the Central Everglades Planning Project, called "CEPP" is a long term plan that may ultimately provide additional water to ENP, but has yet to be authorized by Congress. The ROD for CEPP was signed on August 31, 2015.

1.5.5 Everglades Restoration Transition Plan

The purpose of ERTP is to establish water management operating criteria for the C&SF project features, the currently constructed features of the Modified Water Deliveries and C-111 South Dade projects until the expiration of the ERTP Biological Opinion in 2016 or until another operating plan is approved. This is discussed in Section 1.4.

1.6 PROJECT NEED

The C-111 South Dade project seeks to improve current undesirable resource conditions in Taylor Slough, the eastern panhandle of ENP, Manatee Bay, and Barnes Sound, while maintaining the level of flood damage reduction within the C-111 basin as authorized in the 1996 Water Resources Development Act. The features discussed in this EA include construction modifications that would be necessary to allow future operations (Increment 2 of the MWD field test) to proceed with raising the maximum operating limit of the L-29 Canal, with the expectation of restoring water levels and freshwater flows to ENP while providing flood damage reduction.

The purpose of this EA is to evaluate the environmental effects of proposed construction and/or modifications to the features associated with the C-111 South Dade project in accordance with the C-111 South Dade project purposes, as modified from the 1994 GRR for C-111 South Dade.

1.7 PROJECT GOAL AND OBJECTIVE

The goal of this project is to provide a permanent connection for flow from the 8.5 SMA Detention Cell to the C-111 South Dade NDA and construct internal flowways through the 8.5 SMA Detention Cell, the NDA, and the SDA to create a hydraulic ridge to enhance restoration throughout ENP and provide flood damage reduction.

The C-111 South Dade project is designed to maintain the 40 percent standard project flood level of flood protection for areas east of L-31N and C-111 and to restore natural hydrologic conditions west of L-31W and throughout ENP. This objective remains the same as the 1994 GRR/EIS:

> *"The purpose of this General Reevaluation Report (GRR) is restoration of the Ecosystem in Taylor Slough and the eastern panhandle of ENP that were affected by construction of the flood control project in the C-111 basin. The study also focuses on preserving the current level of flood protection for the agricultural activities in the C111 basin…..to provide restoration of the ecological integrity of Taylor Slough and the eastern panhandle of the ENP and flood protection for the agricultural interests adjacent to the C-111."*

1.8 RELATED ENVIRONMENTAL DOCUMENTS

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

- *General Design Memorandum and Environmental Impact Statement, Modified Water Deliveries to Everglades National Park*, U.S. Army Corps of Engineers, Jacksonville District, June 1992
- *C-111, Central and Southern Florida Project for Flood Control and Other Purposes, Final General Reevaluation Report and Environmental Impact Statement*, U.S. Army Corps of Engineers, Jacksonville District 1994
- *1998 Emergency Deviation from Test 7 of the Environmental Program of Water Deliveries to Everglades National Park to Protect the Cape Sable Seaside Sparrow, Central and Southern Florida Project for Flood Control and Other Purposes, Final Environmental Assessment*, U.S. Army Corps of Engineers, Jacksonville District, 1999
- *Jeopardy and Adverse Modification Biological Opinion on the Modified Water Delivery to Everglades National Park Experimental Program to Everglades National Park and Canal-111 South Dade Projects*, U.S. Fish and Wildlife Service, Vero Beach, Florida 1999
- *General Reevaluation Report and Final Supplemental Environmental Impact Statement, 8.5 Square Mile Area*, U.S. Army Corps of Engineers, Jacksonville District, July 2000
- *Central and Southern Florida Project for Flood Control and Other Purposes, Interim Structural and Operational Plan, Emergency Deviation from Test 7 of the Experimental Program of Water Deliveries to Everglades National Park for Protection of the Cape Sable Seaside Sparrow Final Environmental Assessment*, U.S. Army Corps of Engineers, Jacksonville District, 2000
- *Interim Operating Plan for the Protection of the Cape Sable Seaside Sparrow Final Supplemental Environmental Impact Statement*, U.S. Army Corps of Engineers, Jacksonville District, 2002

- *Biological Opinion, Final Interim Operating Plan,* U.S. Fish and Wildlife Service, Vero Beach, Florida, November 17, 2006
- *Interim Operational Plan for the Protection of the Cape Sable Seaside Sparrow Final Supplemental Environmental Impact Statement,* U.S. Army Corps of Engineers, Jacksonville District, December 2006
- *C-111 Engineering Documentation Report,* U.S. Army Corps of Engineers, Jacksonville District, May 2007
- *Draft Environmental Assessment; Design Modifications for the Canal 111 Project,* U.S. Army Corps of Engineers, Jacksonville District, June 2007
- *Modified Water Deliveries to Everglades National Park Tamiami Trail Modifications Final Limited Reevaluation Report and Environmental Assessment,* U.S. Army Corps of Engineers, Jacksonville District, June 2008
- *Draft Environmental Assessment; Proposed Interim Operating Criteria for 8.5 Square Mile Area Project,* U.S. Army Corps of Engineers, Jacksonville District, November 2008
- *Revised Draft Environmental Assessment; Proposed Interim Operating Criteria for 8.5 Square Mile Area Project,* U.S. Army Corps of Engineers, Jacksonville District, April 2009
- *Canal-111 Spreader Canal Project Implementation Report,* U.S. Army Corps of Engineers, Jacksonville District, 2009
- *Biological Opinion, Canal-111 Spreader Canal,* U.S. Fish and Wildlife Service, Vero Beach, Florida, August 25, 2009
- *Biological Opinion, Everglades Restoration Transition Plan,* U.S. Fish and Wildlife Service, Vero Beach, Florida, November 17, 2010
- *Central and Southern Florida Project Comprehensive Everglades Restoration Plan C-111 Spreader Canal Western Project Final Integrated Project Implementation Report and Environmental Impact Statement,* U.S. Army Corps of Engineers, Jacksonville District, January 2011
- *Environmental Assessment; Proposed Interim Operation Criteria for 8.5 Square Mile Area Project,* U.S. Army Corps of Engineers, Jacksonville District, June 2011
- *Environmental Assessment; Design Refinement for the 8.5 Square Mile Area,* U.S. Army Corps of Engineers, Jacksonville District, August 2012
- *Environmental Assessment for Expansion of C-111 Detention Area and Associated Features South Miami-Dade County,* U.S. Army Corps of Engineers, Jacksonville District, May 2012
- *Everglades Restoration Transition Plan Final Environmental Impact Statement,* U.S. Army Corps of Engineers, Jacksonville District, October 19, 2012
- *G-3273 Constraint Relaxation/S-356 Field Test and S-357N Operational Strategy,* U.S. Army Corps of Engineers, May 27, 2015. This is referred to throughout this EA as the MWD Increment 1 field test.

1.9 DECISION TO BE MADE

This EA will discuss environmental effects of the proposed alternatives on the affected environment through an evaluation of the alternatives with recognition of the dual purposes of the C-111 South Dade Project, flood damage reduction and ENP habitat improvement. The determination of the Preferred Alternative for the modifications of the north and south detention areas and associated features is the primary decision that must be made.

2. DESCRIPTION OF ALTERNATIVES

2.1 ALTERNATIVE 1 – NO ACTION ALTERNATIVE

Evaluation of the No Action Alternative, also known as the future without project condition, is a requirement of NEPA. The No Action Alternative includes all built features of the C-111 South Dade project, including features of the 2006 IOP FEIS, and C-111 South Dade features currently being constructed as discussed in the 2012 NDA EA (Figure 2.1-1), with the exception of the NDA/SDA internal flowway berms. The recommended height and position of the flowway berms within the NDA and SDA changed in response to stakeholder concerns, new information, and further hydrologic analysis, and these features will be reassessed as part of the proposed action alternatives. The No Action Alternative would provide operators the continued ability to maintain target canal stages within the L-31N Canal, which would maintain current levels of service for flood damage reduction. However, as discussed in the 2012 NDA EA, flows from the 8.5 SMA flood mitigation pump station (S-357) would be constrained to prevent outflows from the 8.5 SMA Detention Cell (across the S-360E and S-360W weirs) into the NDA. The Richmond Drive crossing for the 8.5 SMA western levee (L-357) would not be constructed, leaving a gap through which North East Shark River Slough (NESRS) surface water flows may affect privately-owned property within the 8.5 SMA. No additional construction actions would be pursued under this alternative.

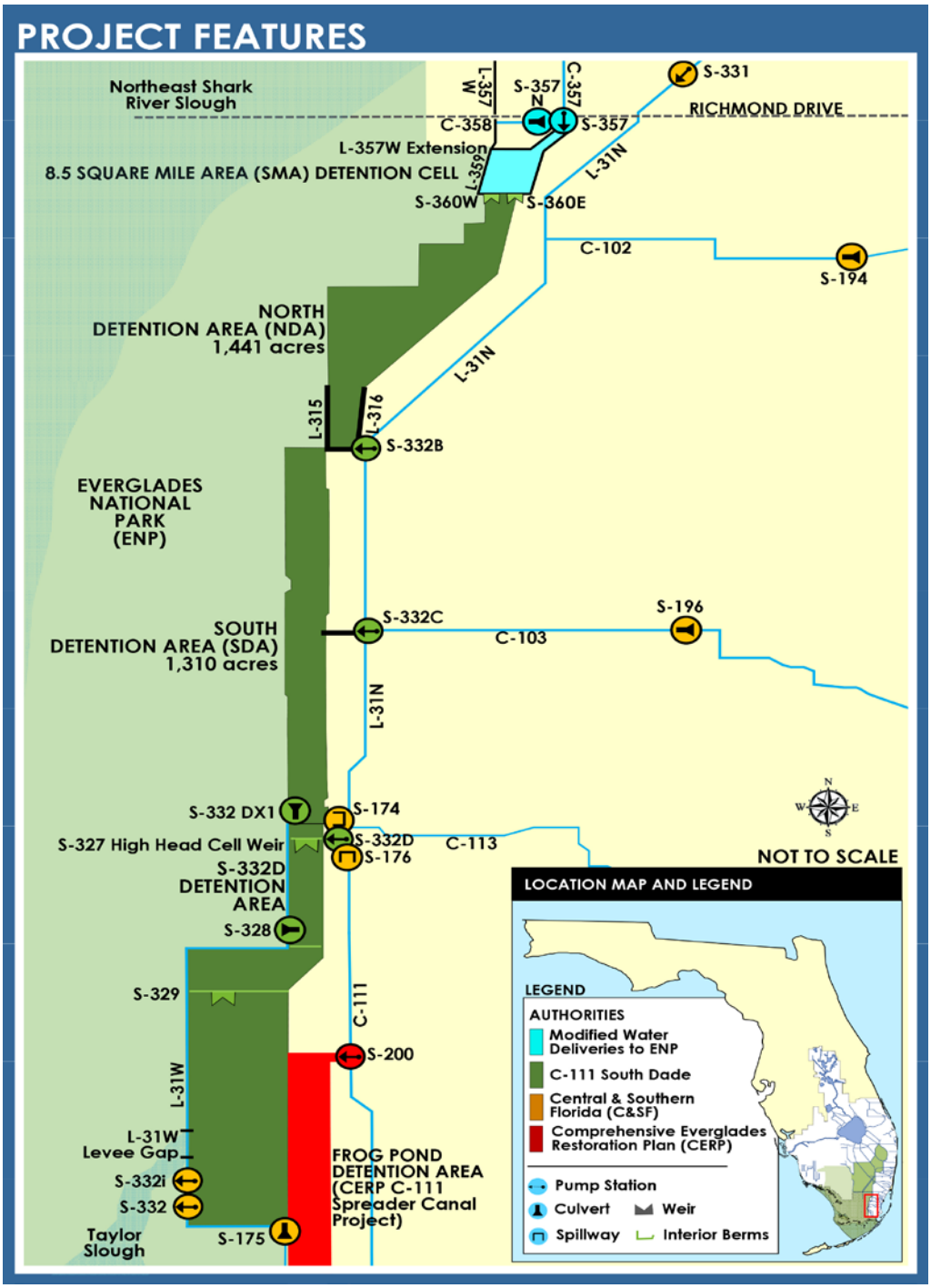

Figure 2.1-1. No Action Alternative

2.2 ALTERNATIVE 2 - COMPLETE MWD-C111 SD PROJECT CONNECTION

In order to provide flexibility for future operations and complete experimental testing under MWD Increment 1, Alternative 2 proposes to connect the MWD and C-111 South Dade projects, as discussed in several MWD NEPA documents. Completion of the hydraulic connection between the two projects is now urgent in order to realize the anticipated hydrologic benefits to ENP from the MWD Project, as Increment 2 of the MWD field test could begin as

early as 2017, bringing increased water stages within NESRS and larger volumes of water into the 8.5 SMA Detention Cell from the S-357 flood mitigation operations.

Alternative 2 involves the consideration of optimizing connections between the 8.5 SMA Detention Cell and the NDA by connecting through the S-360W by removing the structure to ground elevation, providing a direct connection to the western side of the NDA that is closer in proximity to ENP and farther distanced from the agricultural areas east of the L-31N Canal. Alternative 2 includes removing the S-360W weir. An internal flowway in the 8.5 SMA Detention Cell is also included in this alternative to provide a restricted pathway for flows into and through the 8.5 SMA Detention Cell.

The 8.5 SMA Detention Cell ends at its southern boundary with two emergency overflow weir weirs, S-360W (western weir) and S-360E (eastern weir), set at control elevations approximately 4.0 feet and 3.5 feet above grade, respectively; existing operational constraints ensure no potential for discharge across these weirs during normal project operations. Internal flowway berms within the 8.5 SMA Detention Cell would be constructed at approximately 2.5 feet above existing ground elevation to facilitate transfer of S-357 discharges into the western portion of the NDA (final berm elevations will be determined during detailed design). The Detention Cell berms would increase the capability for S-357 discharges to maintain the hydraulic ridge within the NDA storage footprint, reduce the area needed to maintain a continuous hydraulic ridge within the Detention Cell, and reduce potential backwater effects on the southwest corner of the 8.5 SMA from water collecting in the northwest corner of the Detention Cell. This Alternative would provide a hydraulic connection between the 8.5 SMA Detention Cell (built under Mod Waters authorities) and the C-111 South Dade NDA. A hydraulic design analysis was conducted to determine the optimal discharge configuration (flowway berm options) for the connection between the 8.5 SMA Detention Cell and the NDA; for further details, refer to Section 2.2.2.

Several changes to the current MWD 8.5 SMA configuration, including an east/west oriented seepage collection ditch south of Richmond Drive (C-358), changes to some endangered species populations (CSSS immediately west of 8.5 SMA), and agencies' desire to avoid direct discharge of water retained within the NDA and SDA onto adjacent ENP lands, have all led to recommended modifications in this Alternative to the configurations of the detention areas, including enlargement of retention acreage, increased detention depths, and changes to the locations for discharge from the detention areas (if needed during extreme rainfall events). Additional knowledge and experience of the collaborating agencies have required major modifications and improvements to the C-111 South Dade project area south of the 8.5 SMA.

2.2.1 RICHMOND DRIVE ROAD RAMP

Current construction activity will establish the extension of the L-357 Levee from the 8.5 SMA Detention Cell to the southern limits of Richmond Drive, but will not complete the Richmond Drive Levee crossing. Richmond Drive (SW 168th Street) is a Miami-Dade County Road that provides access into ENP west of the 8.5 SMA. The 8.5 SMA western levee (L-357) would be extended south from Richmond Drive to connect with the 8.5 SMA Detention Cell and the adjoining Detention Cell western perimeter levee would connect to L-315 (the western levee

bounding the NDA). Richmond Drive constitutes a lower elevation gap in the flood mitigation system for the 8.5 SMA as long as the road and the adjacent drainage swales extend west into ENP. Therefore, Alternative 2 includes completion of the remaining levee segment to cross Richmond drive, including construction of a ramp over the new levee segment to maintain western access to ENP. Access would be controlled by a gate and lock at the ramp (Fig.8). A turn-around will be constructed to ensure that westbound traffic on Richmond Drive can safely reverse course due to the proposed access restrictions from Richmond Drive into ENP. The Richmond Drive levee crossing alignment is shifted west of the L-357 and L-357W Levee alignment to avoid relocation of the existing drainage culvert under Richmond Drive and to avoid impacts to the existing LPG-1 groundwater monitoring gauge location to the north of Richmond Drive, between SW 213th Avenue and the L-357 Levee alignment. Figure 2.2.1-1 illustrates extension of the L-357W Levee to connect the existing L-357 Levee to the L-357W Levee Extension currently being constructed under the C-111 South Dade project, ramping of Richmond Drive over the levee, and the turn-around. In the design below, North is to the Right. In December 2015, Miami-Dade County has confirmed that a permit would not be required for the proposed road modification (See Appendix D Pertinent Correspondence).

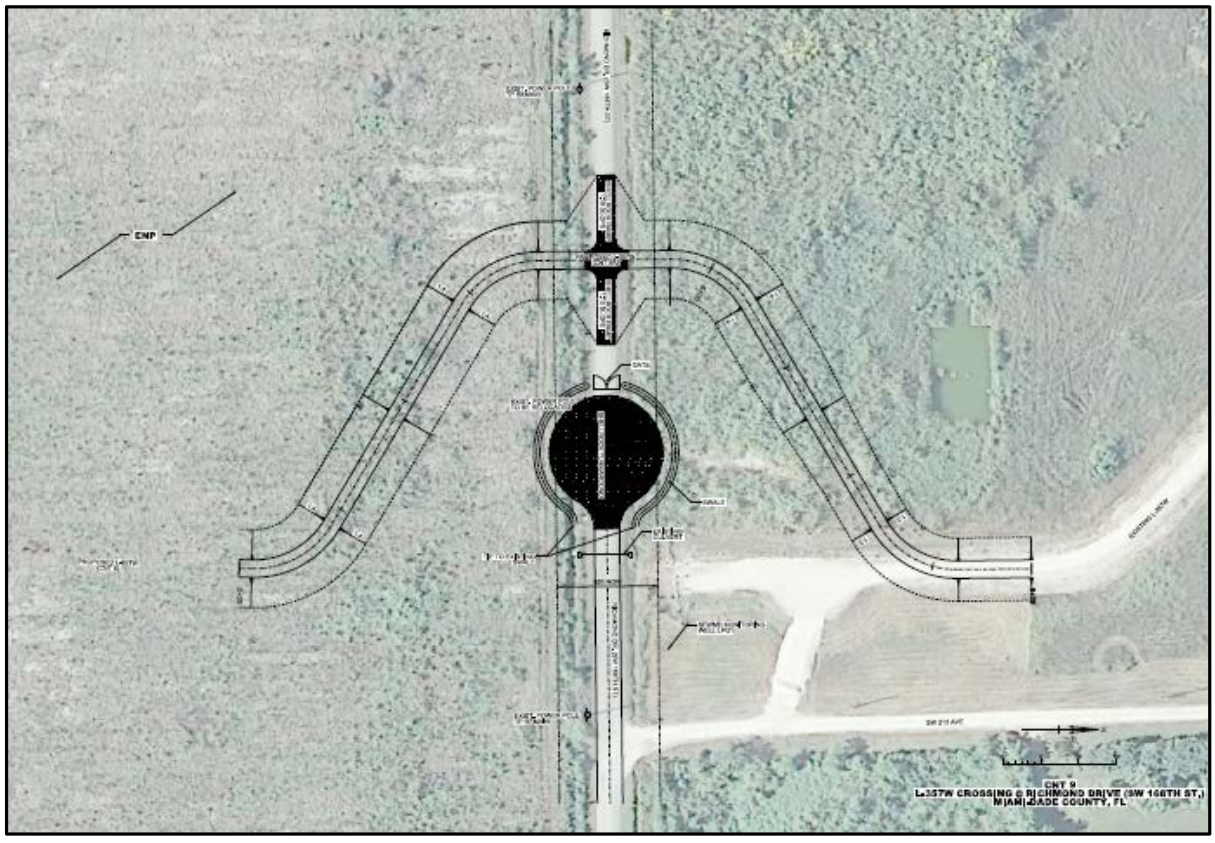

Figure 2.2.1-1. Richmond Drive Road Ramp

2.2.2 8.5 SMA Detention Cell design optimization

A hydraulic design analysis of weir operations was conducted to determine the optimal number of internal berms within the 8.5 SMA Detention Cell and the optimal berm options and heights for Alternative 2. This analysis indicated that only one of the weirs needed to be lowered in

order to provide flows into the NDA flowway. Based on the proximity to ENP and increased distance from the agricultural areas east of the L-31N Canal, Alternative 2 includes lowering the western S-360W weir. The weirs at S-360 (Figure 2.1-1) were built under the MWD 8.5 SMA project to block outflow from the 8.5 SMA Detention Cell until the NDA was built.

Hydraulic design options for the need for and alignment and height of the 8.5 SMA flowway berms were analyzed with the Hydrologic Engineering Center's Riverine Analysis System (HEC-RAS) model. The HEC-RAS model domain included the 8.5 SMA Detention Cell and the NDA, where design options were analyzed across a representative range of hydrologic conditions, including 2-year (normal) and 100 year (extreme) return period rainfall events and concurrent pump station inflows from S-357 and S-332B. Seepage was estimated using groundwater interflow tool in RAS, and the model was calibrated for conductivity using observed historical conditions during wet season S-357 maximum pumping events from August 2012 and September 2014. The berms in the 8.5 SMA Detention Cell were analyzed assuming the NDA western flowway berm was in place, providing tailwater conditions at the S-360W weir location. It was assumed that S-360W would be lowered to ground elevation.

With a hydraulic connection to the NDA, expected water levels within the 8.5 SMA Detention Cell would be reduced and the S-357 pump station would be able to operate up to the design capacity of 575 cubic feet per second (cfs) to provide flood mitigation for the 8.5 SMA.

Under the conceptual design for Alternative 2, flowway berms from the 8.5 SMA Detention Cell to the NDA could provide a direct path to deliver water from the 8.5 SMA to the NDA, assuring adequate drainage of the southwestern corner of 8.5 SMA, that is currently pooling too much water. Options evaluated within the 8.5 SMA Detention Cell included the following:

- No internal flowway, allowing water to non-uniformly spread across the 8.5 SMA Detention Cell, and degrade of the S-360W western weir (degrade of the S-360E eastern weir was initially screened out since the S-360W weir degrade provides conveyance for the full design inflow rate from S-357 and discharges into the western flowway within the NDA)
- One eastern internal flowway berm to confine S-357 inflows within the northwest portion of the 8.5 SMA Detention Cell and to reduce seepage losses from the 8.5 SMA Detention Cell to the L-31N Canal
- Two internal flowway berms, to provide an efficient hydraulic conveyance route between the S-357 pump station and the NDA connection at the degrade location for S-360W

The 8.5 SMA Detention Cell options were evaluated against the following design objectives: (1) increase the capability for S-357 discharges to maintain the hydraulic ridge in conjunction with the C-111 NDA; (2) reduce the area footprint needed to maintain a continuous hydraulic ridge within the Detention Cell; and (3) reduce potential backwater effects on the southwest corner of the 8.5 SMA from water collecting in the northwest corner of the detention cell. This configuration also provides a continuous hydraulic ridge within the 8.5 SMA Detention Cell while reducing potential backwater effects on the southwest corner of the 8.5 SMA.

Features included in Alternative 2 (Figure 2.2-1)**:**

- Degrade S-360W weir, discharge into NDA,
- 8.5 SMA Detention Cell internal flowway berms
- Richmond Drive Levee Crossing

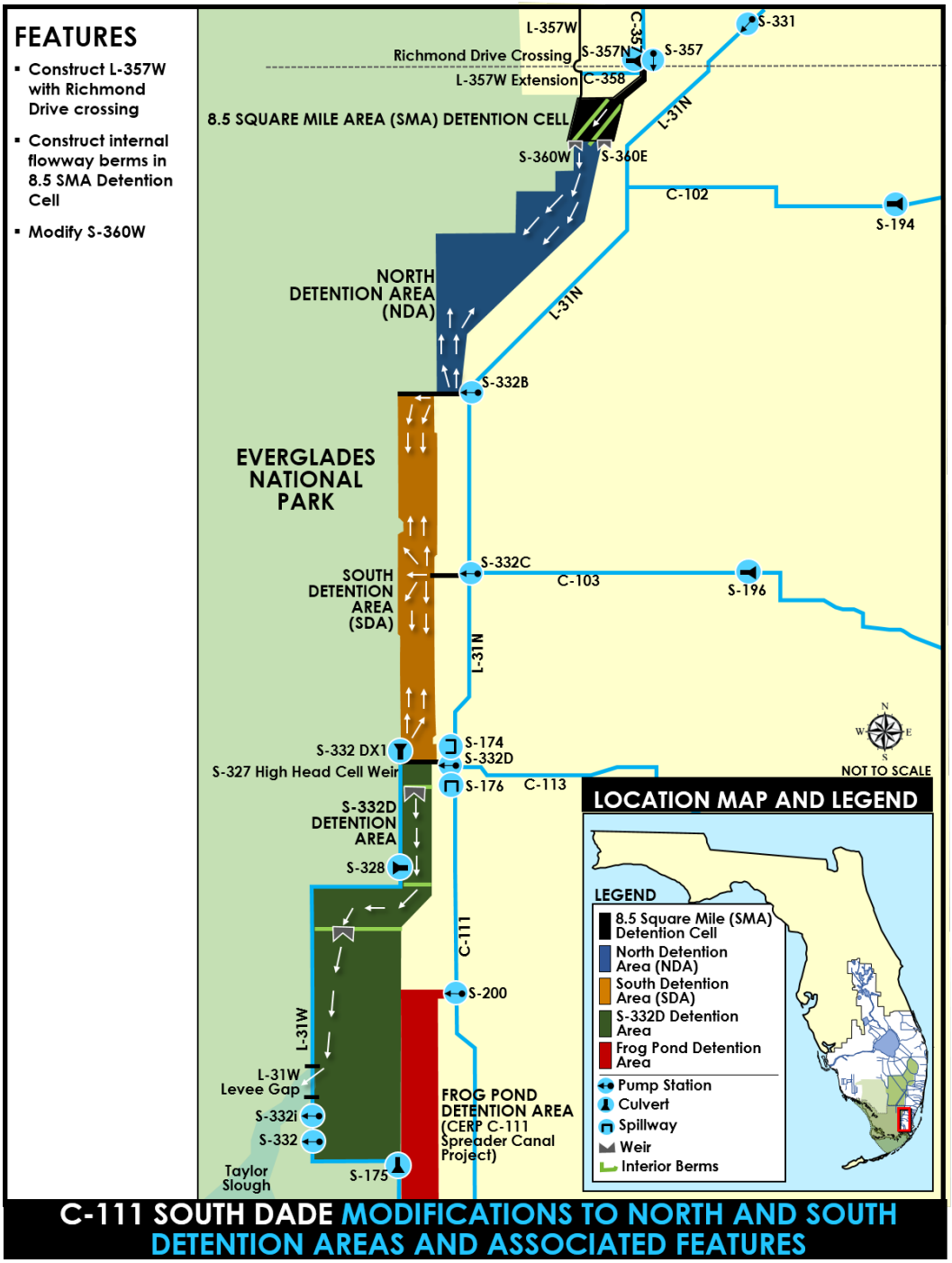

Figure 2.2-2. Features included in Alternative 2

2.3 ALTERNATIVE 3 – FLOWWAY BERMS IN NDA AND SDA

This Alternative includes the following features from Alternative 2:

- Degrade S-360W weir, discharge into NDA
- 8.5 SMA Detention Cell internal flowway berms
- Richmond Drive Levee Crossing

In addition to the features in Alternative 2, Alternative 3 includes internal flowway berms in the NDA and SDA. Alternative alignments considered for the NDA and SDA internal flowway berms include the recommended location in the 2012 C-111 NDA EA (500-foot wide internal flowway berm closely following the eastern levees of NDA and SDA) and alignments along the western levees of the NDA and SDA.

The internal flowway berms within the NDA and SDA are needed to allow the completed C-111 South Dade project to maintain a continuous hydraulic ridge to inhibit seepage loss from ENP during periods of limited water availability. The 2012 NDA EA initially proposed construction of the internal flowway berms along the eastern side of the detention areas to coincide with the existing S-332B and S-332C pump station inflow locations and to minimize potential water quality effects on the adjacent ENP vegetation. Subsequent stakeholder coordination efforts conducted as part of the FDEP permitting process for the NDA construction identified a preferred alignment of the NDA and SDA internal flowway berms along the western side of the detention areas, and this alignment is included in Alternative 3. The western flowway alignments are expected to be more effective than eastern flowway berms to minimize seepage losses from ENP since they would be located closer to ENP. The western flowway control depth would be 2 feet and would provide approximately 600 acres of water storage in the NDA and 430 acres in the SDA; the NDA and SDA western flowways would receive initial inflows from S-357, S-332B, and S-332C. The detention area west of the flowway berm area will have a longer hydroperiod than the eastern portion of the detention areas, resulting in a reduction of seepage eastward towards the C-111 basin (which is closer to the agricultural areas) compared to the previously considered eastern alignment of the internal flowways in the 2012 NDA EA. This alternative also includes the construction of additional internal berms which delineate inflow corridors from the S-332B and S-332C pump stations to convey NDA and SDA inflows to the western flowways. The proposed internal berm alignments for Alternative 3 are shown in Figure 2.3-1.

A hydrologic analysis was conducted to determine the optimal alignment for the proposed internal berms within the NDA and SDA, and to determine the optimal berm height the berms proposed with Alternative 3. The general methodology and results from this analysis are further detailed in Section 2.3.1.

The internal flowway berms would have an approximate height of 2.5-3.0 feet above the average ground elevation within the respective western flowway areas (final berm elevations will be determined during detailed design), with overflow weirs constructed along these berms to enable utilization of the eastern storage footprints within the NDA and SDA when the 2.0 foot control depth is exceeded (inflows exceed the level required to maintain the continuous hydraulic ridge). The internal berm crest elevations are established to maintain a minimum of

0.5 feet difference between the design water surface profile across the weirs and the berm crest elevation. The proposed flowway berm weir locations, which are shown in Figure 2.3-1, would be located away from inflow locations to promote use of the complete flowway area footprint for hydraulic ridge effectiveness; the single weir overflow location in the NDA (3000 feet length) would be located in the northwest to maximize distance to the L-31N Canal, and the three overflow locations in the SDA (each with 800 feet length) would be distributed to balance north-to-south flow distribution within the eastern SDA footprint and to avoid impacts to tree islands. The berms along the inflow corridors from the S-332B and S-332C pump stations would have an approximate height of 3.5 to 4.5 feet above the average ground elevation within the respective inflow corridor (final berm elevations will be determined during detailed design), to accommodate the higher water surface profile projected immediately downstream of the pump station inflow locations.

2.3.1 NDA and SDA flowway design optimization

Internal flowways of various sizes were evaluated for their ability to address the following hydrologic design considerations:

- Seepage/infiltration rates for the NDA and SDA estimated within the range of 0.60 to 1.25 cfs per acre, with variability most directly affected by proximal groundwater table elevations and adjacent L-31N Canal stages (based on hydrologic water budget analysis conducted for the currently constructed partial NDA impoundment of 215 acres, using data for the 2012 and 2013 wet seasons);
- Limited flowway area provides insufficient area for infiltration and may overtop the berm control weirs too frequently, thereby sending water closer to the agricultural areas to the east of L-31N;
- Expanded flowway area will experience less frequent weir overtopping but may limit the effectiveness of the hydraulic ridge to reduce seepage losses from ENP, since the ridge will not be routinely continuous from north to south;
- SDA flowway includes remnant tree islands that will need to be avoided during construction of the flowway berm;
- Minimize impacts to SDA re-established wetland areas;
- Recognition of the high degree of uncertainty regarding NDA future inflows from S-357 with COP, since water levels within the 8.5 SMA will be directly affected by the timing and duration of water levels within NESRS;
- Compared to historical water management operations under IOP and ERTP, anticipate reduced inflows to SDA/NDA from S-332B and S-332C in COP based on increased water deliveries to ENP NESRS.

For the NDA, options considered for the western flowway ranged from 300 acres (equivalent to the eastern flowway acreage originally proposed in the 2012 NDA EA) to 820 acres. All NDA western flowway options would receive inflows from S-357 and S-332B. For the SDA, options considered for the western flowway ranged from 300 acres (equivalent to the eastern flowway acreage originally proposed in the 2012 NDA EA) to 570 acres. All SDA western flowway options would receive inflows from S-332B, S-332C, and the S-332DX1 gated culvert at the southern boundary of the SDA impoundment. These NDA and SDA flowway

options were evaluated to find the flowway size and alignment that would most effectively inhibit seepage loss from ENP during periods of limited water availability and minimize the potential for adverse hydrologic effects in agricultural fields east of the C-111 buffer lands, while also avoiding wildlife habitat and cultural resources. Shifting the internal flowway to the western perimeter of the NDA and SDA impoundments provides a hydraulic ridge immediately adjacent to ENP and minimizes any potential impact on agricultural interests located to the east of the L-31N and C-111 Canals.

For all potential flowway alignments, a control depth would need to be established to determine when the additional eastern storage areas within the NDA and SDA would receive inflows. Although initial consideration was given to a control depth of 1.5 feet within the NDA and SDA western flowways, a control depth of 2.0 feet is recommended to maintain consistency with the normal operating range within the partial NDA and SDA under IOP and the current ERTP, while also reducing the frequency of inundation for the eastern portions of the NDA and SDA impoundments that are closer to the adjacent agricultural areas.

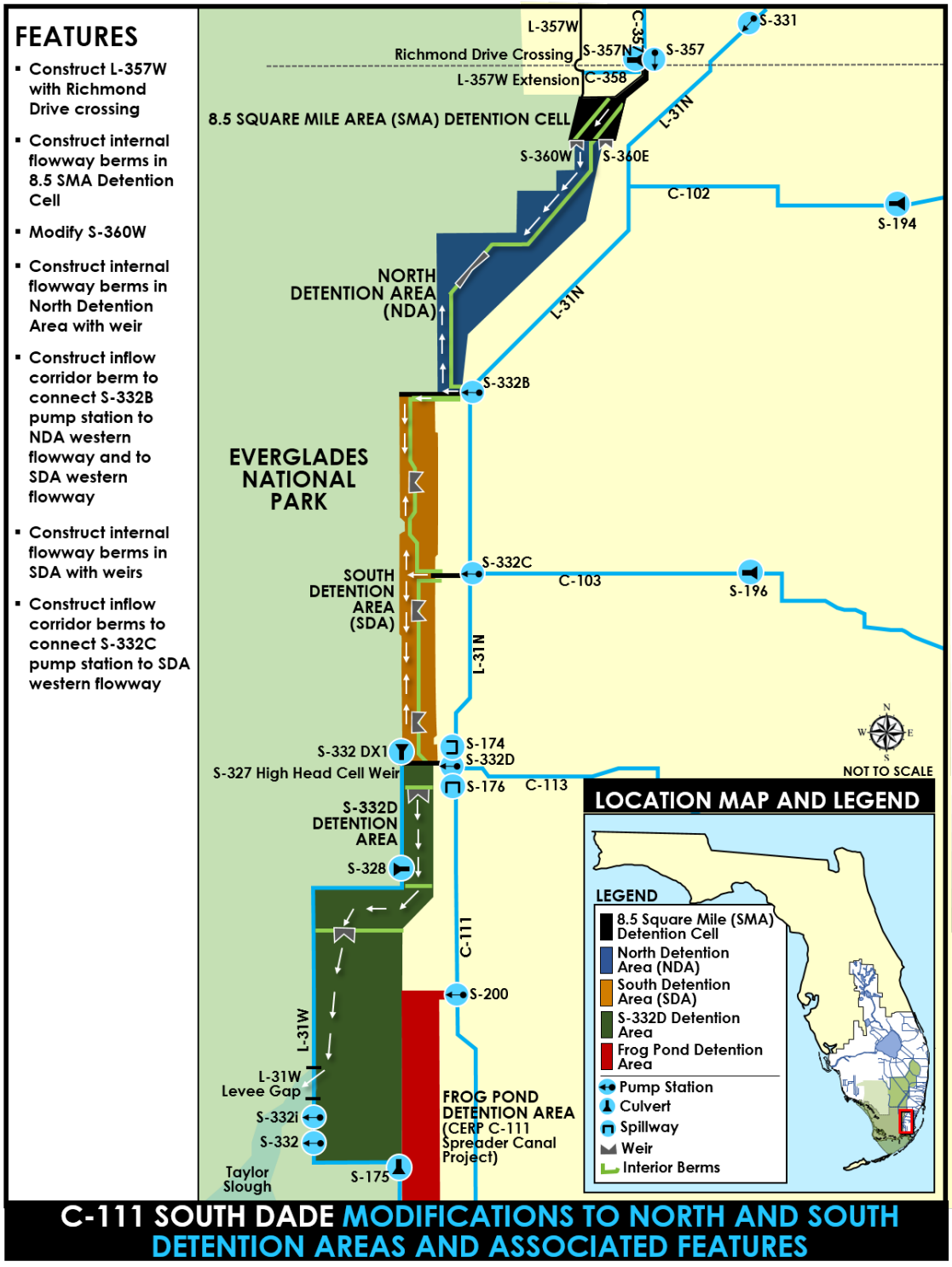

Figure 2.3-3. Features included in the Alternative 3

2.4 ALTERNATIVE 4 – LOWER S-327 WEIR

This Alternative includes the following features from Alternative 3:

- Degrade S-360W weir, discharge into NDA
- 8.5 SMA Detention Cell internal flowway berms
- Richmond Drive Levee Crossing
- NDA internal berm and 600-acre western flowway
- SDA internal berm and 430-acre western flowway
- NDA internal berm to convey S-332B inflows to western flowway
- SDA internal berms to convey S-332B and S-332C inflows to western flowway

In addition to the features retained from Alternative 3, Alternative 4 proposes to remove approximately 250 feet of the S-327 weir by degrading it to the existing limerock surface. The High Head Cell has proven less effective than expected. Lowering this weir will increase system control and flexibility, allowing for greater flow volume into the S-332D Detention Area. Return seepage from the High Head Cell to the L-31N and C-111 Canals would also be reduced by lowering the stage gradient between the High Head Cell and the adjacent canals. The berm at the southern end of Cell 1 of the S-332D Detention Area (approximate height of 1.5 feet; adjacent to S-328 on Figure 2.4-1) will enable maintenance of sufficient depths within the High Head Cell area to allow use of S-332DX1 when conditions warrant.

S-327 is a 1900-foot long discharge weir located along the southern levee of the S-332D Detention Area High Head Cell, opposite S-332D. When water depths in the High Head Cell reach approximately 2.5 feet, water overflows the S-327 weir and moves into Cell 1 of the S-332D Detention Area towards Taylor Slough.

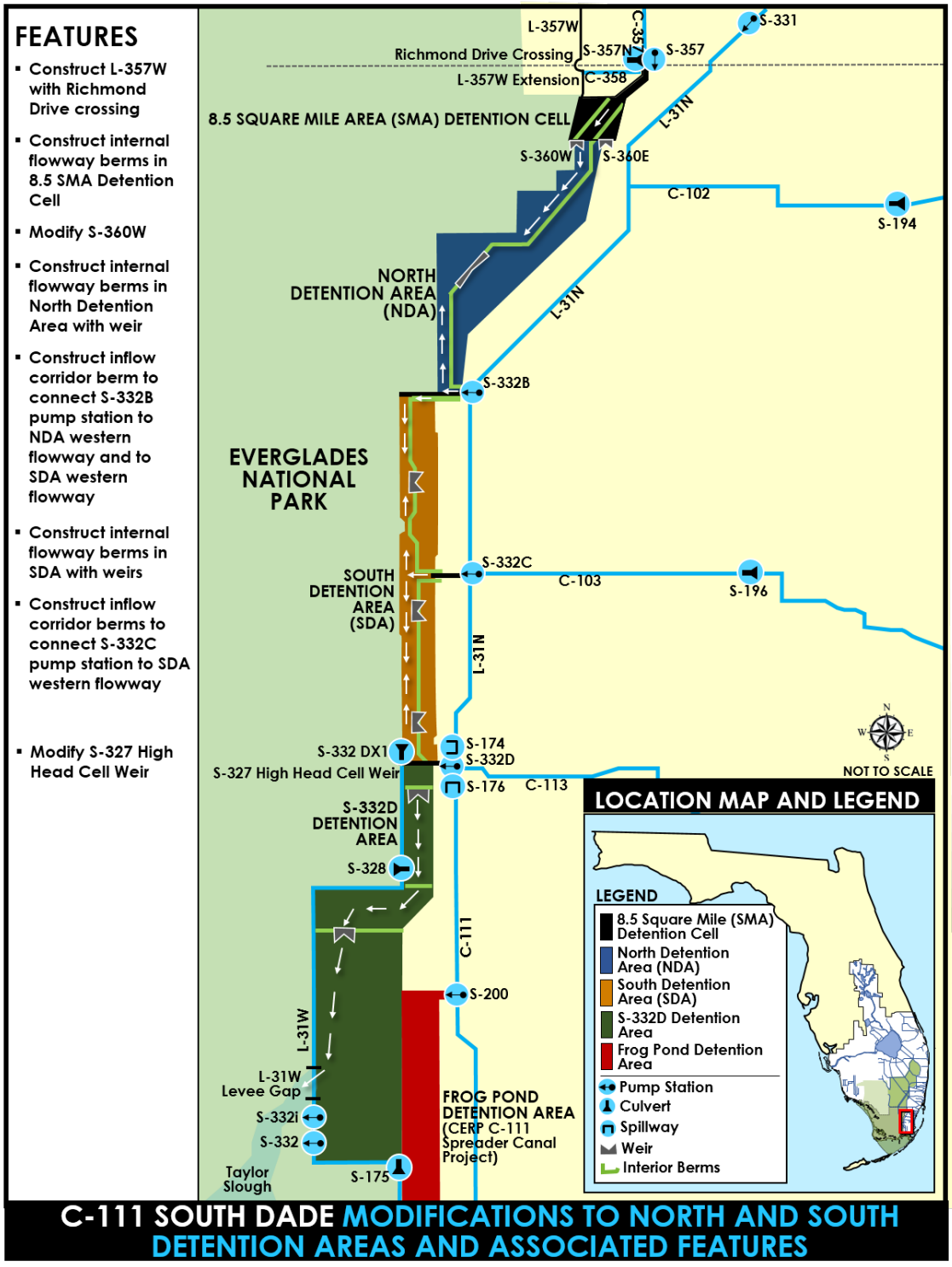

Figure 2.4-4. Alternative 4

2.5 ALTERNATIVE 5 – DEMOLISH/DECOMMISSION STRUCTURES

This Alternative includes the following features from Alternative 4 and is the Preferred Alternative:

- Degrade S-360W weir, discharge into NDA
- 8.5 SMA Detention Cell internal flowway berms
- Richmond Drive Levee Crossing
- NDA internal berm and 600-acre western flowway
- SDA internal berm and 430-acre western flowway
- NDA internal berm to convey S-332B inflows to western flowway
- SDA internal berms to convey S-332B and S-332C inflows to western flowway
- Partial degrade of S-327 High Head Cell weir

In addition to the features retained from Alternative 4, Alternative 5 includes demolition and/or decommission of water control structures S-174, S-175, S-332, and S-332I. The structures S-174, S-175, S-332, and S-332I are not currently functioning and are not required for current or future water management operations for the C-111 South Dade project. Decommissioning the structures would involve leaving the structures in place ensuring they would be rendered inoperable. Demolishing them would entail breaking up the concrete and removing the structures completely with heavy machinery. Removal of S-332 and S-332I may also remove obstacles to water flow if the access road to these pump stations is removed as part of the future C-111 South Dade project plugging and/or backfill of the L-31W Canal, as discussed in the 1994 GRR. Locations of these structures are shown in Figure 2.5-1.

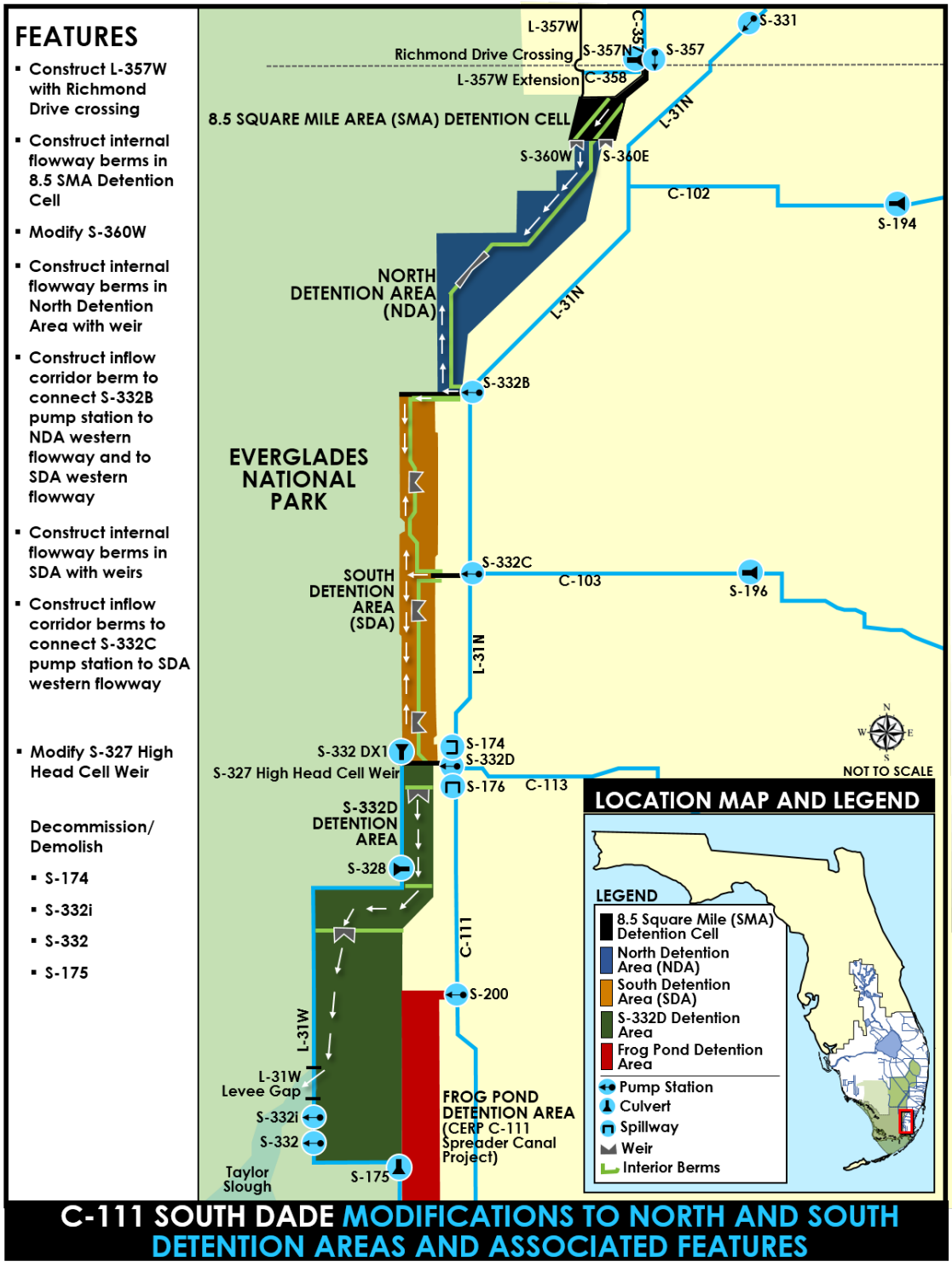

Figure 2.5-5. Alternative 5 – Preferred Alternative

2.6 ISSUES AND BASIS FOR CHOICE

The Recommended Plan is Alternative 5. Primary issues related to alternative evaluation included continuing to provide flood protection for agricultural interests as authorized, providing the required connection between the MWD Project (8.5 SMA) and the C-111 South Dade Project, optimizing design position and dimensions of the flowways, ensuring a high frequency of time that the flowway-created continuous hydraulic ridge could be operated to reduce seepage out of ENP and improve ENP hydroperiods, and avoidance of adverse effects on tree islands, native fauna, endangered species and their critical habitat, and significant wetlands. The recommended alignment of the flowways in the NDA and SDA was based on limiting instances of overflow into the eastern portion of the detention areas and limiting the frequency of drying-out of the hydraulic ridge during dry periods.

Decommissioning/demolishing features that are not currently operational would provide better aesthetics, while also potentially removing impediments to flow by removing the structures. Through project construction and operations, lessons learned reveal that the S-327 High Head Cell weir does not function as intended. It increases seepage losses to the north and east, but does not fully achieve the intent of overland surface water flows throughout the S-332D flowway. Restoration within ENP and flood damage reduction would benefit by lowering this weir. The features identified with Alternative 5 are all needed in order for the project to function to its full potential. The incremental components included in Alternatives 2 through 5 each provide a small piece of the overall restoration and flood damage reduction performance envisioned for the C-111 South Dade project to south Florida.

2.7 DESCRIPTION OF THE PREFERRED ALTERNATIVE

As discussed in the above sections, the preferred (recommended) alternative is based on extensive interagency coordination, anticipated environmental benefits and potential adverse effects, and resulted from an incremental approach to development of the alternatives discussed above. It includes recommendations identified under Sections 2.2 through 2.5.

The recommended plan includes the following and is shown in Figure 2.5-1**.**

- Connect MWD and C-111SD Projects through degrading the S-360W weir at the south of the 8.5 SMA detention cell.
- Two internal flowway berms inside the 8.5 SMA detention cell to create a flowway directing flows to the new gap at the previous S-360W weir location.
- Complete L-357 W levee crossing at Richmond Drive, SW 168th Street.
- NDA flowway approximately 600 acres, with a western alignment along the western side of the NDA. Will receive inflow from new levee gap at previous S-360W location and S-332B. The flowway would be connected to the S-332 B Pump Station. The flowway berm would have one, 800 ft. long overflow weir. A bermed inflow corridor would connect the S-332B Pump Station output to the NDA western flowway.
- SDA flowway approximately 430 acres, with a western alignment along the side of the SDA. This would receive flows from Pump Stations S-332B and S-332C through existing pipes and bermed inflow corridors.
- Demolish or decommission nonfunctioning structures S-332, S-332I, S-174 and S-175.

- Lower approximately 250 feet of the existing S-327 weir opposite S-332D to adjacent ground elevation.

3. AFFECTED ENVIRONMENT

The affected environment for the C-111 basin was most recently described in the EA/FONSI for the Contract 8 C-111 South Dade construction (*Environmental Assessment for Expansion of C-111 Detention Area and Associated Features South Miami-Dade County,* U.S. Army Corps of Engineers, Jacksonville District, May 2012. Additional details are contained in the Final SEIS for the IOP (USACE, 2006).

3.1 CURRENT CONSTRUCTION STATUS OF THE C-111 PROJECT

The following is a description of the features that have been constructed on the C-111 project to date. This includes constructed features authorized under the 1994 GRR/EIS and modifications to the project authorized under the Interim Structural and Operational Plan (ISOP) and the Interim Operational Plan (IOP). Collectively, these changes represent the existing C-111 South Dade project conditions (Figure 2.1-1). The S-332D pump station was completed in 1996. During the design phase, the pump station capacity was increased from 300 cubic feet per second to 575 cubic feet per second.

The removal of the C-111 spoil mounds in the southern part of the project was completed in 1996. The spoil mounds were located on the south bank of southern C-111 Canal, and were removed to provide better sheet flow into the panhandle of ENP. The material was relocated and stockpiled north of L-31W and south east of L-329 for future use on another C-111 South Dade Contract. The Taylor Slough Bridge was constructed in 1999 to establish historic sheet flow patterns in Taylor Slough. Interim pump stations S-332B and S-332C were constructed in 2000 and 2003, respectively, under ISOP and IOP, as well as the SDA (Retention/Detention Area) and partial NDA. The C-109 Canal was backfilled as proposed in the 1994 GRR. Under the CERP project C-111 Western Spreader Canal, the C-110 Canal was plugged. C-111 South Dade construction Contract 8 (awarded October, 2015) will complete the construction of the NDA, providing the storage capacity to accept discharges from the 8.5 SMA. Current construction activity will establish the L-357 Extension Levee from the 8.5 SMA Detention Cell to the southern limits of Richmond Drive, but will not complete the Richmond Drive Levee crossing. Current construction activities also will not construct the internal flowway berms in the NDA or the SDA, since the location and design details for these berms were identified to be reassessed as part of this EA.

3.2 CLIMATE

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

Seasonal rainfall patterns in south Florida resemble the wet and dry seasonal 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 percent falls during the wet

season months of May through October. During the wet season, thunderstorms that result from easterly trade winds and land-sea convection patterns occur almost daily. Wet season rainfall follows a bimodal pattern with peaks during May through June and September through October. Tropical storms and hurricanes also provide major contributions to wet season rainfall with a high level of inter-annual variability and low level of predictability. During the dry season (November through April), rainfall is governed by large-scale winter weather fronts that pass through the region approximately weekly. However, due to the variability of climate patterns (La Niña and El Niño), dry periods may occur during the wet season and wet periods may occur during the dry season. High evapotranspiration rates in south Florida roughly equal annual precipitation. Recorded annual rainfall in south Florida has varied from 37 to 106 inches, and inter-annual extremes in rainfall result in frequent years of flood and drought.

3.3 GEOLOGY AND SOILS

Reference the 2006 IOP FEIS for a description of surrounding soils in the area. The hydrology of these former Everglades soils has been impacted by prior agricultural practices (e.g. ditching, rock plowing, etc.) and regional water management. The majority of the NDA could be best described as prior converted cropland no longer in agricultural production. The limestone substrate is close to the surface and extremely porous.

3.4 HYDROLOGY

The major characteristics that influence the movement of water within South Florida are local rainfall, evapotranspiration, canals and water control structures, flat topography, and the highly permeable surficial aquifer. Surface water that is not removed from the land surface by evapotranspiration and seepage to the aquifer is drained to coastal water bodies via sheet flow from wetlands or via project canals, due to lower stages maintained in canals than the adjacent marsh. Natural groundwater flow direction is generally northwest to southeast in the project area, following surface topography. Due to lower stages being maintained in the C&SF South Dade Conveyance System (SDCS) canals, groundwater in the shallow aquifer inside ENP tends to seep out into the L-31 and C-111 Canals, which were enlarged and deepened during construction of the South Dade Conveyance System in the 1960's. The direction of groundwater flow can be altered on a local scale due to influences of rainfall, canal operations, well-field pumping, or other project features, including surface water impoundments. Fluctuations in groundwater levels are seasonal. 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.

Levees and canals constructed under the Central and Southern Florida (C&SF) Project have divided the former Everglades into areas designated for development and areas for fish and wildlife benefits, natural system preservation, and water storage. The C-111 South Dade project is located within south Miami-Dade County (adjacent to ENP) and is operated as part of the SDCS, which was authorized for the purpose of improving the supply and distribution of water to agriculture, ENP, flood control, and for meeting the expanding urban and agricultural water supply needs. Eastern portions of the ENP are influenced by the canals and structures that provide flood control and water supply for agricultural and developed areas. Optimum and design water levels in the project canals are established on the basis of desirable

water control conditions in each area, such as optimum groundwater levels, intake and/or discharge structure elevations and removal rates for flood control. Water discharged from the C-111 basin is comprised of water from some or all of the following sources: deliveries from the Water Conservation Areas (WCAs), seepage from ENP, and local runoff from the South Dade Agricultural Area that is adjacent to L-31N and C-111 Canals. Occasional freshwater discharges from C-111 to the coast are typically due to excessive rainfall, which may negatively impact the salinity in Manatee Bay/Barnes Sound.

3.4.1 LOWER EAST COAST AREA

The LEC area is located to the east of the L-31N, L-31W, and C-111 canals. Under ERTP, specified canal water levels/ranges are meant to provide flood protection, water supply, and prevention of saltwater intrusion for the LEC. The LEC can be provided water supply from WCA 3A and Lake Okeechobee according to their respective regulation schedules. In wet conditions, the excess water from the LEC is discharged to tide.

3.4.2 8.5 SQUARE MILE AREA

The 8.5 SMA is a primarily residential area adjacent to, but west of, the L-31N Canal. The 8.5 SMA, which is also known as the Las Palmas community, is bordered on both the west and north by NESRS. The community has water management infrastructure consisting of a perimeter levee, a seepage collection canal, a pump station (S-357), and a south detention area meant to collectively provide flood damage reduction as part of the MWD Project (USACE 2000). An additional seepage collection canal and gated water control structure (S-357N), which are being constructed along the southern boundary of the 8.5 SMA (along Richmond Drive) as part of the MWD Project, are presently planned for completion in November 2016.

3.4.3 NORTHEAST SHARK RIVER SLOUGH

NESRS is a complex area located in the northeast corner of ENP. It is currently the northern terminus of Shark River Slough, which is aligned from the northeast to southwest across ENP. Tamiami Trail is the northern boundary, the L-31N Canal the eastern boundary, and the L-67 Extension Canal the western boundary of the NESRS. Prior to construction and operation of the C&SF Project in the 1960s-1970s, NESRS would have been characterized as wet most of the year, but regional developments impacted historic freshwater routes into the area. Hydrologic restoration of the ENP NESRS is a primary objectives of the MWD project.

Water enters NESRS primarily from WCA 3A via S-333, and then to the L-29 Borrow Canal and subsequent passage through several sets of culverts and the one-mile Tamiami Trail bridge (completed as part of the MWD Project in 2013) under Tamiami Trail. In addition, S-355A and S-355B may also be used to deliver water from WCA 3B to the L-29 Canal for subsequent passage through the culverts to NESRS. The discharges made from WCA 3A through the S-12 structures and S-333 are target flows determined from the Rainfall Plan. Under the Rainfall Plan, water deliveries would be computed and operations adjusted weekly, if necessary based on the sum of two components: a rainfall response component and a WCA 3A regulatory component. The normal operational target flow distribution is 55% through the S-333 into NESRS and 45% through the S-12 structures into ENP west of the L-67 Extension. Eastern portions of the ENP are also influenced by the system of canals and structures that provide flood control and water supply for the LEC urban and agricultural areas.

3.4.4 TAYLOR SLOUGH

Taylor Slough is in the southeast quadrant of ENP. The area through the Rocky Glades and Taylor Slough is higher in elevation compared to ground levels north, south, or west. Because of this

characteristic, the area is normally drier than other areas in the ENP. The Rocky Glades and Taylor Slough are somewhat like an island or a peninsula extending from the canals into the ENP. Under ERTP, specified C-111 basin canal water levels/ranges and S-332D pump station operations have resulted in Taylor Slough being provided water from the C-111 Basin mainly during the wet season. During the dry season, under ERTP, water deliveries to Taylor Slough were limited to provide conditions conducive to CSSS Sub-population C nesting (325 cfs from December 1 – January 31; 250 cfs from February 1 – July 14).

3.4.5 NDA AND SDA

The C-111 NDA is located in the northern part of the Rocky Glades. The completed NDA will be bounded on the West by the L-315 levee and on the East by the L-316 levee. The area extends northward from the S-332B pump station to the 8.5 Square Mile Area Detention Cell. The NDA forms the hydraulic ridge to reduce seepage losses from ENP between the 8.5 SMA Detention Cell and the S-332B pump station. The current partial NDA footprint (215 acres) was completed in 2003, as part of the implementation of the IOP. A portion of the S-332B pump station capacity (up to 250 cfs) discharges into the NDA, with the inflow location near the southeast corner of the NDA. With concerns regarding water quality and the potential impacts of direct surface water discharges into ENP previously identified during initial implementation of the IOP, the C-111 South Dade Contract 8 EA recommended that the hydraulic ridge concept used in the original 1994 GRR be extended north to tie into the 8.5 SMA detention cell, to provide additional storage for flood waters (including the future hydrologic connection between the 8.5 SMA detention cell and the C-111SD NDA) and also to reduce seepage losses from the ENP. The total acreage within the completed NDA will be approximately 1,441 acres. The construction contract for completion of the NDA was awarded in October 2015, with construction completion estimated in the fall of 2017. Following completion of Contract 8 construction, the current Water Control Plan does not provide for a hydraulic connection between the 8.5 SMA Detention Cell and the NDA.

The SDA is located in the southern part of the Rocky Glades. During implementation of the ISOP and IOP, construction of the SDA was completed in phases with the S-332B western detention area completed in 2000 and the S-332C detention area and a connector cell between the detention areas completed in 2003. Construction of the full build-out of the C-111 South Dade SDA, as envisioned with IOP, was completed 2009. The completed SDA extends from the S-332B pump station to the S-332D pump station. The SDA is bounded on the west by the L-320 levee and on the east by the L-322 levee. The SDA forms the hydraulic ridge to reduce seepage losses from ENP between the S-332B and S-332D pump stations. In the northeastern portion of the SDA, the L-322 levee forms a connector cell (partial connector) with the L-323 Levee for additional storage. Three pump stations supply water to this area: the S-332B (north; up to 325 cfs discharge capacity), the S-332C (central) and the S-332D (south); the S-332DX1 gated culvert is used to direct S-332D discharges into the SDA. The total acreage within the area is approximately 1,310 acres.

3.5 WATER QUALITY

The Corps has determined that the surface water in both C-111 and L-31N Canals that is impounded within the NDA, SDA, and S-332D Detention Area do not present a problem in terms of phosphorus concentration. This is based on the last 5 years of Settlement Agreement calculations showing compliance with the Taylor Slough/Coastal basin target of a flow weighted mean of 11 parts per billion (ppb) total phosphorus (it has been in the 5-6 ppb range). Further, the water impounded within the NDA will not present a bioaccumulation problem for any animals foraging in this area. This position is based on guidance from the USFWS Ecosystem Risk Analysis Group which indicates that if former agricultural soils are removed

from a detention area down to the consolidated cap rock, bioaccumulation of undesirable constituents from benthic organisms is essentially eliminated. Corps Periphyton Stormwater Treatment Area (PSTA) studies indicate conditions within this impoundment area (limestone substrate and wetting/drying cycles) sequester water column phosphorus and this will occur even at very low inflow concentrations based on recent data. Pesticide levels in this canal system (surface water and sediment) are routinely checked by the SFWMD and there is no indication of a pesticide problem in the surface water or the ground water in the project area. Trace levels of endosulfan are occasionally found in the canal surface water but this pesticide is ubiquitous at trace levels throughout Florida. The extensive ground water sampling conducted for the C-111 project area has not indicated any ground water problem in the project area before the C-111 project features were built or after their construction and operation. The Miami-Dade Department of Environmental Resource Management (DERM) conducts a routine and very thorough sampling program of the ground water and the surface water in this area and this program also indicates that the project ground water and surface water are generally of very good quality.

3.6 FLOOD DAMAGE REDUCTION

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

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

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

The coastal canal system was overlaid on top of the existing flood control system. Many of these canals are used to remove water from interior areas to tidewater in times of excess water. One of the primary purposes of the SDCS portion of the C&SF Project is flood protection. The project was authorized to remove 40-percent of the Standard Project Flood (SPF) flows. This purpose remains an important objective because of the remaining agriculture within the basin. The South-Dade County basin (south of the S-331 pump station) is provided flood protection by operation of the S-332B/S-332C/S-332D pump stations completed under the C-111 South Dade Project and through operation of the L-31N and C-111 Canal control structures (S-176, S-177, S-18C, and S- 197). The South-Dade County basin may also receive inflows from upstream basin drainage through the S-331 pump station and the adjacent S-173 gated culvert structure. Within the SDCS, S-331/S-173 releases are the result of water management operations to: (1) maintain target L-31N Canal stages; (2) provide flood damage reduction to the 8.5 SMA eastern areas when sufficient capacity is available at S-357 and maintain flood damage reduction 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 ERTP Column 2 operations.

The MWD Increment 1 field test hydrologic monitoring will aid in quantifying both long-term and intra-annual/seasonal effects of increased stages within NESRS. Development of the COP will be informed by the MWD Increment 1 and Increment 2 field tests. The COP will conduct regional hydrologic modeling in order to balance the ecological restoration objectives of the MWD and C-111 South Dade projects while demonstrating compliance with the project constraints, which will include requirements to maintain the mitigation for project induced flood damages in the 8.5 SMA and to maintain the level of flood damage reduction associated with the 1994 C-111 GRR Recommended Plan.

3.7 WETLANDS

The lands within the C-111 project area were historically part of the Everglades wetland system. The hydrology of these wetlands has been historically manipulated to suit agricultural interests. The majority of the NDA is classified as abandoned agricultural lands. The South Detention Area (SDA) has some higher quality wetlands within the detention area that have not been previously converted to agriculture. However, the SDA has previously been impacted by water management operations. An interagency wetland assessment of the proposed project area was completed March 22, 2012 for the NDA and April 10, 2012 and May 26, 2015 for the SDA.

3.8 VEGETATION

The habitat in the NDA, the SDA, the 8.5SMA Detention Cell, and S-357W construction footprint is former rocky glades/marl prairie, which may include dominant species of one or more of the following: Gulf hairawn muhly (*Muhlenbergia sericea*), spreading beaksedge (*Rhynchospora divergens*), Florida little bluestem (*Schizachyrium rhizomatum*), black bogrush (*Schoenus nigricans*), Elliott's lovegrass (*Eragrostis elliottii*), sand cordgrass (*Spartina bakeri*). Much of this areas has been converted to agriculture by rockplowing and drainage (flood protection project area).

Rockplowing removes all vegetation and creates a soil matrix that can be used for commercial agriculture, or allows exotic vegetation to be wiped out for native vegetation to come back. The NDA is being currently being scraped to caprock (expected to be finished in 2016) to remove exotic vegetation and create a larger detention area. The internal flowway berms within the NDA will be built directly after scraped to caprock and therefore, the habitat will not contain vegetation at the time of construction. It is expected to revegetated with native vegetation with wetland hydrologic functions. Vegetation within the proposed project area is further described in the 2006 IOP FEIS.

3.9 WILDLIFE

Wildlife diversity is best represented in ENP, west of the L-31 Canal and the NDA/SDA. Common species of mammals observed in detention areas east of ENP include raccoon, deer, rats and mice, opossum, feral cats and dogs and other species adapted to disturbed areas. Recent proliferation of invasive exotic Burmese python and tegu and other lizards have evidently reduced wildlife abundance, both in ENP and to the east. Additional wildlife descriptions are found in the 2006 IOP FEIS.

3.10 THREATENED AND ENDANGERED SPECIES

Threatened and endangered species that are known to occur in Miami-Dade County are presented in Table 1. Federally listed species expected to occur in the project area are discussed below. The land in the area of the C-111 basin originally consisted of relatively natural Everglades features including sloughs, rocky glades, tree islands, marshes, and coastal mangrove fringe.

Table 1. Federal and State listed species known to occur in Miami-Dade County, Florida.

Scientific Name	Common Name	Federal Status	State Status
Reptiles			
Alligator mississippiensis	American alligator	SAT*	SSC**
Caretta caretta	Loggerhead sea turtle	Threatened	Threatened
Chelonia mydas	Green sea turtle	Endangered	Endangered
Crocodylus acutus	American crocodile	Threatened	Endangered
Drymarchon couperi	Eastern indigo snake	Threatened	Threatened
Gopherus polyphemus	Gopher tortoise	Not listed	Threatened
Birds			
Ammodramus maritimus mirabilis	Cape Sable seaside sparrow	Endangered	Endangered
Aphelocoma coerulescens	Florida scrub jay	Threatened	Threatened
Charadrius melodus	Piping plover	Threatened	Threatened
Polyborus plancus audubonii	Audubon's crested caracara	Threatened	Not listed
Mycteria americana	Wood stork	Endangered	Endangered
Egretta caerulea	Little blue heron	Not listed	SSC**
Polyborus plancus audubonii	Audubon's crested caracara	Threatened	Not listed

Scientific Name	Common Name	Federal Status	State Status
Egretta tricolor	Tricolored heron	Not listed	SSC**
Egretta thula	Snowy egret	Not listed	SSC**
Rostrhamus sociabilis plumbeus	Snail kite	Endangered	Endangered
Eudocimus albus	White ibis	Not listed	SSC**
Calidris canautus	Red Knot	Candidate	Not listed
Aramus guarauna	Limpkin	Not listed	SSC**
Picoides borealis	Red-cockaded woodpecker	Endangered	Endangered
Platalea ajaja	Roseate spoonbill	Not listed	Endangered
Sterna antillarum	Least tern	Threatened	Threatened
Invertebrates			
Anaea troglodyte floridalis	Florida's leafwing butterfly	Candidate (historical)	Not listed
Strymon acis bartrami	Bartram's hairstreak butterfly	Candidate (1974)	Not listed
Heraclides aristodemus ponceanus	Schaus swallowtail butterfly	Endangered	Not listed
Mammals			
Puma concolor coryi	Florida panther	Endangered	Endangered
Neovison vison evergladensis	Everglades mink	Not listed	Threatened
Puma concolor	Puma	Threatened/ SAT	Endangered
Trichechus manatus	Manatee	Endangered	Endangered
Eumops floridanus	Florida Bonneted Bat	Endangered	
Plants and Lichens			
Amorpha crenulata	Crenulate lead-plant	Endangered	Endangered
Cladonia perforata	Perforate reindeer lichen	Endangered	Endangered
Chamaesyce garberi	Garber's spurge	Endangered	Endangered
Curcubita okeechobeensis	Okeechobee gourd	Endangered	Endangered
Polygala smallii	Tiny polygala	Endangered	Endangered

*The American alligator is currently federally designated as *Similarity of Appearance to a Threatened Taxon (SAT).*
** Species of Special Concern (SSC) is a species, subspecies, or isolated population that is facing a moderate risk of extinction in the future.

The actual construction area for project features considered by this EA represents a small portion of Miami-Dade County, and the lands to be affected are prior converted, mostly rock-plowed cropland, some of it fallow or converted to detention many years ago, with a few small inclusions of tree islands or other wetlands incorporated. Therefore, evaluation of this extensive species list and its comparison to species populations likely to be present in the 8.5 SMA, NDA, SDA and S-333D detention area, revealed that most species are not likely present at all. For purposes of evaluation under the Endangered Species Act, the Corps made a

determination for the following species expected to be within the project area: Florida panther, Cape Sable Seaside Sparrow, Eastern Indigo Snake, Deltoid spurge, Garber's spurge, Small's Milkpea and Tiny polygala. The other species of mammals, reptiles, birds, invertebrates and plants were judged to be either not present (habitat was lacking); if present, not dependent on the C-111 Detention Areas for reproduction or feeding; or outside their known geographic range; therefore, the determination was "no effect". For species accounts and individual assessments refer to Appendix A, Endangered Species Act Biological Assessment.

3.11 AIR QUALITY

EPA's AirData database contains measurements of air pollutant concentrations for the entire United States. The measurements include both criteria air pollutants and hazardous air pollutants and are compared against the National Ambient Air Quality Standards (NAAQS) specified by the EPA. The ambient air monitoring network in Florida reflects the state's population growth, new air monitoring technologies, and concern for health. The monitoring equipment has improved and become easier to operate, while analysis methods have become more precise and reliable. The monitoring effort has concentrated on the six criteria pollutants: carbon monoxide, lead, nitrogen dioxide, ozone, sulfur dioxide and particle pollution. The most recent available FDEP final air monitoring report is the 2012 version (FDEP 2012). Florida continued to be in attainment for all criteria pollutants, except for the lead nonattainment area in Hillsborough County, which is not within the project area.

3.12 NOISE

Within the major natural areas of south Florida, external sources of noise are limited and of low occurrence. Rural areas typically have noise levels in the range of 34 to 70 decibels, and urban areas may attain noise levels of 90 decibels or greater. Noise levels within ENP are associated predominately with the natural undeveloped landscape, with recreational traffic and occasional air traffic contributing intermittent higher levels.

Noise levels are associated with surrounding land use. There are no significant noise generating land users within the project area; however, there is periodic boat and airboat activity in the ENP. An un-muffled airboat, frequently powered by a V-8 car engine, registers between 115 to 130 decibels at 50 feet, according to University of Florida researchers. Fishing boats have lower noise levels. For the roads adjacent to and cutting through the project area, sound levels typical for automobile, motorcycle and truck traffic could be as high as 90 decibels but typically are lower, in the range of 75 decibels at 50 feet.

3.13 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. Tree islands may be found within the project area as well.

3.14 LAND USE

Land use of the project area is depicted in Figure 3.14-1 with a Florida Land Use Cover Classification System (FLUCCS) map. The proposed project area consists predominantly of

agricultural lands and herbaceous dry uplands, and a small area of freshwater marsh according to the FLUCCS map from 1999.

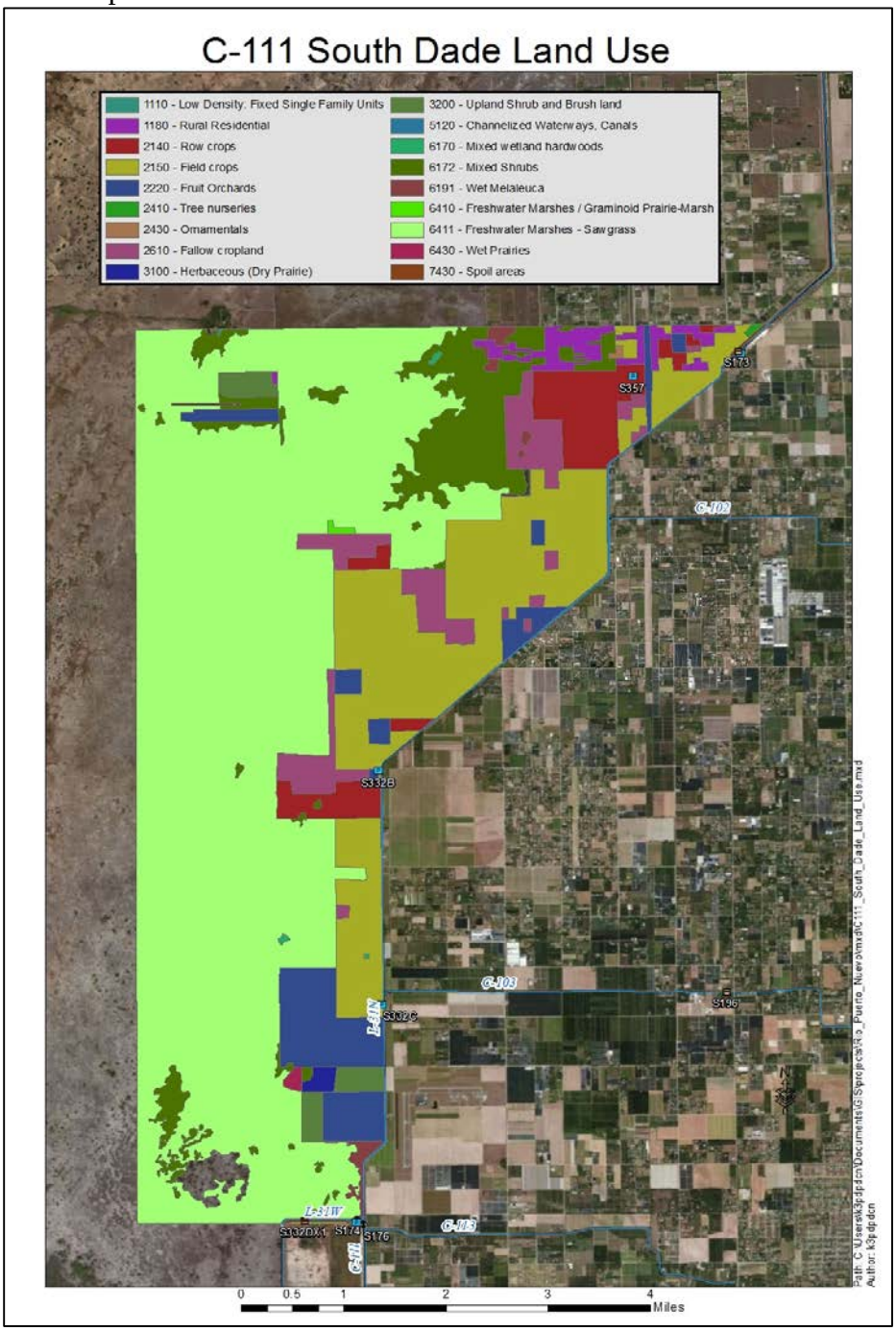

Figure 3.14-1. FLUCCS map of Project Area

3.15 SOCIOECONOMICS

Florida's economy is characterized by strong wholesale and retail trade, government, and service sectors. The economy of south Florida is based on services, agriculture, and tourism. Florida's warm weather and extensive coastline attract vacationers and other visitors and help make the state a significant retirement destination. The three counties that comprise the LEC

(Palm Beach, Broward, and Dade) are heavily populated, and it is estimated that over 6.9 million people will reside in this region by the year 2050.

A complete socioeconomic description of the C&SF Project area was completed in the Comprehensive Review Study (1999). In addition, the 1994 GRR/EIS describes socioeconomic conditions specific to the C-111 Project area.

3.16 AGRICULTURE

The current NDA and SDA lands are classified as agriculture; however, the lands have not been used for agricultural practices in recent years. Agriculture exists on the eastern border of the project area. A variety of fruits, vegetables, and ornamentals are grown within this region and include many tropical and subtropical crops which are grown year-round. The most active growing season is between September and May. Because of the wet and dry rainy seasons in the area, planting times are controlled by the elevation of groundwater.

3.17 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE (HTRW)

Hazardous, toxic, and radioactive waste (HTRW) surveys have been conducted as part of EAs and EISs prepared as part of the prior C-111 basin restoration efforts and indicated no problems or occurrence of HTRW levels of contaminants. There is a low potential of occurrence of HTRW within the proposed project area based on the current and past activity in this area. The SFWMD conducted a phase 1 HTRW assessment that was completed in 2007. This assessment indicated no presence of contaminants at HTRW levels. The SFWMD also completed a soils sampling survey in 2008 of the project area construction footprint to address the potential for ecosystem risk (potential negative impacts to sensitive endangered species via bioaccumulation of agricultural amendments). Only trace amounts of agricultural amendments were found throughout the project area.

3.18 CULTURAL RESOURCES

Within the planned project area are known cultural resources. In 2006, the Corps contracted a cultural resource survey and site evaluation study for the proposed "C-111 Phase II and III" project area (Smith et al. 2006). This study covered portions of the NDA and fully covers the SDA This study identified four prehistoric sites in the project area (8DA3210, 8DA3218, 8DA6514, and 8DA6515) within the SDA. Two of the sites had been previously identified in 1983 as part of rock quarry permit application (Carr 1983). Construction of the SDA was designed to exclude all of the recorded prehistoric sites except 8DA6514. Cultural material recovered from this site includes: prehistoric ceramics, shell, and faunal (animal bone, including: fish, alligator, snake, turtle, bird, frog and small mammals) remains; a flotation sample was processed no prehistoric plant remains were recovered. This site is located in the southern end of the SDA and is subject to periodic inundation that typically does not overtop the site. In 2006, the Corps determined that use of the area and project design associated with the SDA would have no adverse effect on cultural resources located within the proposed project area. This determination was concurred with by the State of Florida Historic Preservation Officer on 28 June 2006 and the proposed SDA was constructed thereafter and has been in operation since. This determination was also consulted with Seminole Tribe of Florida and the Miccosukee Tribe of Indians of Florida.

In addition to the Corps studies within the project area, in 2009 a portion of the project area was incorporated into a study of the eastern land expansion of Everglades National Park (Schwadron 2009). No new cultural resources were identified in the survey that covers part of the NDA and SDA.

In 2012, modifications to the C-111 South Dade project included additional work within the NDA area and the 8.5 SMA. The current project area includes portions of the 8.5 SMA project area and all previously unstudied portions of the NDA. Neither area contains known archaeological resources and have been subjected to previous cultural resource investigations which includes the 2000 study by SEARCH, Inc. entitled *A Cultural Resource Assessment Survey of an 8.5 Square Mile Area, Dade County, Florida* and an internal 2011 study conducted by the Corps entitled; *Supplemental Phase I Cultural Resource Survey Of The 8.5 Square Mile Land Exchange Project, Miami-Dade County, Florida*. In 2011 and 2012, the SHPO concurred with the Corps determination that use of the area and modifications to the projects within the 8.5 SMA and NDA would have no effect to Historic Properties ((DHR No 2011-00583, DHR No 2012-00905).

3.19 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 region of the project area (Figure 3.19-1). Both tribes maintain strong connections within South Florida and shared use of the region which may have historically included the project area.

Members of both Tribes continue to rely upon the Everglades to support their cultural, medicinal, subsistence, and commercial activities. However, while uses, are known throughout the region, there are no known uses of the specific project area. Prior consultation under section 106 of the National Historic Preservation Act on various aspects of the project for construction purposes over the last decade have not indicated any historic uses although that certainly remains possible. The specific issues impacting each tribe have been different over the last few decades, but they are all related to impacts due to man-made changes to the Everglades ecosystem. Consultation will be updated with both tribes in regards to project impacts.

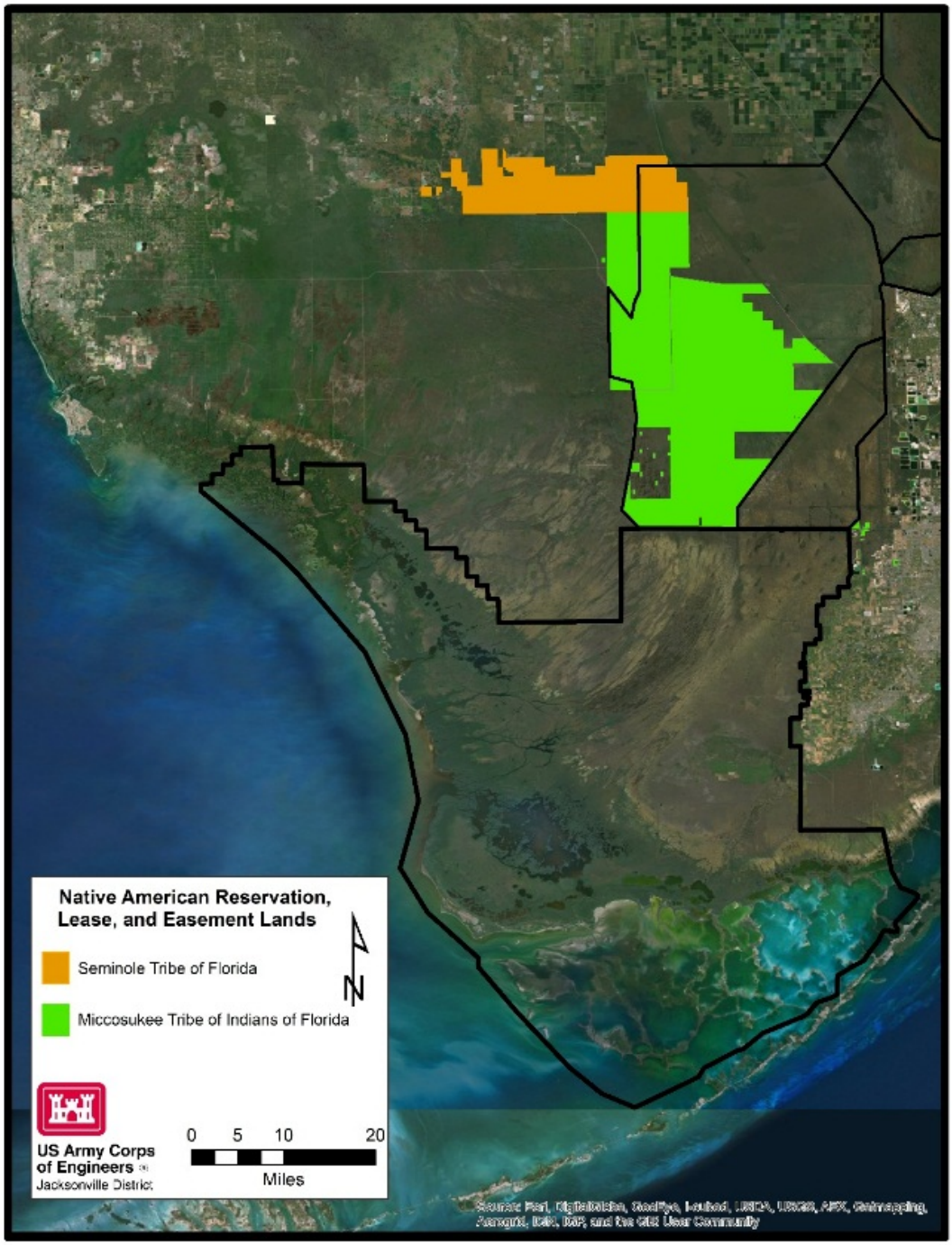

Figure 3.19-1. Map outlining the location of Tribal reservation, Leased and Easement lands

4. ENVIRONMENTAL EFFECTS

The Alternatives analyzed in the section are the No Action Alternative and the Preferred Alternative (Alternative 5). The Preferred Alternative contains components of Alternatives 2-5, and therefore, unless a resource is specifically affected by the separate components (alternatives), the specific features of the alternatives will not be separately discussed.

4.1 GEOLOGY AND SOILS

4.1.1 NO ACTION ALTERNATIVE

The No Action Alternative would not cause any additional effects to the geology and soils of the area. Impacts would be as described in the 1994 GRR/EIS and 2006 IOP FEIS.

4.1.2 PREFERRED ALTERNATIVE

The Preferred Alternative would not affect current geology. There would be additions of flowway berms and weirs to improve flow and hydrology in the area, however, this would not impact the actual geology.

4.2 HYDROLOGY

4.2.1 NO ACTION ALTERNATIVE

The No Action Alternative would continue to provide hydrologic conditions within WCA-3A, ENP NESRS, ENP Taylor Slough, and the adjacent Lower East Coast urban and agricultural areas as generally described within the 2012 NDA EA, the 2012 ERTP Final EIS, and the 2015 MWD Increment 1 field test EA. Although the alternatives analyzed within this EA do not address operational changes for the MWD or C-111 South Dade projects, which are currently being analyzed under the MWD incremental field tests, general assumptions regarding project operations were identified to facilitate evaluation of the proposed alternatives.

The No Action Alternative includes consideration of the ongoing MWD Increment 1 field test which raises the operational stage constraint for inflows to NESRS at the G-3273 gage and operates the S-356 pump station for control of seepage into the L-31N Canal. The first increment will maintain the current 7.5 feet National Geodetic Vertical Datum of 1929 (NGVD) maximum operating limit in the L-29 Canal. The field test will also implement a testing protocol to assist in defining operating criteria for the new 8.5 SMA S-357N water control structure following completion of construction, which is currently expected in late 2016. Information and operational criteria identified from the Increment 1 field test will be used to develop an expanded set of operations and monitoring criteria for a subsequent operational field test (Increment 2) that will raise the maximum operating limit in the L-29 Canal level above 7.5 feet NGVD, up to a maximum of 8.5 feet NGVD, as outlined in the 2008 MWD Tamiami Trail Modifications LRR and EIS.

As defined within ERTP, the No Action alternative assumes continued operation of the 8.5 SMA S-357 pump station to maintain an average daily water level in the 8.5 SMA seepage canal (C-357) of between 5.7-6.2 feet NGVD. In addition to the C-357 operational range, S-357 pump station operations are also constrained to 125 cfs (575 cfs design capacity) when the

north to south gradient between the Angel's Well water level (located 0.2 miles west of the 8.5 SMA within NESRS) and the LPG-1 water level (located in the southwest corner of the 8.5 SMA) is between 0.1 and 0.2 feet or turned off if the gradient is less than 0.1 feet, as these conditions may indicate potential backwater effects from water storage within the 8.5 SMA detention cell. The No Action alternative does not provide for a hydraulic connection between the 8.5 SMA detention cell and the NDA under normal operations, since the gradient criteria are exceeded prior to S-357 operations generating depths within the 8.5 SMA detention cell that may result in discharges across the existing S-360W or S-360E emergency discharge weirs.

Storage of water within the 1,441 acres of the expanded NDA would reduce the slope of the groundwater gradient from high water conditions within the adjacent ENP NESRS to the west and the L-31N Canal to the east, which will inhibit seepage loss from ENP. The completed NDA will continue to receive inflows from the portion of S-332B pump station discharges that are directed north to the NDA, which provides a design discharge capacity of 250 cfs. For the No Action alternative, the completed NDA will not receive additional inflows from the S-357 pump station via the 8.5 SMA detention cell. Completion of the NDA construction is currently anticipated by 2017.

The No Action alternative assumes that the S-332D pump station would continue to be governed by the operational criteria defined for ERTP and the Increment 1 field test. S-332D discharges into a 20 acre high head cell. During normal operations, the high head cell (HHC) inflows are directed south towards ENP Taylor Slough across the S-327 weir (1900 feet length) when depths in the HHC exceed approximately 2.5 feet, which is achieved after 1-2 hours of sustained pumping at S-332D (575 cfs design capacity). The gated culvert S-332DX1 (500 cfs design capacity) can also be used to re-direct a portion of the S-332D inflows to the HHC into the southern portion of the SDA, with this operation typically used during the dry season when S-332D discharges towards Taylor Slough are constrained by operational limits prescribed for protection of the CSSS sub-populations C and D (325 cfs constraint during November through January; 250 cfs constraint during February through 15 July). Operational experience has indicated a high rate of return seepage to the L-31N Canal when water depths approach the level needed for S-327 weir discharges, which limits the efficiency of the S-332D pump station to maintain and/or lower L-31N Canal stages and maximize water deliveries towards Taylor Slough.

Operations will continue in accordance with ERTP and/or the MWD Increment 1 field test until another operating plan is authorized. If a revised operational plan for WCA-3A, ENP, and/or the South Dade Conveyance System is implemented by the Corps, operation of the S-357, S-331, S-332B, S-332C, or S-332D pump stations would be operated in accordance with the prescribed operations.

4.2.2 PREFERRED ALTERNATIVE

North Detention Area

The Preferred Alternative (Alternative 5) includes components that were incrementally incorporated during the formulation of Alternatives. To more easily explain the contribution

to the hydrologic effects of the Preferred Alternative as a combination of Alternatives 2-5, this section includes a discussion of hydrologic effects for each Alternative.

Completion of the MWD-C-111 South Dade Connection (Alternative 2)

The C-111 South Dade NDA is part of the C-111 South Dade Project and is a necessary component to achieve full operations of the S-357 Pump Station, as described in the 2012 NDA EA and the 2000 GRR for 8.5 SMA. The purpose of the S-357 Pump Station is to provide flood damage reduction to the residents of the Las Palmas Community.

Alternative 2 proposes to provide a direct surface water connection from the 8.5 SMA detention cell to the NDA by removal of the S-360W weir and construction of two internal flowway berms. This connection is also included as part of the Preferred Alternative. This hydraulic connection would enable the S-357 pump station to move water further away from the protected portion of the 8.5 SMA, thereby reducing the frequency of operational restrictions on the S-357 pump station caused by storing water within the 8.5 SMA detention cell. By not allowing significant water storage depths within the 8.5 SMA detention cell and by constructing the internal flowway to convey water through the 8.5 SMA Detention Cell more efficiently, the potential for backwater drainage effects on the southwest corner of the 8.5 SMA caused by retardation of the regional groundwater flow to the southeast is significantly reduced. The detention cell berms would increase the capability for S-357 discharges to maintain the hydraulic ridge within the C-111 NDA, reduce the area footprint needed to maintain a continuous hydraulic ridge within the detention cell, and reduce potential backwater effects related to water collecting in the northwest corner of the detention cell. The northwestern and southeastern portions of the 8.5 SMA detention cell would receive inflows only from direct rainfall during normal operational conditions. These portions of the detention cell storage would remain accessible for water storage during extreme rainfall and flood control events by allowing overtopping of the flowway berms, which would only be anticipated for events approaching a 100-year return frequency (17-18 inches of rainfall over 3 days).

The hydraulic connection from the 8.5 SMA to the NDA will result in a maximum of 575 cfs of additional inflows into the C-111 NDA from the S-357 pump station. Aside from the eastern emergency discharge weirs, water stored within the NDA and SDA can only be removed through infiltration and evapotranspiration. Due to the relatively higher gradient between the detention area stages and the L-31N Canal, as compared to the gradient to the groundwater or surface water stages within NESRS, a higher fraction of the infiltration losses will be transmitted to the L-31N Canal. Compared to the No Action alternative, Alternative 2 will result in increased return seepage to the L-31N Canal due to the additional S-357 inflows and the resulting deeper depths within the NDA. The increased return seepage may reduce the efficiency of the S-332B and S-332C pump stations to maintain and/or lower L-31N Canal stages, which may have the potential to result in increased groundwater movement towards the agricultural areas located east of the L-31N Canal. However, the increased capability to utilize S-357 will reduce the need to use the regional S-331 pump station to provide flood mitigation for the 8.5 SMA, which may provide additional storage capacity in the L-31N Canal to effectively manage the increased seepage. The net effect of reduced flood control releases from S-331/S-173, including the effects from MWD Increment 1 operations, and potential increased

seepage to the L-31N Canal south of S-331 is not able to be quantified prior to completion of the hydrologic monitoring and evaluations associated with the MWD Increment 1 and Increment 2 field tests.

Independent of the actions proposed within this EA, the 8.5 SMA western levee (L-357) will be extended south from Richmond Drive to connect with the 8.5 SMA Detention Cell, and the adjoining Detention Cell western perimeter levee connects to L-315, the western levee bounding the NDA. The Richmond Drive configuration in the No Action alternative therefore constitutes a lower elevation gap in the western flood protection mitigation system for the 8.5 SMA as long as the road and the adjacent swales extends west into ENP. Completion of the remaining levee segment to cross Richmond drive, including construction of a ramp over the new levee segment to maintain western access to ENP, is needed to complete the flood damage reduction system for the 8.5 SMA. The Richmond Drive levee crossing is included in Alternative 2 and the Preferred Alternative.

Internal Flowways in the NDA and SDA (Alternative 3)

Internal flowway berms within the 8.5 SMA detention cell, will facilitate transfer of S-357 discharges into the western flowway established by the NDA interior berms. The detention cell berms would increase the capability for S-357 discharges to maintain the hydraulic ridge within the C-111 NDA, reduce the area footprint needed to maintain a continuous hydraulic ridge within the detention cell, and reduce potential backwater effects on the southwest corner of the 8.5 SMA from water collecting in the northwest corner of the detention cell.

Inflows to the NDA and SDA will be confined within the western flowways (600 acres for the NDA and 430 acres for the SDA) until flowway depths exceed approximately 2.0 feet, at which time controlled water discharges from the weirs within the flowways would enable utilization of the remaining detention area footprint. The 2.0 feet depth criteria for the western flowways is consistent with the 2.0 feet normal operating depth that is currently used for the partial NDA and SDA under ERTP operations. The weirs along the NDA and SDA flowway berms were sized to provide controlled discharge of the maximum pump inflow capacity to each area (825 cfs for the NDA; 900 cfs for the SDA). The NDA and SDA berm overflow locations were located away from inflow locations to promote use of the complete flowway area footprint for hydraulic ridge effectiveness. In addition, the single weir overflow location in the NDA (3000 feet length) would be located in the northwest to maximize distance to the L-31N Canal, and the three overflow locations in the SDA (each with 800 feet length) would be distributed to balance north-to-south flow distribution within the eastern SDA footprint and to avoid direct tree island impacts.

Modification to S-327 High Head Cell Weir (Alternative 4)

Demolition of a portion of the S-327 HHC weir (approximately 250 feet of the 1900 foot weir length to be removed) will facilitate more efficient delivery of S-332D discharges to Taylor Slough and reduce return seepage to the L-31N Canal from the HHC. The degraded length of the weir will provide conveyance for the full design discharge capacity of S-332D (575 cfs). The existing 1.5 foot high berm located approximately 7,200 feet south of the S-328 will maintain sufficient stages within the northern portion of the S-332D Detention Area to accommodate continued use of the S-332DX1 gated culvert for water deliveries to the SDA.

Demolish and/or Decommission Obsolete Water Control Structures (Alternative 5)

Demolition or decommissioning of the S-174 spillway, S-332 pump station, and S-332I pump station will result in no hydrologic changes, as none of these structures are currently used for water management operations.

Although S-175 is not currently used for water management operations, the structure functions as an effective plug to prevent movement of water from the current Taylor Slough headwater (near the existing 2000 foot gap in the L-31W Levee, at the base of the S-332D detention area). Demolition of the S-175 gated culvert would result in reduced flows and hydroperiods to Taylor Slough and increased discharges from the headwaters of Taylor Slough to the southern terminus of the L-31W Canal, due to a significant north-to-south stage gradient. Decommission of S-175 would not result in adverse hydrologic effects to Taylor Slough. However, due to the adverse effects on Taylor Slough associated with S-175 demolition within the current configuration of the L-31W Canal, consideration may be given to demolish this structure if backfill and/or plug modifications are pursued along this southern reach of the L-31W Canal in the future, as authorized under the 1994 GRR. Similarly, demolition of S-174 would require reconstruction of the L-31N Levee in the vicinity of the structure, which is bordered east and west by remnant segments of the L-31W Canal; if demolition, rather than decommissioning is pursued at S-174, consideration may be given to complete the structure removal and levee reconstruction to coincide with a future phase of the C-111 South Dade project.

4.3 WATER QUALITY

4.3.1 NO ACTION ALTERNATIVE

The water quality in the C-111 basin will remain as indicated in the 2012 NDA EA under the No Action Alternative. No additional effects on groundwater or surface water quality are expected with this alternative; however, current rates of groundwater seepage out of ENP will continue.

4.3.2 PREFERRED ALTERNATIVE

The internal flowway berms would create a hydraulic ridge adjacent to ENP. The hydraulic ridge is expected to allow higher groundwater and surface water stages in ENP while not causing adverse effects on agricultural or residential use to the east. Higher stage levels in ENP are beneficial to help move the ENP hydrology in the direction towards restoration. Decommissioning or demolishing the structures would not alter the quality of water. Alternative 5 is not expected to change the quality of water.

4.4 FLOOD DAMAGE REDUCTION

4.4.1 NO ACTION ALTERNATIVE

Negative impacts to flood control are not likely due to the maintenance of existing canal target stages with completion of the NDA. Completion of the C-111 South Dade NDA expansion (likely in 2017, and part of the No Action Alternative) is expected to reduce the seepage from

the ENP NESRS to the L-31N Canal, due to the expanded NDA acting as a hydraulic ridge. The detention storage capacity of the C-111 system will increase with completion of the NDA, although the total pump station capacity remains unchanged. In general, it will be possible to remove greater volumes of water out of the L-31N Canal and into the detention areas (because the detention areas are expected to be expanded by 2017). Continuous monitoring, data evaluations, and stakeholder coordination to identify and address potential flooding concerns will be conducted under both the MWD Increment 1 and Increment 2 field tests. Constraints included in the monitoring plans may result is discontinuation of the field tests if adverse impacts to flood damage reduction are indicated as a result of the field test operations.

4.4.2 PREFERRED ALTERNATIVE

In order to maintain a continuous hydraulic ridge along the eastern boundary of ENP, which will extend from the 8.5 SMA detention cell through the NDA and the SDA, and to provide flood damage reduction for the 8.5 SMA for the increased NESRS water depths expected with the MWD project (Increment 2), the recommended alternative will enable a hydraulic connection between the 8.5 SMA detention cell and the NDA. Leaving the C-111 South Dade configuration in the state described for the No Action Alternative would not provide adequate flood mitigation for the 8.5 SMA in response to incrementally increasing the maximum operating limit for future operations (in the L-29 Canal and increasing flows into ENP NESRS under MWD Increment 2 and the COP). The S-357 pump station operation would frequently be limited to 125 cubic feet per second (cfs) (design capacity is 575 cfs), consistent with the current ERTP Water Control Plan. To maintain the authorized flood mitigation for the 8.5 SMA without the hydrologic connection to the C-111 South Dade detention areas that was envisioned by the 2000 GRR/EIS for the 8.5 SMA, water levels within the L-29 Canal would necessarily be constrained below the maximum operating limit of 8.5 feet NGVD that was outlined in the 2008 MWD Tamiami Trail Modifications LRR and EA, and the envisioned hydrologic benefits to ENP from the MWD Project would not be achieved.

The internal flowway berms in the 8.5 SMA Detention Cell would provide greater operational flexibility to maintain flood mitigation requirements for areas in the southwest corner of the 8.5 SMA and to maintain flood protection for the adjacent South Dade basin by inhibiting the pooling of water in the northwest and southeast corners of the Detention Cell. Instead, the water will flow through the middle of the 8.5 SMA Detention Cell and directly into the NDA, establishing a hydraulic ridge within the 8.5 SMA Detention Cell footprint and limiting the spatial extent for water depths above two feet to the confines of the 8.5 SMA Detention Cell flowway during normal operating conditions. Rainfall would not be controlled by the internal berms and limited seepage flows from the flowway to the adjacent areas is expected, still allowing for intermittent inundation of the entire Detention Cell as previously observed following events which triggered extended operation of the S-357 pump station. The eastern portions of the NDA and SDA will receive inflows from the NDA and SDA western flowways when water depths within the flowways exceed approximately 2.0 feet depth due to the combined effects of pumped inflows and direct rainfall, which will result in surface water flow across the weirs along the NDA and SDA flowway berms. Since inter-basin transfer of water from the 8.5 SMA to the C-111 South Dade project lands was not evaluated in the 1994 GRR and since the hydrologic and flood damage reduction effects on the C-111 basin lands located east of the NDA and SDA from these operations were also not evaluated in the 2000 GRR for

the 8.5 SMA, there is a potential for increased risk to flood protection within the C-111 Basin. However, the addition of flowway berms in the 8.5 SMA, NDA, and SDA are expected to reduce the potential for flooding concerns within the 8.5 SMA and the C-111 South Dade Basin by creating a dual purpose hydrologic ridge within the detention areas.

Continuous monitoring, data evaluations, and stakeholder coordination to identify and address potential flooding concerns will be conducted under both the Increment 1 and Increment 2 field tests. Constraints included in the monitoring plans may result is discontinuation of the field tests if adverse impacts to flood damage reduction are indicated as a result of the field test operations. Additional analysis will be conducted prior to and during the development of the MWD Increment 2 field test, for which interagency coordination is anticipated to initiate in late 2016. The Preferred Alternative will result in increased return seepage to the L-31N Canal due to the additional S-357 inflows and the resulting deeper depths within the NDA. The increased return seepage may reduce the efficiency of the S-332B and S-332C pump stations to maintain and/or lower L-31N Canal stages, which has the potential to result in increased groundwater movement towards the agricultural areas located east of the L-31N Canal. However, the increased capability to utilize S-357 will reduce the need to use the regional S-331 pump station to provide flood damage reduction for the 8.5 SMA, which may provide additional storage capacity in the L-31N Canal to effectively manage the increased seepage. The net effect of reduced flood control releases from S-331/S-173, including the effects from MWD Increment 1 operations, and potential increased seepage to the L-31N Canal south of S-331 is not able to be quantified prior to completion of the hydrologic monitoring and evaluations associated with the MWD Increment 1 and Increment 2 field tests. All of the monitoring results will be used to effectively develop future operations for the MWD and C-111 South Dade System.

The Richmond Roadway crossing and decommissioning or demolishing structures included in the Preferred Alternative would not negatively affect flood damage reduction

4.5 WETLANDS

4.5.1 NO ACTION ALTERNATIVE

No wetland impact is expected with the No Action Alternative. Wetland impacts that resulted from the prior C-111 South Dade project implementation have been discussed in previous NEPA documents and wetland assessments (1994 GRR/EIS, 2006 IOP FEIS, 2012 8.5 SMA, 2012 NDA EA).

4.5.2 PREFERRED ALTERNATIVE

The flowway berms in the NDA consists of former agricultural land that is currently overgrown with non-native invasive species; therefore no adverse wetland impacts are expected as a result of this component. A wetland assessment completed March 22, 2012, verified that no wetlands are present in the NDA. However, upon completion of Contract 8 that is underway and the Preferred Alternative, wetlands are expected to establish to conditions typical to historic wetlands within the area (freshwater marsh).

Construction of the flowway berms within the 8.5 SMA and the SDA would affect approximately 8 and 40 acres of wetlands, respectively. The Richmond Drive Roadway would affect less than one acre of wetlands. The total berm construction footprint are based on the berm dimensions of approximately 10 foot top width; 3H:1V side slopes; and average height 2.5 to 3 feet. The 8.5 SMA Detention Cell currently has established wetlands from prior scraping to caprock, which allowed regrowth of wetland plants with improved hydrology; however, most of these wetland hydroperiods are currently due to rainfall, rather than the limited operations of the S-357. The areas outside of the proposed flowway within the 8.5 SMA Detention Cell would still be expected to be hydrated due to rainfall and seepage from the internal flowway. The eastern portions of the NDA and SDA will receive inflows from the NDA and SDA western flowways when water depths within the flowways exceed approximately 2.0 feet depth due to the combined effects of pumped inflows and direct rainfall, which will result in surface water flow across the weirs along the NDA and SDA flowway berms The temporary impacts due to the construction footprint buffer will not be replanted, but is expected to naturally re-vegetate to a condition similar to its current one. If the four structures are demolished, there would be temporary effects to wetlands in removing the weirs.

Wetland assessments were performed April 10, 2012 and May 26, 2015 within the SDA for the prior location of the flowway berms in the 2012 NDA EA. Since the wetlands are located within the existing detention area, they have been subject to and will continue to be subject to water management operations. Due to the hydrologic benefits associated with wetlands within ENP and the expected wetlands to be regenerated in the NDA, no mitigation is anticipated for the impacts due to the 8.5 SMA Detention Cell, SDA, or Richmond Drive Levee Crossing construction. A Uniform Mitigation Assessment Method will be completed prior to construction to identify actual acreages of wetlands that will be affected.

Once complete, the C-111 South Dade Project is expected to provide benefit to 1,155 square miles of wetlands in ENP, including 128 square miles in Taylor Slough and 1,027 square miles in Shark River Slough (USACE 1994). Wetlands in ENP are expected to benefit from the restoration of more natural hydroperiods by inhibiting seepage to the east by constructing the flowway berms and forming a continuous hydrologic ridge along the eastern boundary of ENP. Restoration of the natural hydroperiods would result in more historic vegetation within these wetlands.

4.6 VEGETATION

4.6.1 NO ACTION ALTERNATIVE

Vegetation would not be altered due to the No Action Alternative beyond what was discussed in the 1994 GRR/EIS, 2006 IOP FEIS, and 2012 NDA EA.

4.6.2 PREFERRED ALTERNATIVE

Vegetation within the immediate footprint of the NDA has already undergone removal as described in the 2012 NDA EA. This vegetation included many exotic and nuisance plants such as *Pennisetum purpureum* (elephant grass) and *Ceratopteris thalictroides* (water sprite). Vegetation is expected to remain the similar to current conditions except for the change in land use due to the flowway berms as described above in the Wetlands Effects. Construction of the

flowway berms will cover approximately 5 acres in the 8.5 SMA detention cell and 20 acres in the SDA. Wetland vegetation is expected to increase in eastern ENP areas adjacent to the project due to the hydraulic ridge that is expected from completion of the flowway berms. The pump station inflow corridors and areas around S-332B and S-332C would have perpetual maintenance to restrict vegetation build up because they are adjacent to levees/berms that need to be maintained for flood damage reduction purposes.

4.7 EFFECTS ON THREATENED AND ENDANGERED SPECIES

4.7.1 NO ACTION ALTERNATIVE

The No Action Alternative would not impact any threatened or endangered species due to no change within the project area.

4.7.2 PREFERRED ALTERNATIVE

The Corps has determined that the Preferred Alternative may affect, but is not likely to adversely affect any of the federally listed species known to occur within the project area, which includes Florida panther, Cape Sable Seaside Sparrow, Eastern Indigo Snake, Deltoid spurge, Garber's spurge, Small's Milkpea, and Tiny polygala. The effects to species based on the Preferred Alternative are discussed in the Biological Assessment, which is located in Appendix A of this EA.

All monitoring and survey of endangered species onsite will be conducted in accordance with survey protocol from the USFWS South Florida Ecological Services Office. The Corps began informal consultation in May of 2015 with the USFWS on the proposed table of potentially present listed species in Miami-Dade County. In October 2015, the Service re-considered the list, including a few additional listings.

Consultation under Section 7 of the Endangered Species Act with the USFWS will continue throughout the project duration.

4.8 AIR QUALITY

4.8.1 NO ACTION ALTERNATIVE

Impacts to air quality under the No Action Alternative would be as described in the 1994 GRR/EIS, 2006 IOP FEIS, and the 2012 NDA EA and would not be expected to result in any negative effects. The pump stations will continue to discharge the same quantity of diesel exhaust products into the project area with or without this project.

4.8.2 PREFERRED ALTERNATIVE

Construction activities associated with implementing the project would temporarily increase dust within the project area. Best management practices to control dust would be implemented during construction. It is not expected that implementing the project would permanently affect air quality.

4.9 NOISE

4.9.1 NO ACTION ALTERNATIVE

Impacts due to noise under the No Action Alternative would be as described in the 1994 GRR/EIS, 2006 IOP FEIS, and 2012 NDA EA and would be temporary increases in noise levels that are expected during maintenance activities.

4.9.2 PREFERRED ALTERNATIVE

Temporary increases in noise levels would be expected during construction activities; however, this would be limited to the immediate area of construction.

4.10 AESTHETICS

4.10.1 NO ACTION ALTERNATIVE

Selection of the No Action Alternative would not affect aesthetics as construction of features described in the 1994 GRR/EIS, 2006 IOP FEIS, and 2012 NDA EA has been completed. Normal operations of pump stations would continue under the No Action Alternative.

4.10.2 PREFERRED ALTERNATIVE

Construction of this project will have some temporary impacts such as access restrictions, noise, and smoke associated with construction sites, but these are not expected to last for a sustained period of time. Access restrictions, noise and smoke associated with construction sites will interfere to an extent with enjoyment of the area and may disturb wildlife in the immediate area of work. Once work is completed, wildlife will once again inhabit the area around the construction sites and restrictions on access will be lifted. Vegetation will quickly become established on disturbed soil areas and within a year will cover any remaining signs of construction activities. Removal of the pump stations would improve aesthetics.

4.11 LAND USE

4.11.1 NO ACTION ALTERNATIVE

No land use changes are expected at this time under the No Action Alternative.

4.11.2 PREFERRED ALTERNATIVE

The Preferred Alternative would not additionally alter land use within the project footprint. Most of the land is former agricultural land that the South Florida Water Management District (SFWMD) acquired for conservation and water management actions, and most of the land is currently used and operated as detention areas.

4.12 SOCIOECONOMIC EFFECTS

4.12.1 NO ACTION ALTERNATIVE

The No Action Alternative would not cause any changes to socioeconomics in the area.

4.12.2 Preferred Alternative

The Preferred Alternative is not expected to change any socioeconomic impacts. The SFWMD currently owns the project lands and the project benefits to the Everglades could increase recreational opportunities, therefore encouraging more tourism for the area.

4.13 AGRICULTURE

4.13.1 NO ACTION

Agricultural practices are not expected to change due to the No Action Alternative.

4.13.2 PREFERRED ALTERNATIVE

The Preferred Alternative is not expected to negatively affect agriculture in the area. Target stages specified in the 2012 WCP (ERTP) will continue to be maintained along the L-31N and C-111 Canal reaches between S-331 and S-177 with the proposed construction features. The hydraulic ridge would reduce seepage from the Everglades, but is not expected to change water flow to the east where the majority of agriculture is located. Potential effects from the proposed hydraulic connection between the MWD 8.5 SMA and the C-111 South Dade NDA will continue to be addressed through operational permit coordination, interagency coordination to develop the MWD Increment 2 field test, and ongoing hydrologic monitoring and evaluations associated with the MWD Increment 1 field test.

4.14 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE (HTRW)

4.14.1 NO ACTION ALTERNATIVE

Selection of the No Action alternative would not have any HTRW consequences for this project area.

4.14.2 PREFERRED ALTERNATIVE

The SFWMD has conducted phase 1 HTRW assessments for this project area. The assessments, conducted approximately 5-10 years ago, indicated no presence of contaminants at active levels. This area was primarily used for agriculture with some limited residential use. This type of use is normally considered to be relatively low risk for HTRW problems as compared to what could be expected at industrial, residential, or former military sites. The SFWMD completed an HTRW assessment and screening level ecosystem risk analysis (SLERA, a soil sampling and analysis program conducted in a method coordinated with USFWS) of this project area in 2008. There was no evidence of HTRW levels of contaminants and only trace levels were found of residual agricultural amendments.

4.15 CULTURAL RESOURCES

4.15.1 NO ACTION ALTERNATIVE

Selection of the No Action Alternative would have no adverse effect on cultural resources. The previous NEPA documents covered the SDA and the current NDA with a determination of no adverse effect on cultural resources as well as the 8.5 Square mile area. Previous consultation as discussed in Section 3 indicated that previously the existing conditions were

determined to have no adverse effects on historic properties (See Pertinent Correspondence Appendix D).

4.15.2 PREFERRED ALTERNATIVE

The preferred alternative would see ground disturbing activities in the NDA and construction activities in the 8.5 SMA, NDA, and SDA. As discussed in section 3 there are no known resources with the NDA and the 8.5 square mile project area. These areas have been previously subjected to cultural resources surveys. Project associated impacts to these areas will have no impacts on historic resources. Proposed flowway alignments have been designed to avoid all tree islands within the detention areas and there will be no immediate impacts to the known archaeological site 8DA6514. The proposed internal flowway and internal berm will shift water away from the site. The creation of a hydraulic ridge will occur to the west of the resource. While overall the site will be exposed to similar periods of inundation as it has since 2009, the first two feet of use would occur west of the two foot internal berm while the overall maximum pool elevation of four feet will remain in effect as well as the six foot external berms. The decreased duration of saturation is not expected to result in a significant alteration of the cultural materials at the site as water is still expected to flow over the 2 foot internal berm and levels remain within the operational cycle initially established. In 2006, the Jacksonville Corps, based on site 8DA6514's elevation and its content, determined that the periodic inundation would have "no adverse effect". The Florida State Historic Preservation Officer concurred with this determination (DHR Project File No. 2006-06722, August 16, 2006). In 2012, changes to the SDA were also determined to be of "no effect" (DHR No.: 2012-00905). The preferred alternative will thus have no effects to historic properties as overall conditions of use remain similar to those conditions created in 2006. The removal and building of new structures within the system will have no effect on historic properties.

In addition to interior changes, there are structures which are scheduled to either be demolished and/or decommissioned. The structures S-174, S-175, S-332, and S-332I are not currently functioning and are not required for current or future water management operations for the C-111 South Dade project. S-174 and S-175 are potential historic structures and as such further investigations are warranted. All other structures are modern and there will be no effects to historic properties from their removal be either method. However in regards to S-174 and S-175 at this time that actual effects are not know to these structures as the process of decommissioning vs deconstruction is not clear and specific plans have not been formalized. The Corps will consult further on these structures. The goals will be to either avoid, minimize, or mitigate affects if such structures are determined to be historic properties and potentially eligible for inclusion in the National Register of Historic Places.

4.16 NATIVE AMERICANS

1.9.1 NO ACTION ALTERNATIVE

Selection of the No Action Alternative would have no adverse effect on Native American groups. As discussed in Chapter 3 previous portions of the project have been consulted upon with both federally recognized tribes who live within the region. However further consultation will continue and comments from this draft updated based on consultation with federally recognized tribes.

1.9.2 PREFERRED ALTERNATIVE

As part of the development of this project consultation is ongoing between the Corps and the two federally recognized tribes within the immediate area of potential effect. As discussed in Chapter 3, there are no known Native American properties within the project area and the project should not have any effects to Native Americans. However, consultation with both federally recognized tribes within the region is ongoing and will be updated upon further consultation on this project.

4.17 CUMULATIVE EFFECTS

The project area has been subject to Federal involvement for many years. The need for flood damage reduction, water supply, recreation, and fish and wildlife enhancement has provided a difficult task of balancing various, and sometimes-conflicting needs for the region. In the early years of the C&SF Project, flood control was the overriding goal, and eventually the need for additional water supplies for south Florida required additional modification to the project. The Everglades National Park Protection and Expansion Act of 1989 directed the Corps:

> *"to construct modifications to the Central and Southern Florida Project to improve water deliveries into the park and shall, to the extent practicable, take steps to restore the natural hydrological conditions within the park."*

Since that time, a number of Federal actions have been authorized and implemented that have attempted to improve the flow of water to the ENP without compromising the other needs of the region (i.e., flood control, water supply). The cumulative effects of these actions have been mostly positive. However, some adverse effects have occurred. The CERP (USACE 1999) has already addressed cumulative effects of lost agricultural land use with the expansion of publicly owned lands in the region.

Cumulative impacts in terms of hydrology, water quality, and natural resources have occurred with the many Federal projects implemented over the years. However, this proposed action, coupled with other recent and future projects, should eventually restore the hydrology of the ENP to a more historic natural condition while maintaining flood damage reduction.

In combination with construction of the Preferred Alternative, the MWD Increment 1 and 2 field tests will help inform future decisions on operations. The MWD Increment 1 field test, which was initiated in October 2015, includes a robust hydrologic monitoring plan that will aid in quantifying both long-term and intra-annual/seasonal flood damage effects of increased stages within NESRS on the urban and agricultural areas east of ENP in Miami-Dade County. The 2015 Increment 1 EA recognized that under certain hydrologic and operational conditions during the field test, increased risk to flood protection for South Dade areas may result from a combination of the following water management factors during the field test: increased seepage to the L-31N Canal south of S-331 prior to completion of C-111 South Dade NDA; increased discharges from S-331 for 8.5 SMA flood damage reduction (potentially offset by reduced S-331 discharges with limited WCA 3A regulatory releases to the SDCS); and/or operation of the downstream S-332D pump station and/or the C-111 South Dade SDA to manage L-31N Canal stages during periods of increased inflows. The SFWMD also initiated a 6-month evaluation and modeling study in September 2015 to provide additional information

regarding the current flood protection challenges and potential short- and long-term solutions. Information from these studies, along with ongoing SFWMD monitoring and analysis of the C-111 Spreader Canal Project operations, will need to be further analyzed to determine whether western outlets from the NDA and/or SDA are needed to meet the objective of the C-111 South Dade project to maintain the pre-project levels of flood protection within the C-111 Basin. Further detailed analysis of recent water quality data will also be conducted, along with detailed assessment of potential environmental effects of additional surface water discharges from the NDA and/or SDA to ENP. Another feature within the 1994 GRR that has not yet been addressed is the backfill of the L-31W; this will likely be addressed in a future NEPA document to complete the C-111 South Dade project. The future COP study will result in a comprehensive integrated water control plan for the operation of the water management infrastructure associated with the MWD and C-111 South Dade Projects.

4.18 IRRETRIEVABLE OR IRREVERSIBLE COMMITMENT OF RESOURCES

Irretrievable and irreversible commitment of resources would occur with the conversion of wetlands with the construction of the flowway berms within the detention areas. The SDA has been operated since 2009, and will continue to be operated through pump stations. Resources committed would also include State and Federal funds to purchase lands, labor, energy, and project materials to build, operate, and maintain the project.

4.19 UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS

4.18.1 WETLANDS

The C-111 South Dade project area was historically part of the Everglades wetland system. Approximately 20 acres of wetlands within the current SDA will be impacted by the proposed flowway berm, and 5 acres in the 8.5 SMA Detention Cell. The benefits to wetland function and value provided to ENP and the expected wetlands to occur within the NDA as a result of the project are expected to offset the functional losses within the project footprint.

4.18.2 WATER QUALITY

Surface runoff will be controlled during project constructions and no impacts are expected to occur in the local canals or drainage ditches. Precautions to limit turbidity will be employed. A water quality certificate is currently being applied for and will be required prior to construction.

4.18.3 AIR QUALITY

Fugitive dust from vehicular traffic and earth moving during construction will be unavoidable but insignificant overall. Dust control measures will be employed throughout the construction process.

4.18.4 SOILS

The disruption of soils is expected to result from construction activities. Organic soils onsite would be used in the construction of the levees.

4.18.5 WILDLIFE

Localized short-term disturbances to fish and wildlife are expected from construction activities.

4.18.6 THREATENED AND ENDANGERED SPECIES

Short-term disturbances to fish and wildlife are expected from construction activities. Precautionary measures and construction conditions to limit impacts to threatened and endangered species would be implemented. Please refer to Appendix A.

4.20 COMPATIBILITY WITH FEDERAL, STATE, AND LOCAL OBJECTIVES

The Corps has partnered with the SFWMD on this project. The proposed action is consistent with the overall goals and objectives of the C-111 South Dade Project. It is expected that the proposed action will be consistent with Federal, State, and local plans and objectives.

4.21 ENVIRONMENTAL COMMITMENTS

The Corps, the non-federal sponsor (SFWMD), and contractors commit to avoiding, minimizing, or mitigating for adverse effects during construction activities by taking the following actions:

1. Employ best management practices with regard to erosion and turbidity control. Prior to construction, the construction team should examine all areas of proposed erosion/turbidity control in the field, and make adjustments to the plan specified in the plan control device as warranted by actual field conditions at the time of construction.

2. The contract specifications will prohibit the contractor from dumping oil, fuel, or hazardous wastes in the work area and will require that the contractor adopt safe and sanitary measures for the disposal of solid wastes. The contractor will be required to prepare a spill prevention plan.

3. Demolition debris would be transported to a landfill or otherwise disposed of in accordance with Federal, State, and local requirements. Concrete or paving materials would be disposed of in accordance with Federal, State, and local requirements.

4. Inform contractor personnel of the potential presence of threatened and endangered species in the project area, the need for precautionary measures and the ESA prohibition on taking listed species.

5. Incorporate any commitments required by the appropriate regulatory agencies identified during the NEPA and ESA process.

6. The contractor will prepare an environmental protection plan for listed species onsite.

7. Construction activities will avoid impacting existing tree islands.

4.22 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

4.22.1 NATIONAL ENVIRONMENTAL POLICY ACT OF 1969

Environmental information on the project has been compiled and this EA has been prepared in compliance with NEPA. Full compliance with the Act will be achieved with the coordination of this EA.

4.22.2 ENDANGERED SPECIES ACT OF 1973, SECTION 7

The Corps is currently in consultation with the USFWS with "May affect, not likely to adversely affect" determinations for listed species. Upon review of the BA by the USFWS, the project will be in full compliance with this law.

4.22.3 FISH AND WILDLIFE COORDINATION ACT OF 1958

The C-111 South Dade Project has been extensively coordinated with the USFWS. Fish and Wildlife Coordination Act (FWCA) reports were submitted by the USFWS for the 1994 GRR, 2002 IOP EIS, and the 2006 IOP FEIS. A letter of concurrence was received on the 2012 NDA USFWS coordination. This project is in compliance with the Act.

4.22.4 NATIONAL HISTORIC PRESERVATION ACT OF 1966 (INTER ALIA), (PL 89-665, THE ARCHEOLOGY AND HISTORIC PRESERVATION ACT (PL 93-291), AND EXECUTIVE ORDER (EO) 11593)

The Proposed Action is in compliance with Section 106 of the National Historic Preservation Act, as amended (PL 89-665). As part of the requirements and consultation process contained within the National Historic Preservation Act implementing regulations of 36 CFR 800, this project is also in compliance through ongoing consultation with the Archaeological and Historic Preservation Act, as amended (PL 93-29), Archeological Resources Protection Act (PL 96-95), American Indian Religious Freedom Act (PL 95-341), Native American Graves Protection and Repatriation Act (NAGPRA) (PL 101-601), Executive Order 11593, 13007, and 13175, the Presidential Memo of 1994 on Government to Government Relations and appropriate Florida Statutes. Consultation with the Florida SHPO, appropriate federally recognized tribes, and other interested parties has been initiated and is ongoing. The Proposed Action will be in compliance with the goals of this Act prior to implementation of any portion of this project and upon completion of coordination as stated above.

4.22.5 CLEAN WATER ACT OF 1972

A 404(b)(1) Evaluation has been prepared (Appendix C) and will be coordinated along with this EA. Full compliance with this Act will be achieved upon the issuance of a Section 401 Water Quality Certification (WQC) and National Pollutant Discharge Elimination System permits by the State of Florida.

4.22.6 CLEAN AIR ACT OF 1972

Full compliance of this Act will be achieved through the coordination and review of this EA with the Environmental Protection Agency and the issuance of any required permits. No air permit will be required for the construction of these new detention areas. Though not anticipated, if the contractor has to perform any onsite burning activity associated with the clearing and grubbing activity, any required permits will be obtained by the contractor.

4.22.7 COASTAL ZONE MANAGEMENT ACT OF 1972

A Federal consistency determination in accordance with 15 CFR 930 Subpart C is included in this EA as Appendix D. The State's consistency review for this project was performed during the coordination of this EA. Full compliance will occur with the issuance of the Water Quality Certificate (WQC) by the State of Florida.

4.22.8 FARMLAND PROTECTION POLICY ACT OF 1981

The Corps consulted with the Natural Resource Conservation Service (NRCS) in 2012 to determine whether prime or unique farmland would be impacted by implementation of this project. This project is in compliance with the Act.

4.22.9 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.

4.22.10 MARINE MAMMAL PROTECTION ACT OF 1972

The West Indian manatee may occur adjacent to the project area. Incorporation of the safeguards used to protect threatened and endangered species during construction would protect any marine mammals in the area. Coordination with USFWS will continue as construction and operational guidelines are incorporated to avoid impacts to this species. No work is being completed in the canals. The project is in full compliance of this Act upon review of the BA by the USFWS.

4.22.11 ESTUARY PROTECTION ACT OF 1968

No designated estuary would be affected by project construction activities, however, operations of the project may benefit Florida Bay. The project is in full compliance of this Act upon review of this EA by the NMFS.

4.22.12 FEDERAL WATER PROJECT RECREATION ACT

This project does not include any recreation features, and therefore, this Act does not apply.

4.22.13 FISHERY CONSERVATION AND MANAGEMENT ACT OF 1976

The project is in full compliance of this Act upon review of this EA by the NMFS.

4.22.14 SUBMERGED LANDS ACT OF 1953

The project would not occur on submerged lands of the State of Florida. This Act does not apply.

4.22.15 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 this project. These Acts are not applicable.

4.22.16 RIVERS AND HARBORS ACT OF 1899

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

4.22.17 ANADROMOUS FISH CONSERVATION ACT

Anadromous fish species would not be affected by this project. This Act is not applicable.

4.22.18 GOLD AND BALD EAGLE PROTECTION ACT

During Section 7 consultation with the USFWS for the IOP, the USFWS concurred with the Corps' determination that construction and operation of the project was not likely to adversely affect the Bald Eagle. This was recoordinated through the USFWS for the features described within the 2012 NDA EA and will be for this EA. This fulfils the Corps' commitments under the Bald Eagle protection Act. The project is in compliance with the Act.

4.22.19 MIGRATORY BIRD TREATY ACT AND MIGRATORY BIRD CONSERVATION ACT

No migratory birds would be adversely affected by project activities. The project is in compliance with these Acts upon review of this EA by the USFWS.

4.22.20 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

This project is inland and not expected to adversely affect Essential Fish Habitat. Essential fish habitat in Florida Bay is comprised of seagrasses, estuarine mangroves, intertidal flats, the estuarine water column, live/hard bottoms, and coral reefs. Project construction activities should have no effect on the nearshore communities or essential fish habitat downstream of the project area. However, this project is expected to have a beneficial indirect effect by increasing overland flow into Florida Bay through Taylor Slough. The increased flow is anticipated to stabilize the water quality and salinities required to improve and sustain nearshore biological communities. The project is in full compliance of this Act upon review of this EA by the NMFS.

4.22.21 MARINE PROTECTION, RESEARCH AND SANCTUARIES ACT (MPRSA)

The term "dumping" as defined in the Act (3[33 USC. 1402] (f)) does not apply to this project. Therefore, the MPRSA does not apply.

4.22.22 RESOURCE CONSERVATION AND RECOVERY ACT (RCRA), COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT (CERLA), TOXIC SUBSTANCES CONTROL ACT OF 1976

A preliminary Phase I HTRW assessment was conducted in 2009 to address the potential for the occurrence of HTRW on lands within the full scope of the C&SF project in the study area. No specific sites were identified within the footprint of the structures. Lands related to the C-111 project were also surveyed for HTRW by SFWMD prior to that agency's transfer and certification of lands to the Federal Government. The project is in compliance with these Acts.

4.22.23 E.O. 11988, FLOOD PLAIN MANAGEMENT

The areas to be used for the C-111 project are part of the floodplain. The purpose of the E.O. is to discourage federally induced development in floodplains. Commitment of lands to the C-111 project will preclude such development. This project is in compliance with the intent of this E.O.

4.22.24 E.O. 11990, PROTECTION OF WETLANDS

This E.O. directs Federal agencies to avoid developing or siting projects in wetlands. The nature of this project is that it involves work in wetlands, and no practicable alternative to working in wetlands exists. The project would reduce seepage of groundwater away from wetlands along the eastern boundary of the ENP. The project is in compliance with the intent of this E.O.

4.22.25 E.O. 12898, ENVIRONMENTAL JUSTICE

This E.O. directs Federal agencies to provide for full participation of minorities and low-income populations in the Federal decision-making process and further directs agencies to fully disclose any adverse effects of plans and proposals on minority and low-income populations. This project would benefit all population groups of southern Miami-Dade County by providing flood damage reduction, drinking water supply protection, and restoration of wetlands and other natural resources inside and outside of the ENP. The project would not result in disproportionately high and adverse human health or environmental effects on minority populations and low-income populations. The project is in compliance with this E.O.

4.22.26 E.O. 13045, PROTECTION OF CHILDREN

Executive Order 13045, requires each Federal agency to "identify and assess environmental risks 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 project has no environmental or safety risks that may disproportionately affect children. The project is in compliance.

4.22.27 E.O. 13089, CORAL REEF PROTECTION

No coral reefs will be impacted by this project due to the large distance between coral reefs and this project. This E.O. does not apply.

4.22.28 E.O. 13112, INVASIVE SPECIES

The project will help reduce the abundance and variety of invasive plant species in the project area. Best management practices will be implemented during the construction phase to preclude the introduction of additional invasive species. The project is in compliance with this E.O.

4.22.29 E.O. 13186 RESPONSIBILITIES OF FEDERAL AGENCIES TO PROTECT MIGRATORY BIRDS

The project will coordinated with the USFWS concerning migratory birds. The project is expected to benefit migratory birds by improved habitat and increased availability of forage species (amphibians, fish, aquatic invertebrates) for wading birds. The project is in compliance with this E.O.

5. LIST OF PREPARERS

5.1 PREPARERS AND REVIEWERS

The following individuals listed were responsible for contributing to the preparation, review and technical editing of the EA and proposed Finding of No Significant Impact (FONSI):

Name	Role
Barbara Cintron	Biologist, NEPA Coordination
Dan Hughes	Cultural Resources
Jim Riley	Water Quality and HTRW
Raphael Velez	Engineering Technical Lead
Daniel Crawford	Hydrology and Hydraulics
Donna George	Project Management
Michael Drog	Project Management
Steve Nguyen	Hydrology and Hydraulics

6. PUBLIC INVOLVEMENT

C-111 South Dade project features have been extensively coordinated with the public throughout the last several years. A GRR/EIS was completed in 1994. Project features described in the 1994 GRR/EIS were modified as a result of the IOP and the MWD 8.5 SMA design modifications. The IOP Supplemental Final EIS was completed in 2002 and another IOP Supplemental Final EIS was completed in 2006. The MWD 8.5 SMA GRR and EIS was completed in 2000, and the MWD 8.5 SMA EA for the Richmond Drive Seepage Collection Canal was completed in 2012. The 2012 NDA EA/FONSI was circulated for a 45 day public review period starting on February 20, 2012. Finally, this EA and Proposed FONSI will be circulated for a minimum 30-day review to concerned agencies, organizations, and the interested public.

7. LIST OF RECIPIENTS

The following agencies, groups, and individuals will be sent copies of this EA and proposed FONSI:

Native American Tribes
Miccosukee Tribe of Indians of Florida
Seminole Tribe of Florida

Federal Agencies
Federal Emergency Management Agency
US Environmental Protection Agency
US Department of Agriculture
Forestry Service
Natural Resources Conservation Service
US Department of Commerce
National Oceanic and Atmospheric Administration
Florida Keys National Marine Sanctuary
National Marine Fisheries Service
US Department of Housing and Urban Development
US Department of the Interior
Bureau of Indian Affairs
US Fish and Wildlife Service
US Geological Survey
National Park Service
Office of Environmental Policy and Compliance
US Coast Guard
US Department of Transportation
Federal Highway Administration
US Public Health Service

State Agencies
Florida Department of Agriculture and Consumer Services
Florida Department of Community Affairs
Florida Department of Environmental Protection
Florida State Clearinghouse
Florida Fish and Wildlife Conservation Commission
Florida Department of Transportation
Florida Division of Historical Resources - SHPO
South Florida Water Management District

Regional Governments
South Florida Regional Planning Council

County Governments
Miami-Dade County

Municipalities
Miami, Florida
Florida City
Homestead, Florida

Groups
Audubon Society of the Everglades
Biodiversity Legal Foundation
Miami-Dade County Farm Bureau
Dairy Farmers, Inc.
Defenders of Wildlife
Environmental Coalition of Broward County
Environmental Defense Fund
Everglades Coordinating Council
Everglades Foundation
Florida Audubon Society
Florida Biodiversity Project
Florida Defenders of the Environment
Florida League of Anglers, Inc.
Florida Power and Light Company
Florida Sportsman Conservation Association
Florida Wetlands
Florida Wildlife Federation
Friends of Florida
Friends of the Everglades
Izaak Walton League of America, Inc.
Lake Worth Drainage District
League of Women Voters
National Audubon Society
National Parks and Conservation Association
National Park Trust
National Resources Defense Council
National Sierra Club
National Parks Conservation Association
National Wildlife Federation
Save the Manatee Club
Sierra Club, Florida Chapter
South Florida Agricultural Council
South Florida Anglers for Everglades Restoration, Inc.
The Environmental Coalition
The Nature Conservancy

The Wilderness Society
Tropical Audubon Society
Trust for Public Lands
World Wildlife Fund

Individuals
A complete list of individuals who received the EA and FONSI is on file in the Jacksonville District of the Corps.

8. REFERENCES

EWES- US Army Engineer Waterways Experiment Station. 1990 "Archeological Inundation Studies" in Archeological Sites Protection and Preservation Notebook, Technical Notes ASPPN XI-2.

Florida Department of Environmental Quality. 2012. Air Quality Report. http://www.dep.state.fl.us/air/air_quality/techrpt/AMR2012.pdf

Smith, Greg C, Mason W. Sheffield, Leslie Raymer, Steve Koski, and Jennifer B. Langdale 2006 Cultural Resources Survey, C-111 Phase II and III, Dade County, Florida. Prepared for US Army Corps of Engineers, Jacksonville District by New South Associates, Stone Mt. GA.

USACE. 1994. Canal-111, Central and Southern Florida Project for Flood Control and Other Purposes, Final General Reevaluation Report and Environmental Impact Statement, Dade County, Florida. Jacksonville District, Jacksonville, Florida.

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

USACE. 2000. Central and Southern Florida Project, Modified Water Deliveries to Everglades National Park, Florida: 8.5 Square Mile Area. General Reevaluation Report and Final Supplemental Environmental Impact Statement.

USACE. 2000. Final Environmental Assessment, Central and Southern Florida Project for Flood Control and Other Purposes, Interim Structural and Operational Plan, Emergency Deviation from Test 7 of the Experimental Program of Water Deliveries to Everglades National Park for Protection of the Cape Sable Seaside Sparrow, Dade County, Florida. Jacksonville District, Jacksonville, Florida.

USACE. 2002. Interim Operational Plan for Protection of the Cape Sable Seaside Sparrow, Central and Southern Florida Project for Flood Control and Other Purposes, Final Environmental Impact Statement, Dade County, Florida. Jacksonville District, Jacksonville, Florida.

USACE. 2006. Interim Operational Plan for Protection of the Cape Sable Seaside Sparrow, Central and Southern Florida Project for Flood Control and Other Purposes, Final Supplemental Environmental Impact Statement, Miami-Dade County, Florida. Jacksonville District, Jacksonville, Florida. (ROD, May 2007.

USACE, 2012a. Environmental Assessment; Design Refinement for the 8.5 Square Mile Area, Miami-Dade County, Jacksonville, Florida

USACE. 2012b. Environmental Assessment for Expansion of Canal 111 (C-111) Detention Area and Associated Features South Miami-Dade County, Florida, Jacksonville, Florida, May 2012.

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

U.S. Fish and Wildlife Service. 1999b. South Florida Multi-Species Recovery Plan. Southeast Region, Atlanta, Georgia, USA.

USFWS. Designated CSSS Critical Habitat. Revised CSSS Critical Habitat Designation, p. 62766. Federal Register / Vol. 72, No. 214 / Tuesday, November 6, 2007.

USFWS. 2016 Endangered and Threatened Species webpages and tools: http://www.fws.gov./endangered. Individual species accounts.

U.S. Fish and Wildlife Service. 2002. Final Amended Biological Opinion, Interim Operational Plan for the Protection of the Cape Sable Seaside Sparrow (March 28, 2002).

U.S. Fish and Wildlife Service. 2006, 2010, Suppl. 2012. Biological Opinion, Interim Operational Plan for the Protection of the Cape Sable Seaside Sparrow (November 17, 2006); Everglades Restoration Transition Plan, 2010, 2012.

Ware, John A. 1989 Archeological Inundation Studies: Manual for Reservoir Managers, Contract Report EL-89-4, US Army Engineer Waterways Experiment Station, Vicksburg, MS.