DESIGN MODIFICATIONS
FOR THE CANAL 111 (C-111) PROJECT
MIAMI-DADE COUNTY, FLORIDA

DRAFT ENVIRONMENTAL ASSESSMENT

US ARMY CORPS OF ENGINEEERS
JACKSONVILLE DISTRICT

JUNE 2007

(this page intentionally left blank)

DRAFT FINDING OF NO SIGNIFICANT IMPACT

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

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

a. Will not adversely affect the overall existing fish and wildlife habitat.

b. A Biological Assessment has been prepared in accordance with Section 7 of the Endangered Species Act. Consultation with the U.S. Fish and Wildlife Service is ongoing and will be completed prior to the signing of this FONSI to be in compliance with the Endangered Species Act.

c. Will have no effect on any sites of cultural of historical significance and is in compliance with the National Historic Preservation Act.

d. Will not adversely affect the authorized purposes of the Central and Southern Florida Project.

e. Will not adversely affect water quality and will be in compliance with appropriate conditions in the State Water Quality Certification.

f. Will benefit wetlands 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 restoration of more natural hydroperiods resulting in more historic vegetation coverage.

_____ _____

Paul L. Grosskruger Date
Colonel, U.S. Army
District Commander

(this page intentionally left blank)

DRAFT ENVIRONMENTAL ASSESSMENT
CANAL 111 (C-111)
SOUTH DADE COUNTY, FLORIDA

TABLE OF CONTENTS

1.0 PROJECT PURPOSE AND NEED 1
1.1 PROJECT AUTHORITY 1
1.2 PROJECT LOCATION 1
1.3 HISTORY OF THE PROJECT 1
1.4 CURRENT STUDIES 6
1.4.1 Combined Structural and Operational Plan 6
1.4.2 Comprehensive Everglades Restoration Plan 6
1.5 PROJECT NEED 6
1.6 AGENCY GOAL OR OBJECTIVE 7
1.7 RELATED ENVIRONMENTAL DOCUMENTS 7
1.8 DECISION TO BE MADE 9
2.0 ALTERNATIVES 10
2.1 BACKGROUND 10
2.2 DESCRIPTION OF ALTERNATIVES 10
2.2.1 L-31W Borrow Canal backfilling 11
2.2.2 Discharge Canals for S-332B and S-332C 11
2.2.3 L-31W Tieback levee 11
2.2.4 S-332D tieback levee 12
2.2.5 East-West Levees 12
2.2.6 Partial connector levee 12
2.2.7 C-111 NDA Southern Divide Berm 12
2.3 PREFERRED ALTERNATIVE 19
3.0 AFFECTED ENVIRONMENT 27
3.1 CURRENT CONSTRUCTION STATUS OF THE C-111 PROJECT 27
4.0 ENVIRONMENTAL CONSEQUENCES 30
4.1 HYDROLOGY 30
4.2 ENVIRONMENTAL RESOURCES 31
4.3 THREATENED AND ENDANGERED SPECIES 32
4.3.1 Section 7 Consultation 32
4.4 WATER QUALITY 33
4.5 AIR QUALITY 34
4.6 NOISE 34
4.7 AESTHETICS 35
4.8 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE 35
4.9 RECREATION 35
4.10 CULTURAL RESOURCES 35
4.11 CUMULATIVE IMPACTS 36
4.12 IRRETRIEVABLE OR IRREVERSIBLE COMMITMENT OF RESOURCES 36

4.13 UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS 36
4.13.1 Land Use 36
4.13.2 Wetlands 37
4.13.3 Water Quality 37
4.13.4 Air Quality 37
4.13.5 Soils 37
4.13.6 Wildlife 37
4.13.7 Threatened and Endangered Species 37
4.14 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES AND LONGTERM PRODUCTIVITY 37
4.15 COMPATIBILITY WITH FEDERAL, STATE, AND LOCAL OBJECTIVES 38
4.16 ENVIRONMENTAL COMMITMENTS 38
4.17 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS 39
4.17.1 National Environmental Policy Act of 1969 39
4.17.2 Endangered Species Act of 1973 39
4.17.3 Fish and Wildlife Coordination Act of 1958 39
4.17.4 National Historic Preservation Act of 1966 (Inter Alia) 39
4.17.5 Clean Water Act of 1972 39
4.17.6 Clean Air Act of 1972 39
4.17.7 Coastal Zone Management Act of 1972 40
4.17.8 Farmland Protection Policy Act of 1981 40
4.17.9 Wild and Scenic River Act of 1968 40
4.17.10 Marine Mammal Protection Act of 1972 40
4.17.11 Estuary Protection Act of 1968 40
4.17.12 Federal Water Project Recreation Act 40
4.17.13 Fishery Conservation and Management Act of 1976 40
4.17.14 Submerged Lands Act of 1953 40
4.17.15 Coastal Barrier Resources Act and Coastal Barrier Improvement Act of 1990 41
4.17.16 Rivers and Harbors Act of 1899 41
4.17.17 Anadromous Fish Conservation Act 41
4.17.18 Bald Eagle Protection Act 41
4.17.19 Migratory Bird Treaty Act and Migratory Bird Conservation Act 41
4.17.20 Magnuson-Stevens Fishery Conservation and Management Act 41
4.17.21 Marine Protection, Research and Sanctuaries Act (MPRSA) 41
4.17.22 Resource Conservation and Recovery Act (RCRA), Comprehensive Environmental Response Compensation and Liability Act (CERLA), Toxic Substances Control Act of 1976 41
4.17.23 E.O. 11988, Flood Plain Management 41
4.17.24 E.O. 11990, Protection of Wetlands 42
4.17.25 E.O. 12898, Environmental Justice 42
4.17.26 E.O. 13089, Coral Reef Protection 42
4.17.27 E.O. 13112, Invasive Species 42
4.17.28 E.O. 13186 Responsibilities of Federal Agencies to Protect Migratory Birds 42
5.0 LIST OF PREPARERS **43**
5.1 PREPARERS 43
6.0 PUBLIC INVOLVEMENT **44**
6.1 LIST OF RECIPIENTS 44
6.2 COMMENTS RECEIVED AND RESPONSE 46

LIST OF FIGURES

FIGURE 1: PROJECT LOCATION MAP

FIGURE 2: THE 1994 GRR PLAN.
FIGURE 3: INTERIM OPERATIONAL PLAN
FIGURE 4: PREFERRED ALTERNATIVE
FIGURE 5: FEATURES OF THE EXPANDED NDA
FIGURE 6: FEATURES OF THE C-111 PROJECT CONSTRUCTED TO DATE (EXISTING CONDITIONS)

LIST OF TABLES

TABLE 1. COMPARISON OF C-111 AUTHORIZED 1994 GRR COMPONENTS VERSUS THE CSOP TSP

LIST OF ABBREVIATIONS AND ACRONYMS

BC	Borrow Canal
BNP	Biscayne National Park
BO	Biological Opinion
C-x	Canal
C&SF	Central and Southern Florida Project
CAR	Coordination Act Report
cfs	Cubic Ft per Second
Corps	US Army Corps of Engineers (see also USACE)
CSSS	Cape Sable Seaside Sparrow
CSOP	Combined Structural and Operational Plan
EA	Environmental Assessment
EDR	Engineering Documentation Report
EIS	Environmental Impact Statement
ENP	Everglades National Park
EO	Executive Order
EPA	US Environmental Protection Agency
ESA	Endangered Species Act
FCA	Flood Control Act
FDA	Frog Pond Detention Area
FDEP	Florida Department of Environmental Protection
FFWCC	Florida Fish and Wildlife Conservation Commission
FONSI	Finding of No Significant Impact
GRR	General Reevaluation Report
HTRW	Hazardous, Toxic, and Radioactive Waste
IOP	Interim Operational Plan
ISOP	Interim Structural and Operational Plan
L-x	Levee
MWD	Modified Water Deliveries (to ENP)
NDA	Northern Detention Area
NEPA	National Environmental Policy Act
NGVD	National Geodetic Vertical Datum
PL	Public Law
ROD	Record of Decision
RPA	Reasonable and Prudent Alternative
S-x	Pump Station, Spillway, or Culvert (Structure)
SDA	Southern Detention Area
SFWMD	South Florida Water Management District
SMA	Square Mile Area
SPF	Standard Project Flood
STA	Stormwater Treatment Area
TL	Tieback Levee
USACE	US Army Corps of Engineers (see also Corps)
USFWS	US Fish and Wildlife Service
WQC	Water Quality Certification
WRDA	Water Resources Development Act

DRAFT ENVIRONMENTAL ASSESSMENT FOR CANAL 111 (C-111) SOUTH DADE COUNTY, FLORIDA

1.0 PROJECT PURPOSE AND NEED

1.1 PROJECT AUTHORITY

The Canal 111 (C-111) project was constructed as part of the Everglades National Park (ENP) – 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). Further modifications to the C-111 were authorized as an addition to the C&SF project in the Water Resources Development Act (WRDA) of 1996 (PL 104-303) to protect the natural values associated with the ENP, while maintaining flood damage reduction within the C-111 basin east of L-31N and C-111.

1.2 PROJECT LOCATION

The project is located in southern Miami-Dade County and extreme southeastern Florida (***Figure 1***). It is situated within the C-111 basin which includes roughly 100 square miles of mostly agricultural lands in the Homestead/Florida City area. The project adjoins ENP to the west, and discharges to the eastern panhandle of ENP, Florida Bay, Manatee Bay and Barnes Sound.

1.3 HISTORY OF THE PROJECT

In the late 1950s local interests in southern Dade County requested the C&SF project be modified to provide an adequate system of canals to provide drainage for urban development, with water control structures to prevent over-drainage of agricultural lands and contamination of groundwater by saltwater intrusion. The United States Army Corps of Engineers (USACE) published a Survey Review Report on South Dade County in 1959, which was published in Senate Document 87-138 and authorized by the 1962 FCA. The FCA of 1962 authorized a project for southern Dade County to remove 40-percent of the standard project flood runoff from the drainage area, to reduce depth and duration of larger floods, and to provide water control to prevent over-drainage of the area. To accomplish this, the plan provided for gravity drainage of the South Dade area by a primary system of 12 canals, including the C-111, and provided the necessary outlets to serve a system of secondary canals proposed by local interests. Local interests were responsible for constructing and maintaining lateral drainage facilities as necessary to realize the benefits made available by the federally authorized project improvements.

The plan recommended in the 1962 Act was reviewed in the 1963 General Design Memorandum for South Dade County and was modified to effect conciliation of the desires of the ENP, local interests, and land developers. The plan was designed to:

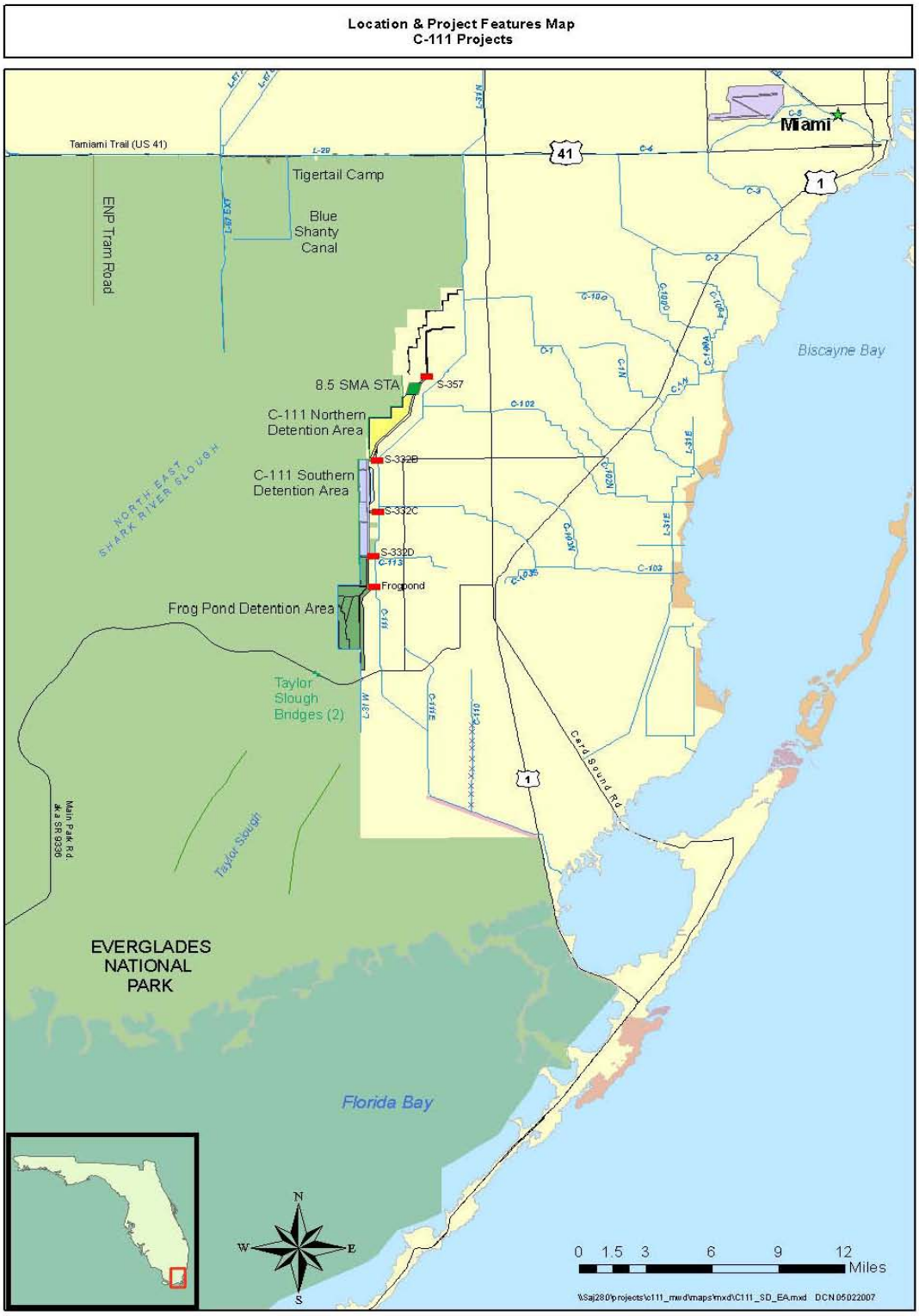

FIGURE 1: PROJECT LOCATION MAP

remove the 40-percent standard project flood (SPF) from the entire drainage area without exceeding the design water surface profile, reduce the depth and duration of floods of greater magnitude than the 40-percent SPF, prevent over-drainage of the area by maintaining optimal water levels in the project canals, insofar as possible, and controlling discharge within permissible limits, prevent saltwater intrusion from entering the area through the canals and water control structures, and provide facilities to convey up to 500 cubic feet per second to ENP when normal runoff is available within the natural drainage limits.

The proposed plan required the construction of L-31N and L-31W and their borrow canals for a distance of 21 miles, extending south from the existing part of L-31N to a point about 1.5 miles south of State Road 27. The purposes of the L-31N and L-31W canals and levees were to protect South Dade County area from overflow from the west and to provide water supply to ENP.

The ENP-South Dade Conveyance System was authorized by the 1968 FCA. In the 1973 General Design Memorandum for the plan outlined in the 1968 FCA, modifications included enlarging existing canals such as the C-111 to permit supplemental water supply from Water Conservation Area 3A to south Dade County and ENP. The plan was designed to serve the dual purpose for water control; (1) to maintain adequate elevations in the canals to recharge groundwater and (2) maintain head at the coastal structures to prevent saltwater intrusion. In addition to maintaining water surface elevations, the plan recognized that adequate head must be available to transport or convey water throughout the system and yet not create excessive transient seepage losses with too high a water surface elevation. No additional flood damage reduction beyond the level provided in the 1962 authorization was authorized for the C-111 area as a result of this Act. The USACE terminology has shifted towards the use of the term “flood damage reduction” projects, as opposed to “flood damage protection” projects, to better convey the intended function of federally authorized flood projects.

Environmental concerns caused construction to be discontinued before all authorized project features recommended in the 1962 FCA were completed. In 1970, Congress enacted PL 91-282 which prescribed a monthly schedule of minimum water deliveries that must be provided to ENP from the C&SF project. From 1983 through 1988 additional studies were conducted to complete the authorized plan of improvement for flood control, environmental enhancement and water management in the C-111 basin as constructed. The recommended plan contained in the 1988 C-111 GDM Addendum 2 focused on preventing large, damaging discharges to Barnes Sound via S-197 and to increase flows to northeast Florida Bay via flows from the lower C-111. From 1988 to 1990, several actions developed which changed the scope and schedule for completion of the C-111 report.

The United States Congress, finding that the ENP is a nationally and internationally significant resource and the park has been adversely affected and continues to be adversely affected by external factors which have altered the ecosystem including the natural hydrologic conditions within the park, enacted in 1989 the ENP Protection and Expansion Act (PL-101-229). The Secretary of the Army was directed in the analysis, design and engineering associated with completion of works and operations in the C-111 basin area of the East Everglades, to take all measures which are feasible and consistent with the purposes of the C&SF project to protect natural values associated with ENP. The Act further stated in Section 104 that nothing in this

section should be construed to limit the operation of C&SF project facilities to achieve their design objectives, as set forth in the Congressional authorization and any subsequent modifications thereof.

From 1989 to 1994, the Corps continued to work with the South Florida Water Management District (SFWMD), ENP and US Fish and Wildlife Service (USFWS) to address plans which would protect the natural values of ENP while preserving the other authorized project purposes. As a result of this continued project reformulation effort to reconcile the desires of the stakeholders and complete the C-111 project in response to the 1962 and 1968 FCAs, PL 91-282, and the legislative direction contained in the ENP Protection and Expansion Act of 1989 requiring the Secretary of the Army to "take all measures which are feasible and consistent with the purposes of the (C-111) project to protect natural values associated with the ENP", the USACE completed the C-111 General Reevaluation Report (GRR) in 1994. The 1994 GRR plan is shown on Figure 2.

The 1994 C-111 GRR recommended additional modifications to provide restoration of the ecosystem in Taylor Slough and the eastern panhandle of ENP, while maintaining flood damage reduction within the C-111 basin. One of the objectives stated in the C-111 GRR was to preserve the existing level of flood damage reduction in the C-111 basin east of L-31N and C-111. The document also states that the original operating levels and discharge capacities were intended to provide flood damage reduction for storms up to the 40-percent SPF. The 1994 GRR further states that the flood protection preservation objective involves maintaining the original design canal stages and discharge capacities while restoring more natural hydrologic conditions within ENP. The design optimal canal stages are summarized in Section 2.2 of the 1994 GRR. All alternatives examined in the C-111 GRR, including the recommended plan, were evaluated based on maintaining design optimal canal stages under these flood conditions. Results of these evaluations indicated that the additional capacity provided by the S-332A, B, C and D pump stations addressed the objective of maintaining flood capacity by pumping to the buffer area and discharging surface waters to ENP. The 1994 GRR further identified that although the plans were evaluated using design optimal canal stages, the focus of the GRR was to develop a structural plan that provided the greatest flexibility in providing restoration while maintaining flood damage reduction. Therefore, the purpose of the 1994 GRR was to maintain the level of flood damage reduction already provided by the authorities of the FCAs of 1962 and 1968, not to augment or diminish these already existing benefits.

In February 1999, the USFWS found that operations of the system were likely to cause "jeopardy" to the Cape Sable seaside sparrow (CSSS). The USFWS issued a Final Biological Opinion (BO) under provisions of the Endangered Species Act (ESA) that presented a

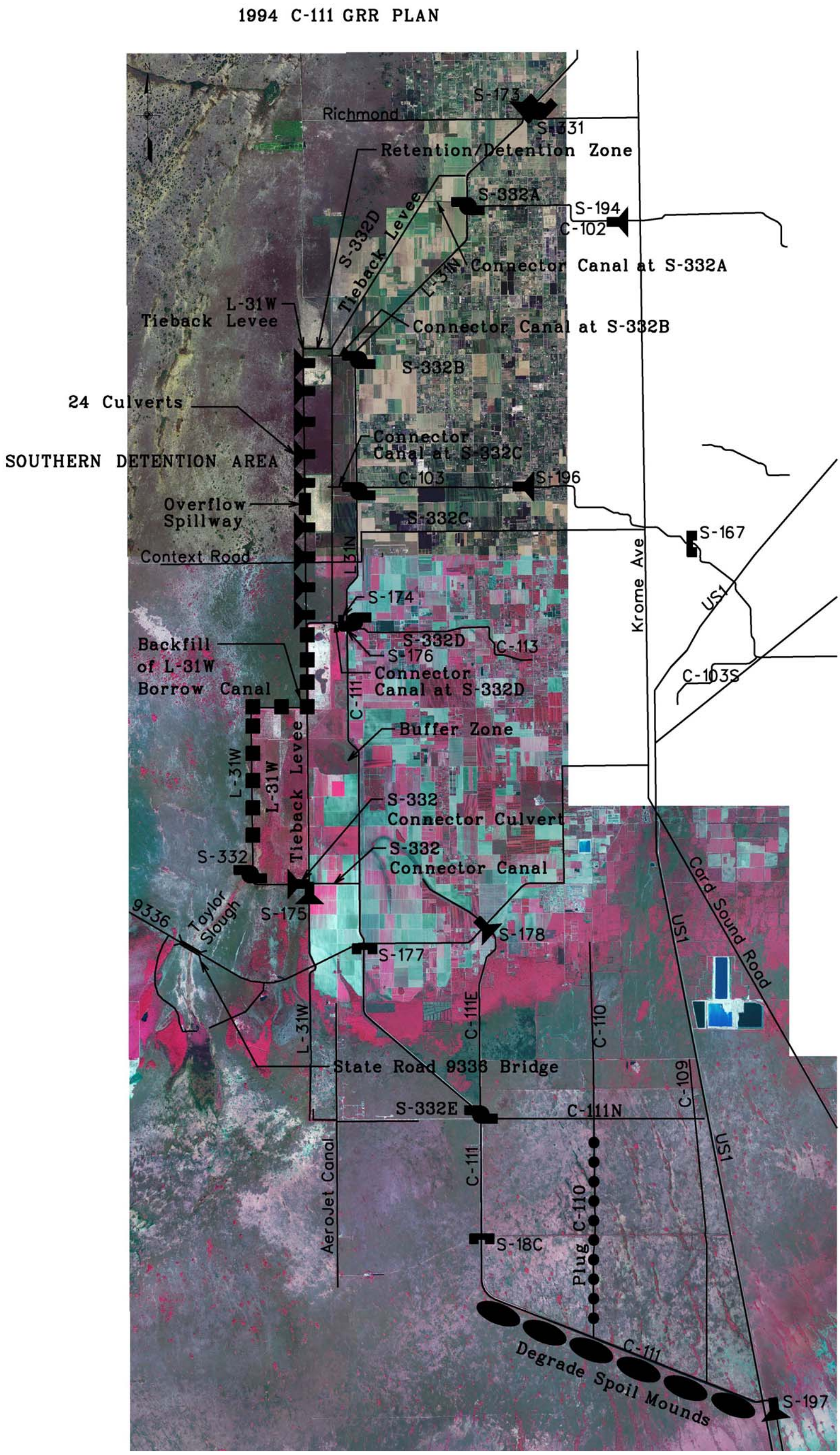

FIGURE 2: THE 1994 GRR PLAN (NO ACTION PLAN)

Reasonable and Prudent Alternative (RPA) to avoid jeopardizing the sparrow during the interim period leading up to completion of the Modified Water Delivery (MDW) project. The USFWS RPA recommended that certain hydrologic conditions be maintained in the sparrow's breeding habitat to avoid jeopardizing the continued existence of the species.

The USFWS BO ended the Experimental Program of Water Deliveries to ENP and brought about 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 IOP was signed in July 2002, and IOP was implemented to continue USFWS RPA protective measures for the CSSS. The IOP is shown on ***Figure 3.***

1.4 CURRENT STUDIES

1.4.1 Combined Structural and Operational Plan

The Combined Structural and Operational Plan (CSOP) is an integrated structural and operational plan for two modifications of the C&SF Project – the MWD project and the C-111 canal project. The purpose of CSOP is to define the operations for the C-111 and MWD projects that are consistent with their respective project purposes as defined by their authorizing legislation and further refined by subsequent general design memoranda (GDM) and general re-evaluation reports (GRR). This Environmental Assessment (EA) will reference CSOP often since CSOP will ultimately define C-111 operations and integrate those with MWD operations. The system in the study area is currently operated pursuant to the IOP (May 2002).

1.4.2 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. It covers 16 counties over an 18,000-square-mile area and centers on an update of the Central & Southern Florida (C&SF) Project also known as the Restudy. The goal of CERP is to capture fresh water that now 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 dying ecosystem. The remaining water will benefit cities and farmers by enhancing water supplies for the south Florida economy. CERP was authorized in the Water Resources Development Act (WRDA) of 2000. It includes more than 60 elements, will take more than 30 years to construct and will cost an estimated $7.8 billion. There are several elements in CERP that are inter-related with some of the features of the C-111 Project modifications to the C&SF Project, especially the C-111 Spreader Canal. See http:///www.evergladesplan.org for more information on CERP.

1.5 PROJECT NEED

The problems associated with the C-111 Project include flood damage reduction and the negative impact on environmental resources due to alteration of the natural hydrology, including the natural values associated with the Everglades National Park (e.g. Cape Sable seaside

sparrow, snail kite, manatee and crocodile, Loxahatchee peat forming wetlands, and tree islands), damaging freshwater flows to Manatee Bay / Barnes Sound, and the need for increasing flows to northeast Florida Bay from the lower C-111 basin. The Corps seeks to improve undesirable resource conditions in Taylor Slough, the eastern panhandle of ENP, Manatee Bay, and Barnes Sound, while maintaining flood protection within the C-111 basin as described in the Corps' 1994 Final Integrated General Re-evaluation Report and Environmental Impact Statement (EIS), Canal 111, South Dade County, Florida (C-111 GRR/EIS). Features of the authorized plan that resulted from the 1994 GRR/EIS have been adjusted in the years since completion of the C-111 GRR/EIS. Certain alterations were previously documented in the Corps' 2002 Final EIS and 2006 Final Supplemental EIS for the IOP for Protection of the CSSS. The Corps has prepared an Engineering Documentation Report (EDR) that defines the design refinements for the C-111 project that have not been included in previous design documents. The purpose of this EA is to record and evaluate those modifications to the C-111 project described in the EDR that have not been addressed in previous National Environmental Policy Act (NEPA) documents (i.e. ISOP EA, 2002 IOP FEIS, and 2006 IOP FSEIS). Any modifications described in the EDR that have been deferred to future projects (e.g. C-111 Spreader Canal) will also not be addressed in this EA.

1.6 AGENCY GOAL OR OBJECTIVE

The C-111 project is designed to restore hydrological conditions in Taylor Slough and the eastern panhandle of ENP, eliminate damaging freshwater flows to Manatee Bay, and Barnes Sound in Biscayne National Park (BNP), and maintain flood protection within the C-111 basin.

1.7 RELATED ENVIRONMENTAL DOCUMENTS

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

- *1994 C-111 General Reevaluation Report and Supplemental Environmental Impact Statement* – an integrated planning and NEPA document that concluded with the selection of Alternative 6A as the approach that provided the greatest potential for habitat improvement while maintaining flood protection. A ROD was signed in November 1994.
- *1999 Central and Southern Florida Project Comprehensive Review Study (Restudy)* - this feasibility report was submitted to Congress on 1 July 1999 and was approved in December of 2000. The Restudy was thereafter renamed the Comprehensive Everglades Restoration Project (CERP).
- *2000 Final Environmental Assessment, 2000 Emergency Actions to Protect the Cape Sable Seaside Sparrow –ISOP* - a NEPA document prepared to address structural and operational modifications to the C-111 project to meet the conditions of the USFWS RPA included in their 1999 B.O. on the CSSS.
- *2000 8*.5 *Square Mile Area General Reevaluation Report and Final Supplemental Environmental Impact Statement* – a combined planning and NEPA document issued to address alternatives to mitigate potential flooding within the 8.5 SMA resulting from increased stages associated with the Modified Water Deliveries to Everglades National Park Project.

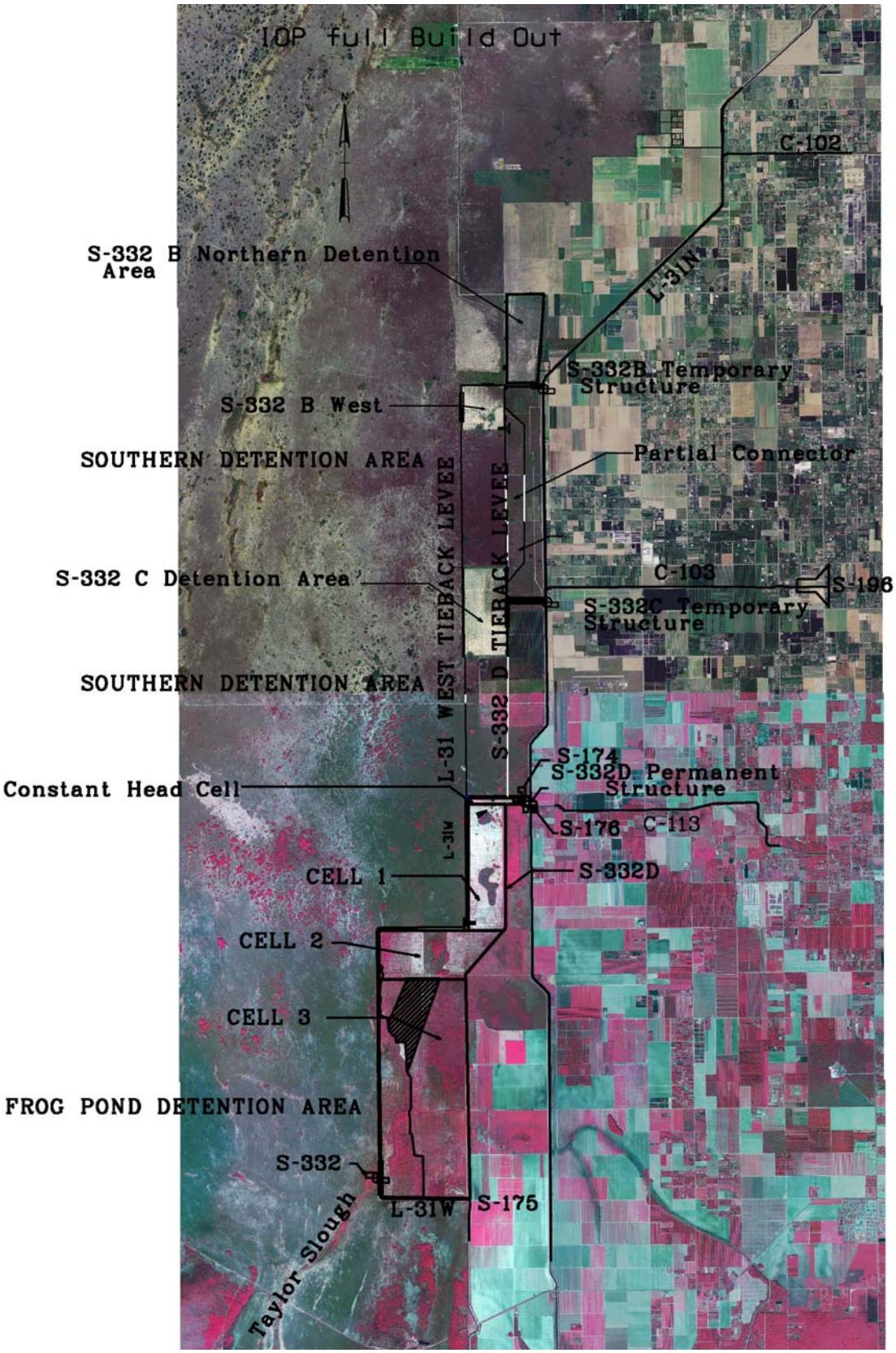

FIGURE 3: INTERIM OPERATIONAL PLAN

- *2002 Interim Operating Plan for the Protection of the Cape Sable Seaside Sparrow Final Supplemental EIS* – A NEPA document exploring alternative operational approaches for C&SF features in C-111 study area and beyond. Alternative 7R was recommended in the 2002 report. This alternative dictates current operations of C&SF Project features in the C-111 study area. A ROD was signed in January 2002.
- *2006 Interim Operating Plan for the Protection of the Cape Sable Seaside Sparrow Final Supplemental Environmental Impact Statement* – A NEPA document issued in response to a March 2006 court order resolving a lawsuit by the Miccosukee Tribe regarding NEPA compliance and other matters related to IOP. This FSEIS discusses IOP Alternative 7R model output and structural features as well as actual operations since IOP began in 2002. No ROD has been signed to date.
- *Combined Structural and Operational Plan Draft General Reevaluation Report and Environmental Impact Statement* – This integrated planning and NEPA document is under preparation. It concerns an integrated structural and operational plan for two modifications of the C&SF Project: MWD and the C-111 project. The purpose of CSOP is to define the operations for the C-111 and MWD projects that are consistent with their respective project purposes. The Draft CSOP GRR/EIS is scheduled to be released during the third quarter of calendar year 2007.

1.8 DECISION TO BE MADE

The Corps is considering whether to reconfigure structural design of elements of the authorized 1994 C-111 GRR, in a consistent manner to enhance water deliveries to Everglades National Park while maintaining the other authorized purposes of the Project. The C-111 project is not being reformulated. It is more accurate to say that features of the plan are being optimized.

2.0 ALTERNATIVES

2.1 BACKGROUND

The Corps considered alternatives for meeting project goals when completing the 1994 C-111 GRR/EIS. An interdisciplinary team with members from the US Environmental Protection Agency (EPA), ENP, USFWS, Florida Fish and Wildlife Conservation Commission (FFWCC), Florida Department of Environmental Protection (FDEP), and the South Florida Water Management District (SFWMD) assisted in the preparation of the 1994 report. Several features of the authorized plan in the 1994 C-111 GRR/EIS have been adjusted in the years since completion of the report. Some of these modifications have been previously documented in the Corps' 2002 Final EIS and 2006 Final Supplemental EIS for the IOP for Protection of the CSSS.

The Corps has prepared an Engineering Documentation Report (EDR) to define the structural design refinements for the C-111 project that have not been included in previous design documents. The EDR describes structural design refinements to the 1994 C-111 GRR and new components incorporated to maintain the authorized purposes of the C-111 Project—restore more natural hydroperiods in Taylor Slough in the ENP and lower section of C-111, and address flooding problems in the adjacent urban and agricultural areas of the C-111 basin in an acceptable and implementable manner. In this EA, the Corps is evaluating whether to refine structural elements of the authorized C-111 project, as described in the EDR. The 1994 C-111 GRR plan as a whole is not being reformulated. Rather, features of the plan are being optimized. These refinements are based on lessons learned, design changes, implementation strategy resulting from emergency contracts (e.g. IOP), and evaluations performed by the CSOP PDT, since the approval of the 1994 C-111 GRR. The CSOP PDT evaluated five alternative plans, considering the authorized objectives of the C-111 Project and the MWD to ENP Project. All of the five alternative plans included these structural design refinements to the 1994 C-111 GRR/2002 IOP, which remained constant across all five plans. Additional information on the evaluation of CSOP alternative plans will be included in the draft CSOP GRR, currently scheduled for completion fall 2007, or can be requested from Mr. Ernest Clarke, U.S. Army Corps of Engineers, Planning Division, at (904) 232-1199 or e-mail at ernest.clarke@saj02.usace.army.mil.

2.2 DESCRIPTION OF ALTERNATIVES

The No Action Alternative is the authorized C-111 project as described in the 1994 C-111 GRR (***Figure 2***) and modified by IOP in 2002. The No Action Alternative consists of both structural and non-structural modifications to the existing C&SF Project within the C-111 basin. Structural components of the plan include the construction or modification of nine canals, the construction of the L-31 tieback levee and S-332D tieback levee, construction of five pump stations, and replacement of the existing bridge over Taylor Slough within the ENP. The No Action Alternative calls for the removal of existing materials placed along the southerly leg of C-111 with these materials to be used as fill for the L-31 W tieback levee. Non-structural components

of the No Action Alternative include the acquisition of over 11,866 acres of land, including the Frog Pond and Rocky Glades, and the relocation of approximately four residential structures which are expected to be impacted by project implementation.

Alternative Number 1 in this EA (***Figure 4***; Preferred Alternative) reconfigures some features of the authorized plan. ***Table 1*** is a feature-by-feature comparison of the No Action Alternative and Alternative Number 1. Features in ***Table 1*** are arranged in four groups, those authorized features:

1. not changing in Alternative Number 1
2. that previously changed as a result of detailed design or IOP with no additional changes proposed under Alternative Number 1.
3. that were eliminated in Alternative Number 1
4. that were modified in Alternative Number 1

The original intent of each feature and the reason for the proposed modification are also included in ***Table 1***.

2.2.1 L-31W Borrow Canal backfilling

The L-31W borrow canal parallels the northern and western extent of the Frogpond Area. . The frog pond area or Frog Pond Detention Area (FPDA) extends south from S-332D pump station to the C-111 canal. Several different scenarios for backfilling the canal were discussed among the PDT from complete backfill to partial backfill. The recommended plan was decided upon to minimize impacts to recreational users within the lower part of the L-31W BC south of S-175 and to maximize restoration benefits north of S-175 by using a combination of partial and complete backfill, respectively. Material from the C-111 spoil mound removal contract that was stockpiled within the Frogpond would be used to accomplish the backfill. A detailed listing of locations of partial and complete backfilling can be found in the Engineering Appendix.

2.2.2 Discharge Canals for S-332B and S-332C

The 1994 C-111 GRR called for concrete lined channels to convey discharges from the respective pump station to the retention/detention area. During the ISOP and IOP construction projects to expedite construction corrugated metal pipe (CMP) was used as an interim solution. An additional alternative was looked at that used a flowway system to convey water to the detention area. The flowway was decided upon for both structures to save construction/maintenance cost and add detention area.

2.2.3 L-31W Tieback levee

The intent of this levee is to serve as the western side of the C-111 North Detention Area (NDA) and South Detention Area (SDA). The NDA starts at the S-332B pump station and runs north to the 8.5 SMA. The SDA starts at the S-332B pump station and runs south to the S-332D pump Station. Several different alternatives for the levee alignment were looked at and evaluated. Discussions went from placing the levee centered on ENP boundary, to the western toe placed on ENP's boundary, to offsetting the western toe a prescribed distance from the park boundary. In the end for the protection of the National Park and to maximize the use of project lands the western toe was offset 150 feet from the park boundary and 200 feet at emergency overflow weirs, except in areas where levees had already been constructed.

2.2.4 S-332D tieback levee

The intent of the levee is to serve as the eastern side of the C-111 NDA and SDA. Several different alternatives for the levee alignment were looked at and evaluated. The location was chosen to maximize the detention area footprint, minimize return seepage to the L-31N canal, and maximize the use of project lands. It was decided to maintain a half mile distance between the tieback levee, except in areas where levees had already been constructed, and L-31N.

2.2.5 East-West Levees

These levees were constructed as part of the ISOP and IOP emergency contracts to allow the incremental construction of the hydraulic ridge (S-332B west and S-332C Detention Areas) on lands owned by the local sponsor. Two alternatives were looked at for these levees. One utilized these levees as intermediate wave breaks within the detention area due to the long north-south length of the C-111 SDA. The other looked at the complete removal of the levees. It was decided to completely remove the levees to maximize the storage capacity of the detention and that the low depths and vegetation within the area would minimize wave effects in the area.

2.2.6 Partial connector levee

This levee segment was part of the IOP construction plan as a back-up plan if the Land Swap lands of ENP were not available during construction to connect the S-332B west and S-332C Detention areas. Due to two parcels within this area that could not be obtained during construction this connection was not finalized. In the early stages it was debated whether or not to remove/leave this area as part of the final project. It was decided that this area would be connected as planned and used as additional storage areas during wet periods. The culvert structures would connecting the area to the C-111 SDA would be set to allow a water level in the detention area before utilizing this additional storage.

2.2.7 C-111 NDA Southern Divide Berm

This berm segment with two overflow sections was added to minimize the amount of levee that would have to be degraded from the IOP construction of the S-332B north detention area. This was a cost saving and also helped maximize the usage of project lands adding more storage capacity to the overall system. Overflow weirs to the west through L-31W Tieback Levee

The 1994 GRR had one overflow weir that worked in conjunction with 24 stop-log risers through the L-31W Tieback Levee. Several locations were looked at for the overflow weirs from directly west of the pump station inflow points to locations that maximized this distance. It was decided to provide the greatest protection to ENP that locations would be set a maximum distance from inflow points. S-332 B Discharge Control Structure

Two alternatives were looked at for the determination of the S-332B Flowway. S-332B Flowway is located between the C-111 NDA and SDA it was debated whether to connect these areas as one large area or leave them separated. The decision was made to keep the areas separated and the ability to distribute the flows either north or south from the pump station. By being able to send any combination of the flows either north or south maximizes the operational flexibility of the two detention systems.

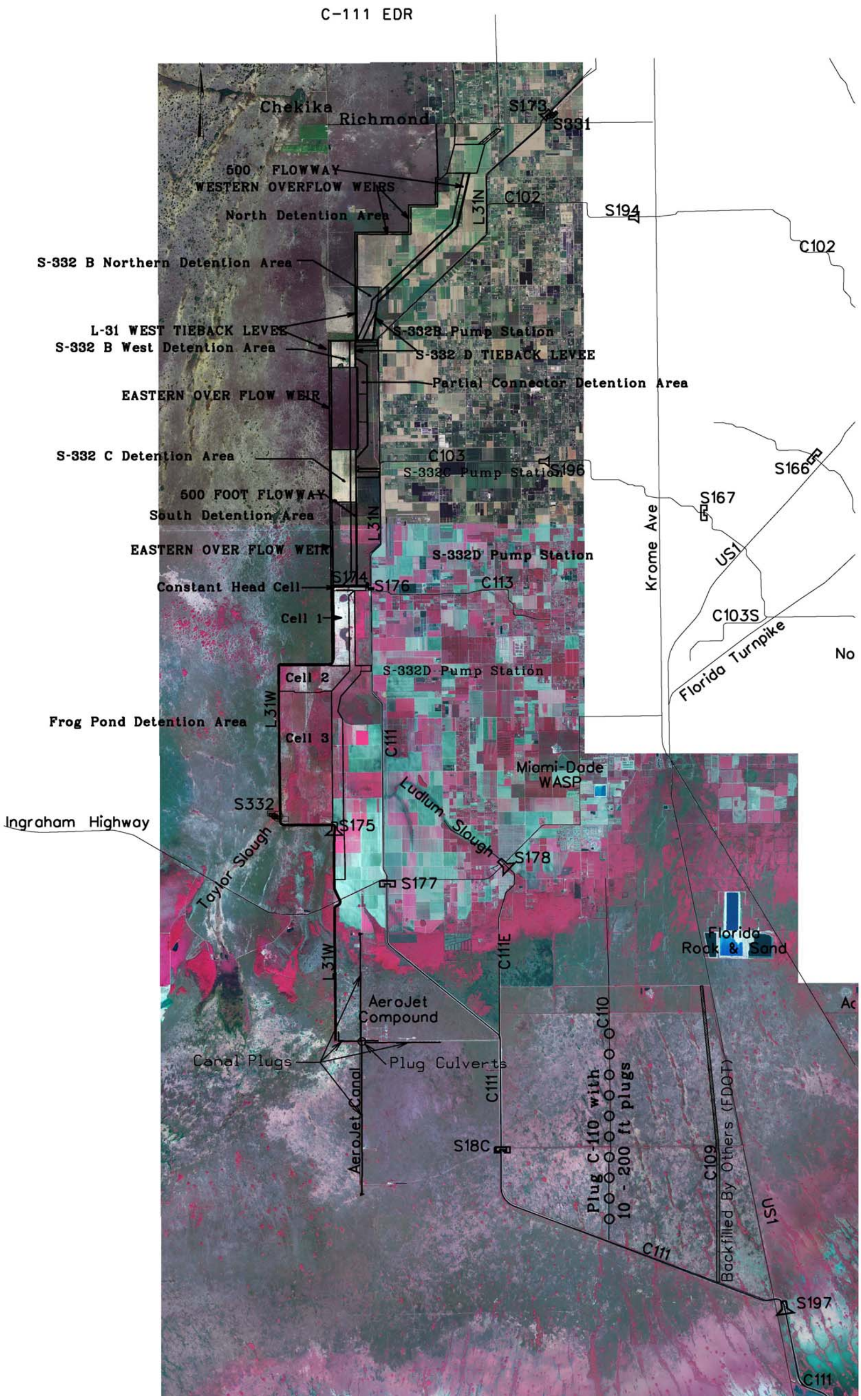

FIGURE 4: PREFERRED ALTERNATIVE

TABLE 1. COMPARISON OF C-111 AUTHORIZED 1994 GRR COMPONENTS VERSUS THE CSOP TSP

Feature	Authorized in 1994 GRR	Purpose of Authorized Feature	Alternative 1 Modifications	Reason for Proposed Modification
Features not changing				
State Road 9336	Replace existing bridge with a longer bridge, elevated roadway, or series of culverts over Taylor Slough.	Establish more historic sheet flow patterns in Taylor Slough,	No change. Feature has been constructed.	N/A
Canal C-111	Degrade the disposal banks on the southern side of the canal along the east-west run of C-111 upstream S-197.	Improve flow into the ENP panhandle.	No change. Feature has been constructed.	N/A
C-111 N	Construct a canal from the C-111/C-111E confluence eastward.	Initiate sheetflow southward towards the ENP panhandle through the southern glades.	No change. This feature is deferred to CERP C-111 Spreader Canal Project.	N/A
Canal C-109	Create nine canal plugs in the C-109 canal using material from the C-111 spoil mounds.	Promote sheet flow from within the southern glades.	No change. FDOT has completed this.	N/A
Canal C-110	Create ten canal plugs in the C-109 canal using material from the C-111 spoil mounds.	Promote sheet flow within the southern glades.	No change. This feature is deferred to CERP C-111 Spreader Canal Project.	N/A
S-332E	A 50 cfs diesel driven pump.	Promote sheet flow south towards the ENP panhandle.	No change. This feature is deferred to CERP C-111 Spreader Canal Project.	N/A

Feature	Authorized in 1994 GRR	Purpose of Authorized Feature	Alternative 1 Modifications	Reason for Proposed Modification
Features that previously changed but with no additional change proposed under Alternative Number 1.				
S-332D Pump Station	A 300 cfs diesel driven pump station with 4 pumps (75 cfs each).	Discharge into the southern part of the C-111 retention/detention area.	No change. Feature modified during design and the 2002 CSSS emergency.	No Change
L-31W TL	Segment 1 would start near S-175 on the L-31W levee and proceed north for three miles tying back into the L-31W levee. Segment 2 would start roughly 1 mile west of S-174 on the L-31W levee and proceed north to high ground within the rocky glades.	Segment 1 completes the L-31W TL allowing the removal of parts of the L-31W levee, which restores part of the Frog Pond. Segment 2 forms the western boundary of the retention/detention area.	TL extended north to the 8.5 Square Mile Area (SMA) perimeter levee and realigned to create the Frog Pond Detention Area (FDA). Levee elevations would be increased from 7-10.5 ft to 12-14 ft (NGVD 1929). Portions were completed as part of the 2000 and 2002 CSSS emergency contracts.	Extend the retention/detention area further north to minimize seepage losses from and preventing direct discharge to ENP. Levee heights increased to add to storage volume to prevent overflow.
S-332D TL	TL starting at the S-332D, proceeding north parallel to L-31N and tying into high ground in the rocky glades south of Richmond Drive.	Forms the eastern part of the retention/detention area and creates a buffer between the L-31N and new levee to prevent discharges from S-332A from flowing back towards the L-31N levee.	Realign TL from the L-31W levee west of S-174 north to the 8.5 SMA Stormwater Treatment Area. Levee elevations would be increased from 7-10.5 ft to 12-14 ft (NGVD 1929). Portions completed as part of the 2000 and 2002 CSSS emergency contracts.	Forms the eastern levee for the SDA and NDA.
L-31W Borrow Canal (BC) /S332D	Line with concrete ½ mile of the existing L-31W BC downstream of S-174 to the west side of the S-332D TL.	Convey water taken from the L-31N BC to the retention/detention area. The concrete lining inhibits seepage.	Change the conveyance to a high head cell that feeds water to the FDA. This feature was constructed in 2002 as part of the CSSS emergency work.	Unnecessary with the incorporation of the FDA.

Feature	Authorized in 1994 GRR	Purpose of Authorized Feature	Alternative 1 Modifications	Reason for Proposed Modification
Features eliminated in Alternative Number 1				
Three 84" CMP w/flap gates	Corrugated metal pipes with flap gate controls.	Allow the delivery of water to the Levee-31 (L-31) W BC to deliver water to Structure-332 (S-332) and S-175 while preventing water from draining from L-31W BC.	Eliminated.	With the incorporation of the Frog Pond Detention Area (FDA) S-332 is no longer needed to provide flows to Taylor Slough.
Twenty-four 36 inch culverts with risers	Culverts with an invert of 3.5 ft (2.5-3 ft below grade) and the risers would have 48 inch length.	Structures would be located on the west side of the retention/detention in the L-31W TL discharging west into ENP.	Eliminated	Protect ENP from surface water discharges.
S-332A	A 300 cfs diesel driven pump station with 4 pumps (75 cfs each).	Provide flows to the Taylor Slough headwaters in the northern part of the rocky glades and aid with flood protection.	Eliminated	Easier to increase the capacity at S-332B and S-322C. Also, the 8.5 SMA project puts S-357 in the same area.
Connector Canal from C-111 to L-31W BC	Connector canal with a 10-ft bottom width, 1:1 side slopes, and an invert of -12 ft, NGVD1929.	Connect C-111 with the L-31W BC. Provide water to the west and south and prevent backflow to C-111.	Eliminated	Feature is no longer needed due to the inclusion of the FDA.
Connector Canal from S-332A	Roughly ½ mile concrete lined canal with a 10-ft bottom width, 1:1 side slopes, and an invert of 3.2 ft, NGVD1929.	Convey water from the L-31N BC to the west side of the S-332D TL and into ENP. The concrete lining inhibits seepage.	Eliminated	S-332A was eliminated removing the need for this canal.

Feature	Authorized in 1994 GRR	Purpose of Authorized Feature	Alternative 1 Modifications	Reason for Proposed Modification
Features modified in Alternative Number 1				
S-332B	A 300 cfs diesel driven pump station with 4 pumps (75 cfs each).	Discharge into the northern part of the C-111 retention/detention area.	Increased pump station to 575 cfs (four 125 pumps with diesel engines and one 75 cfs electric pump) and deliver water to the Northern and Southern Detention Area (NDA and SDA).	Provide additional capacity in conjunction with the elimination of S-332A.
S-332C	A 300 cfs diesel driven pump station with 4 pumps (75 cfs each).	Discharge into the central part of the C-111 retention/detention area.	Increased pump station to 575 cfs (four 125 pumps with diesel engines and one 75 cfs electric pump) and deliver water to the NDA and SDA.	Provide additional capacity in conjunction with the elimination of S-332A.
Connector Canal at S-332B	Roughly ½ mile concrete lined canal with a 10-ft bottom width, 1:1 side slopes, and an invert of 3.2 ft, NGVD1929.	Convey water taken from the L-31N BC to the retention/detention area. The concrete lining inhibits seepage.	Replace canal with a 500 ft wide conveyance area contained by levees.	Increased S-332B capacity made it possible to construct a flowway and allow a minimal seepage.
Connector Canal at S-332C	Roughly ½ mile concrete lined canal with a 10-ft bottom width, 1:1 side slopes, and an invert of 3.2 ft, NGVD1929.	Convey water taken from the L-31N BC to the retention/detention area. The concrete lining inhibits seepage.	Replace canal with a 500 ft wide conveyance area contained by levees.	Increased S-332C capacity made it possible to construct a flowway and allow a minimal seepage.
Fill-in L-31W Borrow Canal from S-332	Approximately 25,500 ft of the L-31W BC would be backfilled between S-332 and the alignment for the new L-31 W TL by pushing in the adjacent levee.	Restore the western part of the Frog Pond to the Taylor Slough system.	Material from the C-111 spoil mound degrade would be used to completely backfill 27,800 ft and partial backfill of 19,300 ft of the canal. L-31W will remain intact.	Extending the backfilling of L-31W BC will reduce seepage losses from ENP. Partial backfill allows for the continued recreational use. L-31 W to remain as the western levee to the FDA.

Feature	Authorized in 1994 GRR	Purpose of Authorized Feature	Alternative 1 Modifications	Reason for Proposed Modification
Features modified in Alternative Number 1 (continued)				
300 ft Spillway	One 300 ft trapezoidal spillway constructed in the L-31W TL.	Pass 50% of the maximum pump capacity of S-332B, S-332C, and S-332D from the retention/detention area into ENP. The culvert risers would pass the balance of the pump capacity.	Four 240 ft spillways capable of passing approx. 250 cfs with ½ ft of head.	Spillways will serve as emergency overflow structures discharging to the west.

2.3 PREFERRED ALTERNATIVE

Alternative Number 1 is the preferred alternative. It includes modifications to C-111 project features that have been contemplated in a number of forums since completion of the 1994 GRR/EIS (e.g. ISOP, IOP and CSOP). Alternative Number 1 has been selected based on its ability to satisfy the project purpose to the greatest degree while providing flexibility in reducing other potential impacts to the human environment. Evaluations performed for CSOP are referenced to support this EDR's recommended structural design refinements. These evaluations include (1) a comparison of habitat units provided by the CSOP Tentatively Selected Plan[1] (TSP) and the "No Action" planning condition[2], and (2) level of service for flood damage reduction provided by the CSOP TSP compared to the 1994 C-111 GRR planning condition to ensure authorized level of service of flood damage reduction in the C-111 basin is maintained. As shown in the table below, the potential annual equivalent flood damages for the CSOP TSP, which includes the C-111 structural design refinements, are less than the CSOP No Action and the 1994 C-111 Planning Conditions, indicating the level of service for the 1994 C-111 GRR is maintained. Additional information on the evaluation of CSOP alternative plans will be included in the draft CSOP GRR, currently scheduled for completion Fall 2007, or can be requested from Mr. Ernest Clarke, U.S. Army Corps of Engineers, Planning Division, at (904) 232-1199 or e-mail at ernest.clarke@saj02.usace.army.mil.

BENEFITS—C-111 PROJECT MODIFICATIONS TO THE C&SF PROJECT

Benefit	CSOP TSP[2]	CSOP No Action Planning Condition	1994 C-111 GRR CSOP Planning Condition
Ecological -- Habitat Units	1,278,000 acres	834,000 acres	N/A
Potential Annual Equivalent Flood Damages	$134,409,000	$139,811,000	$137,925,000

The proposed modifications to the C-111 project under Alternative 1 are described below:

1. Expansion of the North Detention Area.

The 1994 C-111 GRR plan did not have a detention area in the northern Rocky Glades but rather discharged water west of the S-332D tieback levee to flow into the ENP (***Figure 2***). Under IOP a 226 acre detention area called the S-332B Northern Detention Area (NDA) was constructed north of the S-332B pump station (***Figure 3***).

The current proposal (***Figure 4***) would expand the detention area north from the existing S-332B NDA to the 8.5 Square Mile Area Stormwater Treatment Area (8.5 SMA STA), which is a

[1] The CSOP TSP includes all of the structural design refinements provided in Section 1.10.1 (C-111 Project (Design Refinements to 1994 C-111 GRR Recommended Plan).

[2] Represents MWD to ENP Project modifications to the C&SF Project and C-111 Project modifications to the C&SF Project implemented.

component of the Modified Water Deliveries to ENP (MWD) project. The proposed new C-111 NDA would be created by extending the L-31W tieback levee to the north to tie into the 8.5 SMA STA and realigning the S-332D tieback levee to also tie into the 8.5 SMA STA. Both of these levees are discussed in more detail below. This modification would increase the size of the NDA to approximately 1,441 acres and cover former agricultural lands now owned by the SFWMD, the non-Federal sponsor for the C-111 project. The interior of the detention area would be scraped to the underlying rock layer to provide material to construct the L-31W and S-332D tieback levees. Two pump stations would supply water to the area, the S-357 (a MWD project component) from the 8.5 SMA in the north, and the S-332B in the south). The NDA would be divided into three areas: 1) flowway area (232 acres), 2) main detention area (1180 acres), and 3) additional storage in the southern part of the NDA (29 acres). Refer to ***Figure 5***.

The reconfigured C-111 NDA would extend the hydraulic ridge created by the C-111 project north to the 8.5 SMA and benefit ENP by reducing seepage out of the park in this area. The NDA would also improve water quality in ENP by preventing direct discharge of surface water from former agricultural lands into the park.

2. Extension of L-31 West Tieback Levee North to the 8.5 SMA STA.

The 1994 C-111 GRR called for a new north-south levee to be constructed roughly parallel to the existing L-31N levee, beginning at L-31W near S-175 and extending northward approximately 9.25 miles to higher ground in the Rocky Glades area in the vicinity of S-332B, to form the western containment levee of the retention/detention area (SDA). Based on the 2000 8.5 SMA Report the goal now is to extend the retention/detention area (hydraulic ridge) north to the 8.5 Square Mile Area, tying the tieback levee into the 8.5 SMA perimeter levee at Richmond Drive

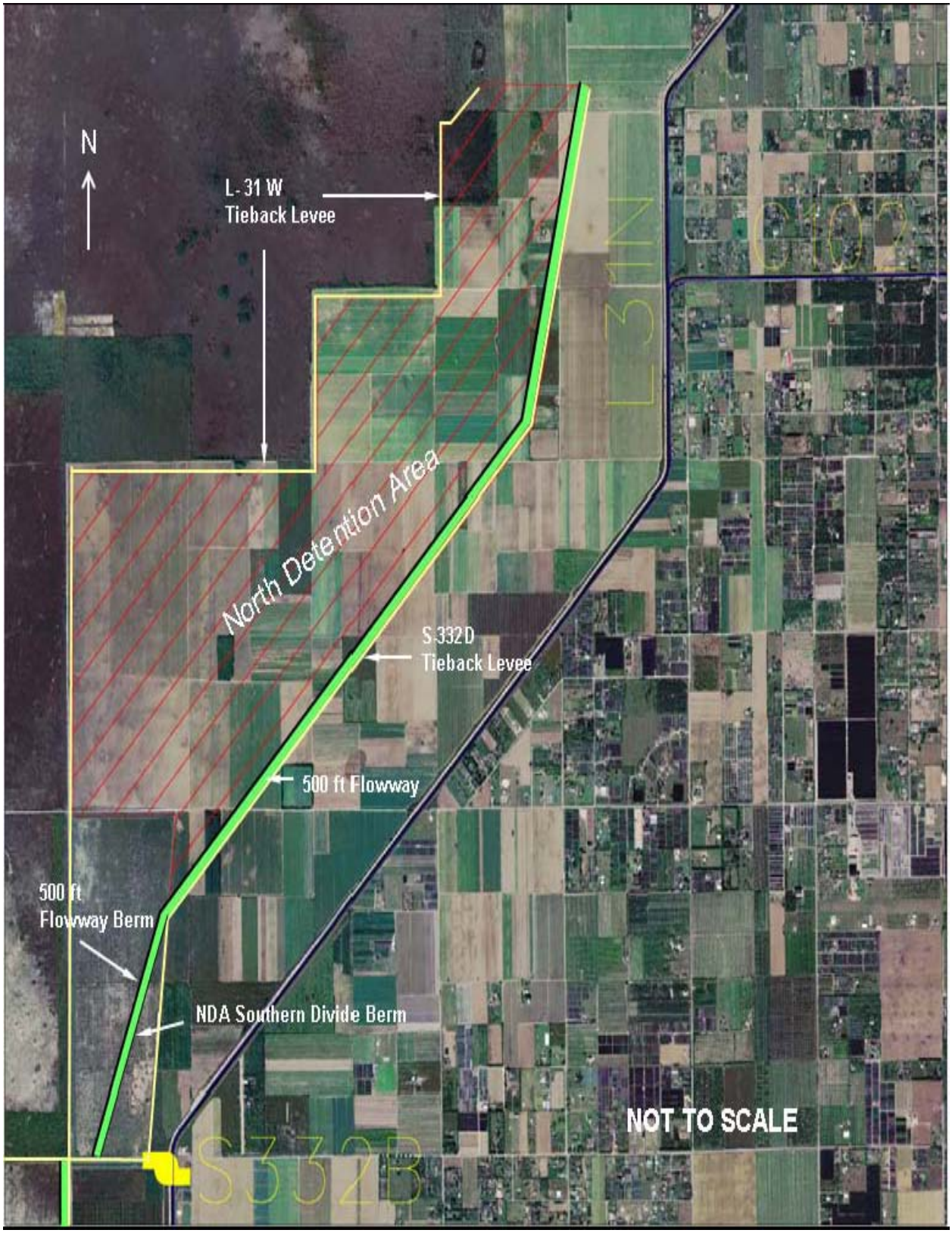

FIGURE 5: FEATURES OF THE EXPANDED NDA

(***Figure 4 and Figure 5***). This modification increases the length of the levee by 6.75 miles, of which approximately 2.0 miles was constructed under IOP. To increase the storage capacity of the retention/detention area, the levee heights were increased 2 to 3 feet to make the retention/detention areas surrounded by 6 foot levees. The western toe of the levee would be constructed so that it is offset from the ENP eastern boundary by 150 feet.

Material for the construction of the levee would be obtained from the scraping of former agricultural land within the detention area. If additional material is needed then additional lands would be scraped within the buffer area between the retention/detention area and the L-31N borrow canal. The crown width of the levee would be 15 feet with 1 vertical on 4 horizontal side slopes. Toe drains would be added to supplement for levee stabilization due to deeper detention. The average height of the levee crest would be 6 feet above grade.

3. S-332D Tieback Levee

A slight refinement to the alignment of the S-332 tieback levee presented in the 1994 C-111 GRR is being proposed to increase the storage capacity of the retention/detention areas. The levee heights would be increased 2 to 3 feet to make the retention/detention areas surrounded by 6 foot levees. The northern terminus of the levee would be realigned to tie into the southeast corner of the 8.5 SMA STA (***Figure 4 and Figure 5***).

The S-332D tieback levee starts in the Frog Pond approximately one half mile east of L-31N and proceeds north approximately 45,800 feet to tie into the 8.5 SMA STA. In conjunction with the L-31W tieback levee, this portion of the levee forms the eastern containment levee for the hydraulic ridge/detention area that extends from the Frog Pond north to the 8.5 Square Mile Area. The detention area is divided into two areas; the northern area (S-332B North to S-357, total of 1,441 acres) and the southern area (S-332B to S-332D, total of 1,310 acres).

Material for the construction of the levee would be obtained from the scraping the agriculture land within the detention area. If additional material is needed, additional lands would be scraped within the buffer area between the retention/detention area and the L-31N borrow canal. The levee crown width would be 15 feet with 1 vertical on 4 horizontal side slopes. Toe drains would be added to supplement for levee stabilization due to deeper detention. The average height of the levee crest would be 6 feet above grade.

4. NDA Southern Divide Berm.

The NDA Southern Divide Berm is a proposed new feature that would be constructed in the southeastern part of the existing S-332B NDA (***Figure 5***). The purpose of this 3 foot high berm would be to offset the lower portion of the proposed C-111 NDA further away from the L-31N borrow canal. This would reduce the seepage losses from the area by increasing the seepage length. Once stages exceed 2.75 feet above average ground within the area then the two overflow weirs (described below) to be built into the berm section would begin to utilize this part of the detention system. The berm would have a 12 foot top width with 1 on 4 (V:H) side slopes and a crest elevation approximately 3 feet above grade. The total length of the berm would be approximately 3,250 feet.

5. C-111 NDA Southern Divide Berm Weirs.
Two concrete overflow weirs are proposed to be constructed within the proposed NDA Southern Divide Berm and are designed to start passing water into this portion of the detention area when stages exceed 2.75 feet above average ground. The weirs would allow for water to equalize across the berm between the two areas so that scour problems do not occur. The weirs would be 100 feet long with a crest elevation set at 2.75 feet above grade with a 12-foot top width and side slopes of 1 on 3 (V:H).

6. Overflow weirs to the west through the L-31W Tieback Levee.
The 1994 C-111 GRR planned to construct twenty-four 36-inch diameter culvert/risers and one 300-foot long emergency overflow weir through the L-31W tieback levee to convey water from the retention/detention area westward towards ENP. Each feature was designed to pass 50% of the maximum pump capacity of the three pump stations S-332B, S-332C, and S-332D, with 0.5 feet of head difference. It is now recommended to eliminate the culverts and construct four overflow weirs in the L-31W tieback levee. Two weirs would be constructed in each detention area.

The two weirs in the C-111 NDA would be constructed approximately 2 miles north of the S-332B control structure. One would be in the center of the east-west run of the L-31W tieback levee and the other would be in the north-south run of the tieback levee. The two weirs in the C-111 SDA would also be constructed on the L-31W tieback levee. One would be constructed halfway between the S-332B and S-332C pump station and the second halfway between S-332C and S-332D pump station. The purpose of these structures would be to maintain the level of flood protection for the C-111 basin. When stages exceed 3.5 within the respective detention area, water would begin to be discharged west of the L-31W tieback levee towards ENP. Each weir would be 240 feet long and designed to pass 250 cfs with 0.5 feet of head. The weirs would be constructed from concrete with a filter fabric underlayment. The top of the weirs would be 12-foot wide and the side slopes would be 1 on 3 (V:H).

Final operations the C-111 NDA and SDA will be determined as part of the CSOP. In the CSOP tentatively selected plan, the pumps discharging into the detention areas turn off when water stages reach 2.5 feet above grade. The western overflow weirs are set to 3.5 feet above grade. To overflow the weirs the detention areas would first need to be filled to 2.5 feet and then the area would need to receive more than 12 inches or rain. For example, if we were to pump the reservoir under CSOP to its maximum stage 2.5 feet above grade then it would take at least a 24-hour 100-year rainfall event to overtop the weir. From Technical Paper No. 40, Rainfall Frequency Atlas of the United States, the 100-year 24-hour rainfall event is approximately 13-14 inches, interpolating from rainfall map. In the interim until the CSOP planning process is finalized the detention areas will be operated based on the IOP which allows a normal maximum depth of 2.0 feet. This will provide a minimum of 1.5 feet of freeboard before overflowing.

7. S-332B 500-foot Flowway.
The 1994 C-111 GRR had proposed to construct a 0.5-mile long concrete-lined canal from the S-332B pump station to the retention/detention area just west of the S-332D tieback levee. The canals were to be constructed of concrete to minimize return seepage to L-31N. With increased capacity at the S-332B pump station it was decided that it would be more economical to

construct a 500 foot wide flowway (23.6 acres) and to allow a minimum amount of return seepage to the L-31N borrow canal. Experience in the area has shown that, in general, the current detention areas (S-332B West, S-332B North, and S-332C) seep approximately 0.1 to 0.3 cfs/acre during wet and dry periods respectively.

The purpose of the flowway would be to convey water from the L-31N canal to the NDA and SDA. Water depths and distribution of flows for the S-332B flowway would be controlled by the S-332B Discharge Control Structure. The S-332B Discharge Control Structure would also be operated to minimize scouring velocities along the toe of the levees.

The flowway would be contained by a portion of the S-332D tieback levee in addition to a new segment of levee approximately 3,100 feet long that would be constructed 500 feet south of the S-332D tieback levee. The levee crown width would be 15 feet with 1 vertical on 4 horizontal side slopes. Toe drains would be utilized for levee stabilization. The average height of the levee crests would be 6 feet above grade. In addition the entire area within the flowway would be scraped to the cap rock and any agricultural wells within the area would be sealed.

8. S-332C 500-foot Flowway.

The 1994 C-111 GRR had proposed to construct a 0.5-mile long concrete lined canal from the S-332C pump station to the retention/detention area just west of the S-332D tieback levee. The canals were to be constructed of concrete to minimize return seepage to L-31N. With increased capacity at the S-332C pump station it was decided that it would be more economical to construct a 500 foot wide flowway (23.6 acres) and to allow a minimum amount of return seepage to the L-31N borrow canal. Experience in the area has shown that, in general, the current detention areas (S-332B West, S-332B North, and S-332C) seep approximately 0.1 to 0.3 cfs/acre during wet and dry periods respectively.

The purpose of the flowway would be to convey water from the L-31N canal to the retention/detention areas. Water depths and flows for the S-332C flowway would be controlled by the S-332C Discharge Control Structure to minimize scouring velocities along the toe of the levees.

The flowway for the S-332C pump station would be contained by constructing two new segments of levee, each being approximately 2,500 feet in length. The levees would be parallel to each other and tie into the S-332D tieback levee on the west and the pump station on the east. The levee crown width would be 15 feet with 1 vertical on 4 horizontal side slopes. Toe drains would be utilized for levee stabilization. The average height of the levee crests would be 6 feet above grade. In addition the entire area within the flowway would be scraped to the cap rock and any agricultural wells within the area would be sealed.

9. 500 foot Flowway System.

A 500 foot wide flowway system would be constructed within the C-111 NDA (20,000 feet) and the C-111 SDA (25,500 feet) parallel to the S-332D tieback levee. The flowway would be contained by the S-332D tieback levee on the east and a 1.5 foot high concrete berm located 500 feet west of the tieback levee. The flowway would hold the first 1.5 feet of water before

overflow would be allowed west into the rest of the detention area. This would allow the ability to maintain a hydraulic ridge, during periods of low flow, on the eastern side of the detention area, which would retard seepage loss from ENP.

Two possible construction techniques are being considered for the concrete berm. One method would be to excavate a six inch trench once the overburden is removed. A curbing machine would then be used to construct a concrete curb within the trench that would have a height and width of 2 feet, giving it an elevation of 1.5 feet above grade. The second method would be place pre-cast concrete piles end on end for the total length of the berm. The piles would be cast in 50-foot lengths (890 piles) and like the concrete curb would have a height and width of 2 feet. The piles would be placed in a trench excavated approximately 6 inches into the rock substrate giving the berm an elevation of 1.5 feet above grade. In addition, a poly-ethylene seal would be placed at the end of each pile to seal the berm.

10. Additional L-31W Borrow Canal to be filled.

The original 1994 C-111 GRR plan proposed that the L-31W borrow canal be filled from the S-332 pump station north to where the L-31W levee ties into the L-31W tieback levee, a distance of approximately 25,000 feet. The new plan proposes to backfill the L-32W borrow canal for a distance of 30,000 feet and partially backfilling for an additional 19,300 feet.

The original plan proposed degrading the L-31W levee and using that material to back fill the borrow canal. However, this levee is now be required for the Frog Pond Detention Area (constructed in 2002), and would not be degraded. Fill would now be taken from the material stockpiled during the degrading of the C-111 spoil mound, which is located within the Frog Pond area. Backfilling the L-31W borrow canal would prevent the canal from acting as a sump and pulling water out of ENP.

The complete backfill of the L-31W borrow canal will start at the S-176 structure (station 0+00) and proceed due west for 1300 feet (300 feet past the S-332D tieback levee). The next 1700 feet of the borrow canal will be left intact to act as a spreader canal for the Frog Pond High Head Culvert. At station 30+00 (300 feet east of the L-31W tieback levee), backfill will begin again and go to station 105+00, just north of the Frog Pond Cell 1 Culvert structure. From station 105+00 to 160+00, the borrow canal will be left intact to act as a spreader canal for the Frog Pond Cell 1 Culvert structure. From station 160+00 to 285+00 and 310+00 to 375+00 (structure S-175), the borrow canal will be completely backfilled. The segment from 285+00 to 310+00 will not be backfilled. This segment will be used to distribute flows discharged by the Frog Pond Discharge Structure into Taylor Slough. Partial backfill will extend from station 375+00 to 435+00 (approximately 1,000 feet north of Ingraham Highway). 1,000 feet south of Ingraham Highway (station 455+00) partial backfill will begin again and extend to the end of the L-31W borrow canal (station 587+32). Partial backfill of the canal brings the invert of the canal to approximately 4 feet below average ground elevation.

11. Aerojet Canal Plugs.

It is now proposed to construct canal plugs in the existing Aerojet Canals to reduce the southward flow of water during dry conditions thereby improving the nearby hydroperiods of the Southern Glades and reducing the unnaturally large flow lost from Taylor Slough that was

supplied through the Frog Pond Detention area (via S-332D). These plugs would greatly reduce the surface water conveyance capacity when the water level reaches ground surface and slightly reduce the surface water conveyance as the plugs would stop flow through the canal but not prevent flow around the plugs, through the marsh, and subsequently back into the canal.

The Aerojet Canals consist of two intersecting canals, one canal is oriented north-south and the other canal is oriented east-west. The canals were constructed in the 1960's as part of a testing facility for the Aerojet General Corporation. The north-south canal is located approximately 1 mile south of Ingraham Highway and halfway between L-31W and the C-111 canal. The canal extends approximately 4.75 miles due south of its starting point. The canal is approximately 20 feet deep and has a road that parallels the east side of the canal. The east-west canal is also approximately 20 feet deep and intersects the north-south canal about two miles south of the northern terminus of the north-south canal. The western terminus of the east-west canal connects into the L-31W borrow canal and extends east approximately 10,000 feet.

Four canal plugs would be placed in the canal, two in the north-south canal and two in the east-west canal. These plugs would have a 100 foot top width, 1 on 5 (V:H) side slopes, and backfilled to 1 foot above the surrounding grade. Material would be obtained from the C-111 Spoil Mound stock pile within the Frog Pond area. In addition at the confluence of the two canals there are earthen canal crossings. Until field investigations can be performed it is assumed that culverts exist in these crossings that would need to be plugged.

3.0 AFFECTED ENVIRONMENT

The affected Environment for the C-111 basin was previously described in the Final EIS for the IOP for the Protection of the CSSS dated May 2002. This information provides a description of the existing conditions at the time the proposed project was evaluated and still serves as the basis for comparison of alternatives. This information is incorporated by reference and is available for review at:
http://hpm.saj.usace.army.mil/issueweb/Sparrow/fiopeis.htm.

The following is a summary of the affected environment:

C-111 is located within and is operated as part of the South Dade Conveyance System (SDCS). Water discharged from the C-111 basin is composed of water from some or all of the following sources: deliveries from the WCAs; seepage from ENP; and local runoff/seepage from the South Dade Agricultural Area that is adjacent to the C-11 canal. Occasional freshwater discharges from the C-111 canal due to excessive rainfall negatively impact the salinity in Manatee Bay/ Barnes Sound.

There are numerous threatened or endangered species in the C-111 basin such as: the Cape Sable Seaside Sparrow, the snail kite, wood stork, bald eagle, American alligator, American crocodile, eastern indigo snake, Florida panther, and the West Indian manatee. The land in the area of the C-111 basin originally consisted of relatively natural Everglades's type including sloughs, tree islands, marshes, and coastal mangrove fringe. Now this land is used for fruit tree groves, row and field crops, and plant nurseries.

3.1 CURRENT CONSTRUCTION STATUS OF THE C-111 PROJECT

The following is a description of what has been constructed on the C-111 project to date. This includes constructed features authorized under the 1994 GRR/FEIS and any modifications to the project authorized under ISOP or IOP that have been constructed. This represents the existing condition of the C-111 project. Refer to ***Figure 6***.

The S-332D pump station was completed in December 1997. During the design phase the pump station capacity was increased from 300 cfs to 575 cfs to match the discharge capability of S-174. Originally the discharge canal from the pump station tied into the L-31 W borrow canal. During the 2002 IOP emergency contract the discharge canal was retrofitted and incorporated into the FDA.

The removal of the C-111 spoil mound in the southern part of the project was completed in 1997. The spoil mounds were located on the south bank. This portion of the C-111 Canal is south of the C-110 and C-109 canals and runs east and west from S-197 to C-111E. The spoil was removed to provide better sheet flow into the panhandle of ENP.

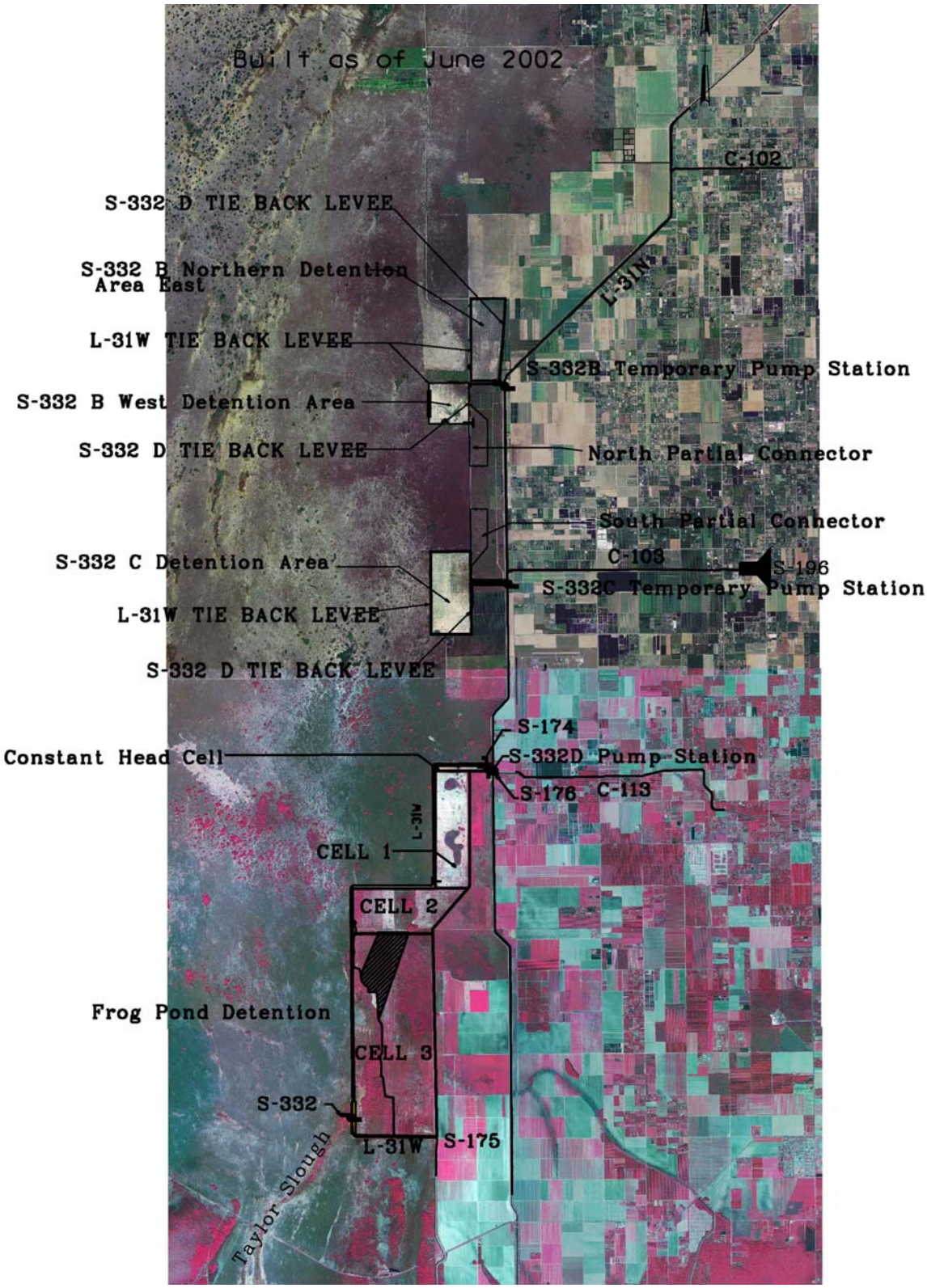

FIGURE 6: FEATURES OF THE C-111 PROJECT CONSTRUCTED TO DATE (EXISTING CONDITIONS)

The Taylor Slough Bridge was constructed in 1999 to establish historic sheet flow patterns in Taylor Slough.

The endangered Cape Sable Sea Side Sparrow (CSSS) has sub populations (generally referred to as B, C, D, E, and F) near the C-111 project. In 1999, USFWS issued a "jeopardy" Biological Opinion (BO) that required changes in C-111 operations. Modeling showed that installing temporary pump station S-332B with a detention area to the west would provide a more favorable hydroperiod for the sparrow. The emergency solution became known as the ISOP. It included a 575 cfs S-332B temporary pump station, 5 corrugated metal discharge pipes to the S-332B West Detention Area, and a 150 Acre S-332B West Detention Area. The S-332B West Detention Area levee contains 5,180 feet of the L-31W tieback levee and 2,580 feet of the S-332D tieback levee. These features were constructed in 2000.

The eastern habitat for the CSSS continued to be a problem and was apparently still too dry, so the IOP was proposed. The IOP had several features constructed in 2002:

- The S-332B North Detention Area (240 acre), which included 5,203 feet of the L-31W tieback levee and 5,283 feet of the S-332D tieback levee.
- Two of the S-332B pump station's five corrugated metal discharge pipes were rerouted from the S-332B West Detention Area to the S-332B North Detention Area.
- The S-332C pump station (575 cfs) was constructed with 5 corrugated metal discharge pipes that pump into the S-332 C Detention Area (3000 acres).
- The S-332 C Detention Area contains 5,265 feet of the L-31W tieback levee and 5,135 feet of the S-332D tieback levee.
- S-332D High Head Cell consists of a 1,840 foot weir 2 feet high with tie back levees connecting it to the L-31W levee on the west and the S-332D tieback levee on the east.
- The Frog Pond Area was divided into three additional cells. Cell 1 starts south of the High Head Cell and terminates at the Divide Berm.
- The Divide Berm is an earthen berm 1.5 feet above grade that connects the L-31W levee and the S-332D tieback levee. Cell 1 also contains eight 5-foot diameter culverts through the L-31W. Cell 2 runs from the Divide Berm to the 1,900 foot overflow weir. The overflow weir is one foot high and has two connector levees 6 feet high. Cell 3 runs from the overflow weir to the Southern Portion of the L-31W levee. Cell 3 has a 2,000 foot degraded area of L-31W. A 1,000 foot berm was also degraded west of the L-31W canal. The L-31 W levee existed prior to the C-111 project. The S-332D tieback levee was constructed under the C-111 project.

4.0 ENVIRONMENTAL CONSEQUENCES

Only those environmental affects resulting from new modifications that have not been addressed in previous NEPA documents (i.e. 1994 GRR/FEIS, 2000 ISOP EA, 2002 IOP FEIS and 2006 IOP FEIS) will be addressed here.

4.1 HYDROLOGY

In order to maximize benefits and prevent surface water discharges into ENP the hydraulic ridge principle was extended north forming the C-111 Northern Detention Area (NDA). The NDA is enclosed by extending the L-31W tieback levee north (west levee) to the southern levee for the 8.5 Square Mile Area (8.5 SMA) Stormwater Treatment Area (STA) and re-aligning the S-332D tieback levee (east side) to tie into 8.5 SMA STA. The S-332D tieback levee was already designed to extend this far north based on the 1994 GRR and the 8.5 SMA STA was designed and constructed based on the 2000 GRR and FEIS. The NDA will receive water from the S-332B pump station and the S-357 pump station via overflow from the 8.5 SMA STA (a component of the MWD Project). The extension of the hydraulic ridge will benefit the area by minimizing the loss of seepage water from ENP north of the S-332B pump station. The hydraulic ridge allows for a more natural hydroperiod within ENP while maintaining the current level of flood protection within the C&SF system. In addition, the extension of the L-31W tieback levee will prevent the surface water runoff of rainwater from former agriculture lands in the northern Rocky Glades from entering the park.

The complete backfilling of the L-31W borrow canal between structures S-174 and S-175 will benefit Taylor Slough by removing a short circuit path that tends to over drain the northern part of the system through surface and ground water flows. Three short segments however will not be backfilled within this area to benefit the overall performance of the system. Within the C-111 SDA, where the L-31W and S-332D tieback levees tie into the existing L-31W levee, 1700 feet of the canal will be left intact to act as a spreader canal to evenly distribute flows from the Frogpond High Head Culvert to the C-111 SDA. At the southern end of the FDA Cell 1 the east-west portion of the L-31W borrow canal will be left intact to distribute flows from the FDA Cell 1 Culvert to Taylor Slough. It is expected that this culvert structure will be used during dry periods to deliver water to Taylor Slough to keep the area hydrated when the overall C&SF system does not have enough water to utilize the full FDA. At the outfall of the FDA (FDA Flowway Weir) 2500 feet of the L-31W borrow canal will be left intact. This area corresponds to the location of the existing 2000 foot gap in the L-31W levee that was created during the Interim Operation Plan in 2002. The FDA Flowway Weir will close this gap and use this portion of the L-31W borrow canal to distribute flows to Taylor Slough.

The partial backfill of the L-31W borrow canal will extend from S-175 south to the end of the canal except for an area around the State Road 9336 Bridge (approximately 1000 feet upstream and downstream of the bridge), where the canal will be left intact to prevent any damage to the existing bridge. The bottom of the canal will be raised to within approximately 4 feet of average ground elevation, which would raise it approximately 12-15 ft. By only partially backfilling the

canal small boats will still be able to utilize this canal for recreational fishing. In addition, this significantly reduces the canal's short circuiting ability from not only groundwater but from surface water flows.

The S-332B and S-332C flowways, which move water from their respective pump stations to the detention areas (NDA and SDA), were a cost savings over the concrete lined channels proposed in the 1994 C-111 GRR. However, due to the proximity of these features to the canal and their surface areas, return seepage to the L-31N borrow canal will be increased above what is expected from the detention areas. For a worst case scenario this loss would be no more than 1 cfs per acre or approximately 25 cfs, which is 4% of the total capacity of the pump station.

The eastern side C-111 NDA and SDA will be compartmentalized by the S-332D Tieback levee and a 1.5 berm (flowway berm) located 500 feet west of the S-332D tieback levee. The flowway area is designed to create the hydraulic ridge on the eastern side of the detention area first. Once stages in this area increase over 1.5 feet then the entire detention area will be utilized. This allows in times of low flow the ability to maintain a hydraulic ridge on the eastern side of the detention area, which retards the seepage loss from ENP.

4.2 ENVIRONMENTAL RESOURCES

With the proposed action (extending the NDA to the north), there would be additional adverse affects to wetlands over what was proposed in the 1994 GRR, 2002 IOP FEIS and the 2006 IOP FSEIS. The lands within the C-111 project area were historically part of the Everglades wetland system. These wetland areas have been previously rock plowed and converted to agriculture and are currently of low functional wetland value.

The footprint of the L-31W tieback levee increased due to the extension of the NDA and increasing the levee height. Under IOP, the tieback levee was to fill approximately 81 acres of wetlands. Subsequent design changes would require approximately 115 acres of direct fill. Wetland impacts would also increase from the construction of the S-332D tieback due to an increase in the levee footprint. Under IOP, the S-332D tieback levee would have filled approximately 78 acres of wetlands. With the current proposal, approximately 115 acres of wetlands would be filled.

In addition to the impacts associated with the construction of the levees, wetlands within the proposed extended NDA would be also adversely impacted by impounding water. Under IOP approximately 226 acres of wetlands would be impacted within the detention area. The proposed action would impound approximately 1,440 acres of wetlands within the NDA.

Once complete, the C-111 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 SRS (USACE 1994). Wetlands in NESRS, The Rocky Glades, and the western marl prairies are expected to benefit from the restoration of more natural hydroperiods. Restoration of the natural hydroperiods and burning patterns would result in more historic vegetation within these wetlands.

4.3 THREATENED AND ENDANGERED SPECIES

4.3.1 Section 7 Consultation

A Biological Assessment (BA) has been prepared in accordance with Section 7 of the Endangered Species Act (ESA) and submitted to the USFWS initiating consultation. The BA has been included in this EA as ***Appendix C***. Based on input from USFWS staff in the Vero Beach Ecological Services Office (Kevin Palmer email communication), the following species were included in the BA. This is the same list of species that was previously presented in the Corps' July 7, 2006 BA for IOP and the USFWS's November 17, 2006 BO for IOP.

Common Name	**Scientific Name**	**Federal Status**
Cape Sable seaside sparrow (CSSS or sparrow)	*Ammodramus maritimus mirabilis*	E, CH
Everglade snail kite (SK)	*Rostrhamus sociabilis plumbeus*	E, CH
Wood stork (WS)	*Mycteria americana*	E
Red-cockaded woodpecker	*Picoides borealis*	E
Bald eagle	*Haliaeetus leucocephalus*	T
West Indian manatee (manatee)	*Trichechus manatus*	E, CH
Florida panther	*Puma = Felis concolor coryi*	E
American crocodile (crocodile)	*Crocodylus acutus*	T, CH
Eastern indigo snake	*Drymarchon corais couperi*	T
Garber's spurge	*Chamaesyce garberi*	T
Okeechobee gourd	*Cucurbita okeechobeensis ssp. okeechobeensis*	E

The Corps has determined that the proposed action would have "no affect" on the red-cockaded woodpecker, the Okeechobee gourd and the Everglade snail kite. The Corps has determined that the proposed action "may affect, but is not likely to adversely affect" the Cape Sable seaside sparrow, wood stork, bald eagle, West Indian manatee, the Florida panther, the American crocodile, eastern indigo snake, and the Garber's spurge. Please refer to the BA in ***Appendix C*** for a more detailed discussion of the effects on listed species.

Critical habitat was designated for the Cape Sable seaside sparrow on August 11, 1977 (42 FR 40685) and was corrected on September 22, 1977 (42 FR 47840). The 1977 critical habitat designation for Cape Sable seaside sparrow encompasses approximately 197,260 acres. The USFWS has proposed a revision in sparrow critical habitat that will reduce the total acreage of critical habitat to approximately 156,350 acres (October 31, 2006, 71 FR 63980). According to USFWS, the revised proposal omits several areas originally designated as critical habitat in 1977 that were determined not to be sparrow habitat. These include forested areas of Long Pine Key in Everglades National Park, dwarf cypress forests in Everglades National Park, deep water slough communities, and agricultural areas. The proposed change in critical habitat is under review. The proposed extension of the NDA would adversely affect approximately 480 acres of land currently designated as Critical Habitat for the CSSS either by fill for the levees or inundation by water. However, this land has been previously converted to agriculture and although designated

as Critical Habitat, is no longer suitable habitat for the CSSS. The area within the proposed NDA falls outside the newly proposed critical habitat. Please refer to ***Figure 3*** of the BA in ***Appendix C***. This indicates that the agricultural areas in the project footprint have been determined not to be sparrow habitat.

In their 2002 BO for the IOP, the USFWS acknowledged that there would be some loss of suitable panther habitat due to the construction of the C-111 detention areas, but that this was marginal habitat, the loss of which would be offset by the overall ecological improvement in the adjacent habitat in ENP. Additionally, once the detention areas are constructed, it is likely that panthers would utilize the interior of the detention areas during dry times.

The following special measures would be incorporated during project construction to minimize effects to any listed species that may be present: a) Standard construction protection measures for the eastern indigo snake; b) Standard protection measures for the manatee; c) *Management Guidelines for the Bald Eagle in the Southeast Region* and *Bald Eagle Standard Local Operating Procedures for Endangered Species*; d) *Habitat Guidelines for the Wood Stork in the Southeast Region* and e) The USFWS, ENP and Corps will cooperatively monitor CSSS populations for nesting following the strategy coordinated with the USFWS for the C-111 contract 7. If breeding is initiated, construction would be restricted as appropriate.

Section 7 consultation with the USFWS will be completed prior to the signing of a FONSI.

4.4 WATER QUALITY

The impoundment area that will be created when the 8.5 SMA STA is connected to the existing S-332B North Detention area, will complete the hydrologic ridge, running generally north/south, for the C-111 project. The hydrologic ridge is expected to allow higher stage levels in the ENP while not increasing negative impacts to agricultural or residential use to the east. Higher stage levels in the ENP are necessary to help move the ENP hydrology in the direction towards restoration.

The water placed into this final portion of the C-111 detention system will come from the 8.5 SMA STA. In addition, water from the existing S-332B NDA could also potentially flow into this portion of the detention system.

Current hydrologic modeling indicates that there will be no direct discharge of surface water from the expanded NDA. In the unlikely event that surface discharge into ENP does occur, the Corps has determined that the surface water that would be impounded within this portion of the detention system would not present a problem in terms of phosphorus concentration. Also the water impounded within the NDA would 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. The plan is to scrape the soils down to the consolidated cap rock within the NDA and use this material to construct the levees.

The surface water discharged into the detention area will be subjected to a greater intensity of ultraviolet penetration, higher oxygen content and higher temperatures than the L-31 Canal water or ground water in that area due to the shallower depths and greater surface area per unit volume of water. All of those factors will act to improve the water quality by the reduction of any undesirable pathogens and will enhance the uptake/sequestration of nutrients. The short hydroperiods that will exist within this detention feature will favor the type of periphyton that better sequesters phosphorus.

In summary, the surface water that will be impounded within this portion of the C-111 detention system will not present a problem to the ENP from surface water discharges or present a bioaccumulation problem.

There is some concern (expressed by one of the ENP water quality consultants) that surface water from the C-111 detention system could enter into the ENP ground water system. The Corps position on this matter is thereby presented below.

The ground water flow in that area is predominantly from the west to the east (towards the L-31N canal). That gradient would tend to prevent detention ground water from being driven any significant distance into the ENP ground water system as the higher stages to the west tend to drive the ground water towards the east. The concern is that L-31N canal water is potentially unsuitable, and any introduction of that water into the ENP is not desired. Water quality is not presently a concern in the L-31N canal system with regards to phosphorus (based on the past few years of Settlement Agreement calculations). It should be noted that there is presently no phosphorus criteria/constraint for ground water, only the surface water is presently regulated for phosphorus content. No ground water constraint for phosphorus is currently anticipated. Even if the ground water from the detention area moves into the ENP ground water system, it would not become part of the surface water system, and it would tend to be routed back towards the L-31N canal. The Corps believes that the introduction of groundwater from the C-111 detention system is a limited concern at this time based on the current canal water quality data (meets Settlement Agreement requirements), the predominant ground water flow direction (west to east which drives the ground away from the ENP towards the L-31W canal), and the ability of the shallow detention area's ability to help treat any potential water quality problems.

4.5 AIR QUALITY

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.

4.6 NOISE

Noise impacts associated with implementation of the project would not permanently increase over what presently exists within the project area. Temporary increases in noise levels would be

expected during construction activities; however, this would be limited to the immediate area of construction.

4.7 AESTHETICS

Construction for this project will have some negative impacts, but these are not expected to last for a sustained period of time. These impacts include soil disturbance turbidity, noise, and exhaust from equipment. 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.

4.8 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE

The SFWMD has conducted phase 1 Hazardous, Toxic, and Radioactive Waste (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 or former military sites. A more extensive investigation of the project area that will comply with the new FWS protocols for low level contaminants will be conducted before construction.

4.9 RECREATION

Hunting, fishing and bird watching will not be adversely affected by the construction of this project. Hunting may have to be curtailed during construction for the safety of the workers, but will be allowed to resume after it is completed. Waterfowl may be somewhat disturbed by construction activities. Bank fishing will continue unchanged at those accessible sites which currently exist.

4.10 CULTURAL RESOURCES

Four significant cultural resources have been recorded within the project area, despite the project area being highly disturbed from long term agricultural and other ground disturbing activities. Three of the sites have been avoided by project redesign. It has been determined the fourth site will not be adversely affected by the project as only pre-historic ceramics have been recovered. The site where the ceramics were found is located within the proposed detention area and would only be inundated by water, which would not adversely affect ceramics. Consultation with the State Historic Preservation Officer (SHPO) is complete and is in concurrence with the USACE determinations (refer to correspondence in ***Appendix D***). The cultural resource survey and consultation decisions were made in accordance with the implementing regulations for Section 106 of the National Historic Preservation Act (36CFR800).

4.11 CUMULATIVE IMPACTS

The project area has been subject to federal involvement for many years. The need for flood control, 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 South 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 1999 Restudy Plan (USACE 1999a) has already addressed cumulative effects of lost agricultural land use with the expansion of publicly owned lands in the region.

Cumulative impacts to the ENP in terms of hydrology, water quality, and natural resources have occurred with the many federal projects implemented over the years. However, this proposed action, along with other recent and future projects, should not hinder progress to eventually restore the hydrology of the ENP to more natural conditions.

4.12 IRRETRIEVABLE OR IRREVERSIBLE COMMITMENT OF RESOURCES

Irretrievable and irreversible commitment of resources would occur with the conversion of wetlands (most of which is currently in agriculture) with the construction of the various pump stations, levees, berms, canals and detentions areas. The loss of marginal Florida panther habitat and approximately 480 acres of designated Critical Habitat for the CSSS would occur with implementation of the proposed action (refer to ***Section 4.3*** of the EA and the BA in ***Appendix C***). Resources committed would also include state and Federal funds to purchase lands, and labor, energy and project materials to build, operate, and maintain the project.

4.13 UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS

4.13.1 Land Use

Approximately 1300 acres of existing improved and unimproved pasture and other former agricultural lands would be permanently altered to construct the levees canals and detention areas within the proposed expanded NDA. This land is now owned by the SFWMD and has been taken out of agricultural production. NCRS has indicated that this land is not prime or unique farmland. Refer to letter dated July 22, 2003 in ***Appendix D***.

4.13.2 Wetlands

The C-111 project area was historically part of the Everglades wetland system. Although impacted by agriculture the project area is predominately a wetland habitat, although of low functional value. The proposed modifications to the L-31W and S-332D tieback levees would cover approximately 70 additional acres of low quality wetlands over what was proposed under IOP. The expansion or the NDA would affect approximately 1200 acres of low quality wetlands by scraping the overburden to construct the berms and levees. The benefits to wetland function and value provided to ENP as a result of the project are expected to offset the functional losses within the project footprint.

4.13.3 Water Quality

Temporary increases in turbidity of local waters within allowable limits are expected during construction. Precautions to limit turbidity will be employed.

4.13.4 Air Quality

Fugitive dust from vehicular traffic and earth moving during construction will be unavoidable but insignificant overall.

4.13.5 Soils

The disruption of soils is expected to result from construction activities. Organic soils onsite would be removed or incorporated into the levees.

4.13.6 Wildlife

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

4.13.7 Threatened and Endangered Species

Short-term disturbances to fish and wildlife are expected from construction activities. Precaution measures and construction conditions to limit impacts to threatened and endangered species would be implemented. Approximately 480 acres of land currently designated as Critical Habitat for the CSSS would be adversely affected within the proposed NDA either by fill for the levees or inundation by water. However, this land has been previously converted to agriculture and although designated as Critical Habitat, is no longer suitable habitat for the CSSS. Please refer to ***Section 4.3*** in the EA.

4.14 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES AND LONGTERM PRODUCTIVITY

Agriculture in the project area is maintained by an intensive energy investment. The project would remove this short-term use for the sake of long-term productivity in a revitalized natural system. The comparatively short construction period would produce several unavoidable effects, such as short, localized turbidity and disruption of habitat. In the longer term, restoration of physical form and hydrologic conditions will lead to reestablishment the complex physical, chemical and biological interrelationships and processes that supported the historic ecosystem's high levels of resilience, and allowed for persistence of highly diverse biological communities.

As a result, most of the ecosystem will redevelop, and the restored slough and prairie systems can be expected to support diverse populations of fish and wildlife.

4.15 COMPATIBILITY WITH FEDERAL, STATE, AND LOCAL OBJECTIVES

The Corps has partnered with the SFWMD and DOI on this project. The proposed action is consistent with the overall goals and objectives of the CERP. It is expected that the proposed action will be consistent with Federal, State and local plans and objectives.

4.16 ENVIRONMENTAL COMMITMENTS

The USACE, 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 USFWS, ENP and Corps will cooperatively monitor eastern CSSS populations for nesting following the strategy coordinated with the USFWS for the C-111 contract 7. If breeding is initiated, construction would be restricted as appropriate.

3. 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.

4. 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.

5. 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.

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

4.17 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

4.17.1 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 upon coordination of this EA and signing of a Finding of No Significant Impact (FONSI).

4.17.2 Endangered Species Act of 1973

A Biological Assessment (***Appendix C***) has been prepared in accordance with Section 7 of the ESA and submitted to the USFWS initiating consultation. Consultation will be completed prior to the signing of a FONSI.

4.17.3 Fish and Wildlife Coordination Act of 1958

The C-111 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 FEIS and the 2006 IOP FSEIS. The USFWS is currently preparing a FWCA report for the proposed action which will be included in the final EA. This project will be compliance with the Act.

4.17.4 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)

Archival research, field work and consultation with the SHPO, have been conducted in accordance with the National Historic Preservation Act, as amended; the Archeological and Historic Preservation Act, as amended and EO 11593. Consultation between the SHPO and other concerned parties commenced on June 28, 2005 stating a Phase I Cultural Resources Survey was necessary. A letter dated August 16, 2005 was received from the SHPO concurring with the USACE determinations on four sites within the project area and that the project will not affect historic properties included in or eligible for inclusion in the National Register of Historic Places. Refer to correspondence in ***Appendix D***. The C-111 project is in compliance with each of these Federal laws.

4.17.5 Clean Water Act of 1972

A 404(b)(1) Evaluation has been prepared (***Appendix A***) 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. An NPDES permit will be acquired for the construction activity only. No point source NPDES permits will be required for discharges.

4.17.6 Clean Air Act of 1972

The proposed project is in partial compliance at this time. Full compliance 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. If the contractor has to perform any onsite burning activity (this is not anticipated) associated with the clearing and grubbing activity, any required permits will be acquired by the contractor

4.17.7 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 B***. The State's consistency review for this project will be performed during the coordination of this draft EA. Full compliance will occur with the issuance of the WQC by the State of Florida.

4.17.8 Farmland Protection Policy Act of 1981

According to a letter from NCRS dated July 22, 2003 (***Appendix D***) no prime or unique farmland would be impacted by implementation of this project. This project is in compliance with the Act.

4.17.9 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.

4.17.10 Marine Mammal Protection Act of 1972

The West Indian Manatee does occur within 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. Full compliance with the Act would occur after review of this EA by the USFWS.

4.17.11 Estuary Protection Act of 1968

No designated estuary would be affected by project construction activities however; operations of the project may benefit Florida Bay. Full compliance with the Act would occur upon review of this EA by the NMFS.

4.17.12 Federal Water Project Recreation Act

The principles of the Federal Water Project Recreation Act, (PL 89-72) as amended, have been fulfilled by complying with the recreation cost sharing criteria as outlined in Section 2 (a), paragraph (2).

4.17.13 Fishery Conservation and Management Act of 1976

Full compliance with the Act will occur upon review of this EA by the NMFS.

4.17.14 Submerged Lands Act of 1953

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

4.17.15 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.

4.17.16 Rivers and Harbors Act of 1899

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

4.17.17 Anadromous Fish Conservation Act

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

4.17.18 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 fulfils the Corps' commitments under the Bald Eagle protection Act. The project is in compliance with the Act.

4.17.19 Migratory Bird Treaty Act and Migratory Bird Conservation Act

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

4.17.20 Magnuson-Stevens Fishery Conservation and Management Act

This project is inland and not expected to adversely affect Essential Fish Habitat. Full compliance with the Act will occur upon review of this EA by the NMFS.

4.17.21 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.

4.17.22 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 August 1998 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.

4.17.23 E.O. 11988, Flood Plain Management

The areas to be used for the C-111 project are virtually all considered 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.

4.17.24 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 this E.O.

4.17.25 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 was fully coordinated during the IOP NEPA process. Since the design modifications addressed in this EA will be operated under IOP the results of that coordination are still valid. The operations of the structures 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.

4.17.26 E.O. 13089, Coral Reef Protection

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

4.17.27 E.O. 13112, Invasive Species

The project will help reduce the abundance and variety of invasive plant species in the project area. The project is in compliance with this E.O.

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

The project has been 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.

5.0 LIST OF PREPARERS

5.1 PREPARERS

The following individuals listed were responsible for contributing to the preparation, review and technical editing of the Draft EA:

Name	Role
Mr. Michael Dupes	Impact Analysis, Document Preparation
Mr. Ernest Clarke	Document Preparation
Mr. David Pugh	Cultural Resources
Mr. Jim Riley	Water Quality and HTRW
Ms. Gwen Nelson	Engineering Design
Mr. Trent Ferguson	Hydrology
Ms. Barbara Cintron	Document Review
Mr. Jeff Trulick	Project Management

6.0 PUBLIC INVOLVEMENT

C-111 project features have been extensively coordinated with the public. A GRR/EIS was completed in 1994. Project features described in the GRR/EIS were modified as a result of the IOP. The IOP Final EIS was completed in 2002, and a Draft Supplemental EIS was circulated in 2006. The specific modifications to C-111 features contemplated in the present EA and corresponding EDR were contemplated the multi-agency CSOP project team. The CSOP planning process was developed by the US Institute for Environmental Conflict Resolution at the joint request of ENP, SFWMD, the USFWS and the USACE. Scoping and collaborative public involvement for CSOP have been carried out through the auspices of the South Florida Ecosystem Restoration Task Force, a Florida-based working group that convened the CSOP Advisory Team to advise the Corps on the development of the CSOP. Finally, this Draft EA and Draft FONSI will be circulated for a minimum 30-day review to concerned agencies, organizations and the interested public.

6.1 LIST OF RECIPIENTS

The following agencies, groups, and individuals were sent copies of the Draft EA:

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 list of individuals who received the Draft EA is on file in the Jacksonville District of the USACE.

6.2 COMMENTS RECEIVED AND RESPONSE

Comments received on the Draft EA will be included in the Final EA.

REFERENCES

US Army Corps of Engineers. 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.

US Army Corps of Engineers. 1999. Central and Southern Florida Project Comprehensive Review Study: Final Integrated Feasibility Report and Programmatic Environmental Impact Statement. Jacksonville District, Jacksonville, Florida.

US Army Corps of Engineers. 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.

US Army Corps of Engineers. 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.

US Army Corps of Engineers. 2002. Canal-111, Central and Southern Florida Project for Flood Control and Other Purposes, Final Supplemental Integrated General Reevaluation Report and Environmental Assessment, Miami-Dade County, Florida. Jacksonville District, Jacksonville, Florida.

US Army Corps of Engineers. 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.

US Army Corps of Engineers. In preparation. Combined Structural and Operational Plan for Modified Water Deliveries to Everglades National Park and Canal-111 Projects, Draft Integrated General Reevaluation Report and Environmental Impact Statement, scheduled to be released during the third quarter of calendar year 2007.

US Fish and Wildlife Service. 1999. Biological Opinion, Interim Operational Plan for the Protection of the Cape Sable Seaside Sparrow (November 19, 1999).

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

US Fish and Wildlife Service. 2006. Biological Opinion, Interim Operational Plan for the Protection of the Cape Sable Seaside Sparrow (November 17, 2006).

INDEX

—A—

AFFECTED ENVIRONMENT, 18
Agricultural Areas, 32, 33, 34
Air Quality, 49
ALTERNATIVES, 7
Alternatives Considered, iii
Archeological, 27, 46, 47
Artificial Reef, 46

—B—

Benthic, 46
Biological Opinion, iv, 3
Birds, 29

—C—

Cape Sable Seaside Sparrow, iv
COASTAL BARRIER RESOURCES, 29
COASTAL ZONE MANAGEMENT CONSISTENCY, 45
Combined Structural and Operational Plan, iv, 4
COMMENTS RECEIVED, 34
Consultation, 27, 47
COORDINATION, 27
CSOP, iv
CSSS, iv
Cumulative impacts, 25

—D—

DECISIONS TO BE MADE, 5
Dunes, 46

—E—

EA, 28
Economic, 47
Effect, 46, 48
ENDANGERED, 27
Endangered Species Act of 1973, 27
Enhance, 48
ENP, iv, 25
Environment, 33
Environmental Assessment, 27
ENVIRONMENTAL EFFECTS, 21
Erosion, 49
Everglades, iv, 24

—F—

FEDERAL, 29, 46
Fish, iv, 29, 46
Fish and Wildlife, iv, 27
Florida Department of Transportation, 33

—H—

Habitat, 48
Hazardous, iv, 48
Historic, 27, 47
Historic Preservation, 27, 47
HTRW, iv

—I—

Impact, 47, 48
Interim Operational Plan, iv
Interim Operational Plan (IOP), 4
Interim Standard and Operating Plan, iv, 4
IOP, iv

—L—

LIST OF PREPARERS, 31

—M—

Mitigation, 46
Modified Water Deliveries, iv

—N—

NATIONAL ENVIRONMENTAL POLICY ACT, 27

—O—

Oil, 48

—P—

Petroleum, 48
Preservation, 27, 46, 47
PROJECT LOCATION, 1
PROJECT PURPOSE AND NEED, 1
PUBLIC INVOLVEMENT, 32

—R—

RECREATION, 29
Reef, 46
RELATED ENVIRONMENTAL DOCUMENTS, 5
RESOURCES, 29, 46, 47, 48, 49
RPA, iv, 3

—S—

Safety, 46
SECTION 404(B) EVALUATION, 38
Shark River Slough, iv
SHPO, 27, 47
Solid Waste, 48
Sparrow, iv
State, 28, 29, 46, 47, 49
State Historic Preservation, 47

—T—

Test 7, 3
THREATENED AND ENDANGERED SPECIES, 22
Transfer, 48

—U—

U.S. Fish and Wildlife Service, 27, 32
Unique, 28, 46

—W—

Water
    Management, 33
Water Quality, iv
Water Quality Certification, 49
Water Resources, 48
Wildlife, iv, 46
    Fish, 33

(this page intentionally left blank)

APPENDIX A – SECTION 404(b) CLEAN WATER ACT EVALUATION

(this page intentionally left blank)

SECTION 404(b) CLEAN WATER ACT EVALUATION

ENVIRONMENTAL ASSESSMENT
CANAL 111 (C-111) SOUTH DADE COUNTY, FLORIDA

I. Project Description

a. Location. The Canal 111 (C-111) Basin is located in southern Florida. The area of focus is located in southeastern Dade County. The study area's northern boundary is a line drawn east from S-331, the divide control structure, and west on the southern limit of the 8.5 square mile area (SMA) and west by Shark River Slough located in Everglades National Park (ENP). The eastern boundary varies generally along a line through the ridge structures S-194 and S-196 to Homestead and then parallels Card Sound Road.

b. General Description

Authority and Purpose. C-111 project was constructed as part of the ENP – South Dade Conveyance Canals Project Authorized by the 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). Further modifications to the C-111 were authorized as an addition to the C&SF project in the Water Resources Development Act (WRDA) of 1996 (PL 104-303) to protect the natural values associated with the ENP, while maintaining flood damage reduction within the C-111 basin east of Levee 31N (L-31N) and C-111.

The US Army Corps of Engineers (USACE or Corps) seeks to improve undesirable resource conditions in Taylor Slough, the eastern panhandle of ENP, Manatee Bay, and Barnes Sound, while maintaining flood protection within the C-111 basin as described in the Corps' 1994 Final Integrated General Reevaluation Report (GRR) and Environmental Impact Statement (EIS), Canal 111, South Dade County, Florida (C-111 GRR/EIS). Features of the authorized plan that resulted from the 1994 GRR/EIS have been adjusted in the years since completion of the C-111 GRR/EIS. Certain alterations were previously documented in the Corps' 2002 Final EIS and 2006 Final Supplemental EIS for the Interim Operational Plan for Protection of the Cape Sable Seaside Sparrow (IOP). The intent of the present report is to record and evaluate changes not previously recorded.

General Description of Dredged or Fill Material

(1) General Characteristics of Material. Fill material used to construct the levees and berms will be removed from stockpiles of spoil mound material along the south side of C-111. Material would also be excavated from within the proposed detention areas and the buffer area between the detention areas and the L-31N borrow canal. The material is sandy with limestone inclusions.

(2) Quantity of Material (cubic yards).

L-31 W Tieback Levee: 286,000 cy
S-332D Tieback Levee: 196,000 cy
NDA Southern Divide Berm: 15,000 cy
S-332B Flowway Levee: 51,400 cy
S-332C Flowway Levee: 83,000 cy

(3) Source of Material. The material to be used to construct the levees and berms will come from existing spoil mounds in the project area and from material excavated within the proposed detention areas and the buffer area between the detention areas and the L-31N borrow canal.

Description of the Proposed Discharge Site

(1) Location (map). The location is shown on ***Figure 1*** of the EA.

(2) Size (acres). The extension of the L-31 W and S-332D Tieback Levees will cover an additional 71 acres than what was identified in the IOP. The NDA Southern Divide Berm would cover approximately 3 acres and the S-332B and S-332C Flowway Levees would cover approximately 6 and 9 acres respectively.

(3) Type of Site (confined, unconfined, open water). The levee construction sites are unconfined, open Everglades rocky prairie that is intermittently flooded.

(4) Type(s) of Habitat. The habitat is rocky glades. Vegetation in the rocky glades is primarily comprised of thinly scattered sawgrass (*Cladium jamaicensis*), spikerush (*Eleocharis cellulosa*), and beakrushes (*Rhynchospora* spp.) on marl soils in association with muhly (*Muhlenbergia* sp.) prairies.

(5) Timing and Duration of Discharge. Work would require 2-3 years, with discharge made preferably in the dry season.

c. Description of Disposal Method: The material will be trucked to the road and levee site and dumped. Subsequently it will be moved and smoothed with earthmoving equipment.

II. Factual Determinations (Section 230.11)

a. Physical Substrate Determinations

(1) Substrate Elevation and Slope. The elevation is between 5 and 7 feet, NGVD, and there is almost no slope.

(2) Sediment Type. The substrate at the construction site is limestone rock overlain with marl soil.

(3) Dredged/Fill Material Movement. There will be no appreciable movement of matera1. It will rest on limestone rock.

(4) Physical Effects on Benthos. All benthos in the fill site will be covered, smothered and killed.

(5) Other Effects. An effect would be the formation of an area of upland. Natural uplands that occur in the Everglades are tree islands. The fill, however would be used as an access road, and woody vegetation would be kept from the crown.

(6) Actions Taken to Minimize Impacts (Subpart H). Precautions to confine the fill to the desired roadway-levee alignment will be taken. Existing access roads would be used.

b. Water Circulation. Fluctuation and Salinity Determinations

(1) Water. Water would flow parallel to the levee and through the water control structures.

(a) Salinity. The area is fresh water, and this condition would remain unchanged.

(b) Water Chemistry. No changes.

(c) Clarity. After construction ends, clarity would be as before. During construction, turbidity would be generated in the very slowly-to nonmoving water.

(d) Color. No effect.

(e) Odor. No effect.

(f) Taste. No effect.

(g) Dissolved Gas Levels. The material is essentially clean soil; there would be moderate biochemical oxygen demand, and no change in dissolved gases.

(2) Current Patterns and Circulation.

(a) Current Patterns and Flow. The water now flows very slowly in a southeasterly direction, except when the 8-332 pumps are operating. The levee and detention-retention area would divert water southward

(b) Velocity. The velocity is essentially zero.

(c) Stratification. None.

(d) Hydrologic Regime. The area is characterized by a historic average hydroperiod of 6 to 7 months, but the hydroperiod now is apparently shorter.

(3) Normal Water Level Fluctuations. Two feet deep to -3 feet.

(4) Salinity Gradients. None.

(5) Actions That Will Be Taken to Minimize Impacts (Subpart H) Precautions to confine the fill to the desired berm-levee alignment will be taken. Existing access roads would be used.

c. Suspended Particulate/Turbidity Determinations

(1) Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Disposal Site. Turbidity would be temporary and limited to the time of construction. The fill material has little organics, hence very low quantities of suspendable material.

(2) Effects on Chemical and Physical Properties of the Water Column.

(a) Light Penetration. Temporary attenuation during construction. Afterward, none.

(b) Dissolved Oxygen. No effect. No BOD, and light attenuation effects would be short and negligible.

(c) Toxic Metals and Organics. None.

(d) Pathogens. None.

(e) Aesthetics. No effect, because there are few observers. Post-construction effect of visible pump stations, canals, levees. The canals would support bank vegetation, fish and wildlife.

(f) Others as Appropriate. None.

(3) Effects on Biota.

(a) Primary Production, Photosynthesis. No effect, because light attenuation from very briefly suspended particulates would be negligible.

(b) Suspension/Filter Feeders. Those confined to water in solution holes of the limestone, or unable to move, would be covered with the fill. Effects on the biological communities would be essentially none.

(c) Sight Feeders. Same as above.

(4) Actions taken to Minimize Impacts (Subpart H). Precautions to confine the fill to the desired berm-levee alignment will be taken. Existing access roads would be used.

d. Contaminant Determinations. None present.

e. Aquatic Ecosystem and Organism Determinations (Subpart G)

(1) Effects on Plankton. None, except under the fill.

(2) Effects on Benthos. None, except under the fill.

(3) Effects on Nekton. None.

(4) Effects on Aquatic Food Web. None.

(5) Effects on Special Aquatic Sites. The construction area is in the Everglades, adjacent to ENP. The project effect would be restoration of historic environmental conditions to the Park.

(a) Sanctuaries and Refuges. As stated above.

(b) Wetlands. Wetland functions and form would be restored to some degree as a result of the project.

(c) Mud Flats. None.

(d) Vegetated Shallows. These are the marl prairies described above. Historic, natural conditions would be restored to the extent possible.

(e) Coral Reefs. None.

(f) Riffle and Pool Complexes. None.

(6) Threatened and Endangered Species. A Biological Assessment (***Appendix C*** of EA) has been prepared and submitted to the USFWS. Consultation is ongoing and will be completed prior to the signing of a FONSI.

(7) Other Wildlife. Wading birds would benefit from significant restoration effects.

(8) Actions to Minimize Impacts. Precautions to confine the fill to the desired roadway-levee alignment will be taken. Existing access roads would be used.

f. Proposed Disposal Site Determinations

(1) Mixing Zone Determination. The mixing zone would likely be less than 10 yards, because of slow flow rate and a very small fraction of suspendable material.

(2) Determination of Compliance with Applicable Water Quality Standards (present the standards and rationale for compliance or non-compliance with each standard). All standards will be complied with, unless a variance should be required for unforeseen reasons. A Section 401 water quality certification will be sought from the State of Florida.

(3) Potential Effects on Human Use Characteristics. Non-consumptive uses, such as bird watching, would be enhanced. Long-term contribution to improved sport fishing in Florida Bay.

(a) Municipal and Private Water Supply. No effect.

(b) Recreational and Commercial Fisheries. The project would contribute to long term improvement by increasing fresh water flow at correct times into Florida Bay.

(c) Water Related Recreation. Little to no effect.

(d) Aesthetics. Small direct effect, due to few observers. Long term contribution to restored wading bird populations in ENP.

(e) Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves. The project is intended to restore ecological values to the southeastern portion of ENP.

(g) Determination of Cumulative Effects on the Aquatic Ecosystem. To the extent that the project for Modified Water Deliveries to ENP is implemented successfully, that project and this should interact synergistically to provide significant restoration of ecological integrity to the southeast Everglades.

(h) Determination of Secondary Effects on the Aquatic Ecosystem. All benefits to flora and fauna would be secondary, in that the direct effects would be hydrological, but the secondary effects would be ecological and beneficial.

III. Finding of Compliance or Non-Compliance with the Restrictions on Discharge.

a. No significant adaptations of the guidelines were made relative to this evaluation.

b. The alternative that will be selected from among an array of practicable alternatives will be that which best meets the study objectives. It is probable that no practicable alternative is possible that will not involve discharge of fill into waters of the United States.

c. The discharge of fill materials would not cause or contribute to, after consideration of disposal site dilution and dispersion, violation of any Florida water quality standards. The discharge operation will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

d. The placement of fill material would not jeopardize the continued existence of any species listed as threatened or endangered under the Endangered Species Act of 1973, as amended. Approximately 480 acres of land currently designated as Critical Habitat for the CSSS would be adversely affected within the proposed NDA either by fill for the levees or inundation by water. However, this land has been previously converted to agriculture and although designated as Critical Habitat, is no longer suitable habitat for the CSSS. Please refer to Section 4.3 in the EA.

e. The placement of fill materials would not result in significant adverse effects on human health and welfare, municipal and private water supplies, recreational and commercial fishing, plankton, fish, shellfish, wildlife, wetlands and special aquatic sites. The life stages of aquatic species and other wildlife will not be adversely affected. Significant adverse effects on aquatic ecosystem diversity; productivity and stability; and recreational, aesthetics, and economic values will not occur.

f. Appropriate steps to maximize positive impacts on aquatic systems will be included in plans for the recommended plan.

(this page intentionally left blank)

APPENDIX B – FLORIDA COASTAL ZONE MANAGEMENT PROGRAM FEDRAL CONSISTENCY EVALUATION

(this page intentionally left blank)

FLORIDA COASTAL ZONE MANAGEMENT PROGRAM
FEDERAL CONSISTENCY EVALUATION

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

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

Response: The proposed plans and information will be submitted to the state in compliance with this chapter. No work is proposed seaward of the mean high water line in beach areas.

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

Response: The proposed project has been coordinated with various Federal, State and local agencies during the planning process. The project would achieve the goals of this chapter by contributing to a long-range master plan for South Florida's water resources, which would support the continued orderly social, economic and physical growth of the region.

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

Response: This statute is not applicable to the project.

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

Response: The proposed project would make a positive contribution to preserving cultural, water, fish and wildlife and estuarine resources including the Everglades, which is a unique natural resource. The proposed project would comply with the intent of this chapter.

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

Response: The property proposed for this project is already in public ownership. The proposed project would comply with the intent of this chapter.

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

Response: The proposed project would help improve environmental conditions at state parks or aquatic preserves in the region. The project is consistent with this chapter.

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

Response: Archival research, field work and consultation with the State Historic Preservation Officer (SHPO), have been conducted in accordance with the National Historic Preservation Act, as amended; the Archeological and Historic Preservation Act, as amended and EO 11593. Consultation between the SHPO and other concerned parties commenced on June 28, 2005 stating a Phase I Cultural Resources Survey was necessary. A letter dated August 16, 2005 was received from the SHPO concurring with the USACE determinations on four sites within the project area and that the project will not affect historic properties included in or eligible for inclusion in the National Register of Historic Places. The project will be consistent with the goals of this chapter.

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

Response: The proposed project would achieve the goals of this chapter by contributing to a long-range master plan for South Florida's water resources which would support economic diversification and tourism.

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

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

10. Chapter 370, Saltwater Living Resources. This chapter directs the state to preserve, manage and protect the marine, crustacean, shell and anadromous fishery resources in state waters; to protect and enhance the marine and estuarine environment; to regulate fishermen and vessels of

the state engaged in the taking of such resources within or without state waters; to issue licenses for the taking and processing products of fisheries; to secure and maintain statistical records of the catch of each such species; and, to conduct scientific, economic, and other studies and research.

Response: This project is inland and not expected to adversely affect saltwater resources.

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

Response: The project will help contribute to providing a long-term beneficial effect on freshwater aquatic life and wild animal life.

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

Response: The non-federal sponsor for this project is the South Florida Water Management District, which is the state agency responsible for implementing this statue. Coordinated planning has been done with this agency to ensure compatibility with established policies. The project is consistent with the goals of this chapter.

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

Response: 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. A spill prevention plan will be required.

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

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

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

Response: The proposed project would achieve the goals of this chapter by contributing to a long-range master plan for South Florida's water resources which would support economic diversification and tourism.

16. Chapters 388, Mosquito/Arthropod Control).

This chapter provides for a comprehensive approach for abatement or suppression of mosquitoes and other pest arthropods within the state.

Response: The proposed project will not further the propagation of mosquitoes or other pest arthropods.

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

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

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

Response: Project construction and implementation will include appropriate erosion control plans and measures to ensure compliance with the intent of this chapter.

APPENDIX C – BIOLOGICAL ASSESSMENT ENDANGERED SPECIES ACT CONSULTATION

(this page intentionally left blank)

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P.O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

Planning Division
Environmental Branch

JUN 01 2007

RECEIVED
JUN 05 2007
South Florida ES Office
Vero Beach, FL

Mr. Paul Souza, Field Supervisor
South Florida Ecological Services Field Office
U.S. Fish and Wildlife Service
1339 20th Street
Vero Beach, Florida 32960-3559

Dear Mr. Souza:

In accordance with the provisions of Section 7 of the Endangered Species Act, as amended, the U.S. Army Corps of Engineers (Corps) is hereby re-initiating consultation with the U.S. Fish and Wildlife Service (FWS) concerning the Canal 111 (C-111) project. The Corps is considering whether to reconfigure structural elements of the authorized C-111 project. Re-initiation is in response to our recent telephone and electronic mail correspondence on the proposed modifications.

On May 1, 2007 we received a list of species present in the C-111 project action area from Mr. Kevin Palmer of your office. Species to be evaluated are: Cape Sable seaside sparrow (*Ammodramus maritimus mirabilis)*, wood stork (*Mycteria americana*), bald eagle (*Haliaeetes leucocephalus*), Everglade snail kite (*Rostrhamus sociabilis plumbeus*), eastern indigo snake (*Drymarchon corais couperi*), American crocodile (*Crocodylus acutus),* red-cockaded woodpecker (*Picoides borealis)*, West Indian manatee (*Trichechus manatus latirostris*), Florida panther (*Puma* [=*Felis*] *concolor coryi*) and the plants Okeechobee gourd (*Cucurbita okeechobeensis ssp. okeechobeensis*) and Garber's spurge (*Chamaesyce garberi*). We have also re-evaluated effects on designated Critical Habitat of the sparrow, snail kite, crocodile and manatee in the C-111 project action area.

Based on the information presented in the previous biological opinions, remaining C-111 construction footprints, and additional biological information, the Corps has made the following determinations concerning the proposed C-111 modification:

1. The plan will result in no effect on the Everglade snail kite, red-cockaded woodpecker and Okeechobee gourd.

2. The plan may affect, but is not likely to adversely affect, the Garber's spurge, West Indian manatee and its Critical Habitat, American crocodile and its Critical Habitat, bald eagle, Florida panther, Eastern indigo snake, Cape Sable Seaside Sparrow, and wood stork.

-2-

3. The plan will affect approximately 480 acres of Cape Sable Seaside Critical Habitat. The impacted area is former agricultural land that the FWS has determined not to be sparrow habitat.

The enclosed Biological Assessment discusses information currently obtained by the Corps used in making these determinations. Your concurrence on this determination is requested. If you have any questions or need additional information, please contact Mr. Ernest Clarke at 904-232-1199.

Sincerely,

Stuart J. Appelbaum
Chief, Planning Division

Enclosure

CESAJ-PD-ES

BIOLOGICAL ASSESSMENT (BA)

Endangered Species Act (ESA) Consultation on the Canal 111 (C-111) Project Modifications South Dade County, Florida

Project Location. The C-111 project is located within the C-111 basin in southern Miami-Dade County and extreme southeastern Florida (Figure 1).

General Environmental Setting. The C-111 basin includes roughly 100 square miles of mostly agricultural lands in the Homestead/Florida City area. The basin adjoins Everglades National Park (ENP or Park), and discharges to the eastern panhandle of ENP, Florida Bay, Manatee Bay and Barnes Sound (Figure 1).

Project Description. The C-111 project was constructed as part of the ENP – 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). Further modifications to the C-111 were authorized as an addition to the C&SF project in the Water Resources Development Act (WRDA) of 1996 (PL 104-303) to protect the natural values associated with ENP, while maintaining flood damage reduction within the C-111 basin east of Levee 31 North (L-31N) and C-111.

Unintended natural resource consequences have been recognized over the history of the C-111 project. The project altered the regional hydrology and consequently influenced natural values associated with ENP (e.g. Cape Sable seaside sparrow (CSSS or sparrow), snail kite, manatee and crocodile, Loxahatchee peat forming wetlands, and tree islands). The project also impacted freshwater flows to Manatee Bay, Barnes Sound and Florida Bay. The US Army Corps of Engineers (Corps) seeks to improve these undesirable resource conditions in Taylor Slough, the eastern panhandle of ENP, Manatee Bay, and Barnes Sound, while maintaining flood protection within the C-111 basin as described in the Corps' 1994 Final Integrated General Re-evaluation Report and Environmental Impact Statement (EIS), Canal 111, South Dade County, Florida (C-111 GRR/EIS).

Features of the 1994 GRR/EIS plan for the C-111 project have been adjusted in the years since that report was completed. Certain alterations were previously documented in the Corps' 2002 Final EIS and 2006 Final Supplemental EIS for the Interim Operational Plan (IOP) for Protection of the CSSS. Presently, the Corps is considering whether to further reconfigure structural elements of the authorized C-111 project for the good of the natural environment. Accordingly, the Corps has prepared two reports to document and evaluate the proposed design refinements:

- C-111 Engineering Documentation Report (EDR) – a May 2007 report that describes the proposed design refinements to the C-111 project.

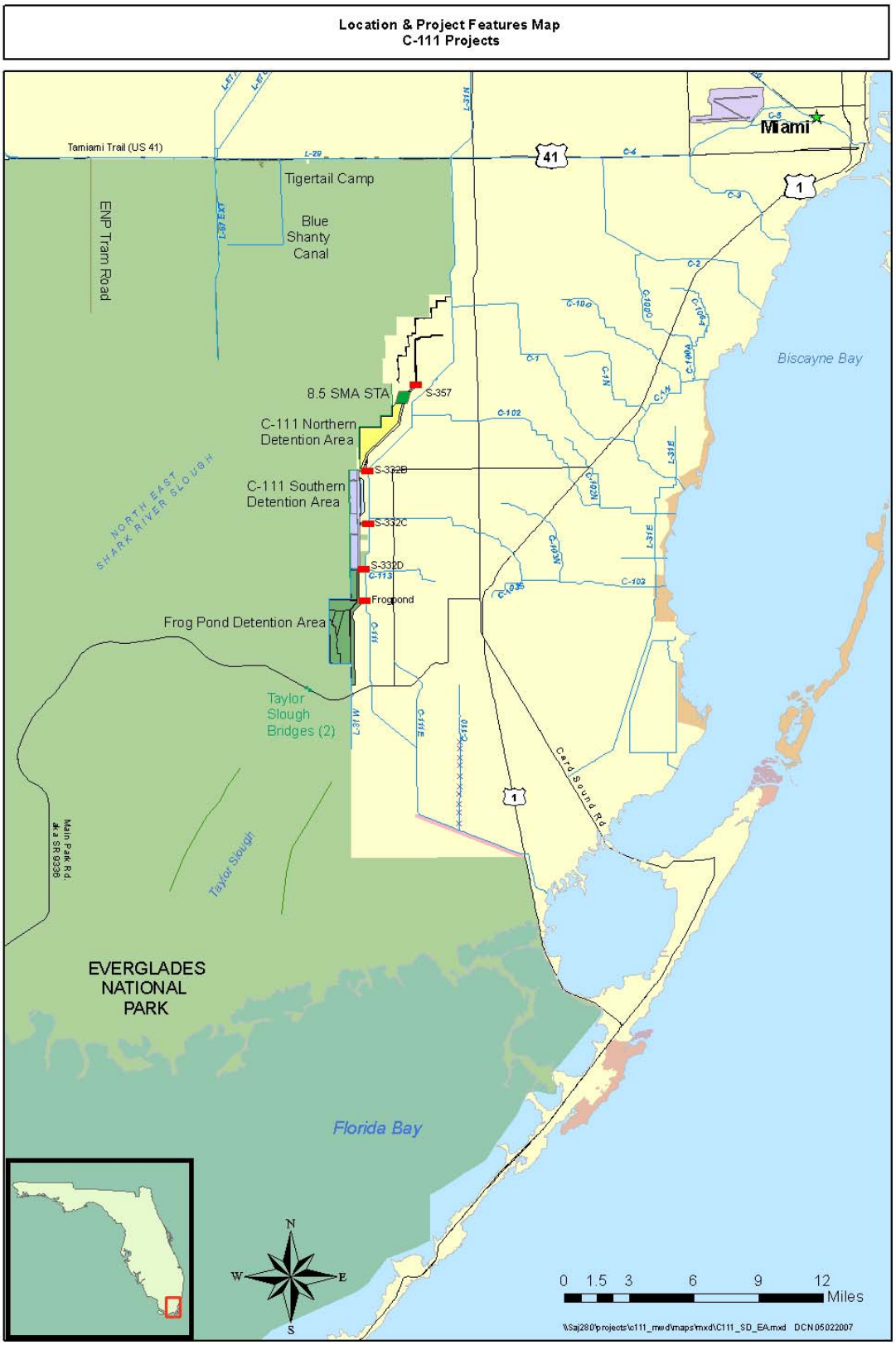

Figure 1. C-111 Project location and features.

- Draft Environmental Assessment (EA), Design Modifications for the Canal 111 (C-111) Project, Miami-Dade County, Florida – a May 2007 report to record and evaluate the proposed modifications to the C-111 project not addressed in previous National Environmental Policy Act (NEPA) documents (e.g. 1994 GRR/EIS and 2002 Final EIS and 2006 Final Supplemental EIS for the IOP for Protection of the CSSS).

Proposed C-111 Modifications. The proposed modification to C-111 project includes features that have been contemplated in interagency forums (IOP and Combined Structural and Operational Plan (CSOP)) since completion of the 1994 GRR/EIS. This consultation relates strictly to the construction of the modified C-111 features. Feature operations will be covered under separate consultation. The refinements, described in detail in Section 1.10 (Project Description and Design Refinements) of the provided EDR and Section 2.0 (Alternatives) of the provided Draft EA, include:

1. Expansion of the North Detention Area (NDA)
2. Extension of L-31 West Tieback Levee North to the 8.5 SMA STA
3. S-332D Tieback Levee
4. NDA Southern Divide Berm
5. C-111 NDA Southern Divide Berm Weirs
6. Overflow weirs to the west through the L-31W Tieback Levee
7. S-332B 500-foot Flowway
8. S-332C 500-foot Flowway
9. 500 foot Flowway System
10. Additional L-31W Borrow Canal to be filled
11. Aerojet Canal Plugs

As this list indicates, 11 specific features of the 1994 GRR/EIS change in the current proposal. These specific changes amount to the following sweeping changes in the C-111 project:

1. Expansion of the footprint of the NDA and resulting extension of the hydraulic ridge on the ENP boundary – features 2 through 6 of the previous list are associated with this change.

   The 1994 C-111 GRR plan did not have a detention area in the northern Rocky Glades but rather discharged water west of the S-332D tieback levee to flow into the ENP (Figure 2). Under IOP a 226 acre detention area called the S-332B NDA was constructed north of the S-332B pump station (Figure 2).

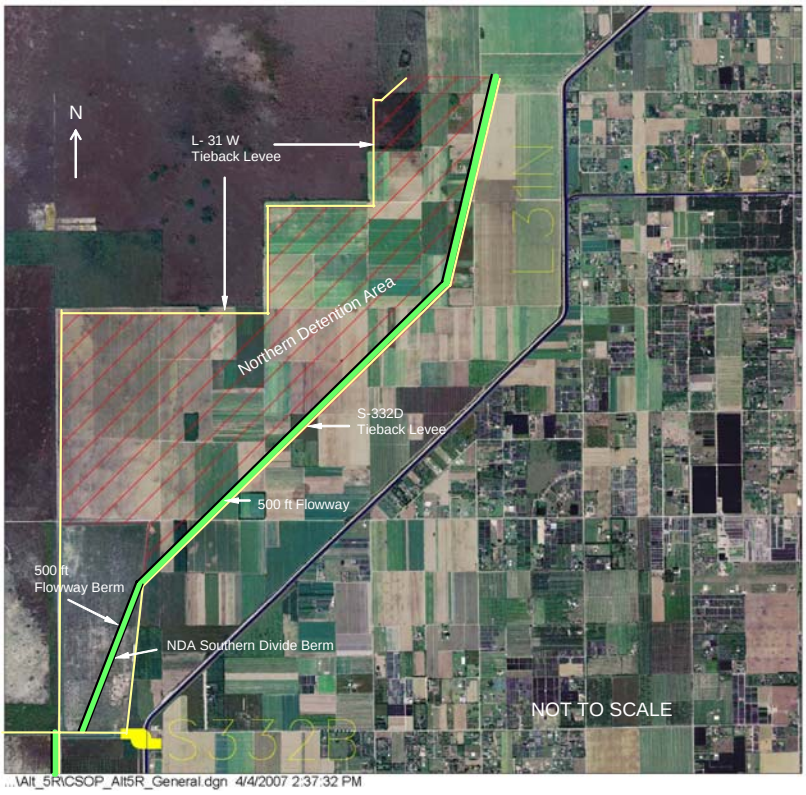

Figure 2. Features of the expanded Northern Detention Area.

The current proposal (Figure 2) would expand the detention area north from the existing S-332B NDA to the 8.5 Square Mile Area Stormwater Treatment Area (8.5 SMA STA), which is a component of the Modified Water Deliveries to ENP (MWD) project. The proposed new C-111 NDA would be created by extending the L-31W tieback levee to the north to tie into the 8.5 SMA STA and realigning the S-332D tieback levee to also tie into the 8.5 SMA STA. Both of these levees are discussed in more detail in the EDR and Draft EA. This modification would increase the size of the NDA to approximately 1,441 acres and cover former agricultural lands now owned by the SFWMD, the non-Federal sponsor for the C-111 project. The interior of the detention area would be scraped to the underlying rock layer to provide material to construct the L-31W and S-332D tieback levees. Two pump stations would supply water to the area, the S-357 (a MWD project component) from the 8.5 SMA in the north, and the S-332B in the south. The NDA would be divided into three areas: 1) flowway area (232 acres), 2) main detention area (1180 acres), and additional storage in the southern part of the NDA (29 acres).

The reconfigured NDA would extend of the hydraulic ridge created by the C-111 project north to the 8.5 SMA STA and benefit ENP by reducing the seepage in this region. The hydraulic ridge would help maintain a more natural hydroperiod within ENP, ultimately contributing to the restoration of degraded habitats in the Park, while maintaining the current level of flood protection within the C&SF system. Section 4.1 of the provided Draft EA provides additional information related to the Corps' hydrologic evaluation for the proposed C-111 modification.

The proposed NDA expansion would result in additional wetland impacts over what was proposed in the 1994 GRR, 2002 IOP FEIS and the 2006 IOP FSEIS. Under IOP approximately 226 acres of wetlands would be impacted within the detention area. The proposed action would impound approximately 1,440 acres

of wetlands within the NDA. Most of the wetlands in the expanded footprint have been previously converted to agriculture. Section 4.2 of the provided Draft EA provides additional information related to the Corps' evaluation of impact of the proposed C-111 modification on wetlands.

2. Change in the water quality effects the C-111 project has on ENP – features 1, 2 and 6 of the previous list are associated with this change.

   In the 1994 C-111 GRR the Corps planned to construct twenty-four 36-inch diameter culvert/risers and one 300-foot long emergency overflow weir through the L-31W tieback levee to convey water from the retention/detention area westward towards ENP. Each feature was designed to pass 50% of the maximum pump capacity of the three pump stations S-332B, S-332C, and S-332D, with 0.5 feet of head difference. It is now recommended to eliminate the culverts and construct four overflow weirs in the L-31W tieback levee. Two weirs would be constructed in each detention area. The reconfigured project would reduce water quality impacts on ENP by:

   a. Preventing surface water runoff of rainwater from former agriculture lands in the northern Rocky Glades from entering the park.

   b. Reducing surface water discharge from the C-111 project into ENP. Operations for C-111 detention area will be determined as part of CSOP. Hydrologic modeling preformed during the CSOP study indicates that there will be no direct discharge of surface water from the expanded NDA. In the CSOP tentatively selected plan, the pumps discharging into the detention areas turn off when water stages reached 2.5 feet above grade. The western overflow weirs for the detention areas are set to 3.5 feet above grade. To overflow the weirs the detention areas would first need to be filled to 2.5 feet and then the area would need to receive more than 12 inches of rain. If the detention area was filled to maximum stage (2.5 feet above grade) it would then take at least 24-hour 100-year rainfall event to overtop the weir. From Technical Paper No. 40, Rainfall Frequency Atlas of the United States, the 100-year 24-hour rainfall event is approximately 13-14 inches, interpolating from rainfall map. In the interim until the CSOP planning process is finalized the detention areas will be operated based on the IOP which allows a normal maximum depth of 2.0 feet. This will provide a minimum of 1.5 feet of freeboard before overflowing.

      In the unlikely event that surface discharge into ENP does occur, the Corps has determined that the surface water that would be impounded within this portion of the C-111 detention system would not present a problem. Also the water impounded within NDA would not present a bioaccumulation problem for any animals foraging in this area.

   c. Improving water quality in the C-111 system. The surface water discharged into the NDA would be subjected to a greater intensity of

ultraviolet penetration, higher oxygen content and higher temperatures than the L-31 canal water or ground water in that area due to the shallower depths and greater surface area per unit volume of water. These factors would act to improve the water quality by reducing any undesirable pathogens and would enhance the uptake/sequestration of nutrients. The short hydroperiods that would exist within this detention feature would favor periphyton that better sequesters phosphorus.

Section 4.4 of the provided Draft EA provides additional information related to the Corps' water quality evaluation for the proposed C-111 modification.

As previously mentioned, the proposed action is for construction of the modified C-111 features only. The operation of these features will be covered under separate consultation.

Listed Species. Based on input from US Fish and Wildlife Service (USFWS) staff in the Vero Beach Ecological Services Office (Kevin Palmer email communication), the following species are included in this BA.

Common Name	Scientific Name	Federal Status
Cape Sable seaside sparrow (CSSS or sparrow)	*Ammodramus maritimus mirabilis*	E, CH
Everglade snail kite (SK)	*Rostrhamus sociabilis plumbeus*	E, CH
Wood stork (WS)	*Mycteria americana*	E
Red-cockaded woodpecker	*Picoides borealis*	E
Bald eagle	*Haliaeetus leucocephalus*	T
West Indian manatee (manatee)	*Trichechus manatus*	E, CH
Florida panther	*Puma = Felis concolor coryi*	E
American crocodile (crocodile)	*Crocodylus acutus*	T, CH
Eastern indigo snake	*Drymarchon corais couperi*	T
Garber's spurge	*Chamaesyce garberi*	T
Okeechobee gourd	*Cucurbita okeechobeensis ssp. okeechobeensis*	E

Listed Species Not Affected. The red-cockaded woodpecker and the Okeechobee gourd are not known to be present in the project area. They are upland species not shown in the Florida Natural Areas Inventory as inhabiting any area in Miami-Dade or Broward counties. Therefore, we have determined that there would be no effect of continued implementation of the proposed C-111 design modifications on these species.

The persistence of the snail kite in Florida is thought to depend principally on the large wetlands present in the Water Conservation Areas (WCAs). WCA-3A, located several miles northwest of the proposed C-111 modification is the largest and most consistently utilized (as measured by numbers of birds observed during annual surveys from 1970 to1994) portion of the designated Critical Habitat for the kites. Accordingly, we

determine that the implementation the proposed C-111 modification will have no affect on the Everglade snail kite.

Listed Species Previously Determined not likely to be Adversely Affected. USFWS issued a Biological Opinion (BO) on February 19, 1999 for the following projects: MWD, C-111, and the Experimental Program of Water Deliveries. In this document, USFWS concluded that none of the considered projects would be likely to adversely affect the manatee, crocodile, bald eagle, or Garber's spurge. In April 2002, USFWS amended the 1999 BO but did not change the conclusion for these four species. There has not been any new information that would be cause for re-evaluation. Therefore, we have determined that these species may be affected, but would not likely be adversely affected by continued implementation of the proposed C-111 modifications.

Eastern Indigo Snake. The Corps commits to implement the standard construction protocols for protection of the Eastern indigo snake during construction of the C-111 modification. Given that precaution, we have determined that implementation of the proposed C-111 modifications may affect, but is not likely to adversely affect the Eastern indigo snake.

Florida Panther. Figure 3 illustrates recent panther use of the expanded NDA. In their 2002 BO, the FWS acknowledged that there would be some loss of suitable panther habitat due to construction of the C-111 detention areas, but that this was marginal habitat, the loss of which would be offset by overall ecological improvement in adjacent habitat in ENP. Additionally, after the C-111 detention areas are constructed, panthers may utilize the interior areas during dry times. Accordingly, it is determined that expansion of those features to extend the hydraulic ridge to the 8.5 SMA STA may affect, but is not likely to adversely affect the Florida panther.

Cape Sable Seaside Sparrow. The CSSS is generally sedentary, secretive, and non-migratory, and it occupies the marl prairies of southern Florida year-round. It is present in six subpopulations primarily within the boundaries of ENP. One of the subpopulations (F) is located in the vicinity of the proposed C-111 modification. The sparrow breeding season extends from March until the rainy season begins, usually in June. Successful breeding requires that breeding season water levels remain at or below ground level in the breeding habitat. It also depends on maintenance of a short hydroperiod vegetative community devoid of woody species.

Critical habitat was designated for the Cape Sable seaside sparrow on August 11, 1977 (42 FR 40685) and was corrected on September 22, 1977 (42 FR 47840). The 1977 critical habitat designation for Cape Sable seaside sparrow encompasses approximately 197,260 acres. The USFWS has proposed a revision in sparrow critical habitat that will reduce the total acreage of critical habitat to approximately 156,350 acres (October 31, 2006, FR 71 63980). According to USFWS, the revised proposal omits several areas originally designated as critical habitat in 1977 that were determined not to be sparrow habitat. These include forested areas of Long Pine Key in Everglades National Park, dwarf cypress forests in Everglades National Park, deep water slough communities, and

agricultural areas. The proposed change in critical habitat is under review. The location proposed C-111 modification impacts approximately 480 acres of the currently designated sparrow critical habitat but falls outside the proposed critical habitat (Figure 3). This indicates that the agricultural areas in the project footprint have been determined not to be sparrow habitat. The Corps commits to monitoring for sparrow nesting activity during the breeding season in a manner similar what is occurring during construction of C-111 Contract 7. If any breeding sparrows are detected during these surveys, a team including USFWS and ENP staff would be convened to decide on further action to be taken based on the specifics of the detections. Considering this, we determine that implementation of the proposed C-111 modification may affect, but is not likely to adversely affect the CSSS.

Wood Stork. Wood storks are wetland dwellers that feed and nest in the project area. In the long-term, the proposed conversion of the agricultural land to a detention area is expected to improve hydropatterns in ENP, and in so doing improve foraging opportunities for wood storks. During certain conditions wood storks may even forage in the NDA itself which would not be considered dangerous (see discussion on bioaccumulation on page 5). The Corps agrees to adhere to the guidelines found in USFWS' "Habitat Management Guidelines for the Wood Stork in the Southeast Region" during construction. Considering this, it is expected that the proposed wetland construction project may affect, but is not likely to adversely affect the wood stork.

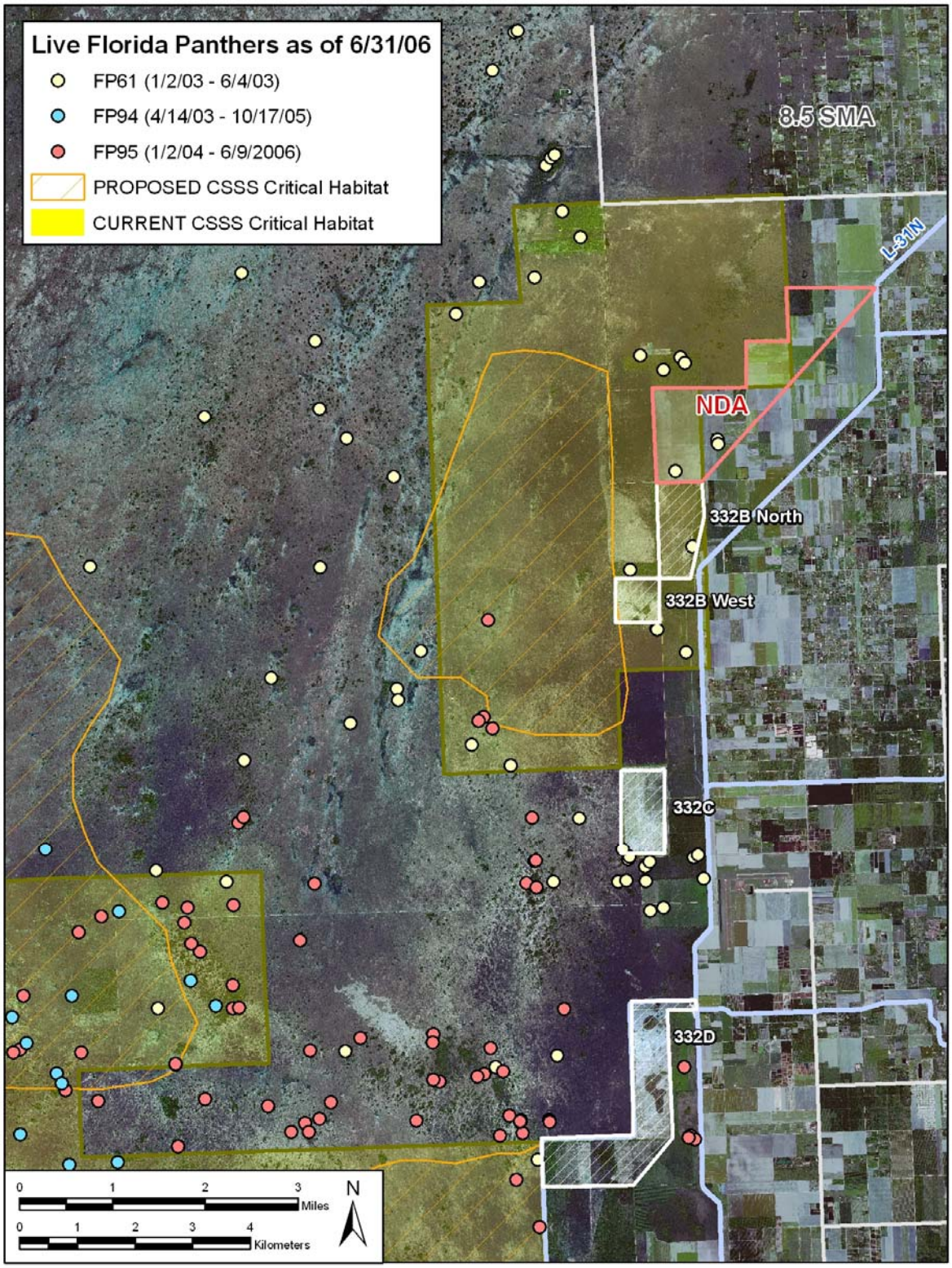

Figure 3. Panther telemetry (as of June 2006) and Cape Sable seaside sparrow proposed and designated critical habitat in relation to the proposed expansion of the C-111 Northern Detention Area (NDA)

(this page intentionally left blank)

APPENDIX D – PERTINENT CORRESPONDENCE

(this page intentionally left blank)

FLORIDA DEPARTMENT OF STATE
Sue M. Cobb
Secretary of State
DIVISION OF HISTORICAL RESOURCES

Mr. David W. Pugh
PD-ES/US Army Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32232-0019

August 16, 2006

Re: DHR Project File No.: 2006-06722 / Date Received: July 17, 2006
Final Report: *Cultural Resources Survey, C-111 Phase II and III;* New South Associates
Dade County

Dear Mr. Pugh:

Our office received the above referenced final report in accordance with Section 106 of the *National Historic Preservation Act of 1966* (Public Law 89-665), as amended in 1992, and *36 C.F.R., Part 800: Protection of Historic Properties;* Chapter 267, *Florida Statutes;* and 1A-46, *Florida Administrative Code*, Archaeological and Historic Report Standards. We reviewed the project report to assess possible adverse impact to cultural resources (any prehistoric or historic district, site, building, structure, or object) listed, or eligible for listing, in the *National Register of Historic Places* (NRHP), or otherwise of historical, architectural or archaeological value.

In January and February 2006, New South Associates (NSA) conducted an archaeological and historical survey of the C-111 project area on behalf of the U.S. Army Corps of Engineers. NSA identified two new sites (8DA6514 and 8DA6515) and two previously recorded sites (8DA3210 and 8DA3218) all of which were determined to be potentially eligible for listing in the *NRHP*. The U.S. Army Corps of Engineers has concurred with avoidance for three of the sites (8DA3210, 8DA3218, and 8DA6515).

It is not possible to completely avoid the site 8DA6514 and it will be subjected to a temporary flooding that the Corps of Engineers feels will have no adverse effect on the primarily faunal site. Therefore it is the opinion of the U.S. Army Corps of Engineers that the proposed project will have no adverse effect on cultural resources listed or eligible for listing in the *NRHP*.

Based on the information provided, our office concurs with these determinations, and finds the submitted report complete and sufficient in accordance with Chapter 1A-46, *Florida Administrative Code*.

500 S. Bronough Street • Tallahassee, FL 32399-0250 • http://www.flheritage.com

❒ Director's Office (850) 245-6300 • FAX: 245-6436
❒ Archaeological Research (850) 245-6444 • FAX: 245-6452
■ Historic Preservation (850) 245-6333 • FAX: 245-6437
❒ Historical Museums (850) 245-6400 • FAX: 245-6433

❒ Southeast Regional Office (954) 467-4990 • FAX: 467-4991
❒ Northeast Regional Office (904) 825-5045 • FAX: 825-5044
❒ Central Florida Regional Office (813) 272-3843 • FAX: 272-2340

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P.O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

Planning Division
Environmental Branch

JUL 14 2006

Mr. Bill Steele
Seminole Tribe of Florida
Ah Tha Thi Ki Museum
HC-61, Post Office Box 21-A
Clewiston, Florida 33440

Dear Mr. Steele:

We have enclosed a single copy of the final report, *C-111 Phase II and III Dade County Florida-Technical Report #1330*, by New South Associates. The U.S. Army Corps of Engineers (Corps) concurs with the determination that sites 8DA3210, 8DA3218, 8DA6514 and 8DA6515 are potentially eligible for listing to the National Register of Historic Places.

The project design has been modified to exclude sites 8DA6515, 8DA3218, and 8DA3210 from the project area and avoid them; 8DA6514 cannot be avoided (Figures 1 and 2). The recovery from 8DA6514 was faunal (predominately snake and turtle) and non-diagnostic ceramics. The preferred alternative will have less water on the site than existing conditions and inundation of the area will be a temporary measure, lasting no longer than it may be naturally absorbed into the aquifer (Figure 3). It is the opinion of the Corps this project will have no adverse effects on 8DA6514 and may proceed without further research. However, a monitor will be onsite during ground disturbing activities in case of unanticipated discoveries.

If you have any questions regarding this report, please contact Mr. David Pugh at (904) 232-1361 or david.w.pugh@saj02.usace.army.mil. A response within 30 days after receipt of this letter would be appreciated.

Sincerely,

James Mc Adams for.

Marie G. Burns
Chief, Environmental Branch

Enclosure

COPY

Mr. Pugh
August 16, 2006
Page 2

If you have any questions concerning our comments, please contact Scott Sorset, Historic Sites Specialist, by phone at (850) 245-6333, or by electronic mail at srsorset@dos.sate.fl.us. Your continued interest in protecting Florida's historic properties is appreciated.

Sincerely,

Frederick P. Gaske, Director, and
State Historic Preservation Officer

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P.O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

28 JUN 2005

REPLY TO
ATTENTION OF

Planning Division
Environmental Branch

Mr. Frederick Gaske
State Historic Preservation Officer
Division of Historical Resources
500 South Bronough Street
Tallahassee, Florida 32399-0250

Dear Mr. Gaske:

The U. S. Army Corps of Engineers, Jacksonville District, is proposing to construct a Stormwater Treatment Area for the removal of phosphorus, located in southwest Dade County-east of Everglades National Park . The project area of "C-111-PHASE 2 and 3", is located in Grossman Hammock Quad. T55S/R38E-Section 34 (NE ¼, NE ¼ ¼ , NE ¼ ¼ ¼), at the junction of L-31N Canal and SW 188 St, south on the west side of L-31N to Quad. Royal Palm Ranger Station, T57S/R38E-Section 7, Pump Station S-332D (See Figures 1-5). The project area is approximately 5,000 acres. The C-111-PHASE 3 Area of Potential Effect, located in Quad. Grossman Hammock (Figure 1) will involve constructing a levee to the west of L-31N Canal, and allowing re-growth of native vegetation between the canal and the proposed levee. The C-111-PHASE 2 Area of Potential Effect, located in Quads. Grossman Hammock and Royal Palm Ranger Station (Figure 3) will consist of build a connector that will join the two existing water retention areas.

A cultural resource survey of the project area has not been conducted. A review of the Florida Master Site File forms did not indicated any known historic properties in the area. Although a site visit discovered the project area has been heavily impacted by previous construction of storm water treatment areas, commercial agriculture and mining practices, we recommend a Phase I Survey be conducted to locate any historical properties in the area of potential effect to evaluate their significance and eligibility for nomination to the National Register of Historic Places. This work will be conducted in compliance with the Natural Historic Preservation Act of 1966, as amended (PL 89-665); the Archaeological and Historic Preservation Act, as amended (PL 93-291); and Executive Order 11593.

If there are any questions regarding this, please contact David Pugh at (904) 232-1361 or david.w.pugh@saj02.uscace.army.mil. Please respond within 30 days after receipt of this letter.

Sincerely,

Stuart J. Appelbaum
Chief, Planning Division

Enclosure

Copies furnished

Mr. David Hertzburg, Office of Historical Preservation, Suite 695, 111 NW First Street, Miami, Florida 33128

Mr. Paul Linton, Project Manager, South Florida Water Management District, 3301 Gun Club Road, West Palm Beach, Florida 33416-4680

Mr. Steve Terry, Miccosukee Tribe of Indians, Post Office Box 44021, Tamiami Station, Miami, Florida 33024

Ms. Tori White, U.S. Army Corps of Engineers, South Florida Restoration Program, 1400 Centerpark Blvd., Suite 750, West Palm Beach, Florida 33401

Pugh/CESAJ-PD-ES/1361
Moulding/CESAJ-ES
Cantron/CESAJ-PD-ES
Burns/CESAJ-PD-E
Couch/CESAJ-DP-E
Appelbaum/CESAJ-PD

L:/GROUP/PDES/PUGH/SHPO/SHPO C-111 PHASE II

06/01/2004 12:38 USDA/NRCS → 919042321888 NO.078

United States Department of Agriculture

USDA

NRCS Natural Resources Conservation Service

2614 N.W. 43rd Street
Gainesville, FL 32606
Phone: 352-338-9533

http://www.fl.nrcs.usda.gov

P.O. Box 141510
Gainesville, FL 32614
Fax: 352-338-9578

July 22, 2003

Mr. James C. Duck
Chief, Planning Division
Department of the Army
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

Dear Mr. Duck:

I have reviewed the information which was submitted for the C111 General Reevaluation Report (GRR) Supplement. Since this land is not being farmed or will not be farmed in the future, it does not meet the criteria for prime or unique farmland.

Please contact me if there are additional questions.

Sincerely,

Warren Henderson

Warren Henderson
State Soil Scientist

Enclosure

cc: Christine Coffin, DC, Florida City Service Center

OPTIONAL FORM 99 (7-90)

FAX TRANSMITTAL # of pages ▸ 1

To John Moulding	From Warren Henderson
Dept./Agency	Phone # 3523389535
Fax # 904 232 1888	Fax # 352 338 9578

NSN 7540-01-317-7368 5099-101 GENERAL SERVICES ADMINISTRATION

The Natural Resources Conservation Service works in partnership with the American people to conserve and sustain natural resources on private lands.

An Equal Opportunity Employer

JUN- 1-04 SUN 12:18 PM 3523389578 P 1