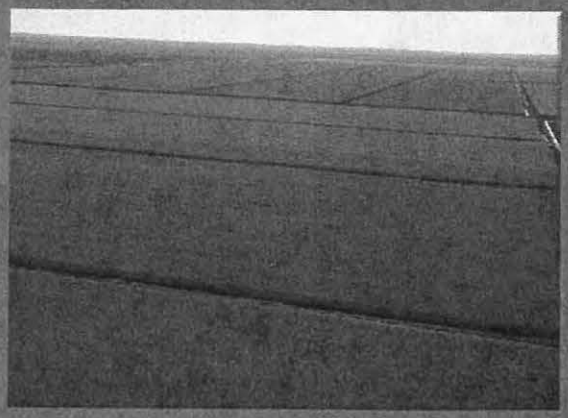
Everglades Agricultural Area Reservoir A-1

Draft Supplemental Environmental Impact Statement









January 2006

U.S. Army Corps of Engineers
Jacksonville District

South Florida Water
Management District

EVERGLADES AGRICULTURAL AREA RESERVOIR A-1

SUPPLEMENTAL DRAFT ENVIRONMENTAL IMPACT STATEMENT

Responsible Agency: The lead agency is the U.S. Army Corps of Engineers, Jacksonville District.

Abstract: The South Florida Water Management District (SFWMD) proposes to construct and operate an above-ground reservoir, with a capacity of 190,000 acre-feet at an approximate depth of 12-feet. The reservoir would be constructed on a 16,768-acre parcel of land situated north of Stormwater Treatment Area 3/4 and between the Miami and North New River Canals in the Everglades Agricultural Area (EAA) in Palm Beach County, Florida. As proposed, construction of the project would impact approximately 16,252.68 acres of atypical jurisdictional areas (farmed sugarcane fields), 187.63 acres of jurisdictional nonagricultural wetlands, and 163 acres of jurisdictional canals and ditches by dredging, filling, and/or flooding. The SFWMD would need to obtain a Department of the Army permit pursuant to Section 404 of the Clean Water Act. This Supplemental Draft Environmental Impact Statement (EIS) evaluates the environmental effects of 5 alternatives including the SFWMD's proposed action, the EAA Reservoir A-1 project, and the no action alternative. The purpose of the EAA Reservoir A-1 is to store water from stormwater runoff and releases from Lake Okeechobee at any given time. Without this project, the 190,000 acre-feet of water will potentially cause flooding in the EAA, and will need to be pumped to Stormwater Treatment Area 3/4, bypassed to tide, or released to the estuaries from Lake Okeechobee. This project will improve timing of water deliveries from the EAA to the Water Conservation Areas, reduce Lake Okeechobee regulatory releases to the estuaries, meet supplemental agricultural irrigation demands, and increase flood protection within the EAA.

THE OFFICIAL CLOSING DATE FOR THE RECEIPT OF COMMENT IS 45 DAYS FROM THE DATE ON WHICH THE NOTICE OF AVAILABILITY OF THIS EIS APPEARS IN THE FEDERAL REGISTER

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EXECUTIVE SUMMARY

SUPPLEMENTAL DRAFT ENVIRONMENTAL IMPACT STATEMENT

EVERGLADES AGRICULTURAL AREA RESERVOIR A-1
PALM BEACH COUNTY, FLORIDA

A. DESCRIPTION OF PROPOSED ACTION

The proposed project involves construction of the Everglades Agricultural Area (EAA) Reservoir A-1 project. The SFWMD proposes construction of the EAA Reservoir A-1 project to expedite the attainment of environmental benefits in the Everglades ecosystem. The South Florida Water Management District's (SFWMD's) proposed project, identified as Cell A-1, is the same footprint as a portion of the Selected Plan (Alternative 4), identified in the United States Army Corps of Engineers' (USACE's) Draft Project Implementation Report / Environmental Impact Statement (PIR/EIS), which features a two-cell reservoir impoundment with a maximum normal pool storage depth of 12 feet at approximately 31,000 acres of above ground surface area storage. The SFWMD identified these two cells as Cell A-1 and Cell A-2 for the purpose of alternative analysis, Cell A-1 and A-2 are approximately 17,000 and 14,000 acres in size respectively, and combined would contain 360,000 acre-feet of water. Both proposed reservoir cells include individual inflow pump stations, discharge structures, emergency overflow spillways, and seepage control canals with associated structures. The SFWMD Cell A-1 and A-2 alternatives differ from the plan recommended in the Draft PIR/EIS due to requirements to build approximately 3 miles of 23 foot high levee to dam safety standards, whereas this segment of levee described in the Draft PIR is 21 feet high and serves only to separate the two reservoir cells providing operational flexibility and a wave break function.

As proposed, construction of the project would impact approximately 16,252.68 acres of atypical jurisdictional areas (farmed sugarcane fields), 187.63 acres of jurisdictional nonagricultural wetlands, and 163 acres of jurisdictional canals and ditches by dredging, filling, and/or flooding. A Department of the Army permit, pursuant to Section 404 of the Clean Water Act (CWA), is required prior to construction. A public notice describing this regulatory action was circulated on October 12, 2005.

The State of Florida has developed a plan called "Acceler8" for the purpose of accelerating design and construction of a number of projects consistent with the Comprehensive Everglades Restoration Plan (CERP) and concurrent with the development of a Project Implementation Report (PIR) but prior to one or more of the following: Administration approval, congressional committee resolution, congressional authorization, or federal construction funding. All Acceler8 projects must be specifically authorized by Congress before becoming a part of the federal CERP. The SFWMD is the lead agency for the State on implementing this plan and will need to acquire the Department of the Army permits under Section 404 of the CWA prior to construction.

The SFWMD is accelerating nine projects (some with multiple components) as shown in Figure 1-2. Of these, seven of the projects were initially authorized under the Water Resources Development Act (WRDA) of 2000: C-44 Basin Storage Reservoir, Everglades Agricultural Area Storage Reservoir, Site 1 Impoundment, C-11 Impoundment & Canal, Water Conservation Areas 3A and 3B Levee Seepage, C-9 Stormwater Treatment Area Impoundment, and C-111N Spreader Canal; one project falls under the WRDA 2000 programmatic authority provisions: Acme Basin B; and the final three require separate authorization: Biscayne Bay Coastal Wetlands, C-43 Reservoir, and Picayune Strand Restoration project.

The SFWMD proposes to construct the EAA Reservoir A-1 project prior to implementation of any federal EAA Storage Reservoirs project. The USACE is proceeding with two separate and independent but related actions, the regulatory evaluation of the SFWMD's proposed EAA Reservoir A-1 project and the planning evaluation of the federal CERP EAA Storage Reservoirs project both of which are described in the September 2005 Draft PIR/EIS (See the Executive Summary, pages 16-17 and Section 8, Plan Implementation, pages 1-2 and pages 12-13). The USACE and SFWMD had anticipated that the SFWMD would accelerate construction and achievement of benefits of certain CERP projects by obtaining required permits and initiating construction upon completion of the Final EIS for the federal CERP project. Because of delays in completion of the FEIS for the CERP EAA Storage Reservoirs project, the SFWMD is pursuing a Department of the Army permit prior to completion of the CERP EAA Storage Reservoirs FEIS. Accordingly, this separate Supplemental Draft EIS is being prepared by the Regulatory Division to address the environmental impacts of the SFWMD's proposed project. The Regulatory Division of the USACE will evaluate the SFWMD's proposed EAA Reservoir A-1 project in this Supplemental Draft EIS while the USACE Civil Works Planning Process continues with a separate and independent evaluation of the CERP project. Any regulatory decision on the SFWMD's proposed project will not affect the planning process and consideration of alternatives for the federal CERP EAA Storage

Reservoirs project. The SFWMD's Acceler8 project may ultimately be a component of the federal CERP EAA Storage Reservoirs project. If it is not a part of the federal recommended plan, it will be considered as a locally preferred plan.

B. NEED FOR PROPOSED ACTION

Within the EAA, much of the Supplemental water supply in the dry season is currently met by deliveries from Lake Okeechobee. Additional water storage in the EAA will lessen its dependency on Lake Okeechobee for irrigation water during the dry season (thereby reducing water demands on the Lake and allowing the Lake to be operated to meet other in-Lake or Everglades system needs). During the wet season, storage within the EAA will help reduce the ecologically damaging high water conditions in the Water Conservation Areas (WCAs) and back-pumping of agricultural runoff into Lake Okeechobee. A regional aboveground impoundment or storage area within the EAA could capture and store EAA runoff or excess water from Lake Okeechobee during the wet season. During the dry season, reservoir releases could be made to the primary canals for agricultural irrigation and for restoration of the downstream Everglades ecosystem. Lake Okeechobee would then no longer serve as the only supplemental source for meeting EAA irrigation demands. During the periods when supplemental irrigation requirements could not be met by the EAA storage reservoir, water supply releases from Lake Okeechobee could still be provided.

The goals and objectives of the SFWMD's proposed EAA Reservoir A-1 will:

- Capture, move and store regulatory releases from Lake Okeechobee, reducing the number/volume of harmful discharges to coastal estuaries
- Capture, move and store agricultural stormwater runoff, reducing the need for emergency flood control back-pumping into Lake Okeechobee
- Provide additional water to meet Everglades and agricultural water demands, improving the timing of environmental deliveries of water to the WCAs and lessening water supply dependency on Lake Okeechobee
- Improve operational flexibility to move water within the EAA, including flow equalization and optimization of STA performance to further reduce phosphorus inflows to the Everglades
- Provide, public access and recreation opportunities

The EAA Reservoir A-1 will store up to 190,000 acre-feet of water from stormwater runoff and releases from Lake Okeechobee at any given time.

Without this project, the 190,000 acre-feet of water will potentially cause flooding in the EAA, and will need to be pumped to STA-3/4, bypassed to tide, back-pumped to Lake Okeechobee, or released to the estuaries from Lake Okeechobee. Therefore, with this project, there will be a reduction in the potential for flooding and releases to the estuaries once the project is implemented.

C. RELATED MAJOR GOVERNMENT ACTIONS

A multi-agency Project Delivery Team, led by the USACE, is in the process of preparing of the Final PIR/EIS for the EAA Storage Reservoirs project as specifically authorized in section 601(b)(2)(C)(ii) of WRDA 2000.

WRDA also authorized the CERP, which is comprised of 68 major components and grouped into over 40 projects. These projects together with the EAA Storage Reservoir project will ultimately benefit the Everglades ecosystem. Details on projects, studies, and program documents can be found on the Internet at www.evergladesplan.org.

On October 14, 2004, a Memorandum of Agreement (MOA) regarding acceleration of the Comprehensive Everglades Restoration Plan between the Executive Office of the Governor and the SFWMD was signed. Acceler8 expedites restoration of the Everglades and attainment of benefits ahead of schedule and serves as the initial foundation for other comprehensive restoration efforts to follow. Acceler8 consists of nine projects (some with multiple components) that, when completed, will provide immediate environmental, flood control and water supply benefits. The nine components, listed below, are all due to be online by 2011, 11 years ahead of the CERP schedule:

- C-44 (St. Lucie Canal) Reservoir / Stormwater Treatment Area (STA)
- C-43 (Caloosahatchee River) West Reservoir
- Bolles & Cross Canals Improvements
- Everglades Agricultural Area STA Expansion
- Everglades Agricultural Area Reservoir- Phase 1
- Water Preserve Areas
  Includes Site 1, C-9, C-11, Acme Basin B, WCA-3A/3B
- Picayune Strand (Southern Golden Gate Estates) Restoration
- Biscayne Bay Coastal Wetlands - Phase 1
- C-111 Spreader Canal

The Acceler8 projects are designed to contribute as much of the benefits from CERP as early as possible. The remainder of the CERP projects will follow as time and resources allow.

D. ALTERNATIVES CONSIDERED

The No-Action (No Build alternative) and construction of an EAA storage reservoir within Compartments B and/or C, construction of the EAA Reservoir A-2, and construction of the EAA Reservoir A-1 (Build alternative) were the alternatives that were considered for the SFWMD's Acceler8 project. As a result of the alternative analysis, the EAA Reservoir A-1 has been selected as the Preferred Alternative. Below are brief summaries of the alternatives.

The No-Action alternative is the future without the project.

The SFWMD considered construction of storage reservoirs within Compartments B and C of the EAA. Analysis of Compartments B and C indicated that independently, they could not meet the Acceler8 project storage goals. Together Compartments B (9,302 acres) and C (8,884 acres) would meet the Acceler8 project goals, however, preliminary analysis indicated that it would not be cost effective due to the additional cost for embankments, pumps, and associated water control structures for both compartments. In addition, Compartment C was identified to have environmental issues such as significant cultural resources and a higher acreage of natural wetlands when compared to lands in Compartment A. Compartments B and C are now intended for use by the SFWMD to expand the Everglades Construction Project through conversion to stormwater treatment areas (STAs).

The EAA Reservoir A-2 alternative consists of the construction of an above-ground reservoir for water storage, with a capacity of 160,000 acre-feet at an approximate depth of 12-feet. The reservoir will be constructed on a 14,000 acre parcel of land situated on the western portion of Compartment A.

The EAA Reservoir A-1 Alternative, or Preferred Alternative, consists of the construction of a component (Cell A-1) of the EAA Storage Reservoirs. This alternative is an above-ground reservoir for water storage, with a capacity of 190,000 acre-feet at an approximate depth of 12-feet. The reservoir will be constructed on a 16,740 acre parcel of land situated on the eastern portion of Compartment A.

Differences in environmental impacts between Cell A-1 and Cell A-2 were not significant. The proposed EAA Reservoir A-1 Alternative (Cell A-1) was selected as the preferred Acceler8 alternative based on the features and operation of the existing system in relation to location of Cell A-1.

E. ENVIRONMENTAL IMPACTS

The environmental impacts attributable to the EAA Reservoir A-1 Alternative are summarized below and are discussed in more depth in Section 4 of this document.

Land Use (Agriculture)
About 16,253.68 acres of agricultural lands will be permanently removed from production due to the construction of the proposed above-ground storage reservoir. These agricultural lands have been determined to be jurisdictional atypical wetlands.

Wetlands
Approximately 187.63 acres of nonagricultural wetlands located within the project footprint as well as approximately 163 acres of jurisdictional canals and ditches will be impacted by the proposed action.

Uplands
A total of 167 acres of uplands will permanently be altered within the boundaries of the above-ground storage reservoir.

Water quality
Temporary increases in turbidity of local waters are expected from the deepening of canals and by the construction of the components of the above-ground storage reservoir.

Air quality
Fugitive dust and vehicle exhaust from vehicular traffic and earth moving will be unavoidable.

Soils
Temporary disruption of soils is expected from most construction activities.

Essential Fish Habitat (EFH)
The USACE determined that the proposed action would not have an impact on EFH or federally managed fisheries for which the National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA Fisheries) is responsible. The regulatory determination for the SFWMD's proposed EAA Reservoir A-1 project was based on coordination efforts that

had occurred between the USACE and NOAA Fisheries for the potential CERP EAA Storage Reservoirs project. By letter dated November 17, 2005, the Habitat Conservation Division of the NOAA Fisheries concurred with the USACE's proposal to construct the EAA Storage Reservoirs project stating reducing high-volume freshwater pulsed releases from Lake Okeechobee should have a positive effect on essential fish habitat and other trust resources present in the St. Lucie and Caloosahatchee River estuaries, and the Indian River Lagoon. This NOAA Fisheries has indicated that the conclusion for the EAA Storage Reservoirs project is applicable for this proposed regulatory action since the goals and objectives of the projects are consistent

Threatened / Endangered Species

The USACE made a determination that the proposed project would not affect the leatherback, hawksbill, green and loggerhead sea turtles and the Audubon's crested caracara; may affect, but is not likely to adversely affect the West Indian manatee, Everglade snail kite, wood stork, bald eagle, eastern indigo snake, and the Okeechobee gourd; and may adversely affect the Florida panther. In a letter dated December 14, 2005 the United States Fish and Wildlife Service (USFWS) concurred with USACE's determination that the project will have "no effect" on the leatherback, hawksbill, green and loggerhead sea turtles, and the Audubon's crested caracara. USFWS also concurred with USACE's determination that the project "may affect, but not likely to adversely affect" the West Indian Manatee, the Everglade snail kite, Eastern Indigo snake and Okeechobee gourd. Informal consultation for the wood stork and bald eagle and formal consultation for the Florida panther is currently ongoing. The USACE has also determined that the EAA Storage Reservoirs project "may affect, but is not likely to adversely affect" the sea turtles in their aquatic habitat. This determination also applies to the SFWMD's proposed EAA Reservoir A-1 project. Consultation with the Protected Resources Division of the NOAA Fisheries is ongoing and a concurrence from the NOAA Fisheries is anticipated.

Wildlife

Localized disturbances to fish and wildlife are expected from deepening of canals and construction of levees and other structures.

F. AREAS OF CONTROVERSY

This Acceler8 project is being developed with input and consensus from federal and state agencies, county officials and the public. There is currently ongoing coordination with the USACE, the USFWS, the U.S. Environmental Protection Agency (USEPA), the Florida Game and Freshwater Fish Commission (FWC), and the Florida Department of Environmental

Protection (FDEP) to address their concerns regarding impacts such as wetlands, water quality, flood protection, wildlife and habitat, and threatened and endangered species. Numerous meetings have occurred with the various agencies and the public in the context of the CERP EAA planning process.

G. LIST OF OTHER GOVERNMENT ACTIONS REQUIRED

The SFWMD will be responsible for obtaining federal, state and local permits, licenses, or other consultation requirements for the EAA Reservoir A-1 project, as described in this section. Depending upon the schedule for obtaining federal review and approval of the project, the USACE will obtain the necessary permits to construct and perform initial operational testing and verification of remaining project features.

The Corps' permitting decision on the EAA Reservoir A-1 rroject is required to comply with many federal requirements including the National Environmental Policy Act (NEPA), Clean Water Act (CWA), Endangered Species Act (ESA), Rivers and Harbors Act, Coastal Zone Management Act (CZMA), Fish and Wildlife Coordination Act of 1958, Magnuson-Stevens Fishery Conservation and Management Act, and the National Historic Preservation Act. The Corps will consider other relevant environmental laws as well as protection of wetlands, floodplain management, environmental justice, and invasive species.

State requirements that will need to be satisfied for this project includes Comprehensive Everglades Restoration Plan Act (CERPRA) permit, a consumptive use evaluation during the CERPRA Permitting process, Florida Department of Transportation Access Permit, Clean Air (Title V) Permit, Petroleum Storage Tanks Permit, Hydrostatic Testing Permits, National Pollution Discharge Elimination System (NPDES) Permits for construction, and a Dam Safety Permit.

Local permitting authority for the EAA Reservoir A-1 project resides with several county Departments and Divisions. Primary coordination of local permit review will be administered by the County's Planning, Zoning and Building (PZB) Division. Following is a list of County Departments and Divisions which will be involved in the review of the EAA Reservoir A-1 project: Palm Beach County Planning, Zoning & Building (PZB) Division – Development Review; Palm Beach County Fire Rescue; Palm Beach County Health Department; a Well Construction Permit; and Palm Beach County Department of Environmental Resources Management Vegetation Preservation and Protection.

H. UNRESOLVED ISSUES

The USACE made a determination of "may affect, likely to adversely affect" for the endangered Florida panther because the recommended reservoir site is in agricultural use and within the habitat expansion area of the panther, requiring evaluation of cumulative impacts to panther habitat, and issuance of a Biological Opinion by the Service. This issue is currently being resolved through the Section 7 Consultation process. The USFWS has identified that the Acceler8 projects will collectively provide for the preservation and restoration of lands within panther core area. Therefore, the USACE anticipates a Biological Opinion from the USFWS that the project is not likely to jeopardize the continued existence of the Florida panther. The USACE also anticipates receiving a concurrence letter from the NOAA Fisheries for swimming marine turtles.

I. PROBABLE ADVERSE ENVIRONMENTAL EFFECTS

The following is a brief summary of adverse environmental effects of the Recommended Alternative, EAA Reservoir A-1:

i IRRETRIEVABLE AND IRREVERSIBLE COMMITMENT OF RESOURCES

Construction of the EAA Reservoir A-1 project will include features considered permanent and may be deemed irreversible. This will include construction of a 16,768 acre reservoir. The construction proposed is on a scale that represents an irreversible and irretrievable commitment of resources.

Committed resources include state and federal funding to purchase lands and labor, energy and project materials to build, operate, and maintain the project. Fish and wildlife habitat will be permanently altered (converted to open water, particularly in the case of a storage reservoir). These lands will likely be inundated for much of the year. Another resource that may be impossible to replace is the cap rock which is the top of the limestone formation underlying the soils in the area of the EAA Storage Reservoir project. It is proposed to be broken during the construction of required canal improvements and borrow areas.

ii FEASIBLE MEASURES TO AVOID OR MINIMIZE POTENTIAL ADVERSE IMPACTS TO THE HUMAN ENVIRONMENT

The SFWMD's proposed EAA Reservoir A-1 project would be constructed and operated in conjunction with the other Acceler8 projects pending Department of the Army authorization. Operated together as a system, the Acceler8 projects are anticipated to provide environmental benefit to the south Florida ecosystem through improving water deliveries and maintaining natural salinity balance in the estuaries; improving natural habitats throughout the south Florida ecosystem by reducing high water levels; restoring and enhancing wetlands by improving timing and hydrology, restoring sheet flow, and controlling seepage; and improving water quality through water diversion and storage prior to discharge into the natural system. Construction of the proposed EAA Reservoir A-1 project, taken together with the other proposed Acceler8 projects, is anticipated to result in net positive environmental benefit. The benefits of the proposed EAA Reservoir A-1 project with interdependencies of the other proposed Acceler8 projects are expected to compensate for adverse local effects of construction and operation.

The permit applicant, SFWMD, commits to avoiding, minimizing, or mitigating for adverse effects during construction activities by taking the following actions:

1. Employ best management practices with regard to erosion and turbidity control. Prior to construction, the construction team should examine all areas of proposed erosion/turbidity control in the field, and make adjustments to the plan specified in the plan control device as warranted by actual field conditions at the time of construction.
2. The contract specifications will prohibit the contractor from dumping oil, fuel, or hazardous wastes in the work area and will require that the contractor adopt safe and sanitary measures for the disposal of solid wastes. A spill prevention plan will be prepared by the contractor.
3. Demolition debris would be transported to a landfill or otherwise disposed of in accordance with federal, state, and local requirements. Concrete or paving materials would be disposed of in accordance with federal, state, and local requirements.
4. Inform contractor personnel of the potential presence of threatened and endangered species in the project area, the need for precautionary measures and the ESA prohibition on taking listed species. Construction contractors will be trained and briefed on how to identify the wood storks and bald eagles in the area. The USFWS will be notified upon observation of any stork or eagle nesting activity.

5. The following special measures will be incorporated during project construction to minimize effects to any listed species that may be present: a) *Standard Protection Measures for the Eastern Indigo Snake*; b) *Management Guidelines for the Bald Eagle in the Southeast Region and Bald Eagle Standard Local Operating Procedures for Endangered Species*; and c) *Habitat Guidelines for the Wood Stork in the Southeast Region.*

6. If new electrical lines are constructed near open water to service new pumps, the publication Suggested Practices for Raptor Protection on Powerlines: The State of the Art in 1996 shall be consulted for recommended measures to protect bald eagles from electrocution.

   Both the FWC and the USFWS have been consulted for recommendations on avoidance of impacts to federally listed and state listed species. Both the FWC and USFWS will be consulted in the event that colonial or solitary wading bird nests are observed within the construction footprint. In addition, Florida burrowing owls are known to inhabit ruderal areas, such as canal banks and road berms, in the vicinity of the project. Eagle, wood stork, and burrowing owl surveys will be performed prior to the start of construction. If owls are observed within the EAA Storage Reservoir construction footprint, the FWC will be consulted for management measures and the contractor may be required to obtain a permit. More information on FWC permit requirements and applications can be found on the web at http://wld.fwc.state.fl.us/permits/permits.html. If bald eagle nests are encountered on the project footprint, the USFWS' *Habitat Management Guidelines for the Bald Eagle in the Southeast Region* will be implemented during construction of the EAA project.

   The USFWS will be notified upon locating a dead, injured, or sick wood stork or bald eagle before, during, and after construction of the reservoir.

7. For the manatee, the following Standard Protocols will be used during construction: a) Protocols to Minimize/Avoid Entrapment at structures; b) Protocols for Existing and New Culverts based on the size of culverts; c) the Manatee Blasting Protocol when explosives are required; d) Ground Observer Protocols, as well as the *Standard Manatee Construction Conditions.* In addition, intake canals and/or structures will include an aluminum grate from the bottom of the structure to approximately 1 ft above high water, with 8 inches of bar spacing, or a similar exclusion feature. The features will be designed for temporary removal in the event of a water emergency.

   If barriers are in place at the Lake Okeechobee structures S-351, S-352, and S-354 to prevent manatees from entering the EAA, prior to

initial construction of the EAA project, adverse effects to manatees in the EAA will be minimized and observer protocols and barriers at individual structures of the EAA project will be unnecessary.

8. The SFWMD agrees to maintain an open and cooperative consultation process with the USFWS and FWC throughout the design, construction, and operation of this restoration project.

9. A monitoring program will be established to assess mercury levels and other contaminants within the water column, including before drying and upon rehydration of the reservoir. Additional monitoring will be performed at inflow and outflow points. The monitoring program will also include assessing mercury levels and other persistent contaminants in prey fish (mosquitofish, sunfish, and largemouth bass) within the reservoir and downstream area. In the event that ecological risks from contaminants to listed species become evident through sampling regimes and monitoring, the USACE will consult with the USFWS to determine if re-initiation of consultation in accordance with Section 7 of the ESA is necessary.

10. The initial flooding of the reservoir will be at a rate of one-half inch per day until a depth of six inches is attained in order to minimize negative impacts to the Eastern indigo snake. The reservoir will also be initially filled at a rate of one inch per day from the six-inch to 12-inch water depth to allow additional time for other terrestrial wildlife to vacate the area.

11. To protect cultural resources, conditions stipulated by the State Historical Preservation Office (SHPO) will be followed. Language will be included in specific conditions of any issued permit outlining the steps to be taken in the event that undiscovered historical properties are encountered. An informational training session, developed by a professional archaeologist, will be conducted for the contractor's personnel to explain what kinds of archaeological/cultural materials might be encountered during construction of the impoundment, and the steps to be taken in the event these materials are encountered. A professional archaeologist will conduct periodic monitoring of the project area during construction to determine if activities are impacting unanticipated cultural resources.

12. In order to offset project impacts, the State will use its reservation or allocation authorities pursuant to Chapter 373 Florida Statues to protect water necessary for ecosystem restoration. This is addressed in Section 4 of this Supplemental Draft EIS.

13. Compliance with the State of Florida's legislative and statutory requirements for state projects being constructed pursuant to state

CERP authorities are addressed in Section 4 of this Supplemental Draft EIS.

iii SHORT-TERM IMPACTS VERSUS LONG-TERM BENEFITS TO THE HUMAN ENVIRONMENT

The SFWMD's proposed EAA Reservoir A-1 project may become a component of the CERP EAA Storage Reservoirs project. Project features will cause some adverse consequences to agricultural land uses - permanently removing tens of thousands of acres from agricultural production. These impacts may be felt locally and/or regionally as the economic base derived from agriculture is incrementally reduced relative to other sectors of the economy. The overall benefit to the regional ecosystem is expected to be far greater than the localized adverse effects. As these features occur disparately across the landscape within different hydrologic basins, and as distinct units rather than multiple features within a single watershed, they will not likely result in a significantly detrimental cumulative effect.

The SFWMD's proposed EAA Storage Reservoir A-1 project is anticipated to be used to increase water storage for the overall gain and long-term benefit of the regional system. The project will provide important storage functions and the Central and Southern Florida (C&SF) project Comprehensive Review Study (Restudy) and Final Integrated Feasibility Report and Programmatic Environmental Impact Statement, dated April 1999, deemed them essential to the overall restoration of the freshwater marshes and the estuaries and the downstream Everglades. As part of Acceler8, the proposed EAA Reservoir A-1 project will benefit south Florida ecosystems. Specifically, the proposed project will benefit the St. Lucie and Caloosahatchee Estuaries and Lake Okeechobee, as well as improve the quality and timing of water delivery to the STAs for improved water treatment within the STAs. In addition, some improvement to lake water quality will occur as a result of the proposed project by redirecting nutrient rich EAA drainage to the reservoirs rather that directly to Lake Okeechobee.

Improvements to the water quality entering the WCAs will result from the ability to more effectively store water within the proposed EAA reservoir by metering peak flows in the STAs. Creation of the reservoir will provide the needed storage function, allowing the STAs primary use as water treatment facilities. Increased residence times of water within the STAs will ensure better treatment of waters released to the WCAs and have beneficial water quality effects on all downstream ecosystems.

Based on initial system-wide modeling assuming a 2010 condition, the following benefits are expected to be derived from the construction and operation of the EAA A-1 reservoir:

- 3"- 6" reduction in Lake Okeechobee stages
- Reduced Lake Okeechobee releases to the St. Lucie and Caloosahatchee estuaries by 15%
- Improved timing of deliveries to WCA 3 which receives 210,000 acre feet of environmental delivery on annual average basis compared to no environmental deliveries currently
- Back-pumping into Lake Okeechobee is reduced by 42% from the North New River and by 33% from the Miami Canal.
- Phosphorus concentration entering STA 3/4 is reduced by 17% from water released from the reservoir.

J. COORDINATION

Throughout the evolution of project design alternates, federal and state agencies, county officials, and the public have been kept informed through meetings, newsletters and a public information workshop designed to inform, gather input, and respond to questions regarding the proposed project.

A reservoir for water storage in the Everglades Agricultural Area has been consistently included as a component of CERP since 1999. Multiple formal scoping initiatives to meet NEPA requirements have been undertaken for prior federal water resources studies in the Study Area (C&SF Project Comprehensive Review Study Reconnaissance Report, C&SF project Comprehensive Review Study Feasibility Study, and Water Preserve Areas Feasibility Study). In addition, several other related planning initiatives have been undertaken by non-federal entities to identify general planning objectives and constraints for environmental restoration and water resources development projects in the study area (National Audubon Society, Water Supply Preserves [1993], South Florida Water Management District, East Coast Buffer Project [1996], Governor's Commission for a Sustainable South Florida, Conceptual Plan [1996], South Florida Water Management District, Lower East Coast Regional Water Supply Plan [2000]). Cumulatively, these prior planning efforts have produced substantial background information, while at the same time providing multiple opportunities for public, federal, and non-federal agency involvement in the development of objectives and constraints associated with implementing a water storage project at this location. A more detailed discussion of agency coordination and public involvement conducted for the project can be found in Chapter 5 of this document.

EAA Reservoir A-1

Supplemental Draft Environmental Impact Statement

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CHAPTER 1
PURPOSE OF AND NEED FOR ACTION

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1.0 PURPOSE OF AND NEED FOR ACTION

1.1 INTRODUCTION

This document is an Environmental Impact Statement that provides a comprehensive environmental analysis to aid in the decision making process regarding whether to issue a permit to the SFWMD for their proposal to construct and operate a reservoir in the Everglades Agricultural Area (EAA) in Palm Beach County, Florida. This Supplemental Draft EIS supplements the 2005 Draft Project Implementation Report/Environmental Impact Statement (PIR/EIS) prepared for the federal CERP EAA Storage Reservoirs project, which is a multi-component project. This Supplemental Draft EIS has been prepared to analyze the SFWMD's Acceler8 proposal and update site-specific information on the SFWMD's proposed EAA Reservoir A-1 project. The USACE is preparing this EIS in accordance with the Council of Environmental Quality (CEQ) Regulations (40 Code of Federal Regulations [CFR] 1500-1508), which implement the procedural provisions of the National Environmental Policy Act (NEPA) (42 United States Code [USC] 4321 et seq.). The NEPA is the "basic national charter for protection of the environment" and requires federal agencies to be fully informed about the environmental consequences of their decision to provide financial assistance, exercise permit or regulatory authority, or to conduct an action that may significantly affect the environment. In addition, NEPA mandates that the public be informed of the proposed actions, the consequences of the actions, and the ultimate agency decision.

The SFWMD's proposed EAA Reservoir A-1 project would result in dredging and filling in waters of the United States, including wetlands. Section 404 of the Clean Water Act (CWA) (33 USC 1344) prohibits the discharge of dredge and fill material into waters of the United States without a permit. Under Section 404 of the CWA, the USACE is responsible for regulating the placement of fill and discharge of dredged material in the waters of the United States, including primary tributaries to those waters, as well as wetlands adjacent to those waters. Therefore, because the SFWMD is seeking approval of a permit from the USACE, a federal agency, the project involves a federal action. Because any environmental consequences of SFWMD's proposed project are essentially products of the USACE permit action, the scope of the federal permitting action includes all of the SFWMD project components (33 CFR 325). During the federal permit review process, the USACE determined that an EIS would be necessary to address the environmental consequences of the proposed project and to aid in the decision to issue, modify, condition, or deny a permit for the proposed project. The USACE is the lead federal agency and responsible for preparation of the EIS. The USACE originally proposed to use the PIR/EIS that is being completed for the CERP EAA Storage Reservoirs project as the NEPA document for a

regulatory action authorizing a component of the selected plan in the federal PIR/EIS. The SFWMD, however, has decided to pursue construction of a reservoir, and requisite permitting, ahead of the schedule for completing the PIR/EIS; therefore, a separate EIS is being completed for the regulatory action on the proposed EAA Reservoir A-1 project. Meanwhile, the USACE continues with evaluation and completion of the PIR/EIS for the EAA Storage Reservoirs project which may or may not include the SFWMD's Acceler8 project. The SFWMD has assisted the USACE in providing information for preparation of this EIS.

This chapter describes the purpose of and need for the proposed action.

1.2 DESCRIPTION OF PROPOSED ACTION

The proposed EAA Reservoir A-1 project is an above-ground reservoir for water storage, with a capacity of 190,000 acre-feet at an approximate depth of 12-feet. The reservoir will be constructed on a 16,768 acre parcel of land situated on the eastern portion of Compartment A of the EAA (Figure 1).

The key features of the EAA Reservoir A-1 project include the following:

- Approximately 190,000 acre-feet reservoir with a perimeter dam and seepage canals
- Northeast pump station that pumps from North New River Canal (NNRC) (3,600 cubic feet per second (cfs)
- Connector canal from the NNRC to the new northeast pump station
- Seepage pump stations
- Gated discharge structures
- New four lane bridge on U.S. 27 across the new connector canal

The proposed EAA Reservoir A-1 is intended to store water from the S-2, S-6, and S-7 Basins, by collecting water from the NNRC. The reservoir also intends to release the water to STA-3/4 for treatment before being released to Water Conservation Area - 3A (WCA-3A).

1.3 PROPOSED PROJECT BACKGROUND

1.3.1 Memorandum of Agreement (Acceler8)

On October 14, 2004, a Memorandum of Agreement (MOA) regarding acceleration of the Comprehensive Everglades Restoration Plan between the Executive Office of the Governor and the SFWMD was signed (Acceler8). Acceler8 expedites restoration of the Everglades and attainment of benefits ahead of the CERP schedule and serves as the initial foundation for other

comprehensive restoration efforts to follow. Acceler8 consists of eight projects (some with multiple components) that, when completed, will provide immediate environmental, flood control and water supply benefits. The nine components, listed below, are all due to be online by 2011, 11 years ahead of the CERP schedule. See Figure 2 for the location of the Acceler8 projects.

- C-44 (St. Lucie Canal) Reservoir/Stormwater Treatment Area (STA)
- C-43 (Caloosahatchee River) West Reservoir
- Bolles & Cross Canals Improvements
- Everglades Agricultural Area Reservoir- A- 1
- Everglades Agricultural Area STA Expansion
- Water Preserve Areas
    - Site 1
    - C-9
    - C-11
    - Acme Basin B
    - WCA-3A/3B
- Picayune Strand (Southern Golden Gate Estates) Restoration
- Biscayne Bay Coastal Wetlands - Phase 1
- C-111 Spreader Canal

These Acceler8 projects are designed to contribute to many of the benefits from CERP as early as possible. The remainder of the CERP projects will follow as time and resources allow.

1.3.2 Project Background

Following the MOA, the SFWMD, and the USACE began to pursue a "Dual Track" process for the EAA Storage Reservoirs Project. While the multi-agency Project Delivery Team, led by USACE, continues to develop the PIR/EIS, the SFWMD is proceeding with the design and construction of the EAA Reservoir A-1.

Detailed design and engineering analysis in support of initiation of construction activities commenced in 2005 under the Acceler8 program with survey and subsurface geotechnical investigations. Detailed design of the Acceler8 project is being accomplished by SFWMD with coordination and review by USACE under the Acceler8 program. All project features are being designed in accordance with USACE regulations and standards.

Under the Acceler8 program, SFWMD has prepared a Basis of Design Report (BODR) for the EAA Storage Reservoir A-1 project. The BODR includes all engineering assumptions and conceptual designs for the Acceler8 project

features. The BODR can be found on the following website:
http://www.evergladesnow.org

Upon completion of the BODR, SFWMD will prepare initial, intermediate, and final plans and specifications for construction contract award.

Construction is expected to begin on Acceler8 project in April 2006. The Acceler8 project is expected to be completed in 2009. Construction activities for the Acceler8 project will be in accordance with the Acceler8 program and will be the responsibility of SFWMD. Crediting for work performed by SFWMD will be subject to project authorization and adherence to USACE design standards and regulations.

The EAA Storage Reservoir Final PIR/EIS with a recommended plan is currently scheduled for April 2006. Upon approval and authorization, construction of the Federal project is currently scheduled to begin in 2007, and is to be completed in 2010.

1.3.3 Proposed EAA Reservoir A-1 Project

The SFWMD's proposed EAA Reservoir A-1 project, identified as Cell A-1, is the same footprint as a portion of the USACE's EAA Storage Reservoirs project, specifically, the Selected Plan (Alternative 4) identified in the Draft PIR/EIS. The proposed EAA Reservoir A-1 project is located in eastern half of Compartment A and borders U.S. 27 and the NNRC to the east, STA-3/4 to the south, and the Holey Land Wildlife Management Area to the southwest (See Figures 1, 3 and 4). The western border is perpendicular to the eastern edge of the Holey Land Wildlife Management Area.. The SFWMD's proposed EAA Reservoir A-1 project covers approximately 16,768 acres and is designed to store stormwater originating within the S-2/7, S-3/8, S-236 and C-139 basins and releases from Lake Okeechobee, all located generally north of the Project site. A schematic of the EAA Reservoir A-1 and its relationship to the other EAA infrastructure is shown in Figure 3.

The CERP EAA Storage Reservoirs project, Alternative 4 features a two-cell reservoir impoundment with a maximum normal pool storage depth of 12 feet at approximately 31,000 acres of above ground surface area storage. The SFWMD has identified these two cells as Cell A-1 and Cell A-2, approximately 17,000 and 14,000 acres in size respectively, and combined would contain 360,000 acre-feet of water. Presently, only the EAA Reservoir A-1 is part of the Acceler8 program. It is anticipated that the construction of EAA Reservoir A-2 will follow EAA Reservoir A-1 in a few years. See Figure 4 for location of the EAA Reservoirs A-1 project.

1.4 PURPOSE OF AND NEED FOR PROPOSED PROJECT

1.4.1 Project Purpose

The Central and Southern Florida (C&SF) Project Comprehensive Review Study (Restudy) and Final Integrated Feasibility Report and Programmatic Environmental Impact Statement, dated April 1999, identified the need to improve timing of water deliveries from the EAA to the Water Conservation Areas (WCAs). Other needs included reducing damaging flood releases from the EAA, reducing Lake Okeechobee regulatory releases to the estuaries, meeting agricultural irrigation and Everglades water demands, and improving flood protection within the EAA. Construction and operation of reservoirs in the EAA would reduce water demands from Lake Okeechobee, reduce the need to back-pump EAA stormwater to the lake, and reduce the damaging pulse regulatory releases from Lake Okeechobee to the Caloosahatchee and St. Lucie Estuaries. Additional storage is needed to reverse declines of ecological function and productivity in Lake Okeechobee and the estuaries of the St. Lucie and Caloosahatchee Rivers.

For the purpose of this Supplemental Draft EIS, the USACE has determined that the basic project purpose of the proposed action is to construct and operate a reservoir in the EAA in Palm Beach County, Florida. The overall project purpose of the reservoir is to provide water storage in order to improve timing of water deliveries from the EAA to the Water Conservation Areas (WCAs), reduce Lake Okeechobee regulatory releases to the estuaries, meet supplemental agricultural irrigation demands, and increase flood protection within the EAA.

1.4.2 Proposed Project Need

The SFWMD's proposed EAA Reservoir A-1 will store up to 190,000 acre-feet of water from stormwater runoff and releases from Lake Okeechobee at any given time. Without this project, that water will potentially cause flooding in the EAA, will need to be pumped through STA-3/4 at higher rates than can effectively provide desired water quality treatment, or will potentially be bypassed to tide, or will potentially be released to the estuaries from Lake Okeechobee. Thus there will be a reduction in the potential for flooding and damaging releases to the estuaries once the project is completed.

The goals and objectives of the SFWMD's proposed EAA Reservoir A-1 will:

- Capture, move and store regulatory releases from Lake Okeechobee, reducing the number/volume of harmful discharges to coastal estuaries.

- Capture, move and store agricultural stormwater runoff, reducing the need for emergency flood control (back-pumping) into Lake Okeechobee.
- Provide additional water to meet Everglades and agricultural water demands, improving the timing of environmental deliveries of water to the WCAs and lessening water supply dependency on Lake Okeechobee.
- Improve operational flexibility to move water within the EAA, including flow equalization and optimization of STA performance to further reduce phosphorus inflows to the Everglades.
- Provide public access and recreation opportunities.

Achievement of these goals and objectives should enhance habitat quality in Lake Okeechobee's littoral zone, the Caloosahatchee and St. Lucie estuaries (the northern estuaries) and the WCAs, and improve native plant and animal species abundance by retaining natural waters in the system. Benefits to downstream estuaries are expected as a result of reduction of abrupt and high volume freshwater discharges and pulse releases from Lake Okeechobee.

CHAPTER 2
ALTERNATIVES

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2.0 ALTERNATIVES

2.1 INTRODUCTION

Alternatives considered in detail include construction of reservoirs at Compartment B, Compartment C, Cell A-1 and Cell A-2 (Figure 4). Creating above ground reservoirs within the EAA could meet all the objectives of the proposed Acceler8 project which are shown below:

1) Capture, move and store regulatory releases from Lake Okeechobee, reducing the number/volume of harmful discharges to coastal estuaries.
2) Capture, move and store agricultural stormwater runoff, reducing the need for emergency flood control back-pumping into Lake Okeechobee.
3) Provide additional water to meet Everglades and agricultural water demands, improving the timing of environmental deliveries of water to the WCAs and lessening water supply dependency on Lake Okeechobee.
4) Improve operational flexibility to move water within the EAA, including flow equalization and optimization of STA performance to further reduce phosphorus inflows to the Everglades.
5) Provide, public access and recreation opportunities.

The above ground storage options have the advantage of robust hydraulic connections with both the lake and the EAA through the existing canals. They also have the advantage of potential enhancement of STA operation by intercepting peak flows during wet periods and retaining water during dry periods while metering water output to the STAs.

Depending upon placement and the size of the reservoirs, these alternatives may remove property from the tax roles in Palm Beach County, with its associated negative impacts on the socioeconomic components of the environment in this county. According to the Palm Beach County Property Appraiser, the value of land in the EAA decreases with distance from Lake Okeechobee. Land near the STAs and WMAs, at the south end of the EAA, was valued at a little more than 40% of the value per acre of the land next to the lake. Apparently, this is related to the relatively poor agricultural productivity of this land when compared to the land adjacent to the lake. For the same reason, large acreages of land have been acquired by the State of Florida and the Federal Government in the southern end of the EAA for the purposes of Everglades restoration. Compartments A, and B are also

adjacent to STAs and the canals that connect with Lake Okeechobee reducing the need to construct significant additional canal infrastructure.

2.2 PRELIMINARY SCREENING OF ALTERNATIVES

In addition to the above ground storage reservoir alternatives, flow-ways and aquifer storage and recovery (ASR) were also considered. The flow-way alternative is a broad shallow marsh area for free flow of water from Lake Okeechobee to WCAs, and ASR could enhance stormwater storage for environmental, urban, and agricultural uses.

2.2.1 Flow-way

A flow-way is a passive measure generally described as a broad, shallow marsh area that is used to freely-flow water from one area or feature to another. This alternative was developed during the Restudy to restore sheet flow between the EAA and the WCAs. The flow-way would provide for sheet flow and dynamic water storage. Various flow-way designs were considered ranging from 1 to 3 miles wide and varying lengths to identify relative differences in the hydrological and environmental response.

The evaluation of this concept showed a number of problems concerning feasibility, such as soil subsidence, evapotranspiration, seepage management, vegetation management, timing of flows, and lack of flow events. Additional EAA issues included numerous roads, bridges, and railroad relocations that would be required if a flow-way divided the entire EAA.

Soil subsidence in the EAA has substantially reduced ground levels in the southern portions of the EAA and would reduce the hydraulic head that would drive the southward flow of water; hence, velocities and flow rates would be greatly reduced. By spreading the water over shallower areas (as opposed to reservoirs) and because a marsh habitat would have to be kept hydrated, the evapotranspiration loss would be much higher than for reservoirs, thereby significantly reducing the storage value of this area. A long, rectangular configuration would have a 75% longer levee than a traditional storage reservoir, thus increasing environmental impacts, project cost, and the area devoted to seepage management features. Because nutrient-laden soil would be flooded for this project, the vegetation most likely to dominate would be cattails and other invasive exotics that would degrade the Everglades habitat.

Flow-ways would not "hold back" water going to the STAs and the delivery of that water would exacerbate the already high stages in the northern parts of the WCAs. Thus, the timing of flows from flow-ways would not be manageable or beneficial for the remaining Everglades. Perhaps the most

crucial element, water flowing from the lake to the WCAs, is not present in dry or even normal years. For example, during long periods from 1970-1982 or 1985-1994, no significant excess lake water was available for the flow-way. Only demand releases to the Everglades were made from the lake during those periods. Water delivered to the Everglades on a demand basis, through a flow-way, would not be effective with increased travel times and increased evapotranspiration losses. The only years where water could flow for long duration were wet periods like 1969-1970, 1982-1983, and 1994-1995. In those years, the stages in the WCAs were already too high and additional flow from flow-ways would have been damaging, not beneficial. Perhaps the most important reason why flow-ways were not included in the Comprehensive Plan was because of the significant water losses that would be unacceptable in an ecosystem in which dry season performance was already impacted. Flow-ways would place an additional hydrological burden on the system. Therefore, flow-ways were screened from further analysis.

2.2.2 Aquifer Storage and Recovery

In terms of acre-feet of storage, each well in the ASR system could have the capacity to inject 5,601 acre-feet of water into the Upper Floridan Aquifer (for later retrieval) on an annual basis, provided enough water was available to do so.

Additional water stored in underground ASR systems within the EAA could meet the following Acceler8 objectives:

1) Reduce regulatory releases of water from Lake Okeechobee to the St. Lucie and Caloosahatchee Estuaries. The ASRs could withdraw water from the lake. This could reduce the need to make lake regulatory releases to the east and west estuaries in such large volumes that their natural salinity regimes are harmed.
2) Reduce Lake Okeechobee regulatory releases of water to the WCAs. The ASRs could withdraw water from the lake reducing the need to make lake regulatory releases southward to the WCAs when the WCAs already have too much water.
3) Improve the timing of environmental deliveries of water to the WCAs. Water could be stored in ASRs moved through the EAA to the WCAs to meet the needs of the natural system. Meet agricultural demands within the EAA. The ASRs could withdraw water from the lake and used to meet the needs of agriculture.
4) Meet agricultural demands within the EAA. The ASRs could withdraw water from the lake and used to meet the needs of agriculture.

Storing additional water in ASR systems rather than in reservoirs raises a high level of technological and regulatory uncertainty. There is an ongoing ASR pilot project and regional studies to address these uncertainties. While the uncertainties will likely be reduced and managed as a result of the pilot project results, they nevertheless play a role in the inability to implement ASR systems in an expedited manner. Uncertainties related to required water quality treatment technologies and recovery efficiencies (currently, only 70% of the water injected into ASRs is assumed to be recoverable) also greatly affect ASR project cost estimates.

Further, ASR as an alternative to above ground storage, has a slower rate of water capture and discharge. The rate of capture (from Lake Okeechobee or a canal) is limited at each well site to a maximum of 15 acre-feet per day, as compared to 6,942 acre-feet per day on average for each pump at above ground storage reservoirs to capture from the lake or a canal. This would significantly limit the system's ability to store regulatory releases from the lake needed to keep the lake below its maximum allowable level. Therefore, ASR was screened from further analysis.

2.2.3 Reservoir

The State of Florida decided that an above-ground reservoir would best meet their needs since above ground storage options have the advantage of robust hydraulic connections with both Lake Okeechobee and the EAA through the existing canals. They also have the advantage of potential enhancement of STA operation by intercepting peak flows during wet periods and retaining water during dry periods while metering water output to the STAs. Therefore, as a result of the State of Florida's Acceler8 initiative, which was discussed in Chapter 1 of this document, the SFWMD and the USACE began to pursue a "Dual Track" process for the EAA Storage Reservoirs project. While the multi-agency Project Delivery Team (PDT), led by USACE, continues to develop the PIR/EIS, the SFWMD is proceeding with the evaluation of plans to construct a reservoir in the EAA to provide additional storage capacity for Acceler8. The SFWMD's Acceler8 EAA reservoir project is being considered independently of the CERP project for purposes of this regulatory action.

2.3 DESCRIPTION OF ALTERNATIVES

2.3.1 No-Action Alternative

The No-Build alternative is always a consideration in plan formulation. The objective of this project is to provide water storage to attain environmental benefits in the EAA. It has been concluded that the No-Build alternative would not achieve the project purposes. If a storage reservoir in the EAA is not built, then additional storage and environmental benefits would not be realized until construction of the CERP EAA Storage Reservoirs project.

2.3.2 Compartments B and C

The SFWMD considered the use of other lands within the EAA i.e., the Talisman lands, specifically Compartments B and C for construction of a storage reservoir. Compartments B and C were eliminated from further consideration for the following reasons:

- Compartment C would require significant cultural resources surveys to identify the significance of resources previously identified on portions of this parcel. There are also additional wetlands that would be impacted as a result of project construction.
- Analysis of Compartments B and C indicated that independently, they could not meet the Acceler8 project storage goals.
- Together Compartments B (9,302 acres) and C (8,884 acres) would meet the Acceler8 project goals, however, preliminary analysis indicated that it would not be cost effective due to the additional cost for embankments, pumps, and associated water control structures for both compartments.
- Compartments B and C are now intended for use by the SFWMD to expand the Everglades Construction Project Stormwater Treatment Areas.

2.3.3 Cell A-1 and Cell A-2 of Compartment A

The SFWMD evaluated both Cells A-1 and A-2. The following features and operations were used to analyze both Cell A-1 and Cell A-2:

S-2, S-6 and S-7 Basin - North New River Canal

The North New River Canal (NNRC) is located along the eastern border of the proposed EAA Reservoir A-1. It provides drainage to the area extending from pump station S-2 to pump station S-7. Pump station S-2 is a 3600 cubic feet per section (cfs) pump station which currently pumps NNRC drainage

into Lake Okeechobee. Pump Stations S-6 and S-7 have 2925 cfs and 2490 cfs capacity respectively.

The G-370 pump station is a three-unit pumping station located on the west side of U.S. 27 and the NNRC, about 25 miles south of Belle Glade. It provides flood protection to the upstream agricultural basins that total approximately 222 square miles. While the removal of stormwater runoff from the upstream basins is the primary function of the pump station, it is also used to convey regulatory releases and supplemental flows from Lake Okeechobee and releases sent to STA-3/4 to maintain minimum depth in the treatment cells.

S-3, S-8 Basin - Miami Canal

The Miami Canal carries flows between pump stations S-3 at Lake Okeechobee, and S-8 at the southern edge of the EAA. Pump station S-3 is a 2,580 cfs pump station which currently pumps Miami Canal drainage into Lake Okeechobee.

G-372 pump station is a four-unit pumping station located about 25 miles southwest of Belle Glade, and 7 miles north of S-8 pump station. It provides flood protection to upstream agricultural basins along the Miami Canal totaling approximately 277 square miles. Similar to G-370 pump station, the primary function of the pump station is the removal of stormwater runoff from the upstream basins. In addition, it conveys regulatory releases and supplemental flow from Lake Okeechobee and releases sent to STA-3/4 to maintain minimum depth in the treatment cells. G-372 pump station can also be used to release water into the Holey Land WMA at the SFWMD's discretion.

Normal operations include agricultural/drainage phases, similar to G-370 pump station, which indicate if the dominant agricultural activity is agriculture or drainage. The operating goal is to hold stages in the Miami Canal at a constant level, although during the agricultural phase, the canal water level may fall below the desired level.

Stormwater Treatment Area 3/4

The STA-3/4 Supply Canal conveys discharges from G-370 and G-372 pump stations to the inflow structures for the three flow-ways comprising STA-3/4. STA-3/4 is a wetlands treatment system for the removal of Phosphorus. The inflow to the northern STA cells is controlled by a series of gated hydraulic structures. Discharge from the STA is controlled by similar structures on the southern end of the area. The treated water from STA-3/4 passes south to WCA-3A.

The STA-3/4 is currently undergoing enhancements, including the construction of an internal levee in Cell 3 with associated structures, small forward pumping stations in Cells 1, 2 and 3, and a demonstration project in Cell 2B. These enhancements are scheduled for completion in 2006.

2.3.3.1 EAA Reservoir A-1 Alternative

The SFWMD's preferred plan, known as the A-1 alternative, consists of the construction of an above-ground reservoir for water storage, with a capacity of 190,000 acre-feet at an approximate depth of 12-feet. The reservoir will be constructed on a 16,768 acre parcel of land situated on the eastern portion of Compartment A.

The A-1 alternative includes the following components:

- Approximately 190,000 acre-feet reservoir with a perimeter embankment and seepage canals
- Creation of a northeast pump station (3,600 cfs capacity that pumps from NNRC)
- A connector canal from the NNRC to the new northeast pump station
- Evaluation of potential modifications to the existing G-370 pump station, (a 2,775 cfs pump station that currently pumps from the NNRC to the STA-3/4 Supply Canal)
- Evaluation of potential modifications to the existing G-372 pump station, (a 3,700 cfs pump station that currently pumps from the Miami Canal to the STA-3/4 Supply Canal)
- Gated discharge structures
- Seepage pump stations
- Gated culvert structures
- New four lane bridge (two parallel two-lane bridges) on U.S. 27 across the new connector canal
- Improvements to conveyance capacity in the NNRC

2.3.3.2 EAA Reservoir A-2 Alternative

The EAA Reservoir A-2 alternative consists of the construction of an above-ground reservoir for water storage, with a capacity of 160,000 acre-feet at an approximate depth of 12-feet. The reservoir will be constructed on a 14,000 acre parcel of land situated on the western portion of Compartment A.

The EAA Reservoir A-2 alternative includes the following components:

- Approximately 150,000 acre-feet reservoir with a perimeter embankment and seepage canals
- Seepage collection canal and cut off wall along entire North, East and West sides to protect adjacent properties, i.e. the Holey Land
- A canal from the North New River Pump Station to the reservoir
- A pump station at the NNRC
- A bridge at US 27 for the new pump station
- Modifications to existing Pump Station 370 and Pump Station 372
- A discharge structure to NNRC
- Canal and Discharge Structure to Miami Canal
- A discharge structure to STA-3/4 inlet canal

The proposed EAA Reservoir A-1 Alternative (Cell A-1) was selected for further study based on the features and operation of the existing system in relation to location of Cell A-1. EAA Reservoir A-1 Alternative was selected instead of EAA Reservoir A-2 Alternative for the following reasons:

- EAA Reservoir A-1 is adjacent to the NNRC and STA-3/4, geographically, for easier construction access.
- EAA Reservoir A-1 can utilize existing G370 pump station as inflow pump station, which is a major cost savings.
- EAA Reservoir A-2 has over three times the amount of embankment along private property. This will create a need for more cut-off wall to protect these properties.
- EAA Reservoir A-1's seepage south to the STA is a benefit and provides a cost savings by eliminating the need for a deep cut off wall and seepage canal on the south side.
- Construction of EAA Reservoir A-2 prior to EAA Reservoir A-1 would require removal of new features, such as hydraulic connections of EAA Reservoir A-2 to STA-3/4 and add additional costs to construction of EAA Reservoir A-1.
- Construction of EAA Reservoir A-1 prior to EAA Reservoir A-2 would not require the removal of hydraulic connections it to STA-3/4.
- EAA Reservoir A-2 would require a canal be cut from the North New River Pump Station to the Reservoir. A1 is adjacent to the reservoir.

- EAA Reservoir A-2 is currently leased land. Process of notification to lease holders to vacate the land would delay the project.
- EAA Reservoir A-2 holds only 150,000 ac-ft of water versus the 190,000 ac-ft A1 holds.
- EAA Reservoir A-2 has not had the subsurface investigation A1 has had. This would delay the project to perform this additional work.

The SFWMD's Selection of the EAA Reservoir A-1 as the preferred Acceler8 plan also included consideration of the fact that differences in environmental impacts of both EAA Reservoir A-1 and EAA Reservoir A-2 were not significant.

2.4 ALTERNATIVE CONSIDERED FOR FUTURE STUDY

Based on the alternatives' analysis, which included an evaluation of the environmental effects (natural and cultural resources effects), the Acceler8 EAA Reservoir A-1 Alternative (Build Alternative) was selected by the SFWMD to be the preferred alternative. The Build Alternative consists of the construction of an above-ground reservoir for water storage, with a capacity of 190,000 acre-feet at an approximate depth of 12-feet. The reservoir will be constructed on a 16,768 acre parcel of land situated on the eastern portion of Compartment A. Construction of this reservoir is anticipated to be completed in approximately five phases.

2.4.1 Design Alternatives for Proposed EAA Reservoir A-1

The A-1 alternative design was evaluated further based on seepage control measures, embankment design, pump stations, discharge structures and cost. Below is the detailed formulation that resulted in the selection of the final design for the EAA Reservoir A-1 alternative.

2.4.1.1 Seepage Control

Seepage will occur from EAA Reservoir A-1 because the soil, to approximately 200 feet below the surface of the site, is permeable. Although quite effective at reducing seepage, cutoff walls of practical depth cannot completely eliminate seepage from EAA Reservoir A-1. Additional seepage control measures were considered, including the effect of lowering the water level in the seepage canal as a way to draw seepage to the surface and the use of pressure-relief wells to intercept deep seepage before it migrates to surrounding areas. Five seepage control alternatives were evaluated with Modular three-dimensional finite-difference ground-water model (MODFLOW).

- Alternative #1 - 34-foot cutoff wall and 13.5-foot seepage canal around entire EAA Reservoir A-1, seepage canal held 3.5 feet below level in farm land
- Alternative #2 - 34-foot cutoff wall and 10-foot seepage canal around west, north, and east sides; 10-foot cutoff wall and no seepage canal along STA-3/4 and Holey Land; seepage canal held at level in farm land
- Alternative #3 - 34-foot cutoff wall and 13.5-foot seepage canal around west, north, and east sides; 10-foot cutoff wall and no seepage canal along STA-3/4 and Holey Land; seepage canal held 3.5 feet below level in farm land
- Alternative #4a - Pressure-relief wells spaced at 100 feet linked together in sets with a total of 21 pump stations of 3,900 gallons per minute (gpm) each; 34-foot cutoff wall and 10-foot seepage canal around west, north, and east sides; 10-foot cutoff wall and no seepage canal along STA-3/4 and Holey Land; seepage canal held at level in farm land. Alternative #4b includes separate pumps in each well, each with a capacity of approximately 150 gpm, which discharge to the seepage canal.
- Alternative #5a - Pressure-relief wells spaced at 200 feet linked together in sets with a total of 23 pump stations of 3,300 gpm each; 34-foot cutoff wall and 10-foot seepage canal around west, north, and east sides; 10-foot cutoff wall and no seepage canal along STA-3/4 and Holey Land; seepage canal held at level in farm land. Alternative #5b includes separate pumps in each well, each with a capacity of approximately 275 gpm, which discharge to the seepage canal.

2.4.1.2 Groundwater Modeling Evaluation

Both two-dimensional and three-dimensional modeling of potential impacts to groundwater from the construction of the EAA Reservoir A-1 were performed to evaluate seepage for a large number of combinations of EAA Reservoir A-1 water depth; cutoff wall depth and location; seepage canal depth, location, and operation; and other seepage control alternatives such as pressure-relief wells. The computer models provide a great deal of assistance in understanding the interaction of the proposed EAA Reservoir A-1 with the surrounding areas and provide direction in designing the EAA Reservoir A-1 and associated facilities.

The groundwater models were used to evaluate the following major issues:

- The effect of seepage on embankment stability
- The amount of water the EAA Reservoir A-1 loses to seepage
- The percentage of seepage that is collected and returned to the EAA Reservoir A-1
- The effectiveness of various seepage control alternatives
- The amount of unrecoverable seepage, if any, that migrates to surrounding areas for the various seepage control alternatives
- The effect of any unrecoverable seepage on groundwater levels in the surrounding areas

The surrounding areas include 1) farmland to the north and west of the EAA Reservoir A-1 and to the east of the NNRC, 2) U.S. 27 immediately east of the EAA Reservoir A-1, 3) STA-3/4 to the south of the EAA Reservoir A-1, and 4) the Holey Land to the southwest of the EAA Reservoir A-1.

Although quite effective at reducing seepage, cutoff walls constructed to these depths cannot completely eliminate seepage from EAA Reservoir A-1. Additional seepage control measures were considered, including the effect of lowering the water level in the seepage canal as a way to draw seepage to the surface, then use pressure-relief wells to intercept deep seepage before it migrates to surrounding areas. The five seepage control alternatives described above were evaluated with MODFLOW. The model results for these alternatives are based on the assumption that the surrounding areas such as the farms, STA-3/4, and the Holey Land would not need to be operated to offset the rise in groundwater levels. In reality, the groundwater levels could be controlled through additional pumping from the agricultural drainage canals or managing surface water control structures to distribute and divert flows.

Alternative #1, including a 34-foot cutoff wall and a 13.5-foot seepage canal surrounding the entire EAA Reservoir A-1 and maintaining the water level of the seepage canal below the level in the surrounding farm lands, would be the most effective of the five alternatives evaluated. Alternative #1 prevents migration of seepage to the farmlands, STA-3/4 and the Holey Land, and prevents impacts to U.S. 27. However, this alternative includes a significantly higher present worth cost of between $134 to $181 million more than the other alternatives evaluated. This is mainly due to the additional cutoff wall depth and additional pumping over the life of the project.

The other seepage control alternatives allow migration of seepage to the Holey Land and STA-3/4, but essentially eliminate impacts to farms and

U.S 27. It is estimated that the total volume of seepage that would impact STA-3/4 and the Holey Land is on the order of one to 10 percent of the volume of water for which these areas were designed, if no seepage control measures were implemented other than a cutoff wall.

Alternative #2 allowed seepage into the farmland and estimated a cost for the seepage to be pumped off the land by the farmers.

Modeling results for Alternative #3 indicate that maintaining the water level of the seepage canal below the water levels in the farmlands effectively prevents offsite migration of seepage. The installation of pressure-relief wells as described by Alternatives #4 and #5 is predicated upon capturing deep seepage at the point where water passes beneath the bottom of the cutoff wall. The pressure-relief wells would be screened below the bottom of the cutoff wall, providing capture of seepage at depth. Alternatives #4 and #5 include higher present worth costs for pressure-relief wells, pipes, and pumps than Alternative #3 of approximately $15.5 to $30.5 million over the 50-year design life of the project.

2.4.1.3 Recommended Seepage Control Alternative

Seepage Control Alternatives #2 and #3 are the lowest cost alternatives. Alternative #3 was chosen which allows the SFWMD more control of the pumping rates in the seepage canal than Alternative #2, which relies on the farmers to pump the seepage.

This alternative includes a 34-foot deep cutoff wall and a seepage canal with a bottom depth of 13.5 feet around the northwest, north, and east sides of the EAA Reservoir A-1. Also there is a 10-foot deep cutoff wall and no seepage canal along STA-3/4 and the Holey Land. In addition, there is an existing seepage canal along the north side of the Supply Canal, which is adjacent to the Holey Land. This seepage canal controls seepage into the farmland north of the Holey Land. The water level in the seepage canal is held 3.5 feet lower than the water level in the surrounding farmlands. The water collected by the seepage canal is pumped back into the EAA Reservoir A-1. Groundwater model results indicate that the total seepage from EAA Reservoir A-1 is approximately 269 cfs at an average EAA Reservoir A-1 depth of 8.8 feet based on the 35-year period of simulation from the water balance model. The model estimates that 249 cfs is collected by the seepage canal for this alternative. This alternative eliminates migration of seepage to the farmlands, causing a water level increase of less than 0.3 feet at an average EAA Reservoir A-1 depth of 8.8 feet. The seepage to STA-3/4 plus the seepage to the Supply Canal (which is assumed to be released to STA-3/4) is estimated to be approximately 10 percent (63,000 acre-feet per year) of the

STA-3/4 treatment capacity of 600,000 acre-feet per year. The additional flow to the Holey Land is estimated to be approximately 3,600 acre-feet per year. Groundwater levels in STA-3/4 and the Holey Land would rise by up to two feet when the EAA Reservoir A-1 is at its average water depth of 8.8 feet The increases in groundwater levels could be reduced by proper management of existing surface water control structures in the Supply Canal and within STA-3/4.

A monitoring program of groundwater levels in the farmland will be initiated during the construction of the EAA Reservoir A-1 and continued after construction is completed. This will provide information to the SFWMD for evaluating the effectiveness of the seepage control. The monitoring program is a means to document whether flood protection has been maintained as required by the project assurances. Please refer to Section 4 of the September 2005, Basis of Design Report (BODR).

Seepage Control Alternative #3 and Impact on Groundwater Levels at the Average EAA Reservoir A-1 Depth of 8.8 Feet (Figure 5)

Configuration:

- EAA Reservoir A-1 at average depth of 8.8 feet
- 34-foot cutoff wall and seepage canal around northwest, north, and east sides of EAA Reservoir A-1; 10 foot cutoff and no seepage canal along STA-3/4 and Holey Land
- Seepage canal held 3.5 feet below farm water levels. Assumes STA and Holey Land are not operated to offset the rise in groundwater levels

Results:

- This alternative keeps rise in groundwater levels in farms less than 0.3 feet
- This alternative causes a rise in groundwater levels of up to 2 feet in STA-3/4 and Holey Land. Keeps groundwater at acceptable levels beneath U.S. 27. Some seepage will migrate to the Holey Land during periods of the year when the water level in the Supply Canal is elevated to fill the EAA Reservoir A-1. Seepage to the north of the Supply Canal will be controlled by an existing seepage canal.
- Total EAA Reservoir A-1 seepage = 269 cfs (~194,700 acre-feet per year)
- Seepage canal collects 249 cfs (~180,300 acre-feet per year)
- Total additional volume to STA-3/4 is approximately 10,900 acre-feet per year with a maximum additional flowrate of approximately 29 cfs when Supply Canal is floated to 8 feet

- Net additional volume to the Supply Canal is approximately 30,100 acre-feet per year. Maximum flow into Supply Canal is approximately 84 cfs when EAA Reservoir A-1 is full of water. Maximum flow out of Supply Canal to surrounding areas is approximately 60 cfs when Supply Canal is floated to 8 feet.
- Total additional volume to Holey Land is approximately 9,900 acre-feet per year with a maximum additional flowrate of approximately 39 cfs when Supply Canal is floated to 8 feet
- Seepage control cost to the project for Alternative #3 = $64,590,000

Seepage Control Alternative #3 and Impact on Groundwater Levels at the Full EAA Reservoir A-1 Depth of 12 feet (Figure 6)

Configuration:

- EAA Reservoir A-1 at full depth of 12 feet
- 34-foot cutoff wall and seepage canal around northwest, north, and east sides of EAA Reservoir A-1; 10 foot cutoff and no seepage canal along STA-3/4 and Holey Land
- Seepage canal held 3.5 feet below farm water levels. Assumes STA and Holey Land are not operated to offset the rise in groundwater levels

Results:

- This alternative keeps rise in groundwater levels in farms less than 0.3 feet
- This alternative causes a rise in groundwater levels of up to 2.5 feet in STA-3/4 and Holey Land. Keeps groundwater at acceptable levels beneath U.S. 27. Some seepage will migrate to the Holey Land during periods of the year when the water level in the Supply Canal is elevated to fill the EAA Reservoir A-1. Seepage to the north of the Supply Canal will be controlled by an existing seepage canal.
- Total EAA Reservoir A-1 seepage = 346 cfs (only when EAA Reservoir A-1 is full)
- Seepage canal collects 290 cfs
- Total additional volume to STA-3/4 is approximately 10,900 acre-feet per year with a maximum additional flowrate of approximately 29 cfs when Supply Canal is floated to 8 feet
- Net additional volume to the Supply Canal is approximately 30,100 acre-feet per year. Maximum flow into Supply Canal is approximately 84 cfs when EAA Reservoir A-1 is full of water. Maximum flow out of Supply Canal to surrounding areas is approximately 60 cfs when Supply Canal is floated to 8 feet.

- Total additional volume to Holey Land is approximately 9,900 acre-feet per year with a maximum additional flowrate of approximately 39 cfs when Supply Canal is floated to 8 feet
- Seepage control cost to the project for Alternative #3 = $64,590,000

2.4.1.4 Embankments

Two fundamental types of embankments were considered for this site:

- A concrete gravity type dam using roller compacted concrete (RCC)
- A zoned embankment dam

Each type was considered in detail. A number of alternative arrangements for each type were considered and an opinion of probable cost prepared to evaluate the cost effective aspects of each alternative. The advantages, disadvantages, and risks of each section were considered.

The evaluation of alternatives considered initial and long-term stability, seepage control, foundation conditions, and probable costs with appropriate allowances for risks, uncertainties and the cost of mitigation measures. The construction sequence and requirements for each alternative were considered in detail. The most favorable concrete dam and embankment sections are presented below:

The roller compacted concrete gravity dam section alternative is composed of a three stepped RCC section with a vertical face on the interior of the dam. The advantages and disadvantages of the RCC dam are presented in Section 8 of the BODR. The cross-section for the RCC dam is shown in Figure 2-1 below.

A zoned embankment concept has been developed to utilize materials from the required seepage collection canal excavations and available on-site borrow resources, and to minimize sorting and processing of the excavated materials for embankment construction. The rockfill zone material will be produced from the caprock providing structural stability to the upstream slope. The cross-section for the zoned embankment is shown in Figure 2-2, and the cross section for the zoned embankment along STA-3/4 is shown in Figure2-3.

Figure 2-1: Cross Section of Roller Compacted Concrete Dam

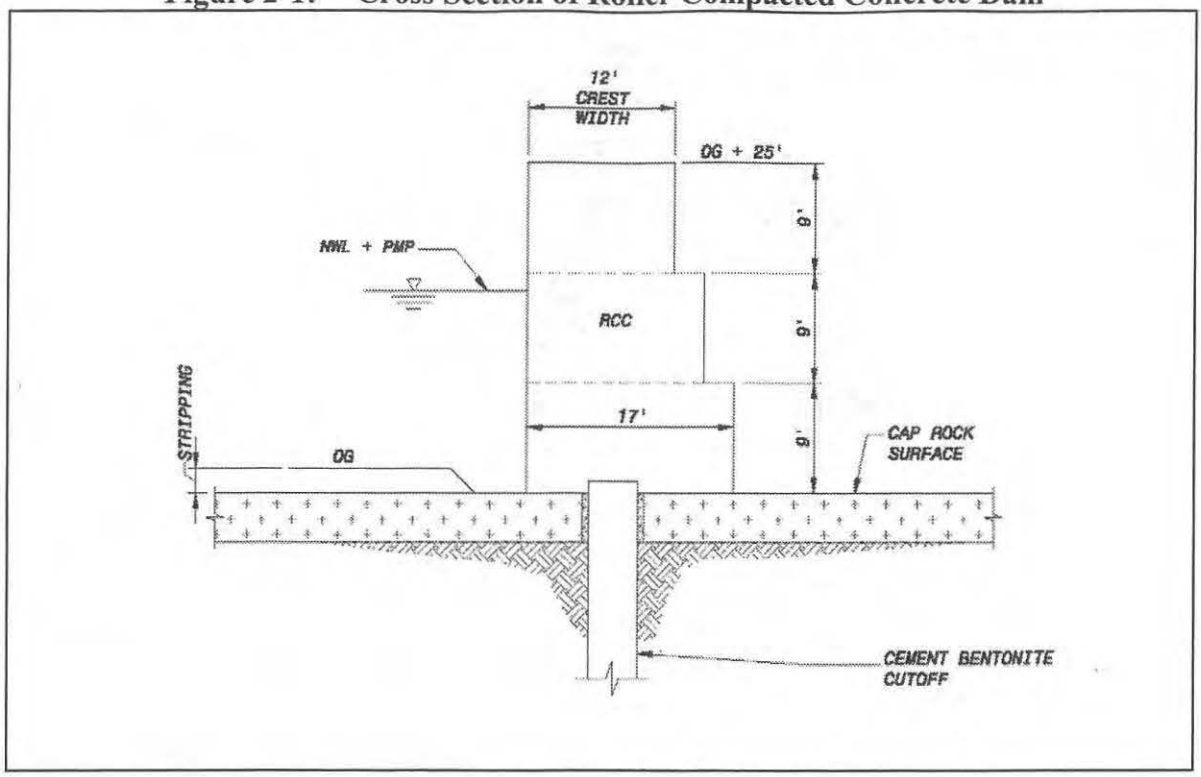


Figure 2-2: Zoned Embankment Cross-Section

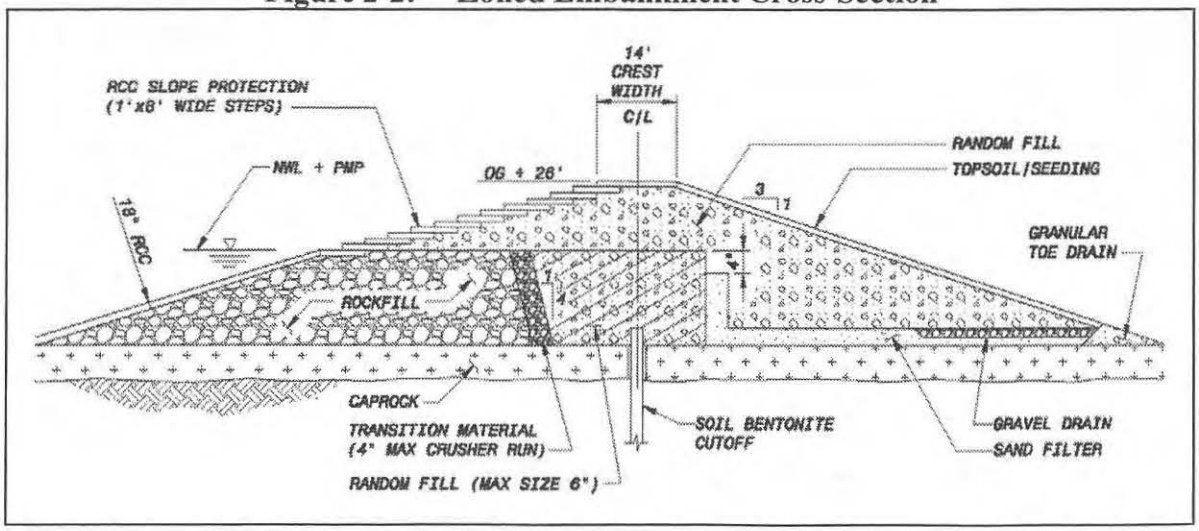
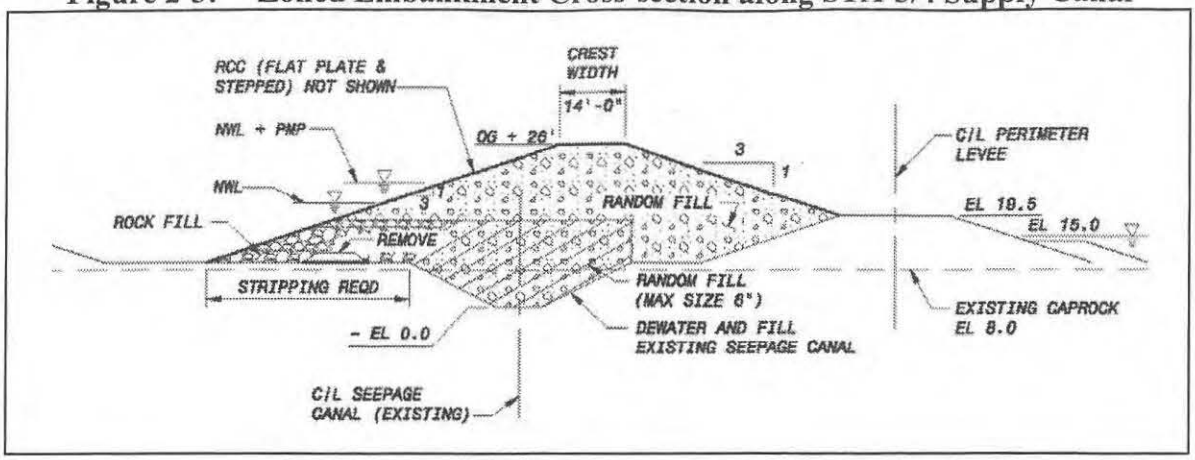


Figure 2-3: Zoned Embankment Cross-section along STA-3/4 Supply Canal



The purpose of the foundation seepage control alternatives is to mitigate seepage losses from the EAA Reservoir A-1, protect the foundation from possible damage by piping, and minimize excess uplift pressures to enhance stability. With higher head in the EAA Reservoir A-1, foundation stability issues are more critical and economic impacts due to pumping will be experienced on a long-term basis. Several different configurations to mitigate seepage from the EAA Reservoir A-1 and control exit pressures were evaluated: adequately sized key trench, cut-off wall or upstream blanket, and increasing distance between the EAA Reservoir A-1 and seepage collection canal. In view of the potential for piping, a foundation cutoff wall to a minimum depth of 34 feet or the base of the Fort Thompson Formation is being recommended for seepage control.

The embankment alternatives were screened considering embankment design standards and probable costs. These alternatives are:

- Embankment with rockfill upstream section (crest at OG+26 feet)
- Embankment with geomembrane
- Embankment with central core
- RCC gravity dam
- Concrete-faced rockfill dam (CFRD)

Based on the evaluation of probable construction costs, the zoned embankment dam with the upstream internal rockfill section represents the least cost alternative. This alternative includes a 34-foot cutoff for a distance of 12.95 miles of the perimeter. The embankment section parallels the existing Supply Canal embankment for the remaining 8.75 miles of the perimeter. Based on the results of the technical and cost evaluation, the

least cost alternative shown in Figures 2-2 and 2-3 is the preferred alternative to be advanced to 30 percent design.

2.4.1.5 Pump Station

Figures 2-4 and 2-5 show potential layouts for gates and pump stations at the EAA Reservoir A-1. Seven pumping and discharge alternatives were selected for preliminary consideration. In general, all alternatives except one were based on the addition of a new northeast pump station located adjacent to the NNRC in the northeast corner of the EAA Reservoir A-1 site.

The operating level of the EAA Reservoir A-1 will fluctuate between elevation 8.6 and 20.6 NAVD88. The normal and maximum operating elevations of the STA-3/4 Supply Canal are about 13.6 and 16.6 NAVD88 respectively. Both G-370 and G-372 pump stations are designed to pump to a water elevation of 13.6 NAVD88 in the STA-3/4 Supply Canal. Pumping to higher water elevations will rapidly diminish their respective capacities. While it is possible to partially supply the EAA Reservoir A-1 from G-370 and G-372 pump stations without modifications to the pump stations, significant modifications would be required to pump to the full EAA Reservoir A-1 elevation.

Figure 2-4: Pumping and Discharge Facilities - Alternative No. 2

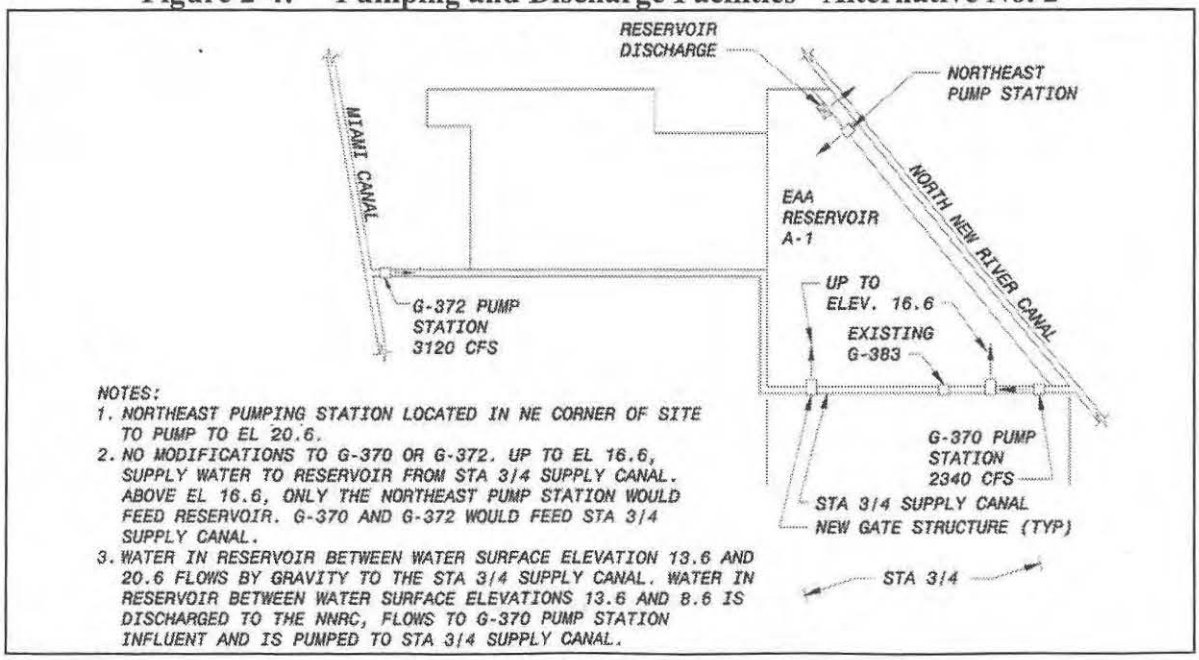
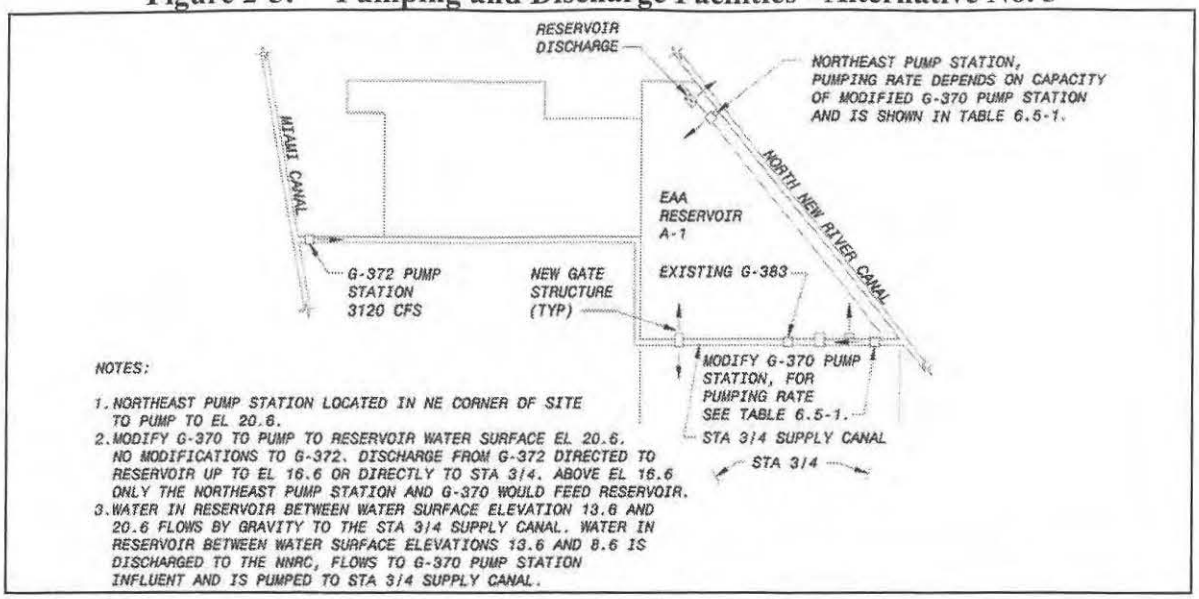


Figure 2-5: Pumping and Discharge Facilities - Alternative No. 3



Further evaluations were completed using the Water Balance Model in an effort to optimize the performance of the pump stations and EAA Reservoir A-1. Two fundamental optimization criteria were considered:

- Optimization based on effectiveness in supplying environmental and agricultural deliveries
- Optimization based on effectiveness in capturing priority water sources. Listed in order of descending priority, the water sources are runoff from the EAA back-pumping to Lake Okeechobee, and Lake Okeechobee releases.

Optimization was considered to be achieved when further increasing of the size of the northeast pump station no longer provided significant benefit. Numerous combinations of northeast pump station sizes and modifications to existing G-370 and G-372 pump stations were evaluated.

Evaluations found that the optimization goal of installing the most cost effective pump capacity to meet maximum deliveries opposed the objective of maximizing pump capacity to capture local runoff, pump backs, and Lake Okeechobee regulatory releases:

- A northeast pump station sized for 1,500 cfs working with G-370 and G-372 pump stations unmodified would provide sufficient capacity during the first phase of operation to provide the maximum delivery percentages that can be expected with an EAA Reservoir A-1 of 190,000 acre-feet of storage volume. Further modifications to the NNRC and to G-370 and G-372 pump stations to allow pumping capacities of 2,220 and 3,700 cfs respectively to full EAA Reservoir A-1

water depth would provide the additional capacity needed for the second phase of operation. A conveyance capacity of up to 6,400 cfs would be required in the NNRC depending on the alternative selected.

- A northeast pump station sized for 3,500 to 4,000 cfs working with G-370 and G-372 pump stations unmodified would be required to provide sufficient capacity during the first phase to maximize local runoff and pump back capture. NNRC modifications would also be required to increase conveyance capacity. Further modifications to G-370 and G-372 pump stations to allow pumping capacities to full EAA Reservoir A-1 water depth would provide the additional capacity needed for the second phase of operation.

The second alternative has several advantages over the first:

- The larger pump station can meet all of the delivery goals that a 1,500 cfs station would meet but the smaller station could not provide the same priority removal levels.
- A 3,500-4,000 cfs pump station would provide a significant increase in flood protection capacity.
- Having a substantial pumping capability in the northeast pump station will ease the disruption that will be experienced during the phase two modifications of G-370 and G-372 pump stations.
- The larger pump station allows for capture of most storm related peak flows.

The primary disadvantage for the larger pump station alternative is cost (about $15.4 million). In addition to the costs associated with a smaller pump station, the 1,500 cfs pump station can provide the optimum deliveries without canal modification for the first phase, and minimal canal modification for the second phase. To be effective, the larger pump station would require canal modifications that coincide with the first phase of construction.

Northeast pump station recommendation:

- Construction of a 3,600 cfs northeast pump station concurrent to the construction of EAA Reservoir A-1.
- Use of the G-370 and G-372 pump stations unmodified during phase one operation to pump into the EAA Reservoir A-1 when its water levels are less than 8 feet and directly to the STA Supply Canal when EAA Reservoir A-1 water levels are greater than eight feet.

- Modification of the G-370 and G-372 pump stations to pump 2,220 and 3,700 cfs capacity to full EAA Reservoir A-1 depth as part of the EAA Reservoir A-2 construction.
- Canal modifications to provide matching conveyance capacity, with an associated cost of up to $37 million depending on the alternative selected.

2.4.1.6 Discharge Structures

Three gate structures are required for implementation of the recommended alternative as shown on Figures 2-4 and 2-5. Two structures located in the southern embankment would be required to provide a dual function of EAA Reservoir A-1 filling and environmental deliveries from the EAA Reservoir A-1. Some studies have suggested that a water quality benefit may result from passing water through EAA Reservoir A-1 prior to discharging to STA-3/4. Additional structures would be required in order to achieve the potential water quality benefit. Implementation of the latter alternative would increase the project cost by approximately $26 million. Because of the added cost and a relatively small (13 to 17 percent reduction in phosphorus loading) water quality benefit, the three gate structure option is recommended. Even with the recommended alternative, operational strategies can be implemented to achieve the goal of routing much of the water through the EAA Reservoir A-1 before passing through to the STA-3/4.

In addition to the gate structure the EAA Reservoir A-1 will be equipped with an orifice-type spillway which will guard against overfilling. The spillway will be designed to limit overflow discharges to less than 500 cfs during rainfall events with less than a 100 year recurrence interval.

This evaluation resulted in the selection of the most feasible design features as mentioned in Section 2.5 below.

2.5 PREFERRED ALTERNATIVE

Based on the Environmental effects evaluation, which includes natural and cultural resources effects, and the costs associated with the alternatives (Table 2-1), the Acceler8 EAA Reservoir A-1 Alternative (Build Alternative) was selected to be the preferred alternative. The Build Alternative consists of the construction of an above-ground reservoir for water storage, with a capacity of 190,000 acre-feet at an approximate depth of 12-feet. The reservoir will be constructed on a 16,768 acre parcel of land situated on the eastern portion of the Draft PIR/EIS Selected Plan Alternative.

The Acceler8 EAA Reservoir A-1 Alternative (Build Alternative) includes the following components:

- Approximately 190,000 acre-feet EAA Reservoir A-1 with a perimeter embankment and seepage canals
- Creation of a northeast pump station (3,600 cfs capacity that pumps from NNRC)
- A connector canal from the NNRC to the new northeast pump station
- Gated discharge structures
- Seepage pump stations
- Gated culvert structures
- New four lane bridge (two parallel two-lane bridges) on U.S. 27 across the new connector canal
- Improvements to conveyance capacity in the NNRC

2.5.1 Pump Stations

The S-610 pump station is the reservoir inflow pump station with a total pumping capacity of 3,600 cfs and is located on the east side of Reservoir A-1 on the NNRC. The pump station is designed to capture runoff and Lake Okeechobee releases in the NNRC. S-610 is a pump station with diesel and electric motor driven pumps for seepage. All diesel engine driven pumps are used during maximum flood control operations. The pumps can be used to back-pump seepage and maintain the perimeter seepage canal levels during non-runoff event times. Although electric motor driven pumps are presented for seepage pumping, for operational flexibility, any combination of pumps can be used to maintain optimum seepage canal levels.

2.5.2 Gated Culverts

The S-602 and S-603 gated box culvert structures are the outlet for Reservoir A-1 into STA-3/4. The design flow is approximately 3,000 cfs. The culvert barrels are typical box culverts with dimensions of 10 feet in height, 10 feet in width and 200 feet in length. S-602 and S-603 are located on the southern Reservoir A-1 embankment just north of the STA-3/4 Supply Canal. The structures will discharge into the STA-3/4 Supply Canal and then into STA-3/4 via existing gated structures G-374 A-F, G-377 A-E and G-380 A-F. The asset numbers and detailed design will be determined in the final design.

The S-605 gated culvert structure is an inlet structure from the NNRC into Reservoir A-1. Pump Station G-370 will pump from NNRC into the reservoir.

The S-609 gated culvert structure is recommended to be a bridge in the EAA Reservoir A-1 alternative.

2.5.3 Existing Structures

G-370 is an existing pump station that is currently being used as the STA-3/4 inflow. Stormwater runoff and Lake Okeechobee releases in the NNRC pass through this pump station and into the STA-3/4 distribution system. This pump station will be used as Reservoir A-1 inflow as well as inflow to STA-3/4. This is a six bay pump station with three 925 cfs diesel pumps and three 75 cfs electric driven seepage pumps. The total flood control capacity is 2,775 cfs. The pump station is located at the southeastern corner of Reservoir A-1 adjacent to U.S. Highway 27 and the NNRC.

G-372 is an existing pump station that is currently being used as the STA-3/4 inflow. Stormwater runoff and Lake Okeechobee releases in the Miami Canal pass through this pump station and into the STA-3/4 distribution system. For the EAA Reservoir A-1, this pump station will be used as the reservoir Cell 2 inflow structure. This is a seven bay pump station with four 925 cfs diesel engine driven pumps and three 75 cfs electric driven seepage pumps. The total flood control capacity is 3,700 cfs. The pump station is located at the southwestern end of Cell 2 adjacent to the Miami Canal.

Existing control structures G-374 A-F, G-377 A-E and G-380 A-F are a series of six, five, and six barreled gated box culvert structures, respectively. Flows from the Miami Canal and the NNRC are conveyed through the STA-3/4 Supply Canal and distributed through these control structures into STA-3/4. The total capacity for these structures is approximately 6,000 cfs. The structures are double-barreled stop log riser structures. For the EAA Reservoir A-1 these structures will continue to function as the STA-3/4 inflow structures. These structures are located along the northern boundary of STA-3/4.

2.5.4 Canals

The function of the perimeter canal, C-601, is for seepage collection and conveyance of reservoir outlet flows. The canal is also required as a borrow source for construction of levees. The new perimeter canal will capture seepage to the western, northern, and eastern boundaries. Seepage along the reservoir's southern boundary will be captured by the existing STA-3/4 Supply Canal.

Canal C-601 is the Reservoir A-1 perimeter seepage canal. The canal is located along the Reservoir A-1 northern and eastern boundaries. The

eastern reach of C-601 is used for seepage collection. Seepage flows in the canal are collected by the S-610 pump station and returned to the reservoir.

2.5.5 Canal Modifications

The design capacity of the NNRC is approximately 4,000 cfs. The conveyance capacity of the NNRC would have to be increased by approximately 150% as determined by the hydraulic analysis. The increase in capacity requirements necessitated an enlargement of an approximate 22.5 mile section of canal between the reservoir and Lake Okeechobee. The NNRC channel improvement is constrained by U.S. 27 on the west bank. All of this work may not be performed within the existing SFWMD right of way of the NNRC.

2.5.6 Embankments

The reservoir has a perimeter embankment, L-601, with a minimum height of 23 feet above average ground for both earthen and RCC designs. The height of the internal levee L-601i is 21 and 19.2 feet above average ground for the earthen and RCC designs, respectively.

Cut-off walls will be installed as part of the levee or embankment construction. For earthen embankments, the estimated depth of the cut-off wall is 34 feet along the east, north, west, and along the Holey Land area. There will be no cutoff wall installed along the STA-3/4 sides of the reservoir.

2.5.7 Bridges

The S-609 box culvert structure is recommended to be a bridge.

2.5.8 Other Features

Wetlands Buffer

Seepage Buffer Wetlands and Littoral Shelves in Cap Rock shall be placed elsewhere within the project. The BODR does not recommend wetland features between the toe of the embankment and the seepage canals. The buffer must remain clear and dry in order that visual inspection of the embankment and its stability can be made. The Draft PIR/EIS recommended a buffer width of 200' for the CERP EAA Storage Reservoirs project vs. 150' in the BODR. The District is currently evaluating the possibility of natural recruitment of vegetation within the buffer appropriate to the hydro-period attained at that elevation. The District estimates that the 150-ft buffer strip strikes an appropriate balance among function, local environmental enhancements, and cost. The District's assesses that a 50 ft maintenance corridor will allow access of larger equipment in case of storm-induced failure modes.

Deep-water Refugia
Deep-water refugia is created by the existing agricultural ditches and excavation of proposed borrow pits within the reservoir. The area of existing ditches is 163 acres. The area of the proposed borrow pits will be determined during construction based on the need for embankment material. The existing ditches and borrow pits provides fish refuge during periods when the reservoir pool elevations approaches average ground elevation.

Recreation
Recreational features are currently being coordinated with the appropriate regulatory agencies and will be included in the final design.

2.5.9 Operations

The ultimate operational goal for the EAA Reservoir A-1 will be to operate in a manner that Lake Okeechobee Regulatory releases and EAA basin runoff will be captured and stored depending upon on which area has the greatest need for runoff or discharge removal. This will depend on the regional drainage system's capability to convey water to the reservoir while maintaining existing levels of flood protection within the basin. It is anticipated that most of the water will be released into STA-3/4 from the reservoir when an environmental need is identified in the Everglades that could be provided from the reservoir. Releases will be made into the NNRC to provide supplemental irrigation for water users in the EAA when there is water remaining in the reservoir after deliveries to the Everglades, otherwise irrigation supply will be maintained via deliveries from Lake Okeechobee.

Initial interim operations of the reservoir will be dependent on existing C&SF project infrastructure particularly within the WCAs and Everglades National Park. Initial operations will focus on storing Lake Okeechobee regulatory releases in the reservoir to provide lake and estuary benefits. Environmental releases from the reservoir through STA-3/4 will be made to meet environmental needs identified in the Everglades, however, these releases will be limited to avoid creating undesirable impacts due to constraints of the existing C&SF project. Water remaining in the reservoir may be used to provide supplemental irrigation for water users in the EAA to create more capacity for additional Lake Okeechobee regulatory releases when they are needed.

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CHAPTER 3
AFFECTED ENVIRONMENT

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3.0 AFFECTED ENVIRONMENT

This section describes the existing environmental resources within the SFWMD's proposed EAA Reservoir A-1 Alternative footprint that would be affected by construction. The environmental resources within the Selected Plan project overall footprint are described in the Draft PIR/EIS, Section 2 – Existing Conditions, prepared for the EAA Storage Reservoirs project.

3.1 GENERAL ENVIRONMENTAL SETTING

3.1.1 EAA Basin

The EAA basin is located south of Lake Okeechobee in western Palm Beach County (Figure 3) and encompasses approximately 620,797 acres of highly productive agricultural land comprised of rich organic peat or muck soils. A small portion of the Study Area includes mucklands located in western Martin County. Approximately 77% of the Study Area (553,000 acres) is in agricultural production; now considered one of Florida's most important agricultural regions for cultivation of sugar cane. The basin extends south from Lake Okeechobee to the northern levee of WCA-3A. The eastern boundary extends to the L-8 Canal. The L-1, L-2, and L-3 levees represent the westernmost limits.

3.1.2 EAA A-1 Reservoir Footprint

The SFWMD's proposed EAA A-1 Reservoir project footprint is the same footprint as described in the Draft PIR/EIS for the EAA Storage Reservoir Cell A-1. It is located in the eastern half of Parcel A and borders U.S. 27 and the North New River to the east, Stormwater Treatment Area (STA) 3/4 to the south, and the Holey Land Wildlife Management Area to the southwest. The western border is perpendicular to the eastern edge of the Holey Land Wildlife Management Area. See Figure 3, EAA A-1 Reservoir Project Location Map.

The SFWMD's proposed EAA Reservoir A-1 project covers approximately 16,768 acres and is designed to store stormwater originating within the S-2/7, S-3/8, S-236 and C-139 basins and releases from Lake Okeechobee, all located generally north of the project site.

A schematic of the EAA Reservoir A-1 and Draft PIR/EIS Selected Cell A-1 footprints and their relationship to the other EAA infrastructure is shown in Figure 4.

3.2 PHYSICAL ENVIRONMENT

3.2.1 Existing Land Use

Nearly the entire EAA Reservoir A-1 project site, as well as adjoining lands to the north, northwest, and east, is designated for sugarcane production (FLUCCS 2156). A small rectangular-shaped parcel in the northern portion of the EAA Reservoir A-1 project site is designated industrial land use (FLUCCS 1500), and was occupied by the Talisman Sugar Corporation processing facility. The Holey Land tract is southwest of the Reservoir A-1 project site and is designated as freshwater marshes with sawgrass. The southern adjoining property is occupied by STA-3/4. See Figure 7, Existing Land Use Map.

The area is drained by a system of canals constructed during the second half of the last century as the Central and Southern Flood Control Project. Pumping and flooding of these canals is used by the local sugar producers to regulate the groundwater level during planting and harvesting of the primary crop (sugarcane). It has a subtropical climate with about 55 inches of rain per year.

3.2.2 Soils and Geology

The soils at the SFWMD's proposed EAA Reservoir A-1 project site include the Pahokee muck (primarily in the southern portion of the site) and Lauderhill muck (primarily in the northern portion of the site). Based on geotechnical borings at the proposed EAA Reservoir A-1 project site, the muck ranges in thickness from less than one foot to approximately five feet. According to the NRCS, the soils located beneath the former Talisman Sugar Corporation processing facility are classified as urban land. Urban land soils are those which have been disturbed due to development. See Figure 8, EAA Reservoir A-1 Soils Map.

Numerous soil borings, taken from 50 to 100 feet below ground surface, were completed within the project footprint in December 2004 and January 2005. The borings generally penetrated through approximately one half to two feet of surficial peat/muck and marl, then through 22 to 26 feet of primarily carbonate sand and limestone, and then into primarily shelly quartz sand with sparse limestone to their completed depths. The marl beneath the peat and muck is known by some authors as the Lake Flirt Marl (Reese and Cunningham, 2000; Harvey et. al., 2002), but is undifferentiated from the peat and muck layer for this report. The upper carbonate sand and limestone constitutes the Fort Thompson Formation at the site. Below this, the shelly

sand and sparse limestone constitutes the Caloosahatchee Formation and possibly part of the Tamiami Formation.

The top of the Fort Thompson Formation consists of a hard limestone layer about four and a half to five feet thick, which is locally called caprock. The caprock is generally white, light gray, tan or yellowish brown. The caprock is underlain by silty carbonate sand extending to about 23.5 to 24.5 feet deep, where another hard limestone layer one and a half feet to three feet thick is encountered. A thinner, hard limestone layer about one half foot to one foot thick is often encountered at around 16 to 17 feet deep. The sand and lower limestone layers are generally white to very pale brown. Laboratory testing of the sand sampled in the borings averaged 84.2 percent calcium carbonate content with an average of 22 percent passing the #200 sieve in gradation tests. Visual inspection of the sand samples from the borings revealed that they include shell fragments, and tend to be angular and platy.

All the Fort Thompson Formation limestone layers exposed in core or in excavations at the proposed EAA Reservoir A-1 project site are very fossiliferous. The sand exposed in the seepage collection canals and dewatering sumps was abundantly fossiliferous with gastropods, pelecypods, corals, and echinoderms.

The top of the Caloosahatchee Formation is composed of fine grained, subrounded, shelly quartz sand that is mixed with shelly carbonate sand similar to that in the Fort Thompson Formation. The Caloosahatchee Formation at the site is 30 to 60 feet thick; however, the interface between this formation and the underlying Tamiami Formation is difficult to define. The proportions of carbonate to quartz sand vary. Laboratory testing on the sampled sand indicated an average calcium carbonate content of 40.1 percent and an average of 12.1 percent of material passing through the #200 sieve. The primary color of the geologic material in the Caloosahatchee Formation is light greenish gray.

Other geologic information may indicate that the Caloosahatchee Formation is not present at the EAA Reservoir A-1 project site. For instance, recent geological work (Reese and Cunningham, 2000) has redefined the stratigraphy of the area. Presently, the Tamiami Formation has several recognized named and unnamed geologic members including the Ochopee Limestone Member and the Pinecrest Sand Member. Both Tamiami Formation members contain sandy strata, but the Pinecrest Sand Member is principally shelly, fine grained, quartz sand. The sands in the Caloosahatchee and Tamiami Formations are generally differentiated based on the fossil assemblages observed in outcrops, but key indicator fossils are typically not recovered in borings (Scott, 2005). Therefore, interpretation of

the contact between the Caloosahatchee Formation and Tamiami Formation at the proposed EAA Reservoir A-1 project site is not possible.

3.2.3 Seismicity

The planned reservoir site is located in a non-active seismic zone. The 2002 United States Geological Survey (USGS) earthquake hazard map for the central and eastern United States indicates that South Florida has the lowest probability for earthquake activity for at least the next 50 years.

3.2.4 Surface Water Hydrology

Lake Okeechobee provides water south to the Everglades Agricultural Area through three structures, S-351, S-354, and S-352. Structure S-354 supplies the Miami Canal, which can flow south past the Bolles Canal, down to the G-372 pump station, and then continue south to structure S-8 and on into the Everglades Protection Area. The G-372 pump station pumps water into the STA-3/4 Supply Canal which currently feeds the Holey Land Wildlife Management Area (WMA) and STA-3/4. S-351 supplies the North New River Canal (NNRC) and the Hillsboro Canal. The NNRC flows south past the Bolles and Cross Canal confluences to G-370 pump station, continues on south to structure S-7 and into the Everglades Protection Area. The NNRC is the source for the G-370 pump station and will be the source for the proposed northeast pump station. Its major sources of water are from Lake Okeechobee, Bolles Canal, Cross Canal, and local farm permitted pump discharges. The Hillsboro Canal also supplied from structure S-351 where the discharge flows south, past the Ocean Canal confluence, and then past the Cross Canal confluence. The Hillsboro Canal continues south to structure S-6 and then into the Everglades Protection Area. Structure S-352 discharges into the West Palm Beach Canal. The West Palm Beach Canal flows south past the Ocean Canal confluence and into structure S-5A, it then continues east into the C-51 Canal (Figure 9, Structures and Canal Locations).

The Bolles and Cross Canals flow east and/or west; water can flow in either direction. However, the most common flow pattern is the Bolles Canal flowing east, and the Cross Canal flowing west, both discharging at a common location; into the NNRC. There are numerous secondary agriculture canals that are responsible for north-south water movement. The secondary canals connect to the major canals. Seepage ditches are common outside the levees.

3.2.5 Groundwater Hydrology

The intermediate confining unit is located approximately 200 to 250 feet below ground surface (bgs) and will restrict any seepage from the proposed EAA Reservoir A-1 project that might reach this depth. There is a high degree of communication between groundwater and surface water in the area, the groundwater gradient in the surficial aquifer system is controlled, to a large extent, by the operation of the hundreds of canals throughout the region. Therefore, even though the general regional gradient in the surficial aquifer system is believed to be southward, localized gradients may actually be in other directions in portions of the area surrounding the proposed EAA Reservoir A-1 project site due to the operation of canals and wells in the region.

3.2.6 Water Management

This section summarizes the existing water management system in the EAA and addresses the status of the Everglades Program, as defined in the 1994 Everglades Forever Act (EFA), and its implications for the Project. Also covered are hydrography, drainage basins, water management practices, and the major groundwater/hydrogeologic features in the EAA.

Currently, water levels in Lake Okeechobee are regulated by a complex system of pumps and locks. The regulation schedule attempts to achieve the multiple-use purposes as well as provide seasonal lake level fluctuations. The schedule maintains a low lake stage to provide both storage capacity and flood protection for surrounding areas at the beginning of the summer wet season. At the end of the wet season, the beginning of winter, lake levels are higher to store water for the upcoming spring dry season. The general plan of operation for Lake Okeechobee is based on the following: 1) flood protection from lake waters and water driven by hurricane winds on lands adjacent to the lake; 2) maintenance of an eight-foot navigation channel across Lake Okeechobee, as part of the Okeechobee Waterway; and 3) storage of water to supply needs of the Lake Okeechobee service area.

Flood control improvements around Lake Okeechobee consist of a system of approximately 1,000 miles (1,600 km) of encircling levees, designed to withstand a severe combination of flood stage and hurricane occurrence, plus the regulatory outlets to the St. Lucie Canal and the Caloosahatchee River. The design discharge of Moore Haven Spillway to the Caloosahatchee River is 9,300 cubic feet per second (cfs) [260 cubic meters (m^3)/second (sec)]; that of St. Lucie spillway is about 16,000 cfs (450 m^3/sec). Following removal of local runoff from the agricultural areas south of the lake, an additional regulatory capability of several thousand cfs is available through the Miami,

North New River, Hillsboro, and West Palm Beach Canals by pumping into the three WCAs.

The EAA is located south of Lake Okeechobee within a belt of highly organic hydric soils originally deposited by the historic Everglades wetland called the "River-of-Grass." The organic soils have served as a fertile agricultural area since they were initially drained. Over-drainage and environmental impacts eventually led to the completion of the C&SF Project. The C&SF Project's intention was to provide water storage in the WCAs and to better control water levels in the Everglades for multiple purposes. As a result, the EAA contains an elaborate canal system. The construction of canals, levees, and roads has eliminated the historical freshwater sheet flow and resulted in changes in the timing and quantity of flow within the system that have influenced water quality conditions and impacted the downstream Everglades Protection Area (EPA).

The revised water management system allowed extensive agricultural development in the EAA. However, environmental effects continued to be observed in the downstream areas of the remaining Everglades ecosystem. Increased loading of phosphorus from the EAA was found to be causing unacceptable ecological changes to the WCAs and the ENP, which comprise the EPA. The Everglades Forever Act required that all waters discharged to the EPA meet applicable water quality standards. Phase I water quality measures included design and construction of a number of STAs by SFWMD. These STAs were intended to provide an interim reduction in the observed phosphorus loads. In addition, a broad suite of agricultural best management practices (BMPs) were implemented to further lower phosphorus discharges to the EPA. Based on a phosphorus water quality criterion of 10 µg/L, additional activities were determined necessary to ensure eventual compliance within the EPA. A long-term plan for achieving this compliance was published by SFWMD in October 2003 (Burns & McDonnell, 2003).

Currently, when the Lake Okeechobee elevation is in zone A, B, C, or D, regulatory releases are made through the St. Lucie Canal and the Caloosahatchee River which flow to estuaries downstream. These releases from Lake Okeechobee have resulted in declines in aquatic vegetation and oyster populations.

Upon completion of EAA Reservoir A-1, a portion of the flow that would otherwise have gone to the St. Lucie Canal and the Caloosahatchee River will be sent to EAA Reservoir A-1. When water levels in the primary canals reach predetermined levels, the G-370 and G-372 pump stations, and the new northeast pump station will be operated to pump the released waters in the

EAA Reservoir A-1. Stored water can later be released to the Supply Canal for environmental deliveries when the EAA Reservoir A-1 level exceeds the minimum Supply Canal level. When the EAA Reservoir A-1 water level is below the minimum water level for the Supply Canal, water may be released through the northeast gate structure into the NNRC from where it can be lifted into the Supply Canal by G-370 pump station. When appropriate, G-370 and G-372 pump stations can also pump Lake Okeechobee releases directly to the Inflow and Supply Canals for environmental deliveries.

3.2.7 Water Quality

Water quality information focuses upon the EAA basin as the area of expected primary impacts. However, the water quality of the larger area is dependent on Lake Okeechobee water quality to the extent that these waters are released to the various receiving waters. Lake Okeechobee water is conveyed to receiving water bodies by canals and primary and secondary tributaries. Receiving waters are St. Lucie and Caloosahatchee River Estuaries, including Indian River Lagoon and Charlotte Harbor, and the northern WCAs.

Nutrients such as phosphorous and nitrogen compounds are a concern in the WCAs. When there are sufficient levels of both nutrients present, cattails and other invasive species displace native sawgrass. There are many natural and human sources of nitrogen compounds. However, vegetation growth is limited by the comparative lack of phosphorous compounds. These come primarily from agricultural fertilizers and decomposition of the peat soils in the area. Decomposition of peat soils in the EAA is accelerated by continued agricultural use. Thus, phosphorous is a parameter of particular concern regarding water from Lake Okeechobee and the EAA.

Agricultural BMPs were implemented in the EAA basin in 2000, which have resulted in improved water quality. However, this area remains a primary source of pollutants for the WCAs. The WCAs form the remnant wetland communities for the northern section of the Everglades system. These areas have been isolated from contiguous lands by a series of levees and pump stations. Water moving south from the lake and EAA is pumped through the WCAs, thereby making these areas nutrient filters for downstream basins. A highly altered hydroperiod results from the presence of various levees and pumping schedules. These factors may worsen water quality conditions in the WCAs and are consistent with the general degradation of water quality in areas along the canals and pump stations when compared to conditions in the central portions of the basins. Construction of STAs upstream of the WCAs serve to improve water quality conditions through time; however, other problems may persist.

The L-8 (C-51), Hillsboro, North New River, and Miami Canals extend from Lake Okeechobee to the L-4, 5, 6, and 7 Canals, which roughly define the EAA, have poor water quality with extremely high nutrient and low dissolved oxygen levels. Other problems include pesticides, biological oxygen demand, bacteria, and suspended solids. Fish kills occur periodically in the C-51 Canal after heavy rains drain from the Chemair Spray hazardous waste site.

FDEP has defined most of the primary and secondary canals within the EAA (Miami, Hillsboro, North New River, West Palm Beach, Bolles and Cross Canals) as Class III Waters with a designated use of "recreation, propagation and maintenance of healthy, well-balanced population of fish and wildlife." Agricultural canals are regulated as Class IV Waters designated for "agricultural water supply." A summary of applicable water quality criteria for Class III and IV Waters of the state as defined in Section 62-302.530, FAC, may be found in Appendix C of the Draft PIR/EIS for the EAA Storage Reservoirs. In addition water quality parameters within the study area and adjacent areas are discussed in Section 2.2.11, *Water Quality* of the Draft PIR/EIS.

3.2.8 Flood Protection Level of Service

The EAA depends on the flood storage capacity of the WCAs, and to a lesser extent, on Lake Okeechobee, as a means to remove water from the basin. In the case of extreme events such as a hurricane, flood storage in Lake Okeechobee becomes more important. Flood control works on Lake Okeechobee consist of a system of about 150 miles (240 km) of encircling levees, designed to withstand a severe combination of flood stage and hurricane occurrence, plus the regulatory outlets of St. Lucie Canal and the Caloosahatchee River.

3.2.9 Hazardous, Toxic and Radioactive Waste

Three tracts of land were identified within the proposed EAA Reservoir A-1 project site with potential Hazardous, Toxic and Radioactive Waste (HTRW) involvement. These tracts are:

- Woerner Farm 3 – Tract No. 100-0039
- Talisman South Ranch Eastern 1/3rd – Tract #100-104
- Cabassa Farm – Tract #100-105

See Figure 10, Potential Sites with Potential HTRW Involvement

Woerner Farm 3- Tract # 100-0039

The Woerner Farm 3 property consists of approximately 1,000 acres of land, which was utilized as a sod farm from 1981 until 1996 when sugarcane was added. Currently the property is utilized solely for the production of sugarcane.

The following assessments and investigations were conducted for the Woerner Farm 3:

- A Phase I Environmental Site Assessment (ESA) - November 1994 and January 1998
- Phase II ESA investigation - February 1999
- Supplemental investigations – February 2000 and March 2001

Three areas of concern were identified which required additional assessments and/or corrective actions. In 2005, over 1,880 tons of toxaphene impacted soils were excavated from the cultivated area. A limited soil excavation of pesticide and petroleum impacted soils was conducted at the former shed on the Woerner tract. In addition 130 tons of petroleum impacted soils were excavated from the main pump station. An Environmental Risk Assessment (ERA) was formulated and site specific cleanup target goal of 5.2 mg/kg was proposed for toxaphene. The ERA is currently under review by the USFWS and their concurrence is anticipated.

Talisman South Ranch 1/3rd –Tract #100-104

The eastern one third portion of the Talisman South Ranch, or approximately 7,000 acres will be utilized by the EAA Reservoir A-1. Currently, this portion of the Talisman South Ranch is vacant fields. In Mach 1996, a Phase I and Phase II ESA for the property were conducted focusing on the Talisman sugar mill and surrounding areas. In November 1998, a Phase II ESA was conducted to determine the status of potential constituents of concern (COC) at each of the areas of concern identified in Phase I.

Based on the Phase I and Phase II ESAs, 11 areas of COC were detected in soil, groundwater, sediment, or surface water at concentrations exceeding regulatory cleanup target levels or guidance concentrations. Transference of ownership of each of the Exclusion Areas was deferred until a Site Rehabilitation Completion Order (SRCO) for each Exclusion Area was issued by the FDEP.

The list of Exclusion Areas included:

- Five pump stations

- Two pesticide mix load areas
- A former labor camp and crop-duster landing strip
- A former borrow pit/agricultural landfill
- The former sugar processing mill
- The surface water management areas adjacent to the sugar mill

These areas were primarily impacted with organochlorine pesticides (e.g., dichlorodiphenyltrichloroethane (DDT), petroleum products, and arsenic).

An assessment and remediation on all of the Exclusion Areas on behalf of Talisman Sugar Corp. and the St. Joe Company was performed. The cleanup objectives for each Exclusion Area within the proposed reservoir area were based on the proposed end land use for water storage areas. As such, cleanup target levels were chosen to be protective of potential ecological receptors which are likely to inhabit the area once a reservoir is constructed. For protection of wildlife, the clean up target levels for most of the chemicals found on the Talisman property are more stringent than the cleanup standards for human health. Therefore, a cleanup to ecological standards is also inherently protective of agricultural workers during the interim period prior to reservoir construction as well as reservoir construction workers.

FDEP issued SRCOs for the majority of the Exclusion Areas. These parcels can be conveyed immediately with no restrictions. On the remaining parcels, the remediation work has been completed to the satisfaction of the FDEP; the FDEP has issued memoranda of technical concurrence. However, a deed restriction was necessary in order to convey the property to SFWMD.

The cleanup of the mill site involved assessment and remediation of a number of point source discharge areas. Areas of concern at the mill site included numerous leaking petroleum storage tanks, pesticide and/or arsenic impacted soils in the sediments of two drainage canals, an ash pit, and a water storage retention area, and metals-impacted soils adjacent to several building slabs.

In general, the petroleum impacted areas were handled through excavation and on-site treatment of soils in ex-situ bioremediation piles. Once the treatment was verified by confirmation sampling, the treated soils were returned to their respective excavations. Approximately 16,000 cubic yards of petroleum impacted soil was excavated, treated and backfilled.

The canals and surface depressions at the mill were covered with a two foot layer of clean soil. The cover is intended to prevent exposure of potential receptor species to these sediments. Pesticide and arsenic impacted soil was

also excavated from other areas of concern at the mill site and consolidated in the ash pit. The ash pit was a low lying excavated area that accepted effluent from the boilers. The ash in the pit was lightly impacted with heavy metals and polynuclear aromatic hydrocarbons (PAHs). Additional soils from other areas of concern were also filled into the pit and the ash pit was covered with two feet of clean soil to prevent future exposure.

These three areas within the mill site where contaminated soils have been left and capped will also require restrictions on excavation activities. These parcels are identified as the South Rock Canal, the Ash Pit, and the Waste Lake Discharge Ditch. An additional area of capped, impacted soil is present approximately three miles west of the mill at the former borrow pit/agricultural landfill. These areas contain pesticide, PAH, and metal impacted soils which are buried beneath a clean soil cover. The excavation restrictions are necessary to prevent disturbance of these areas. These areas have been surveyed by a professional land surveyor and the coordinates have been provided to SFWMD to ensure that no disturbance of these areas occurs.

In summary, all of the physical assessment and remediation intended by SFWMD has been completed on all of the Exclusion Area parcels and all of the technical documents relating to the cleanup have been reviewed and accepted by FDEP. A remaining outstanding activity is to record the appropriate deed restrictions on a few of the parcels. Once this activity is completed, it is expected that the FDEP will issue SRCO's on the remaining parcels and all of the parcels can be conveyed to SFWMD. No additional assessment, corrective actions, or closures are required on this property.

Cabassa Farm –tract #100-105

The Cabassa Farm property consists of approximately 9,700 acres and was historically used for the cultivation of sugarcane. Currently, the land is utilized for sugarcane cultivation with the far southeast portion used for rice cultivation.

A Phase I and Phase II ESA were conducted in February and March 1999, respectively. The Phase I and Phase II ESA identified four areas of concern that required additional assessment and/or corrective actions. A Contamination Ecological Risk Assessment and Corrective Action Plan were prepared in January 2002 for this property. Four hundred and fourteen tons of arsenic and copper impacted soil from the maintenance area and extensive soil sampling were conducted in the cultivated crop area using USFWS and SFWMD sampling protocol. Results of the updated ERA concluded that the residual concentrations of pesticides, copper, and zinc were not a threat to identified sensitive receptors. USFWS and FDEP concurred with SFWMD's recommendation for No further Action (NFA) for the equipment maintenance

area, cane loading / equipment staging area and the cultivated crop area. In 2003, assessments, corrective actions, and closure activities associated with the pump stations were conducted and received NFAs from FDEP for each of the pump stations. No additional assessment, corrective actions, or closures are required on this property.

3.2.10 Air Quality

USEPA and FDEP have established ambient air quality standards for the State of Florida regarding six pollutants: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), particulate matter 10 microns or less in diameter (PM_{10}), particulate matter 2.5 microns or less in diameter ($PM_{2.5}$), and sulfur dioxide (SO_2). These adopted standards are shown in Appendix C (Table C-1) of the Draft PIR/EIS.

According to the 2001 Air Monitor report prepared by FDEP, air quality parameters measured generally are all well within both National primary, secondary, and Florida Standards on average. Only the eight-hour ozone concentrations exceeded the Florida Standard, but met the National Standard.

3.2.10.1 Mercury

In 1989, the Florida Department of Health (FDOH) and the FWC found high levels of mercury in fish from the Everglades - especially in largemouth bass. Currently, approximately one million acres of the Everglades system contain fish with high mercury levels.

Data indicate that a significant portion of mercury deposition originates from sources located in south Florida. The mercury is emitted to the atmosphere and deposited into the Everglades by air currents or rain. The deposited mercury is converted into methyl mercury (MeHg), a highly toxic form of mercury that accumulates in the food chain. Of particular concern are levels of mercury in fish tissues that may be toxic to humans. According to the 2004 Everglades Consolidated Report, the mercury pollution in the air comes from mining and smelting of mineral ore, burning of fossil fuels, the use and disposal of mercury, and incineration of municipal or medical waste. Ninety-five percent to 98% of the total mercury in the EPA comes from atmospheric deposition. Local sources represent at least half of the total atmospheric mercury contribution to the Everglades (Atkeson, et. al., 2002).

Monitoring data of Everglades' fish and wading birds indicate that levels of mercury have declined since 1994 due to FDEP pollution prevention and emission control. The 1993 Florida Waste Management Act required the elimination of mercury from commercial products, prohibition of the

incineration of mercury, and promotion of recycling those products. Also, hazardous waste regulation required strict control of mercury-containing waste and its proper disposal. FDEP has adopted USEPA regulations for medical waste incinerators; therefore the industry has moved away from incineration.

3.2.11 Noise

Noise in the EAA is not considered a problem because of its rural nature and distances between noise-generating activities. Rural areas have noise levels between 34-55 decibels and may approach 70 decibels along roads and near some agricultural operations. Urban areas are generally about 60 decibels, but may reach 90 decibels or greater in high-activity areas.

3.2.12 Climate

The climate of the Everglades is characterized by two seasons: the dry and wet seasons. The dry season extends from November to April. The winter weather cold air fronts that often pass through the region weekly bring cool, but rarely freezing, temperatures. At this time of the year, there is low intensity, moderate rainfall with about 25% of the area's annual rainfall of 53 inches occurring during the dry season.

During the wet season, the region experiences daily thunderstorms, intense solar radiation, and high humidity. Seventy-five percent of the rain occurs in the wet season and can include a variable number of extreme rainfall conditions such as hurricanes and tropical storms. The wet season has a bimodal rainfall pattern with the first peak between May and June and the second peak between September and October. Every 10 years or so, the region alternates between flood and drought conditions. Annual rainfall, while averaging 53 inches, has ranged from a low of 36 inches to a high of 100 inches.

Mean annual temperature for the south Florida ecosystem ranges from 72°F (22°C) in the northern Everglades to 76°F (24°C) in the south (Thomas, 1974). Mean monthly temperatures range from a low of 63°F (17°C) in January to a high of 85°F (29°C) in August (Thomas, 1974). Infrequently, freezing temperatures and frost occur when arctic air masses follow winter cold fronts into the area.

3.2.12.1 Hurricanes

South Florida has been struck by more hurricanes and tropical storms than any other equal-sized area in the United States (Gentry, 1974). The EAA was affected by 138 tropical storms between the periods 1871-1981 (Duever,

et. al., 1994). Hurricanes strike most frequently during August, September, and October with a return frequency of approximately every three years (Gentry, 1974). Their primary effect in the EAA is rainfall (flooding), although there may be destruction from winds, storm surges, and tornadoes. The hurricanes of 1926, 1928, 1935, 1947, 1960, 1962, 1965, 1992, 1999, 2004 and 2005 caused loss of life and/or major damage to the region. The earlier storms were responsible in part for additional water management and drainage efforts in the Everglades.

3.2.12.2 Evapotranspiration

Evapotranspiration plays an important role in the climate of the South Florida ecosystem and removes between 70% and 90% of the rainfall in undisturbed South Florida wetlands (Duever, et. al., 1994). Evaporation, from open water surfaces, peaks annually in the late spring when temperatures and wind speeds are high and relative humidity is low. Evaporation is lowest during the winter when the temperatures and wind speeds are low (Duever, et. al., 1994).

3.3 BIOLOGICAL ENVIRONMENT

3.3.1 Aquatic

The aquatic habitat within the SFWMD's proposed EAA Reservoir A-1 is associated with agricultural canals and ditches as shown on Figure 11. Based on USACE and SFWMD estimates, the proposed reservoir site contains 163 acres of aquatic habitat. Aquatic resource function and value within these ditches and canals is low.

3.3.2 Wetlands

Wetlands occur where water covers the soil or is present at or near the soil surface for all or part of the year. They have characteristic conditions that help define their presence including wetland soils, evidence of water inundation or saturation, and presence of plants adapted to wet conditions. The SFWMD's proposed EAA Reservoir A-1 footprint consists of 16,253 acres of historic Everglades wetlands that have been disturbed through sugarcane production and 187.63 acres of remaining natural wetlands as shown in Figure 11. Wetland hydrology and hydric soils are persistent throughout the site although the natural wetland vegetation has been removed through farming operations. However, in accordance with the Corps 1987 Wetland Delineation Manual, the agricultural areas are considered atypical wetlands. The wetland habitat function and value for these atypical wetlands has been severely diminished due to vegetation removal and agricultural practices. The remaining natural wetlands are comprised of a mixture of native, exotic,

and nuisance plant species and have also been degraded to some degree due to the agricultural operations.

3.3.3 Uplands

Uplands within the EAA Reservoir A-1 footprint include 164.59 acres of roads and a former industrial site that was known as the Talisman Sugar Corporation's processing facility.

3.3.4 Federally Listed Threatened and Endangered Species.

Twelve federally listed threatened and/or endangered species are found within the SFWMD's proposed EAA Reservoir A-1 footprint and/or in natural areas expected to be affected by the project. The species include the endangered Florida panther [*Felix (=puma) concolor coryi*], endangered West Indian Manatee (*Trichechus manatus*), endangered snail kite (*Rostrhamus sociabilis plumbeus*), endangered wood stork (*Mycteria americana*), endangered leatherback sea turtle (*Dermochelys coriacea*), endangered hawksbill sea turtle (*Eretmochelys imbricata imbricata*), threatened bald eagle (Haliaeetus leucocephalus), threatened Audubon's crested caracara (*Polyborus plancus audubonii*), threatened eastern indigo snake (*Drymarchon corais couperi*), threatened green sea turtle (*Chelonia mydas*), and the threatened loggerhead sea turtle (*Caretta caretta*). The only listed plant species for the study area is the endangered Okeechobee gourd (*Curcuribita okeechobeensis*).

3.3.4.1 Species Descriptions

Florida Panther

The endangered Florida panther is one of the most endangered large mammals in the world, being the only extant breeding puma population east of the Mississippi River and presently only found in Florida. The panther prefers native upland forests to the wetlands and disturbed habitats types found in Compartment A (USFWS 1999). Although the core population is currently located southwest of the EAA project footprint, panthers range throughout central and southern Florida. Existing data was searched to document panther use of the habitat or movement through the region. The Florida panther was monitored from February 1981 to June 2001 using radio telemetry from aircraft by the FWC, ENP, and Big Cypress National Preserve. The data, maintained by the FWC, was searched and documented for panther occurrences within the EAA. In addition, panther road kill data was searched; however, no road kills occurred within the EAA, with the closest road kill located two miles west of the EAA boundary.

The EAA is included in the panther's range and three Florida panthers (numbers 26, 43 and 90) have been documented in the EAA, but no occurrences within the proposed EAA Reservoir A-1 footprint have been documented (Figure 12). Panther No. 26 was located in the southwestern portion of the EAA by two radio telemetry points in March and April of 1990. Both data points indicate the panther was in a swamp thicket and inactive. Panther No. 43 was documented along the Miami Canal between the EAA southern boundary to the Holey WMA between June and September 1991. This panther most frequently occurred in swamp thickets. Panther No. 90 occurred between March and April of 2001 and was documented from widely spaced locations, including the southeastern corner of the EAA, along the southern boundary, and next to the Miami Canal. This panther most frequently occurred in swamp thicket, but was documented in other wetlands and agricultural lands as well.

West Indian manatee

The endangered West Indian manatee is a large, aquatic mammal that migrates along the Florida coast through fresh, brackish, and marine waters, and exhibits a seasonal distribution based on water temperatures. Waters colder than 20 degrees Celsius increase the manatee's susceptibility to cold-stress and cold-induced mortality. Distribution is also controlled by aquatic vegetation availability, proximity to water channels of at least 2 meters in depth, and location of fresh water sources (USFWS, 1999). Manatees are currently able to access canals within the EAA including those associated with the Draft PIR/EIS Selected Plan and the three canals slated for expansion.

This slow-moving aquatic mammal is an opportunistic herbivore feeding on a variety of submergent, emergent, or floating aquatic vegetation including bank grasses and overhanging plants. A study is currently underway to document the use of canals by the manatee (Ferrell, D. [personal communication] USFWS, 2004). Watercraft collisions, water control structures, and navigational locks are principal hazards to manatees.

A survey of manatee accessibility performed by the CERP Interagency Manatee Task Force (Manatee Task Force), consisting of representatives from the USFWS, FWC, USACE, SFWMD, U.S. Geological Survey, National Park Service, and the Miami-Dade Department of Environmental Resources Management, shows that manatees access canals within the EAA basin by navigating from the Okeechobee Waterway through the gates at structures S-351, S-352, or S-354.

Wood Stork

The endangered wood stork typically forages in freshwater marshes, ponds, ditches, tidal creeks and pools, impoundments, pine/cypress depressions, and

swamp sloughs (USFWS, 1999). The wood stork has been documented in EAA wetlands, temporarily flooded fields, and in associated canals and ditches. In addition, wood stork nesting colonies are within foraging range of the project footprint and occur adjacent to Lake Okeechobee and downstream in the EPA.

Wood storks are large, long-legged wading birds. They have a heavy bill that is used to locate prey items, mostly fish and crustaceans, by touch in shallow water. Prey must be concentrated in high densities to forage effectively; therefore, wood storks frequent drying wetland pools. Nesting occurs in trees-typically cypress-and communal nest sites occur or have occurred in all South Florida counties.

Bald Eagle

Although the threatened bald eagle has been proposed for delisting under the ESA (64 FR 36453), it is still protected under the ESA, the Bald and Golden Eagle Protection Act (16 U.S.C. § 668 *et seq.*), and Migratory Bird Treaty Act (16 U.S.C. § 703 *et seq.*). The Bald eagle is the largest raptor in the eastern United States and is known to breed throughout Florida. Nest sites are usually located near large rivers, lakes, or estuaries where they feed primarily on fish and water-dependent birds. Bald eagle distribution is influenced by the availability of suitable nest and perch sites near large open water bodies, typically with high amounts of water-to-land edge (USFWS, 1999).

Bald eagle nests have been documented within the EAA basin; however no known active or inactive nest sites are located adjacent to the SFWMD's proposed EAA Reservoir A-1 project footprint. The FWC Bald Eagle Nest Locator Database was checked for the presence of eagle nests. This data uses annual aircraft surveys to develop their information. Five eagle nests are located in the Palm Beach County portion of the EAA and are shown in Figure 13. Two nests (PB001 and PB010) were reported as active in the most recent 2002 survey and have been active annually since 1998.

Audubon's Crested Caracara

The threatened Audubon's crested caracara is a large raptor that was once a common resident from northern Brevard County south to Hendry County, although sporadic sightings throughout peninsular Florida have occurred. The caracara is listed as threatened by the federal government and by the State of Florida. The greatest abundance of breeding and nesting activities is in a five county area north and west of Lake Okeechobee (Glades, Desoto, Highlands, Okeechobee and Osceola Counties). This species generally favors dry or wet prairies with scattered cabbage palms. The caracara also now uses improved or semi-improved pasture with seasonal wetlands as habitat.

They prefer to nest in cabbage palms surrounded by low ground cover. Caracaras are opportunistic feeders eating carrion or live prey. Prey items include small mammals (rabbits, opossums, rats, mice squirrels), frogs, lizards, fish, young birds, and insects (USFWS, 1999). Average home range is 1,552 HA, although juvenile caracaras are nomadic and numerous sightings occur outside the five-county core area.

Within the EAA basin, sparse sightings of the caracara are noted. One observation of a caracara was documented by the FNAI along L-3 in 1978. Another observation was made by the USFWS. However, the location within the EAA was noted only as a roadside survey. There are no known nest sites located on or in close proximity to the SFWMD's proposed EAA Reservoir A-1 project footprint, and are not expected once construction is complete (USFWS, 2005).

Everglade Snail Kite

The endangered Everglade snail kite is a medium sized raptor and food specialist that feeds almost entirely on apple snails (*Pomacea paludosa*) which are found in palustrine emergent, long hydroperiod wetlands (USFWS, 1999). It is restricted to clear, calm waters of freshwater marshes and edges of lakes in South and Central Florida including Palm Beach and Hendry Counties. Nearly continuous flooding is required to sustain apple snail populations. Snail kites require small trees or shrubs near foraging areas as nest sites. The existing wetlands and canals within the proposed project footprint do not provide suitable habitat for apple snails and snail kites and suitable habitat is not expected within the project reservoir footprint if constructed. The project footprint is not within a designated critical habitat for the snail kite.

Eastern Indigo Snake

The historical range of the threatened eastern indigo snake was throughout Florida, and the coastal plain of Georgia, Alabama, and Mississippi. Today, it is present only in Georgia and throughout Florida, but its abundance is reduced to a point where it is uncommon. Habitat for the indigo snake includes pine flatwoods, scrubby flatwoods, high pine, dry prairie, tropical hardwood hammock, edges of freshwater marshes, agricultural fields, coastal dunes, and human-altered habitats (USFWS, 1999). The snake inhabits primarily drier areas including agricultural fields and the margins of freshwater marshes, and may be present within the SFWMD's proposed EAA Reservoir A-1 footprint and along the canals and ditches slated for expansion.

The milder climate of Central and South Florida may not require indigo snakes to have underground thermal refugia as they do farther north; yet they frequently use natural holes, gopher tortoise burrows, trash piles and

the like even in warmer South Florida. They use a variety of food sources including fish, frogs, toads, lizards, turtles and their eggs, small alligators, birds and small mammals (USFWS, 1999).

Sea Turtles

The discussion below, for the sea turtles initially identified for this project, indicates that the SFWMD's proposed EAA Reservoir A-1 foot print does not provide habitat for these species.

The endangered leatherback sea turtle is the largest of the sea turtles. The leatherback turtle regularly nests on the east coast of Florida, with the nesting and hatching season lasting from mid-February to mid-November. The adults are highly migratory and spend the most time in the pelagic zone compared to the other sea turtles. They have been found to exhibit broad thermal tolerances (NOAA Fisheries & USFWS, 1995). Nesting females prefer high-energy beaches with deep, unobstructed access. Based on surveys of nests in South Florida, they nest mainly in Palm Beach County, and secondly Martin County. Leatherback turtles appear to feed primarily on jellyfish. The status of leatherback populations in the U.S. is not known; intensive studies of nesting leatherback turtles have occurred at Sandy Point National Wildlife Refuge in U.S. Virgin Islands (USFWS, 1999).

The endangered hawksbill sea turtle is commonly found in the Caribbean Sea and waters on either side of Florida. In particular, they are regularly seen in the waters of the Florida Keys and reefs off Palm Beach County. In contrast to the green and loggerhead sea turtles, the hawksbill sea turtle nests in low densities on South Florida beaches, with aggregations typically in the range of a few dozen individuals. Hawksbill turtles inhabit the pelagic zone in their early years, then come closer to shore near coral reefs, but may also inhabit mangrove-fringed bays and estuaries. In the near-shore habitat, they primarily feed on sponges (USFWS, 1999).

The endangered Kemp's ridley sea turtle is the smallest and most endangered (in the western hemisphere) of the sea turtles, and is extremely rare in Florida. Juvenile turtles may be found along the eastern seaboard and in the Gulf of Mexico. Nesting in Florida is very rare, with only five reported occurrences. Kemp's ridley turtles are mostly carnivorous, eating mainly crabs and other shallow, benthic organisms. The current estimate of nesting females, based on nest surveys and various factors for clutch size and average number of nests, ranges between 509-740 females (NOAA Fisheries & USFWS, 1995; USFWS, 1999).

The threatened green sea turtle nests regularly in South Florida where the nesting and hatching season lasts from May to November. Important feeding

areas for the green sea turtle include Indian River Lagoon, Florida Keys, Florida Bay, Homosassa River, Crystal River, and Cedar Key. Green sea turtles occupy three habitat types: high-energy oceanic beaches, convergence zones in the open ocean, and benthic feeding grounds in shallow, protected waters. A survey of green sea turtle nests conducted from 1985 to 1995 showed that Palm Beach County has the second highest percentage of green sea turtle nests in Florida (USFWS, 1999). Green sea turtles are primarily herbivorous, eating seagrasses and algae in the benthic feeding grounds. While in the pelagic zone, they may also eat shellfish, jellyfish, and other organisms (NOAA Fisheries & USFWS, 1995).

The threatened loggerhead sea turtle is the most common sea turtle in South Florida. The geographic range of its habitat is temperate and tropical waters worldwide. Within Florida, 80% of the nesting occurs on the east coast of Florida, especially from Brevard through Broward Counties. The nesting and hatching season occurs from mid-March to November. Nesting females prefer moderate to high-energy beaches with steep slopes. Loggerhead turtles inhabit a variety of habitats, from turbid, muddy-bottom bays along the northern Gulf of Mexico coast, to clear, sandy-bottom reefs and shoals of the Caribbean. Upon hatching, juveniles swim out to Sargassum areas in the pelagic zone, and stay there until they reach sub-adulthood. At that point, they migrate to nearshore and estuarine waters. Loggerhead turtles primarily eat benthic invertebrates, such as snails, bivalve mollusks (e.g., clams), and crabs (USFWS, 1999). Loggerhead monitoring suggests that population levels in Florida have remained stable (NOAA Fisheries & USFWS, 1995).

Environmental threats to sea turtles in the marine environment include: gas and oil drilling; loss of seagrass habitat; development; pollution; fishing-related activities; underwater explosions; dredging; boat collisions; entanglement; ingestion of debris; and poaching. Nesting-related threats include: artificial lights; beach nourishment activities; human presence; poaching; recreational equipment; and habitat loss (USFWS, 1999).

Okeechobee Gourd

The Okeechobee gourd is the only federally-listed plant species occurring in the vicinity of the EAA. This endangered plant once grew extensively in the pond apple swamps south of Lake Okeechobee; however, conversion of these habitats for agriculture has eliminated most (95%) of the natural habitat. The vine is restricted to eleven sites along the southern shore of Lake Okeechobee in Palm Beach County and nine sites in Volusia County. Lake level fluctuations seem to be required to facilitate dispersal and destroy competition from weed species. The Okeechobee gourd requires trees or shrubs (typically pond apple, but also willow or cypress) to support vines

above rising water levels during the wet season. The gourd also occurs on elevated, sunny alligator nests along Lake Okeechobee. The occurrence of gourds is temporary; therefore, they may disappear from a known location and reoccur when suitable conditions occur.

3.3.5 State-Listed Species

Many wading birds that utilize the marsh zone and adjacent wetlands are listed by the State of Florida as threatened species (e.g. Florida sandhill crane (*Grus canadensis pratensis*) or species of special concern (snowy egret (*Egretta thula*), little blue heron (*Egretta caerulea*), limpkin (*Aramus guarauna*), tricolored heron (*Egretta tricolor*), white ibis (*Eudocimus albus*)). These species frequently forage along the lake margins or canals.

The FWC compiles wading bird rookery data within the State of Florida. Three wading bird rookeries were identified within the EAA basin, but no rookeries were identified within the SFWMD's proposed EAA Reservoir A-1 footprint (Figure 13).

3.3.6 Fish and Wildlife Resources

Altered native habitats dominate the proposed EAA A-1 project study area; however, remaining wetlands offer some native habitat for fish and wildlife species. Although there are few published fish and wildlife studies available for the area, lists of potentially occurring and confirmed species have been compiled from a variety of sources including: the FWC 1987-1993 Wildlife Observation Database, the FNAI Element Occurrence Database (through 2002), the FWC Breeding Bird Atlas, and the FWC Wading Bird Rookery data. Wildlife observations were documented for the study area as part of field surveys of wetlands and are discussed in Appendix C of the Draft PID/EIS EAA Storage Reservoirs document. The following sub-sections briefly discuss typical wildlife use based on FWC land cover data of habitat types.

3.3.6.1 Aquatic

The distinction between wetland and aquatic habitat is sometimes not apparent; however, aquatic habitat typically represents deeper, permanent water bodies with little or no emergent vegetation. Similarly, aquatic fauna often move between deeper water areas and wetlands depending upon habitat requirements. Fish are the most common vertebrate found in aquatic habitats. Typical species include largemouth bass, bowfin, Florida gar, and sunfish. Mammals that are typically in aquatic habitat include the West Indian manatee and river otter. Manatees are found in canals that interconnect with coastal water bodies, whereas river otter may be found in

all aquatic habitats as they are capable of traversing some distance over land to reach water bodies where they feed. Birds using aquatic habitats include ducks, wading birds (great blue heron, great egret), aquatic birds (terns, cormorant, anhinga), and osprey. The most conspicuous reptile observed in open water areas is the American alligator.

3.3.6.2 Wetlands

Herbaceous wetlands (sawgrass marsh, freshwater marsh, wet prairie) provide habitat for a variety of birds due to the diversity of vegetation in adjacent habitats. Examples of some of the many types of birds include: songbirds (common yellowthroat, red-winged blackbird, boat-tailed grackle); marsh and wading birds (least bittern, king rail, sora, green-backed heron, great blue heron, great egret, limpkin); ducks and aquatic birds (American coot, common moorhen, anhinga); and, birds of prey (osprey, red-shouldered hawk, Everglades kite). Mammals that utilize these habitats include river otter, marsh rabbit, and raccoon. Fish typical of these areas include mosquitofish, Florida gar, and bluefin killifish. Reptiles and amphibians common to herbaceous wetlands include: American alligator, water moccasin, water snake, Florida cooter, southern leopard frog, and green treefrog.

Forested and shrub swamp fauna are home to a variety of mammals such as white-tailed deer, marsh rabbit, Florida panther, cotton mouse, raccoon, fox squirrel, and Florida black bear. These woody swamps are habitat for birds such as barred owl, pileated woodpecker, red-bellied woodpecker, white-eyed vireo, yellow-rumped warbler, and red-shouldered hawk. Reptiles and amphibians such as the rough green snake, eastern indigo, water moccasin, and southern toad are often found in these areas.

3.3.6.3 Uplands

Upland communities consist of relatively open, herbaceous habitat such as dry prairie to forested communities of varying vegetation composition such as hardwood hammocks, pinelands, and a mixture of hardwoods and pine. Dry prairies provide habitat for raccoon as well as the wide-ranging Florida panther. Birds typical of this open habitat include common ground dove, eastern meadowlark, and crested caracara.

3.3.6.4 Disturbed and Urban/Extractive Communities

Wildlife species that may be found in agricultural, urban or mining lands are typically tolerant of open conditions, a certain amount of human activity, and are not restricted to specialized habitats. Species found in these habitats include: raccoon, boat-tailed grackle, bobwhite, cattle egret, black vulture,

turkey vulture, crested caracara, eastern meadowlark, northern mockingbird, red-winged blackbird, white ibis, box turtle, and green anole. Some species that require open habitat, such as burrowing owls, may make use of this habitat in addition to dry prairie.

3.4 CULTURAL, HISTORIC AND ARCHAEOLOGICAL RESOURCES

The SFWMD's proposed EAA Reservoir A-1 footprint contained no areas of high probability for any archaeological sites and historical resources. It was determined that a Cultural Resources Management (CRM) survey was not necessary. Continuous agriculture combined with road and canal construction has heavily disturbed the area. A review of the Florida Master Site Files, a site visit, and consultation with the State Historic Preservation Officer (SHPO) determined that EAA Reservoir A-1 contains no archaeological sites and historical resources considered eligible for listing in the National Register for Historic Places (NRHP).

3.5 SOCIO-ECONOMIC ENVIRONMENT

3.5.1 EAA Socioeconomic Characteristics

The proposed storage reservoir is located in the southern portion of the EAA. Eleven census tracts are partially located within the EAA; Tracts 7903 in Palm Beach County and 0200 in Hendry County are only partially within the EAA Reservoir A-1 target area (Figure 14). Three incorporated population centers are within the EAA: the Cities of Pahokee, Belle Glade, and South Bay. These centers have a significant impact on the demographics of certain tracts and the EAA as a whole. The total estimated population in the EAA in 2000 was 42,265 persons.

From a socioeconomic perspective this area is generally "very depressed," but has significant community cohesion. It is an aging area that is likely to continue to see a loss of working age, educated population - typical of patterns seen in many rural areas throughout the United States. There is a high concentration of minority individuals, both African-Americans and Hispanics, with their numbers far exceeding non-minorities. Income levels are well below state averages with one-third to one-half of the families living in poverty.

Educational achievement in the EAA is low compared to Florida averages, with less than 10% of the area's adults having any formal education beyond high school and only about one-half having graduated from high school. About one-fourth of the adults did not complete ninth grade.

While Florida has experienced a population increase of almost 25% in the ten years between the 1990 and 2000 censuses, the EAA population decreased 5% from 44,700 to 42,265 persons. The population decline most likely reflects the mechanization of agricultural processes and out-migration of youth (USACE and SFWMD, 2003). Reflective of the population decline (that the EAA experienced between 1990 and 2000) the area has seen a decrease in families. Nine of the eleven census tracts saw a decrease of 10% to 20% in the number of families. The number of families in the three municipalities also declined.

The southern and central sections of the EAA have a very low population. Table 3-1 provides an overview of the socioeconomic characteristics within each of the census tracts in the EAA.

A high percentage of the population within the EAA is clustered near Lake Okeechobee, within and adjacent to the incorporated areas. Census tracts comprising over 80% of the surface area in the EAA contain just over 4% of the total population.

When viewing the 2000 income data for the EAA as a percentage of Florida incomes, the relative poverty of the EAA population is very visible. Median income levels of eight of the eleven tracts are less than three-quarters of Florida's median household and family income. Per capita income differences are more severe, with six of the tracts having less than one-half of the statewide average per capita income. Additionally, the per capita income of Florida is higher than that of all tracts in the EAA. The disparity between the Florida values and the individual tract values is much greater than in 1990.

Service-oriented occupations comprise the majority of employment in the EAA. Farming occupations represent a small percent of the workforce, reflective of the modernization of farming operations, while production, mostly related to agriculture, continues to be a major occupation in the EAA.

Analysis of 2000 block level census data reveals a total of 20 persons within the footprint of the Draft PIR/EIS Selected Plan. While the land area of the Draft PIR/EIS Selected Plan totals 35,526 acres or 5.7% of the EAA, population residing within the storage reservoir area represents 0.05% of the EAA total population. The purchase agreement between the Department of Interior (DOI), SFWMD, and the landowners allowed farming to continue on most of the land until March 31, 2005. After March 2005, land may be leased for agricultural purposes until needed by USACE for restoration purposes.

The EAA began agricultural production in the early 20th century. However, it was not until the first dredging of Lake Okeechobee in 1919, the opening of

the Palm Beach Canal, and the freeze of February 3, 1917, that farming emerged as an important economic activity in the area. The initial draining of the rich "muck" soils created opportunities for vegetable production.

Table 3-1: EAA Socioeconomic Characteristics.

Area	Population 1990	Population 2000	Percent Change (1990 - 2000)	Persons per Square Mile 2000	Median Household Income 2000	Per Capita Income 2000
Florida	12,937,926	15,982,378	23.5%	296	$ 38,819	$ 21,557
EAA	44,700	42,265	-5.4%	44		
Hendry County Tract 200	8,535	7,506	-12.1%	102	$ 31,760	$ 13,047
Palm Beach Co. Tracts						
7903	675	5,729	748.7%	5	$ 58,770	$ 21,177
8001	3,459	3,727	7.7%	104	$ 23,081	$ 9,303
8002	6,377	5,360	-15.9%	836	$ 23,625	$ 10,301
8101	5,554	6,229	12.2%	141	$ 33,906	$ 12,756
8102	1,137	1,091	-4.0%	1254	$ -	$ 8,022
8201	5,433	4,355	-19.8%	9467	$ 17,004	$ 8,776
8202	3,295	2,976	-9.7%	8043	$ 15,000	$ 8,056
8203	4,626	4,763	3.0%	258	$ 28,409	$ 12,592
8301	2,154	1,737	-19.4%	22	$ 24,125	$ 7,676
8302	4,130	4,521	9.5%	419	$ 25,227	$ 9,239
Cities						
Belle Glade	16,177	14,999	-7.3%	3226	$ 22,715	$ 11,159
Pahokee	6,822	5,822	-14.7%	1080	$ 26,731	$ 10,346
South Bay	3,358	3,895	16.0%	1437	$ 23,558	$ 9,126

* Derived from the U.S. Census 1990 and 2000. Data for census tracts 0200 and 7903 is not representative of the EAA area because large portions of these tracts lie outside the target area. Tract 8102 has no households or families.
Sources: US Census 1990; US Census 2000; USACE, SFWMD, 2003

Most of the land was owned by either the State of Florida or the Southern Land and Timber Company. Initially, farmers were allowed to farm the land without purchasing the property or paying rent. This resulted in the

development of agricultural settlements along the southern shore of Lake Okeechobee. These settlements evolved into the three municipalities of Pahokee, Belle Glade, and South Bay, with incorporations beginning as early as 1922.

A hurricane that battered the area in September 1928 had far-reaching impacts on the area's land use. The hurricane's death toll of over 1,800 persons and extensive physical damage, caused by wind-driven waters of Lake Okeechobee overflowing into populated areas, led to the construction of the Herbert Hoover Dike around Lake Okeechobee to control future flooding.

After construction of the Herbert Hoover Dike, farming activities significantly increased. The EAA was formally created in the 1940s when one-half of the Everglades Economic Region, consisting of 1.6 million acres, was drained for agriculture and urban development.

Sugarcane production began with the construction of the Clewiston Sugar Mill in 1929. Prior to the Cuban revolution of 1959, 50,000 acres of the EAA were devoted to sugar cultivation. Imposition of the Cuban Embargo in the early 1960s, the arrival of Cuban refugees skilled in sugar production, and abolishment of the production limitation imposed by the "Sugar Act" in 1974, enabled the EAA to become the leading cane sugar production area in the United States. In 1995, over 500,000 acres were devoted to sugarcane production.

In 2002, the study area contained about 505,000 acres in agricultural products cultivation, about 90% of which is in Palm Beach County and 10% in Hendry County. In the 2000-2001 fiscal year, approximately $1.2 billion in agricultural sales were produced in the EAA, representing about one-seventh of Florida's total agricultural sales. The estimated $1.2 billion in sales is believed to result in a total of $2.8 billion in the two counties' economies, based on applied multipliers.

About nine out of every ten (86.8%) crop yielding acres in the EAA are associated with sugarcane. The remaining acreage is split between rice, sod, row crops, and other agricultural uses. Table 3-2 shows acreage of agricultural uses in the EAA.

There are six sugar mills and one refinery (South Bay) currently operating in the EAA, with an additional mill and refinery in Clewiston also serving the area. The combined capacity of these mills is over 17 million tons. Three major entities, U.S. Sugar Corporation, Florida Crystals Corporation, and

Sugarcane Growers Cooperative (SCGC) provide the majority of the sugarcane production in the EAA.

Table 3-2: Acreage by Crop in the EAA

Crop	Palm Beach County Acreage	Hendry County Acreage	Total Acreage	Percent of Total Acreage
Sugarcane*	423,358	45,442	468,800	92.7%
Row**	16,347	—	16,347	3.2%
Sod	9,846	—	9,846	1.9%
Nursery	618	—	618	0.1%
Pastures	1,075	1,884	2,959	0.6%
Miscellaneous	4,031	2,939	6,970	1.4%
Total	455,275	50,265	505,540	100.0%

* Includes rice and corn grown as rotation crops.
** Includes 1,814 non-productive acres associated with service area for row crops.
Source: USACE and SFWMD, 2003.

3.5.2 Recreational Resources

Several recreational opportunities exist on public lands within the EAA, such as the Holey Land WMA, Rotenberger WMA, Everglade Construction Project STAs and Lake Harbor Public Small Game Hunting Area. These lands offer significant recreational opportunities for visitors and tourists to the area. Each recreational area is different, but likely shares a patron base interested in sports recreation and outdoor activities. Many of the areas are adjacent to the proposed storage reservoir and are described in the Draft PIR/EIS for the EAA Storage Reservoir.

3.5.3 Aesthetics

The visual characteristics of the EAA can simply be described as agricultural lands. The land is quite flat with few natural topographic features. Much of the visible topographic features are associated with canals, levees, and agricultural fields. Agriculture is dominated by sugarcane production, with lesser amounts of sod, vegetables, and rice production. The area is open with

a low population density and few buildings or other structures. This use produces a uniform and organized appearance to the landscape. There are few trees or other non-agricultural vegetation. The visual aesthetics are rather monotonous and of marginal value.

CHAPTER 4
ENVIRONMENTAL EFFECTS

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4.0 ENVIRONMENTAL EFFECTS

This section provides a discussion of the environmental effects of the No Action and the Build Alternatives. It presents detailed analysis on the environmental effects including unavoidable adverse effects, irreversible and irretrievable resources, cumulative effects, and environmental commitments. Documentation also is provided for a comprehensive review of environmental issues such as water supply, flood protection, threatened and endangered species, and other natural system and habitat needs. In addition, this section provides recommendations to minimize the potential environmental impacts.

The location of the reservoir on former agricultural land will have an impact upon that land as well as local ground and surface water resources. In addition, there will be increased noise and dust from the construction activities. These impacts will be temporary in nature.

Operation of the reservoir is expected to have positive benefits for the EAA, Lake Okeechobee littoral areas, the St. Lucie and Caloosahatchee Estuaries, and the quality and quantity of water released to the EPA from the EAA.

4.1 PHYSICAL ENVIRONMENT

Potential impacts to the physical environment as a result of implementation of the Build Alternatives, i.e. EAA Reservoir A-1, EAA Reservoir A-2, and reservoir construction within Compartment B and C would essentially be equivalent. The impacts are discussed below for the No Action alternative versus the Build Alternatives.

4.1.1 Existing Land Use

4.1.1.1 No Action

Palm Beach County's Managed Growth Tier System (MGTS), adopted in 1999, designates all land in the EAA as Glades Rural Tier, Urban Glades Tier, or Conservation. Glades Rural Tier was established to protect valuable agriculture areas and has only limited residential development potential. New growth in the EAA, which significantly contains Palm Beach County's remaining undeveloped land with urban residential development potential will be channeled to the Urban Glades Tier.

Land use changes should influence future water quality conditions. It has been estimated that due to oxidation and subsidence of organic soils (Histosols) and based on standard farming practices, about 62,000 acres of the 570,000 acres of arable land would be unusable for any current agricultural use by 2050 (Snyder, 2004). An additional 241,000 acres would

only be useable for highly water tolerant crops within that same period. Smaller acreages could be lost to farming if soils conserving farming practices are implemented in the near future. For the purposes of this forecast, it is assumed that areas of the EAA lost to farming would be converted to relatively natural wetland areas. Other land use changes should be relatively minor in the EAA.

Under the No Action Alternative, land use within the Acceler8 Storage Reservoir footprint would be either open space or agriculture and there would be no significant direct effects on land use.

4.1.1.2 Build Alternatives

The build alternatives were analyzed for potential land use effects relative to:

a. Development trends;

b. Consistency with existing plans and policies; and,

c. Compatibility with surrounding land use.

Construction and operation of an above ground reservoir will not have significant direct or indirect effects on development trends in the EAA. Conversion of the Build Alternatives land area to reservoir storage will have minimal effects on growth trends since the development potential of the property is already extremely limited and the net change in employment will be small relative to EAA employment.

The Build Alternatives will be consistent with land use plans and policies in the Palm Beach County Comprehensive Plan. The alternatives are in the Glades Tier which has an Agricultural Production land use designation. Implicit in the land purchased by the Department of Interior (DOI) and SFWMD is that acquired agricultural land use will be used for Everglades ecosystem restoration purposes. Conversion to either of these uses is consistent with the Future Land Use Plan for Palm Beach County and will not significantly affect surrounding land uses. A storage reservoir, construction of STAs, and natural areas on or within the project footprint would be compatible with surrounding land uses, and land uses in the area generally, which are almost exclusively in agricultural or conservation uses.

4.1.2 Soils and Geology

4.1.2.1 No Action

Future soil conditions and geology are not expected to change from existing conditions other than soil subsidence discussed in section 4.1.1.1 of this document.

4.1.2.2 Build Alternatives

The geology will not be significantly impacted by the proposed action. The extent of the impact to the geology will be limited to breaking an area of caprock, the limestone layer located between 3 to 5 feet below the highly organic surface soil, to obtain material for construction of the levees, construction of cutoff walls, and seepage canals.

The caprock and deeper sandy materials will provide the raw materials for construction of the reservoir embankment (or levee). Thus, much of the site's soils will be disturbed or covered by this levee or other structures. During operation of the reservoir, a layer of fine sediments containing a high level of organic debris and nutrients will settle from the overlying water to coat remaining soils. The low oxygen environment that is expected at the bottom of the reservoir will act to preserve organic material in the remaining soils and in the sediment.

4.1.3 Groundwater Hydrology

4.1.3.1 No Action

The No Action Alternative is anticipated to have no impact on groundwater hydrology.

4.1.3.2 Build Alternatives

The groundwater will be impacted by the proposed action. The reservoir will act to recharge the surficial aquifer. The reservoir water will be in direct contact with the surficial aquifer through the surface soils. The recharge represents a loss of 175,000 acre-feet/year of water to the reservoir. However, the impact of this loss is expected to be offset through recharging of the aquifer. Specifically, the surficial aquifer will benefit by an additional source of recharge to help maintain it over portions of the EAA.

4.1.4 Mineral Resources

4.1.4.1 No Action

The No Action Alternative is anticipated to have no impacts to mineral resources.

4.1.4.2 Build Alternatives

There are limestone resources that will be unavailable for exploitation as a result of placement of the reservoir. Limestone is a commonly available mineral in the region. The impact of the proposed action upon limestone resources is very minor. No other significant mineral resource is known to exist.

4.1.5 Unique Land Forms

4.1.5.1 No Action

The No Action Alternative is anticipated to have no impacts to unique land forms within the EAA.

4.1.5.2 Build Alternatives

The Everglades is a unique landform. It is expected to benefit from the proposed action. The benefit is in the form of contributing to a more natural hydropattern and improved water quality.

4.1.6 Climate

4.1.6.1 No Action

The No Action Alternative is anticipated to have no impacts to climate within the EAA.

4.1.6.2 Build Alternatives

The proposed action is not expected to significantly impact the general climate of the EAA. There may be some minor impacts to microclimates as a result of the presence of a large body of water or the levees containing the reservoir. This will take the form of altered wind directions, slightly moderated temperatures, and an increased likelihood of fog formation.

The proposed action may significantly lessen the impact of stormwater from hurricanes and other storms. The reservoir may be used to help control floodwaters and related environmental damage.

Replacement of crops with open water will act to increase evapotranspiration, which may have a minor, very local effect.

4.1.7 Air Quality

4.1.7.1 No Action

The No Action Alternative is anticipated to have no impacts to air quality

4.1.7.2 Build Alternatives

The operation of heavy equipment used for construction of the reservoir and supporting facilities will have some impact upon the local air quality, primarily in the form of elevated particulates, nitrogen oxides, and volatile organic compounds.

Operation of pumps and other equipment associated with the proposed action will be powered by diesel engines or additional electrical power with appropriate backup generators. The use of electrical power to operate pumps and equipment will cause a secondary impact from emissions at nearby power plants. This will increase nitrogen oxides, sulfur oxides, and particulate levels in the region.

Routine and emergency operation of emergency generators and the storage of diesel fuel will add to local levels of nitrogen oxides, particulates, and volatile organic compounds.

4.1.8 Noise

4.1.8.1 No Action

The No Action Alternative is anticipated to have no impacts to sound levels within the EAA.

4.1.8.2 Build Alternatives

The construction of the proposed action will result in a temporary increase in sound levels in the vicinity of active construction. The operation of the pumps associated with the storage reservoir will increase sound levels in their vicinity. Use of emergency generators will further elevate the sound levels. The absence of a significant population minimizes the impacts of

these increases in sound levels. No significant impacts to wildlife have been observed in the vicinity of other similar pump stations in the general area.

4.2 BIOLOGICAL ENVIRONMENT

Potential impacts to the biological environment as a result of implementation of the Build Alternatives, i.e. EAA Reservoir A-1, EAA Reservoir A-2, and reservoir construction within Compartment B and C would be similar. Environmental impacts are discussed below for the No Action alternative versus the Build Alternatives or for specific alternatives where the biological environment varies among alternatives.

4.2.1 Plant Communities

4.2.1.1 No Action

Without the EAA Storage Reservoirs project, vegetation communities similar to those described in the Existing Conditions section would continue to exist within the Build Alternative footprints and the entire EAA. Future environmental conditions in the EAA without the project should be influenced by regional trends of soil subsidence and improving surface water quality. Of the two trends, soil subsidence should have a greater effect on the plant communities of the region. Continued long-term physical changes in the soil of the region would result in some shifts in land use and vegetation cover, primarily in the most abundant land cover category- disturbed agricultural lands. It would also affect remnant upland and wetland communities within the region. Changes expected within the EAA include continued loss of topsoil over time with current soil loss estimated at 0.6 inches per year (Snyder, 2004). This rate of soil loss should continue, although some evidence suggests that as soils become more mineralized, oxidation of the soil and consequently, subsidence, will decrease. Regardless, changes in land cover should occur as a result of soil subsidence within the project area. In general, agriculture soils in the EAA evolve through a progression of agricultural uses depending upon amount of topsoil available. It should be noted that this discussion is related to generalized trends on how subsidence affects land cover, without consideration of the important forces of politics and economics on agriculture.

Historically, vegetables were the primary crop in the upper Everglades from the 1930s through the 1940s which required deeper soils and good water control. As soil subsidence continued, sugarcane emerged as the primary crop due to its ability to tolerate wetter, shallower soils. Wetter soils result from the reduced ability to effectively drain shallow soils and the lowered land surface elevation due to subsidence. As the soil layer diminishes over the bedrock, agricultural products tolerant of wetter conditions such as rice

or some pasture grasses are favored and replace sugarcane. However, continued changes in agricultural practices and/or cultivars may extend the time period for practical use of some crops, so the ability to predict the land use and cover in the EAA over the next 50 to 60 years is imprecise.

Geographic differences exist in the depth of soils within the EAA. Thicker soils are more prevalent in the north near Lake Okeechobee and thinner soils more common to the south. This suggests that changes within the EAA over the next 60 years would occur in the southern portions of the EAA and move northward.

Changes to the remnant "natural" communities on lands within the EAA are dependent upon the overall agricultural use of the region and resultant water management. Water management of the STAs and WMAs would continue with little changes in vegetation cover anticipated in these areas. With continued use of the EAA region for agriculture, no significant net increase or decrease in aquatic areas within the EAA should occur without the Project. For remnant wetlands, continued subsidence of lands surrounding existing, small, isolated wetlands could slightly increase the extent of wetlands into formerly cultivated lands. Larger scale changes in wetland cover could occur in some areas if agriculture is abandoned in some portions of the EAA. Cessation of active drainage of the agricultural fields by pumping would likely cause the fallow lands to revert to wetlands. Similarly, upland community margins could change to transitional wetlands, if the surrounding landscape becomes wetter, slightly, but not significantly reducing upland communities.

Predictions for disturbed land covers (which include all agricultural lands) through the year 2050 are that no net increase or decrease in disturbed area would occur, but shifts between specific agricultural cover types could occur. About half the EAA could remain suitable for present day crops and the remainder could shift to more water tolerant crops (Snyder, 2004).

For urban and extractive cover types, there should be an increase in the urban area around the existing population centers of Pahokee, Belle Glade, and South Bay. No changes in extractive land cover are anticipated in the project area.

Without development of a water storage reservoir, the project footprints of the Build Alternatives would remain as disturbed land (agricultural), although some crop changes could result over time as soil thickness decreases. These changes would likely result in a conversion of vegetable crops to sugarcane, and some conversion of wetter sugarcane land to other wet tolerant crops such as rice or wetter pasture grasses. Therefore, existing

vegetation communities generally represent future conditions within Compartment A with some shift to crops tolerant of wetter conditions and minor shifts in remnant natural communities to those tolerant of increased water inundation. All or part of Compartments B and C are proposed to be converted to STAs pending a Department of the Army permit. If authorized, this would result in a conversion of plant communities from that which currently exists to submergent and emergent vegetation.

4.2.1.2 Build Alternatives

Existing vegetation communities within the footprint of the proposed action would be destroyed by construction. In general, construction will largely displace existing vegetation communities replacing them with aquatic habitat (water-covered reservoir areas) or disturbed uplands (embankments, roads, berms). The majority of the land will be water-covered to a depth up to 12 feet. The reservoirs for the Build Alternatives will most closely resemble an open-water lake community with significant differences and will lack much of a highly productive littoral zone because of the necessity to construct relatively steep sides to maximize water storage capacity. Side slopes of the earthen embankments are planned at a 3 to 1 ratio with riprap along in the inside slopes.

4.2.2 Land Cover

4.2.2.1 No Action

The No Action Alternative is anticipated to have no impacts to existing land cover within the EAA as it is anticipated land cover would remain in agricultural production.

4.2.2.2 Build Alternatives

The Build Alternative footprints are dominated by the disturbed (agricultural) land cover classes. The footprints of Cell A-1 and Cell A-2 contain 24,589 acres of disturbed habitat (sugarcane, row crop and other agricultural uses) with sugarcane cover the predominant land cover class and 6,641 acres of Urban and Extractive habitat with bare soil/clear cut being the predominant land cover class. Natural land cover i.e., wetland habitats, within Cell A-1 and Cell A-2 are approximately 187.63 acres and 18.37 acres, respectively. Compartment B and Compartment C contain 7,485 and 6,240 acres of agricultural lands. Compartment C has been out of production since the spring of 2005, and all of Compartment B is out of production except for the northern portion which supports an active turf farm operation. There are no natural lands remaining within Compartment B and approximately 288.35 acres of wetlands within Compartment C.

4.2.3 Aquatic Habitats

Aquatic habitats identified for the no action and the build alternatives include agricultural ditches and canals.

4.2.3.1 No Action Alternative

There will be no impacts to existing aquatic habitats of aquatic habitat associated with the agricultural canals and ditches with the "No Action" alternative.

4.2.3.2 Build Alternatives

Agricultural ditches and canals are present throughout the EAA. The acreage of ditches and canals is related to size of the parcel with equal percentage of land cover for all of the Build Alternatives. Other aquatic habitats are present in Compartments B, which includes a 9.51 acre borrow pit.

4.2.4 Wetlands

4.2.4.1 No Action Alternative

The majority of the EAA is considered atypical jurisdictional wetlands (historic Everglades wetlands disturbed through farming operations). Remnant wetlands are present and indicative of areas that were too wet to support agricultural operations. The No Action alternative would result in no direct impacts to the atypical or natural wetland areas. However, natural wetlands would continue to degrade due to soil subsidence and encroachment and disturbance from ongoing agricultural operations.

4.2.4.2 Build Alternatives

The vast majority of the build alternative footprints are also considered to be atypical jurisdictional wetlands with scattered remnant wetlands throughout. The verification of wetland extent and dominant cover was conducted for Compartments A, B, and C. Six categories of wetlands were developed and used in conjunction with the Wetland Rapid Assessment Procedure (WRAP) to evaluate the natural wetlands. WRAP scores for wetlands within Compartments A, B, and C ranged from 0.31 to 0.50 indicative of reduced function and value with no difference in quality and scores between compartments. Wetlands throughout the compartments are dominated by exotic and nuisance plant species. Cell A-1 of Compartment A contains 187.63 acres of wetlands, Cell A-2 of Compartment A contains 18.37 acres,

and Compartment C contains 288.35 acres of wetlands. There are no natural wetlands within the portion of Compartment B evaluated as an alternative for the Accler8 EAA reservoir. (The wetlands verified within Compartment B are located within the area that has been permitted and is currently under conversion to a STA.

4.2.5 Uplands

4.2.5.1 No Action Alternative

There will be no impact to upland land cover as a result of the No Action Alternative.

4.2.5.2 Build Alternatives

Natural upland vegetation communities were characterized by using Florida Fish and Wildlife Conservation Commission land cover data. Uplands cover 486 acres or 0.08% of the entire EAA. Natural upland land cover classes include dry prairie, hardwood hammock and forests, pinelands, and mixed hardwood pine forests in descending order of abundance. No natural upland land cover classes occur within Compartments A, B, or C. All of the build alternatives contain some comparable acreage of uplands in the form of farm roads or farm facilities. Compartment A, specifically, Cell A-1 contains 165 acres of uplands characterized as a former industrial site that was known as the Talisman Sugar Corporation's processing facility.

4.2.6 Federally Listed Threatened and Endangered Species

4.2.6.1 No Action

The following federally listed threatened or endangered species are found within the EAA: the endangered Florida panther, endangered West Indian Manatee, endangered snail kite, endangered wood stork, threatened bald eagle, threatened Audubon's crested caracara, threatened eastern indigo snake, and the endangered Okeechobee gourd.

Under the No Action alternative, use of the EAA area by most endangered, threatened, or state-listed wildlife should not change. Exceptions may include the federally endangered West Indian manatee. Studies are currently underway to document use of the canals in the EAA by manatees. The USFWS has produced a preliminary map that shows over half the canals within the EAA are accessible to manatees. Maintenance dredging or other construction/repair activities may create obstructions for manatees. Manatees within the canals may continue to become entrapped within the

system and suffer harm or mortality due to poor quality habitat and inability to navigate to more suitable habitat.

Other federally-listed species that would be unaffected by the No Action alterative include the Florida panther, eastern indigo snake, and the Okeechobee gourd. No changes to use of the EAA by the Florida panther and eastern indigo snake and no change in the current status of the Okeechobee gourd are likely to occur in the absence of the proposed action. The Audubon's crested caracara is known to use Compartment A. Caracara use a variety of open habitat, both upland and wetland, for foraging. Maintenance of an open agricultural and wetland mix in Compartment A under the no action alternative would continue to provide habitat for the caracara.

In the estuarine areas of the St. Lucie and Caloosahatchee watersheds, continued pulse releases of freshwater from Lake Okeechobee would further degrade the water quality of the estuaries and continue the high fluctuations in salinity. This would have a continued adverse affect on Johnson's sea grass, and it is possible that the spatial extent of this seagrass would continue to decline. Loss of additional submerged aquatic habitat could affect federally listed species such as sea turtles, and manatees by reducing available grazing areas. In addition, increased pulse releases may also result in a loss of Johnson's seagrass (*Halophilia johnsonii*), a federally listed species. The loss of suitable habitat for smaller fishes and further decline of water quality would also likely have an adverse effect on the smalltooth sawfish (*Pristis pectinata*). Smalltooth sawfish may be especially vulnerable to coastal habitat degradation due to their affinity to shallow, estuarine systems. Because of the slow individual growth, late maturation, and low fecundity, long-term commitments to habitat protection are necessary for the eventual recovery of the species (NMFS, 2000).

4.2.6.2 Build Alternatives

All of the Build Alternatives would have similar effects on listed species.

Wood storks and snail kites have overlapping ranges, but different feeding mechanisms and require different hydrologic conditions for optimum feeding. Historically, both have survived with the hydrologic variability characteristic of the natural system. The reduced heterogeneity and extent of natural area of the present system make the snail kites more vulnerable to natural and human-caused threats (USFWS, 1999). Water quality improvements in the WCAs as a result of any of the Build Alternatives would benefit the wood stork, snail kite, and bald eagle by increasing the available forage, improving access to prey species and reducing possible exposure to contaminants including pesticides. Somewhat improved water clarity and reduced

nutrients improve habitat for the apple snail and increase successful foraging by the Everglades snail kite. However, the limited number of shallow open water or marsh communities in the EAA would minimize benefits of improved water quality to snail kite populations.

Florida panthers may travel and forage within the EAA but they are not expected to use the area for breeding. Based on the USFWS' *Draft CERP Landscape Level Project Planning/Siting Map for Panther Consultation* dated February 18, 2004, all of the Build Alternatives are within the core area for the panther. None of the Build Alternatives are in an area designated as primary zone or secondary zone; however, all are within the designated dispersal area for the panther. Conversion of the agricultural lands to open water habitat (i.e., reservoir) would result in the loss of some panther habitat.

A manatee habitat suitability survey was performed within 178 miles of canals within the EAA. The survey was conducted using the following criteria: canal configuration, forage availability, refugia, temperature, presence of structures, mortality/rescue incidents, boat ramps, watercraft, and structure accessibility. The Manatee Task Force concluded the risks of manatee entrapment/mortality in the EAA canals outweigh the availability of suitable manatee habitat (Initial CERP update, 2004). The USACE and the SFWMD have agreed to ensure that all water structures associated with the proposed action include manatee protection devices.

The eastern indigo snake is not documented by the FWC or Florida Natural Areas Inventory to be specifically in the EAA basin, but it likely is found in the uplands and margins of wetlands or agricultural areas. Conversion of agricultural lands to reservoir could potentially result in the loss of some habitat for the eastern indigo snake but these losses would essentially be the same for all of the Build Alternatives. The USACE would ensure compliance with the *Standard Protection Measures for the Eastern Indigo Snake* during construction of any of the Build Alternatives.

Per agreement between the USACE, USFWS, and NOAA Fisheries, the Draft PIR/EIS for the CERP EAA Storage Reservoirs project also serves as the Biological Assessment for the purpose of Section 7 consultation under the Endangered Species Act for the proposed action. The USACE made a determination that the proposed project would not affect the leatherback, hawksbill, green, and loggerhead sea turtles and the Audubon's crested caracara; may affect, but is not likely to adversely affect the West Indian manatee, Everglade snail kite, wood stork, bald eagle, eastern indigo snake, and Okeechobee gourd; and may adversely affect the Florida panther. In a letter dated December 14, 2005 the USFWS concurred with USACE's

determination that the project will have "no effect" on the leatherback, hawksbill, green and loggerhead sea turtles, and the Audubon's crested caracara. USFWS also concurred with USACE's determination that the project "may affect, but not likely to adversely affect" the West Indian Manatee, the Everglade snail kite, eastern Indigo snake and Okeechobee gourd. This concurrence applies to the proposed action. Informal consultation for the wood stork and bald eagle and formal consultation for the Florida panther is currently ongoing.

4.2.7 State-listed species

4.2.7.1 No Action

The Florida burrowing owl (*Athene cunicularia floridana*), a state-listed species of special concern, is know to occur within the EAA. This species generally inhabits open native prairies and cleared areas that offer short groundcover including pastures, agricultural fields, golf courses, airports, and vacant lots in residential areas. Burrowing owl use under the No Action Alternative should continue.

Soil subsidence and wetness would make it difficult for owls to construct and maintain burrows. Regional environmental trends in the EAA that would continue with or without the project include soil subsidence and gradually increasing soil wetness. As subsidence continues, slight expansion of wetland habitat within the EAA may benefit some wetland dependent species including wading birds. State listed species that could benefit from expansion of wetland habitats include the little blue heron, tri-colored heron, snowy egret, reddish egret (*Egretta rufescens*), white ibis (*Eudocimus albus*), limpkin, and roseate spoonbill.

Continued adverse affects on habitat within Lake Okeechobee and the WCAs utilized by state listed species would result from the No Action Alternative since regulation of surface water levels often results in a compromise of ecological needs for flood control needs.

4.2.7.2 Build Alternatives

There are no know wading bird nesting colonies in close proximity to the footprints of the Build Alternatives so there is little concern that existing wetlands would be important foraging areas during the crucial nesting season. Foraging habitat of State listed wading birds will be temporarily affected by reservoir construction. Although there will be temporary effects to wetland foraging areas used by state-listed wading birds, these mobile species will take advantage of other similar areas within the EAA.

Region-wide improvements of water quality from reductions in phosphorus concentrations entering STA-3/4, improved timing of water deliveries to WCA 3, and reductions in pulse releases from Lake Okeechobee to the estuaries is expected as a result of the proposed project. Improvements to these natural areas should have a beneficial effect on state listed species, particularly the wading birds listed above.

4.2.8 Essential Fish Habitat

4.2.8.1 No Action

Under the No Action Alternative EFH would continue to be adversely impacted through discharge of excess stormwater from Lake Okeechobee through the St. Lucie River to the Atlantic Ocean. Pulse releases are very damaging to the St. Lucie and Southern Indian River Lagoon estuaries. Likewise, excess stormwater discharged to the Gulf of Mexico through the Caloosahatchee River is damaging to the Caloosahatchee Estuary.

4.2.8.2 Build Alternatives

Construction of a reservoir within the EAA will reduce the amount of freshwater releases to the estuaries thus reducing its adverse impact on salinity levels. The proposed project is also expected to slightly improve the water quality in Lake Okeechobee thus reducing pollutant loads to the estuaries. Reducing the fluctuation of salinities caused by large fresh water pulse flows, as well as reducing loading of phosphorus and nitrogen associated with the reduction of flows, would allow seagrass, and mangrove habitat conditions in the downstream estuaries to improve through a more sustained salinity regime. With these improvements in water quality, the appropriate conditions for sensitive estuarine biota, such as species dependent on this habitat for egg, larval, and juvenile stages, are anticipated to benefit or rebound.

All construction features of the Build Alternatives are well inland of any EFH. Standard best management practices to reduce erosion and downstream turbidity will be included in the construction specifications.

The USACE has determined that construction activities would have no adverse impact on EFH in the downstream estuaries and that implementation of the project would have a positive affect on EFH. By letter dated November 17, 2005, the Habitat Conservation Division of the NOAA Fisheries concurred with the USACE's proposal to construct the EAA Storage Reservoirs project stating reducing high-volume freshwater pulsed releases from Lake Okeechobee should have a positive effect onEFH and other trust resources present in the St. Lucie and Caloosahatchee River estuaries, and

the Indian River Lagoon. The EFH consultation for the CERP EAA Storage Reservoirs project applies to the SFWMD's EAA Reservoir A-1 project since it is located within the footprint of the proposed CERP project.

4.2.9 Fish and Wildlife Resources

4.2.9.1 No Action

Without the project, no significant change would likely result to fish and wildlife populations in the project footprint. Regional trends that could shape future conditions in the Acceler8 reservoir footprint as well as the whole EAA include: 1) minor changes in land cover/use caused by wetter conditions from soil subsidence; and, 2) improved surface water quality. Minor changes in regional land cover were discussed previously. In general, shifts to somewhat wetter conditions in the EAA would favor wetland fauna or wetland dependent fauna tolerant of the disturbed conditions in agricultural production areas. Some displacement of wildlife could result from expansion of urban or extractive land cover types within the EAA; however, these changes are not likely to affect the project area.

Regional trends in water quality within the EAA should affect fish, aquatic or wetland wildlife populations directly or indirectly by affecting prey or forage used by wetland dependent species. Nutrient loadings to surface water would generally decrease in the future. Slight declines in turbidity and suspended solids, sulfate concentrations, pesticides, and specific conductance in canals should continue. Thus, under the No Action Alternative water quality should continue to generally improve. This will improve fish populations by increasing water clarity and allowing increased coverage of important fish habitat such as submerged aquatic vegetation. The general improvement of water quality within canals should somewhat benefit resident fish or wildlife directly; however, downstream receiving waters and fauna would significantly benefit. Although the canals contribute to significant amounts of open water areas in the EAA , they have low habitat value due to their construction and management. These can lessen potential benefits to resident wildlife compared to more natural shallow, open water habitat. Canals generally lack littoral zones due to steeply sloped sides. These canals have reduced emergent or submergent vegetation due to vegetation management used to maintain conveyance capacities and levee integrity. Consequently, without the project, wetlands, particularly marshes, should benefit by nutrient reductions since cattail-dominated freshwater marshes arise in nutrient-rich conditions, whereas sawgrass is favored in nutrient-poor conditions.

4.2.9.2 Build Alternatives

Potential impacts to the fish and wildlife resources as a result of implementation of the Build Alternatives would be generally the same. The goals and objectives of the project include reductions in phosphorus concentrations entering the STAs, improved timing of water deliveries to WCAs, and reductions in pulse releases from Lake Okeechobee to the estuaries. These environmental benefits should have a beneficial effect on fish and wildlife resources.

Aquatic Fauna

All of the Build Alternatives contain agricultural ditches and canals that would be impacted by construction of a reservoir. Once a reservoir is constructed, however, aquatic habitat will substantially increase. The open water reservoir will likely harbor fish typical of nearby canals. Deepwater refugia will be created from underlying ditches and canals. Water is conveyed to the reservoirs by these canals which also act as conduits for the introduction of many aquatic organisms, including fish. Species that will likely inhabit the reservoirs include: largemouth bass, black crappie, redear sunfish, shad, bluegill, and mosquitofish, among others. Diversity of invertebrates living in reservoirs can be low, especially in deepwater systems that lack emergent vegetation. Invertebrates typically found in lake sediments that provide forage for fish include chironomids, crayfish, and shrimp. In general, shallow water fish bedding and rearing habitat will be limited to the margins of the reservoir. The reservoir's limited littoral zone may tend to reduce populations of fish species dependent upon this habitat for reproduction and sheltering juveniles.

A littoral zone will be constructed between the reservoir embankment and the seepage canal outside of the reservoir. The littoral zone will provide habitat for invertebrates, fish, and amphibians.

Amphibians and aquatic reptiles including frogs, turtles, snakes, and alligators will likely inhabit the deepwater reservoir. Limited emergent vegetation in the reservoir will also affect these organisms by reducing available forage, cover, and reproductive habitat. The reservoir will also create foraging habitat for osprey, bald eagle, terns, cormorant, and other aquatic birds that feed on fish. Ducks may also use the reservoir, but low cover by submergent and emergent vegetation, may limit the habitat value.

Wetlands Fauna

With all of the Build Alternatives, some emergent wetlands may develop along a narrow shelf on the margins of each reservoir cell. Vegetation along the shelf will likely be dominated by herbaceous cover with occasional areas of shrubs. Woody species will likely be managed to maintain low stature

along the upland levees. Many of the species observed in the existing wetlands will use littoral zone wetlands in the reservoir. A seepage buffer will be created within the reservoir footprint exterior to the reservoir levee under all of the Build Alternatives. Depending on the configuration of the Build Alternatives, some wetland habitat may be created. The seepage buffer will help to reduce adverse water quality effects of seepage water as well as provide valuable wetland habitat for macroinvertebrates, amphibians, reptiles, wading and aquatic birds, and small mammals.

Upland Fauna

None of the Build Alternatives include existing natural upland communities. Upland fauna are limited to agricultural fields, farms roads, and levees with the exception of the industrial site within Cell A-1 of Compartment A.

Reservoir construction will involve creation upland levees. The upland levees will not technically be upland vegetation communities within the land cover classification, but they will partially function as an upland habitat. They will provide the only relief within the reservoir for large expanses of aquatic habitat once the reservoirs are constructed. The levees will provide some upland habitat value by creating resting, basking, and burrowing places for birds and reptiles; provide corridors for non-aquatic species and nesting habitat for aquatic turtles, ground-nesting birds, snakes and possibly alligators. The presence of the levees will help to improve wildlife and plant diversity in an area to be dominated by aquatic habitat. Use of the levees by vehicles may make resident and transient wildlife somewhat more vulnerable to road kill since upland habitat will be scarce in the vicinity of the reservoir.

Disturbed & Urban Extractive Communities

Disturbed (agricultural) and Urban and Extractive habitats will be replaced by the construction of the Build Alternatives. These habitats represent the most extensive landscape feature throughout the region. Although these habitats historically replace native wetland communities, they still provide some wildlife benefits, providing feeding areas, cover, or breeding/nesting habitat for generalist wildlife species that can use a broad range of environmental conditions such as boat-tailed grackle, cattle egret, common nighthawk, killdeer, turkey vulture, and tree frogs. A few more specialized species such as burrowing owl or wood stork may also use these lands as the habitats marginally meet certain environmental needs. Flooded sugarcane fields provide seasonal forage habitat to a variety of wading and shorebirds.

4.3 WATER QUALITY

Water quality would be equivalent for the Build Alternatives. Potential impacts to water quality as a result of implementation of the No Action and Build Alternatives are discussed below.

4.3.1 No Action

Many projects scheduled for completion have the specific purpose of lowering total phosphorus (TP) concentrations entering the Environmental Protection Area (EPA) and will also affect a variety of other water quality parameters. Some of the projects will not show effects in the near future. For example, the overall goal of the Lake Okeechobee Protection Plan is to reduce TP loading from the watershed to the lake to an average of 140 metric tons per year from all sources. Achievement of this Total Maximum Daily Load (TMDL) rests partly on the proposed CERP Lake Okeechobee Watershed project (LOWP) realizing its water quality goals. The Lake Okeechobee Priority Basins contribute an approximate average annual phosphorus (P) loading to the lake of 322 metric tons, which is approximately 50% of the total P load (515 metric tons/yr) currently entering Lake Okeechobee. Assuming a 25% BMP reduction and a P-load TMDL of approximately 70 metric tons/year (approx. half of the total TMDL for the north rim of Lake Okeechobee, only), the LOWP has essentially been designed to reduce approximately 130 metric/yr of P. This leaves another approximate 190 metric tons/yr (or, so) of P load from the southern Lake Okeechobee basins that must be removed in order to achieve the overall Lake TMDL goal. If the LOWP does not occur, the state would look for other ways to implement other projects to achieve the target. This load is expected to eventually result in an average in-lake TP concentration of about 40 micrograms per liter (µg/L). However, this goal is not expected to be achievable for at least 30 years following the mandated 2015 project completion date. This predicted lingering TP concentration in the lake water column is expected due to the phosphorus trapped in sediments that will be released for years after TP levels in the water have dropped (FDEP, 2001).

Several other basins and watersheds are being incorporated into the EAA through the STAs. Although not directly a part of the EAA, water quality improvements in contributing basins would affect interior water quality, especially in the STAs.

Total phosphorus is a parameter of particular concern in the EAA. Currently, implemented BMPs in the EAA have resulted in reductions of TP meeting or exceeding the 25 % reduction required for compliance (McGinnes, et al., 2004). In addition, the STAs have performed better than predicted and are planned to be further enhanced until completion in 2006 (B&M, 2003; Piccone, et al., 2004).

Additional projects that could improve water quality parameters are the improved operation of Holey Land and Rotenberger Water Management

Areas (WMAs), which could increase nutrient removal efficiencies in these natural wetland areas through better hydroperiod management. Also, any conversion of EAA lands from sugarcane farming to fallow lands (possibly natural wetlands) would further reduce TP loads downstream.

All of these projects should result in a continuing decline of TP concentrations within the surface waters of the EAA. It is predicted that in the "without project" condition, average TP at the north end of the EAA canals could be as low as 40 µg/L, and somewhere in the vicinity of 10 to 15 µg/L at the south end of the EAA prior to discharge into the EPA.

Several other water quality parameters could be expected to change in response to anticipated activities and land use changes in the EAA over the planning period. For example, concentrations of organic nitrogen could decrease in response to the water quality programs being implemented in Lake Okeechobee, in the contributing basins to the EAA, and within the EAA. Total nitrogen concentrations have been declining in the EAA canals since at least the 1970s, apparently in response to changing farming practices and BMPs. These nitrogen concentrations should eventually level off at approximately 2 to 2.2 milligrams per liter (mg/L) based on normal background concentrations typical of South Florida wetlands.

Dissolved oxygen (DO) concentrations in the EAA canals have averaged between 3.9 and 4.8 mg/L over the past four decades with no clear temporal trends. These concentrations could increase slightly as a result of decreased nutrients in Lake Okeechobee. The water in the canals is largely from the lake. Lower nutrients in the lake will result in reduced levels of algae. This in turn would reduce the organic load to the canals allowing dissolved oxygen levels to rise slightly in the future. However, due to the physical nature of the canals and their position in an area of wetlands and organic soils, DO concentrations should continue to be depressed below the 5 mg/L Class III water quality criterion. DO concentrations within the STAs and within natural wetlands in the Holey Land and Rotenberger WMAs should remain similar to current conditions (typically < 4 mg/L).

Specific conductance increased in the EAA canals until the 1980s to an average of about 1,028 microSiemens per centimeter (µS/cm) and has been decreasing since that time. This decreasing specific conductance trend should continue in light of changing agricultural practices in the EAA to near historic levels, approximately 600 µS/cm, by the end of the planning period.

Levels of turbidity and suspended solids have declined slightly in the EAA canals in the past decade. A continuing trend of decreasing concentrations is expected in light of the variety of water quality improvement projects in and

around the EAA. This trend could result in EAA canal concentrations of turbidity and suspended solids less than 10 Nephelometric Turbidity Units (NTU) and 10 mg/L, respectively.

Sulfate concentrations in the EAA canals increased from the earliest records in the 1930s through the 1980s when they reached a maximum decade average concentration of about 97 mg/L. Since 2000, average canal sulfate concentrations have declined to 1930s levels (about 42 mg/L). Total mercury concentrations have also decreased in the EAA canals over the past decade. This trend should continue under the "without project" condition.

Concentrations of some key pesticides that are frequently found in the EAA canals have declined precipitously over the past three decades. For example, average canal water concentrations for atrazine have declined from 1.2 to 0.6 µg/L since the 1980s. The average simazine concentration has declined from 2.2 to 0.08 µg/L over the same period. This trend should continue through 2050.

4.3.2 Build Alternatives

The Build Alternatives are expected to improve water quality conditions in the Study Area, as well as in Lake Okeechobee, the Caloosahatchee Estuary, the St. Lucie Estuary, and the EPA. The proposed storage reservoir will reduce pollution loading into downstream receiving water bodies through the attenuation of surface flows and reduction of associated pollutant loads prior to discharge. The metering of water from the proposed storage reservoir into the STAs will allow them to consistently improve water quality before release to the WCAs and eventually to the EPA.

Based on initial system-wide modeling assuming a 2010 condition, the following water quality benefits are expected to be derived from the construction and operation of the SFWMD's proposed EAA Reservoir A-1 project: 1) improvement to water quality in the St. Lucie and Caloosahatchee estuaries by reducing releases from Lake Okeechobee by 15%, 2) reducing agricultural back-pumping into Lake Okeechobee by 42% from the NNRC and by 33% from the Miami Canal, and 3) reducing phosphorus concentration of water released from the reservoir entering STA-3/4 by 17%.

4.4 HAZARDOUS, TOXIC AND RADIOACTIVE WASTE (HTRW)

4.4.1 No Action Alternative

Under the No Action Alternative, lands within the EEA should remain in agriculture or open space uses. With agricultural land use, there is the potential of additional toxic releases between the present and the future.

This potential exists because of the use of fuel and agricultural chemicals on the lands and roads of the within the project footprint.

4.4.2 Build Alternatives

Three tracts of land with HTRW concerns are present within Compartment A, specifically A-1. Fifty-four of the 56 areas of concern identified on these three tracts of land (Woerner Farm 3, Talisman South Ranch Eastern 1/3rd and Cabassa Farm) require no further action, have received Site Rehabilitation Completion Orders, or received regulatory closures. The USFWS is currently reviewing the Environment Remediation Assessment. No additional assessment, corrective actions, or closures are warranted on these three properties pending USFWS' review.

One tract of land within Compartment B, Woerner Farm 2, has also been identified to have HTRW concerns similar to the Woerner Farm 3 tract. The northern portion of Compartment B in operation as a turf farm also has HTRW issues that will have to be resolved once the property is vacated.

4.5 CULTURAL, HISTORIC AND ARCHAEOLOGICAL RESOURCES

There will be no impacts to cultural, historic and archaeological resources with the No Action alternative.

A review of the Florida Master Site Files, in June 2002, indicated no recorded archaeological or historic sites within Compartments A and B. There are nine known prehistoric sites within the boundaries of Compartment C. All three compartments have been heavily impacted by rock plowing and agricultural practices. Site visits by archaeologist from the USACE revealed that the southern portion of Compartment B shows evidence of tree hammocks and should be considered a high probability area. Based on the history of landuse and agricultural disturbance, the USACE determined it is unlikely that any unimpacted historic properties exist within Compartment A or the northern two thirds of Compartment B and that additional surveys would be not be needed for these areas. The USACE indicated a Phase II survey would be required for Compartment C of the known historic sites, in order to evaluate significance and eligibility for nomination to the NRHP. The SHPO concurred in a letter (DHR No 2002-09656) dated December 13, 2002, that due to a previous Phase I level investigation in 1996, and the existing conditions, no cultural resources survey was necessary for Compartment A or the northern two thirds of Compartment B, subject to condition that a professional archaeologist is on-call and performs periodic monitoring throughout the construction phase any project.

4.6 SOCIO-ECONOMIC ENVIRONMENT

4.6.1 No Action Alternative

Despite population loss in the EAA between 1990 and 2000, the area should see significant population growth. Palm Beach County's population is projected to increase 64%, from 1.13 million to 1.86 million, over the thirty year period from 2000 to 2030 (BEBR, 2002). Assuming a conservative 1% annual growth rate between 2030 and 2050, Palm Beach County's population would grow to 2.27 million. Hendry County has a much smaller population but should grow 71%, from 36,000 to 62,000 between 2000 and 2030. Assuming the same 1% annual growth rate from 2030 to 2050, Hendry County's population would grow to 75,000 persons.

The project footprint under the No Action alternative would not have significant direct or indirect effects on population within the EAA or the South Florida Region as measured by displaced population from the project footprint and induced population growth. The 2000 U.S. Census reported 20 persons living along the eastern border of Compartment A. The purchase agreement between the United States Department of Interior (DOI), SFWMD and the landowners allowed farming to continue on most of the land until March 31, 2005. After March 2005, land could be leased for agricultural purposes until needed by USACE for restoration purposes. Compartments B and C are currently out of production, with the exception of a turf farm lease in the northern portion of Compartment B.

Under the No Action Alternative, likely land uses within the project footprint would not have a significant effect on future population growth in other areas resulting from agricultural uses of the area or conversion to open space uses. Palm Beach County's "Agriculture Production" land use designation on the project area restricts residential development to farm labor quarters and camps, caretaker's quarters (e.g., for pump houses), and dwelling quarters and farm residences for bona fide farm operations. Consequently, future residential development potential on the property is limited by the land use designation, whether the property remains in agricultural uses or is converted to open space. Even in the unlikely event that the land use designation was changed to allow higher density residential development, lack of central water and sewer infrastructure effectively preclude most residential development. Conventional well and septic systems are unlikely in the area because of soil and groundwater characteristics. In summary, potential uses under the No Action Alternative would not shift future population growth to another location.

SFWMD anticipates a decline in sugarcane production within the EAA from 529,920 acres (1995 condition) to 491,520 acres (2050 condition) due to the

purchase of agricultural land for restoration projects. Sugarcane production will also be directly related to future U.S. government import/export policies and the relationship with Cuba.

4.6.2 Build Alternatives

Social and/or economic impacts that could occur with construction and operation as a result of implementing one of the build alternatives includes the following:

a. Induced substantial population growth;
b. Displaced on-site population;
c. Substantial employment losses; and,
d. Increased demand on community services causing service level reductions.

Construction and operation of the Build Alternatives will not have significant direct or indirect effects on population within the EAA or South Florida Region as measured by displaced population from Compartment A and induced population growth. The 2000 U.S Census reported 20 persons living along the eastern border of Compartment A.

The Build Alternatives will not have a significant effect on future population growth in other areas resulting from conversion of the site from agricultural use to a reservoir. As stated above, the county's land use designation restricts residential development, whether the property remains in agricultural use or is converted to storage reservoir.

Conversion from predominantly agricultural use to a storage reservoir will indirectly affect population by changing the type and number of employees employed in the area. Agriculture employment in the EAA was estimated to be 74 persons based on an employee to acreage ratio of one full-time farm worker per 289 acres of sugarcane (Roka & Cook, 1998).

The conversion to a reservoir will also eliminate the production value of sugarcane and other crops. Compartment A contains approximately 23,791 acres in sugarcane, 620 acres in row crops, and 142 acres in other agricultural lands (Water & Air Research, 2005). Sugarcane production on the Compartment A in 2002 was estimated to be 469,852 tons with a value of $13.3 million or about 3.7% of total sugarcane production value in Palm Beach County. Compartments B and C are currently out of production with the exception of a turf farm in the northern portion of Compartment B.

Conversion to reservoir would not impact the majority of these lands, with the exception of the turf lease.

Construction, operation, and maintenance of a storage reservoir will generate demand for workers. This will have a positive impact through direct employment and spin-off service employment within the region. The need for construction materials, such as concrete, will also be filled locally. Once completed, operation and maintenance personnel will also be needed and filled primarily from the local (i.e., West Palm Beach-Boca Raton MSA, Miami-Ft. Lauderdale CMSA, and the Ft. Pierce-Port St. Lucie MSA, and Glades and Hendry Counties) area. The primary local benefits will be direct employment, direct purchase of construction materials as well as secondary/induced jobs (economic activity). Construction, operation, and maintenance employment has not been determined. Approximate construction costs are $379 million; annual operations and maintenance costs are estimated to be $28 million.

Water quality improvements in Lake Okeechobee, the Everglades, St. Lucie Estuary, and other areas resulting from the storage reservoir and other Acceler8 projects should have a significant, indirect effect on economic activity in the region through revenues from increased fisheries production and an increase in tourism-related expenditures.

Increased water storage capacity should reduce agricultural flood damage thereby indirectly affecting agricultural employment. Computation of flood damages (in dollars) based on seasonality of crops within the sub-basin containing Compartment A has not yet been completed. The additional water storage should enhance economic values and social well-being in urban areas near Lake Okeechobee by reducing the number of structures affected by flooding. The storage reservoir will also increase the viability of agriculture through maintenance of high water tables, which is thought to be a key to reducing subsidence (Snyder, 2004).

Development of the storage reservoir will not have significant effects on community infrastructure and services. Infrastructure in the area is limited to roads, electric, and telephone service. Roads could be temporarily affected by traffic from construction activities; however, effects should be minor. Community services such as schools, public protection, and fire and emergency management services should be essentially unchanged.

4.7 CUMULATIVE IMPACTS

Cumulative impacts associated with the Build Alternatives would be similar. Cumulative impacts are discussed in the Draft PIR/EIS for the EAA Storage

Reservoirs project. Since the preferred alternative, the EAA Reservoir A-1 project, is a subset of the proposed CERP project cumulative impacts would be the same but to a lesser degree.

Project features will cause some adverse consequences to agricultural land uses - permanently removing tens of thousands of acres from agricultural production. These impacts may be felt locally and/or regionally as the economic base derived from agriculture is incrementally reduced relative to other sectors of the economy. The overall benefit to the regional system is expected to be far greater than the localized adverse effects. As these features occur disparately across the landscape within different hydrologic basins, and as distinct units rather than multiple features within a single watershed, they will not likely result in a significantly detrimental cumulative effect.

The proposed EAA reservoir will benefit south Florida ecosystems. Specifically, the proposed reservoir will benefit the St. Lucie and Caloosahatchee Estuaries and Lake Okeechobee as well as improve the quality and timing of water delivery to the STAs for improved water treatment within the STAs. Based on initial system-wide modeling assuming a 2010 condition, the following benefits are expected to be derived from the construction and operation of the EAA Reservoir A-1:

- Approximately 3"- 6" reduction in Lake Okeechobee stages.
- Reduced Lake Okeechobee releases to the St. Lucie and Caloosahatchee estuaries by 15%.
- Improved timing of deliveries to WCA 3 which receives 210,000 acre feet of environmental delivery on annual average basis compared to no environmental deliveries currently.
- Back-pumping into Lake Okeechobee is reduced by 42% from the NNRC and by 33% from the Miami Canal.
- Phosphorus concentrations entering STA-3/4 are reduced by 17% from water released from the reservoir.

Improvements to the water quality entering the WCAs will result from the ability to more effectively store water within the proposed EAA reservoir by metering peak flows in the STAs. STAs are intended to provide treatment rather than store water; however, during the wet season and flood events, they have been used to provide both functions. Creation of the reservoir will provide the needed storage function, allowing the STAs primary use as water treatment facilities. Increased residence times of water within the STAs will

ensure better treatment of waters released to the WCAs and have beneficial water quality effects on all downstream ecosystems.

The SFWMD's Acceler8 Program is anticipated to convert large areas within the EAA, around Lake Okeechobee, in the Caloosahatchee River basin, and on the upper east coast to reservoirs for increasing water storage for the overall gain and long-term benefit of the regional system. These project features will provide important storage functions which the C&SF Comprehensive Review Study, April 1999, deemed essential to the overall restoration of the freshwater marshes, the estuaries and the downstream Everglades. Some improvement to lake water quality will occur as a result of the project by redirecting nutrient rich EAA drainage to the reservoirs rather that directly to Lake Okeechobee. The overall benefit to the regional system is expected to be far greater than the localized adverse effects. As these features occur disparately across the landscape within different hydrologic basins, and as distinct units rather than multiple features within a single watershed, they will not likely result in a significantly detrimental cumulative effect.

4.8 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Construction of the storage reservoir project will include many features considered permanent as well as modifications to existing C&SF Project features, which may be deemed irreversible. This will include construction of an approximately 16,768-acre reservoir and deepening of canals. Such construction and structural modifications are proposed on such a scale that these features represent an irreversible and irretrievable commitment of resources.

Committed resources include state and federal funding to purchase lands and labor, as well as energy and project materials to build, operate, and maintain the project. Fish and wildlife habitat will be permanently altered (converted to open water, particularly in the case of a storage reservoir). These lands will likely be inundated for much of the year. Another resource that may be impossible to replace is the caprock. It is proposed to be broken at the top of the limestone formation underlying the soils in the area of the proposed Acceler8 EAA reservoir project.

4.9 UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS

Land Use (Agriculture)

Agricultural lands will be permanently removed from production due to the construction of the proposed large above-ground storage reservoir

Wetlands
Natural and atypical wetlands will be permanently altered within the boundaries of the large above-ground storage reservoir.

Uplands
A limited number of acres of uplands may be permanently altered within the boundaries of the large above-ground storage reservoir.

Water quality
Temporary increases in turbidity of local waters are expected from the deepening of canals and by the construction of the components of the large above-ground storage reservoir.

Air quality
Fugitive dust and vehicle exhaust from vehicular traffic and earth moving will be unavoidable.

Soils
Temporary disruption of soils is expected from most construction activities.

Cut-off Walls
Temporary disruption of the soils is expected during construction of the cut-off walls. No adverse environmental impacts expected.

Wildlife
Localized disturbances to fish and wildlife are expected from deepening of canals and construction of levees and other structures.

Recreation
Limited impacts to recreation resources (canal fisheries for example) are expected.

4.9.1 EAA Reservoir A-1

The environmental impacts attributable to the EAA Reservoir A-1 Alternative are summarized below.

Land Use (Agriculture)
About 16,253.68 acres of agricultural lands will be permanently removed from production due to the construction of the proposed large above-ground storage reservoir.

Wetlands
Approximately 187.63 acres of natural wetlands and 16,252.68 acres of atypical wetlands, historic Everglades wetlands disturbed through

agricultural practices, are located within the footprint of the preferred alternative and will be permanently removed by construction of the proposed large above-ground reservoir.

Uplands
Approximately 164.59 acres of uplands including roads, levees, and an industrial site are located within the footprint of the preferred alternative and will be permanently removed by construction of the proposed large above-ground reservoir. .

Water quality
Temporary increases in turbidity of local waters are expected from the deepening of canals and by the construction of the components of the large above-ground storage reservoir.

Air quality
Fugitive dust and vehicle exhaust from vehicular traffic and earth moving will be unavoidable.

Soils
Temporary disruption of soils is expected from most construction activities.

Threatened / Endangered Species
Per agreement between the USACE, USFWS, and NOAA Fisheries, the Draft PIR/EIS for the CERP EAA Storage Reservoirs project also serves as the Biological Assessment for the purpose of Section 7 consultation under the Endangered Species Act for the proposed action. The USACE made a determination that the proposed project would not affect the leatherback, hawksbill, green, and loggerhead sea turtles and the Audubon's crested caracara; may affect, but is not likely to adversely affect the West Indian manatee, Everglade snail kite, wood stork, bald eagle, eastern indigo snake, and Okeechobee gourd; and may adversely affect the Florida panther. In a letter dated December 14, 2005 the United States Fish and Wildlife Service (USFWS) concurred with USACE's determination that the project will have "no effect" on the leatherback, hawksbill, green and loggerhead sea turtles, and the Audubon's crested caracara. USFWS also concurred with USACE's determination that the project "may affect, but not likely to adversely affect" the West Indian Manatee, the Everglade snail kite, eastern Indigo snake and Okeechobee gourd. This concurrence applies to the preferred alternative. Informal consultation for the wood stork and bald eagle and formal consultation for the Florida panther is currently ongoing. Consultation with the NOAA Fisheries regarding swimming sea turtles in the downstream waters is ongoing.

Wildlife
Localized disturbances to fish and wildlife are expected from deepening of canals and construction of levees and other structures.

4.10 NEEDED MITIGATION

The SFWMD's proposed EAA Reservoir A-1 project would be constructed and operated in conjunction with the other Acceler8 projects pending Department of the Army authorization. Operated together as a system, the Acceler8 projects are anticipated to provide environmental benefit to the south Florida ecosystem through improving water deliveries and maintaining natural salinity balance in the estuaries; improving natural habitats throughout the south Florida ecosystem by reducing high water levels; restoring and enhancing wetlands by improving timing and hydrology, restoring sheet flow, and controlling seepage; and improving water quality through water diversion and storage prior to discharge into the natural system. Construction of the proposed EAA Reservoir A-1 project, taken together with the other proposed Acceler8 projects, is anticipated to result in net positive environmental benefit. The benefits of the proposed EAA Reservoir A-1 project with interdependencies of the other proposed Acceler8 projects are expected to compensate for adverse local effects of construction and operation.

Permit conditions to ensure system-wide environmental benefits resulting from Acceler8 would be required if the proposed project is authorized. These conditions may include the following:

1. During permit evaluation and prior to permit issuance the USACE and the SFWMD would identify the operational regime. The SFWMD would be required to operate the proposed project in accordance with the approved operation plan so that system-wide environmental benefits are achieved. Any deviation or modification to the operation plan would require Department of the Army approval prior to deviation.
2. During permit evaluation and prior to permit issuance the USACE and the SFWMD would identify the performance measures, targets, success criteria, and monitoring requirements for the proposed project necessary to achieve the system-wide benefits. Monitoring would be reported annually, in the SFWMD's Consolidated Report.
3. The SFWMD would be required to conduct monitoring as identified for the project. Monitoring, adaptive management, remedial measures, etc. would be developed on a case-by-case basis for the permit consistent with the Jacksonville District Mitigation Monitoring Guidelines. Duration of the project-related monitoring would be dependent on project contributions and corresponding expected ecosystem response times.

4. If monitoring identifies areas where Acceler8 system-wide goals and purposes are not being achieved, the SFWMD and the Corps would review the operation plan to determine if adjustments can be made.

5. The permit may include an identification of the functional losses as a result of the project in order to establish a base line if system-wide benefits do not come to fruition. The SFWMD would be required to fully satisfy, implement, and pay for any alternative mitigation requirements that the USACE may later determine to be necessary to address the loss.

6. The SFWMD would be required to construct and operate the project consistent with the Central and Southern Florida Project as modified.

4.11 COMMITMENTS

The South Florida Water Management District and its contractors commit to avoiding, minimizing, or mitigating for adverse effects during construction activities by taking the following commitments:

4.11.1 Environmental Commitments

The SFWMD would commit to avoiding, minimizing, or mitigating for adverse effects during construction activities by taking the following actions:

1. Employ best management practices with regard to erosion and turbidity control. Prior to construction, the construction team should examine all areas of proposed erosion/turbidity control in the field, and make adjustments to the plan specified in the plan control device as warranted by actual field conditions at the time of construction.
2. The contract specifications will prohibit the contractor from dumping oil, fuel, or hazardous wastes in the work area and will require that the contractor adopt safe and sanitary measures for the disposal of solid wastes. A spill prevention plan will be prepared by the contractor.
3. Demolition debris would be transported to a landfill or otherwise disposed of in accordance with federal, state, and local requirements. Concrete or paving materials would be disposed of in accordance with federal, state, and local requirements.
4. Inform contractor personnel of the potential presence of threatened and endangered species in the project area, the need for precautionary measures and the ESA prohibition on taking listed species. Construction contractors will be trained and briefed on how to identify the wood storks and bald eagles in the area. The USFWS will be notified upon observation of any stork or eagle nesting activity.

5. The following special measures will be incorporated during project construction to minimize effects to any listed species that may be present: a) *Standard Protection Measures for the Eastern Indigo Snake*; b) *Management Guidelines for the Bald Eagle in the Southeast Region and Bald Eagle Standard Local Operating Procedures for Endangered Species*; and c) *Habitat Guidelines for the Wood Stork in the Southeast Region.*

6. If new electrical lines are constructed near open water to service new pumps, the publication Suggested Practices for Raptor Protection on Powerlines: The State of the Art in 1996 shall be consulted for recommended measures to protect bald eagles from electrocution.

   Both the FWC and the USFWS have been consulted for recommendations on avoidance of impacts to federally listed and state listed species. Both the FWC and USFWS will be consulted in the event that colonial or solitary wading bird nests are observed within the construction footprint. In addition, Florida burrowing owls are known to inhabit ruderal areas, such as canal banks and road berms, in the vicinity of the project. Eagle, wood stork, and burrowing owl surveys will be performed prior to the start of construction. If owls are observed within the EAA Storage Reservoir construction footprint, the FWC will be consulted for management measures and the contractor may be required to obtain a permit. More information on FWC permit requirements and applications can be found on the web at http://wld.fwc.state.fl.us/permits/permits.html. If bald eagle nests are encountered on the project footprint, the USFWS' *Habitat Management Guidelines for the Bald Eagle in the Southeast Region* will be implemented during construction of the EAA Project.

   The USFWS will be notified upon locating a dead, injured, or sick wood stork or bald eagle before, during, and after construction of the reservoir.

7. For the manatee, the following Standard Protocols will be used during construction: a) Protocols to Minimize/Avoid Entrapment at structures; b) Protocols for Existing and New Culverts based on the size of culverts; c) the Manatee Blasting Protocol when explosives are required; d) Ground Observer Protocols, as well as the *Standard Manatee Construction Conditions*. In addition, intake canals and/or structures will include an aluminum grate from the bottom of the structure to approximately 1 ft above high water, with 8 inches of bar spacing, or a similar exclusion feature. The features will be designed for temporary removal in the event of a water emergency.

   If barriers are in place at the Lake Okeechobee structures S-351, S-352, and S-354 to prevent manatees from entering the EAA, prior to

initial construction of the EAA Project, adverse effects to manatees in the EAA will be minimized and observer protocols and barriers at individual structures of the EAA Project will be unnecessary.

8. The SFWMD agrees to maintain an open and cooperative consultation process with the USFWS and FWC throughout the design, construction, and operation of this restoration project.

9. A monitoring program will be established to assess mercury levels and other contaminants within the water column, including before drying and upon rehydration of the reservoir. Additional monitoring will be performed at inflow and outflow points. The monitoring program will also include assessing mercury levels and other persistent contaminants in prey fish (mosquitofish, sunfish, and largemouth bass) within the reservoir and downstream area. In the event that ecological risks from contaminants to listed species become evident through sampling regimes and monitoring, the USACE will consult with the USFWS to determine if re-initiation of consultation in accordance with Section 7 of the ESA is necessary.

10. The initial flooding of the reservoir will be at a rate of one-half inch per day until a depth of six inches is attained in order to minimize negative impacts to the Eastern indigo snake. The reservoir will also be initially filled at a rate of one inch per day from the six-inch to 12-inch water depth to allow additional time for other terrestrial wildlife to vacate the area.

11. To protect cultural resources, conditions stipulated by the SHPO will be followed. Language will be included in specific conditions of any issued permit outlining the steps to be taken in the event that undiscovered historical properties are encountered. An informational training session, developed by a professional archaeologist, will be conducted for the contractor's personnel to explain what kinds of archaeological/cultural materials might be encountered during construction of the impoundment, and the steps to be taken in the event these materials are encountered. A professional archaeologist will conduct periodic monitoring of the project area during construction to determine if activities are impacting unanticipated cultural resources.

12. In order to offset project impacts, the State will use its reservation or allocation authorities pursuant to Chapter 373 Florida Statues to protect water necessary for ecosystem restoration.

13. Compliance with the State of Florida's legislative and statutory requirements for state projects being constructed pursuant to state CERP authorities.

4.11.2 Operation Commitments

The ultimate operational goal for the SFWMD's proposed Acceler8 EAA Reservoir A-1 project will be to operate in a manner that Lake Okeechobee regulatory releases and EAA basin runoff will be captured and stored depending upon on which area has the greatest need for runoff or discharge removal. This will depend on the regional drainage system's capability to convey water to the reservoir while maintaining existing levels of flood protection within the basin. It is anticipated that most of the water will be released into STA-3/4 from the reservoir when an environmental need is identified in the Everglades that could be provided from the reservoir. Releases will be made into the NNRC to provide supplemental irrigation for water users in the EAA when there is water remaining in the reservoir after deliveries to the Everglades, otherwise irrigation supply will be maintained via deliveries from Lake Okeechobee.

Consistent with the C&SF project, as modified, identification of the water necessary to achieve the system-wide environmental benefits associated with the project and flood protection for local users was evaluated. Initial interim operations of the reservoir will be dependent on existing C&SF Project infrastructure particularly within the WCAs and Everglades National Park. Initial operations will focus on storing Lake Okeechobee regulatory releases in the reservoir to provide lake and estuary benefits. Environmental releases from the reservoir through STA-3/4 will be made to meet environmental needs identified in the Everglades, however, these releases will be limited to avoid creating undesirable impacts due to constraints of the existing C&SF project. Water remaining in the reservoir may be used to provide supplemental irrigation for water users in the EAA to create more capacity for additional Lake Okeechobee regulatory releases when they are needed.

4.11.3 Engineering and Design Commitments

1. The proposed EAA Reservoir A-1 project will provide capacity to store storm runoff and will increase the pumping capacity from the NNRC. In addition, areas within the EAA Reservoir A-1 previously used for agriculture will no longer deliver runoff to the NNRC, thereby making available 500 cfs of NNRC water that was previously unavailable. Therefore, the project will not diminish flood protection and should reduce flooding in the NNRC under most conditions. Flood damage reduction, while not a primary project objective, will be attained by increasing canal conveyance capacity in the canals and by providing storage capacity in the surface impoundments.
2. A monitoring program of groundwater levels in the farmland will be initiated during the construction of the proposed EAA Reservoir A-1

and continue after construction is completed. This will provide information to the SFWMD for evaluating the effectiveness of the seepage control. The monitoring program is a means to document whether flood protection has been maintained required by Chapter 373.1501 F.S.

3. A zoned embankment concept has been developed to utilize materials from the required seepage collection canal excavations and available on-site borrow resources, and to minimize sorting and processing of the excavated materials for embankment construction.
4. For a zoned embankment, a configuration along the STA-3/4 Supply Canal will be utilized that provides cost-savings and additional storage. Rather than setting back the embankment from the proposed EAA Reservoir A-1 boundary, the embankment would tie in with the northern embankment of the Supply Canal.
5. Curved corners will be utilized in the northwest and southeast corners of proposed EAA Reservoir A-1, as they provide additional storage benefits. Both the northwest and southeast corners will be curved at a radius that aids construction of the embankment.
6. Northeast pump station recommendation:
   - Construction of a 3,600 cfs northeast pump station concurrent to the construction of EAA Reservoir A-1.
   - Use of the G-370 pump station unmodified during phase one operation to pump into the EAA Reservoir A-1 when its water levels are less than eight feet and directly to the STA Supply Canal when EAA Reservoir A-1 water levels are greater than eight feet.
   - Modification of the G-370 pump station to pump 2,220 cfs capacity to full EAA Reservoir A-1 depth.
   - Canal modifications to provide matching conveyance capacity, with an associated cost of up to $37 million depending on the alternative selected.
7. In addition to the gated structure the proposed EAA Reservoir A-1 will be equipped with an orifice-type spillway which will guard against overfilling. The spillway will be designed to limit overflow discharges to less than 500 cfs during rainfall events with less than a 100 year recurrence interval.
8. A Project Operating Manual (POM), for day-to-day use in managing essentially all foreseeable conditions affecting the EAA Reservoir A-1 will be developed upon completion of the Project. Knowledge gained from the Operational Testing and Monitoring Phase will be

incorporated into this POM, which will be coordinated with SFWMD and the USACE Jacksonville District.

9. The proposed EAA Reservoir A-1 will be operated to assure that implementation of the project will not diminish flood protection in the EAA.

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CHAPTER 5
AGENCY COORDINATION AND PUBLIC INVOLVEMENT

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5.0 PUBLIC INVOLVEMENT

5.1 PUBLIC INVOLVEMENT PROGRAM FOR ACCELER8

A number of opportunities occur through the Acceler8 design process for the public and government agencies to provide input regarding each project. Project information, schedules, documents, and presentations to the Public are kept updated and available on the Acceler8 website, http://www.evergladesnow.org.

A series of public workshops and stakeholder meetings are held for the Basis of Design Report (BODR) and the Preliminary Design Report for each Acceler8 project including Water Resources Advisory Commission (WRAC) Issue Workshops. At these workshops, information regarding the project is presented; technical questions are answered; and the public are provided the opportunity to comment. Monthly updates for the Acceler8 projects are also provided during full WRAC meetings and SFWMD's Governing Board meetings, where the public also has the opportunity to comment. Acceler8 status presentations have also been provided at the Quarterly meetings of the South Florida Ecosystem Restoration Task Force and the South Florida Ecosystem Restoration Working Group where the public also has an opportunity to provide comments.

5.2 AGENCY/PUBLIC COORDINATION FOR THE PROPOSED EAA STORAGE RESERVOIR A-1 PROJECT

Meetings and presentations to specifically present/discuss the BODR (October 13, 2005) for the Acceler8 EAA Reservoir A-1 Project were as follows:

- Several Public Workshops/Stakeholder Meetings were held during October and November of 2005.
- WRAC Issues Workshop Meeting held on October 24, 2005.
- Full WRAC Meeting on December 7, 2005
- SFWMD Governing Board December 14, 2005

Additionally, an assurance pre-application meeting was held with Florida Department of Agriculture and Consumer Services. A Criteria Committee Meeting (CCM) was held on June 20, 2005. Other meetings have been held with representatives from the following agencies present:

- Florida Department of Environmental Protection

- Florida Fish and Wildlife Conservation Commission
- U.S. Army Corps of Engineers
- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service

Governing Board Review and action on contracts related to the EAA Storage Reservoir Project include the following:

- Test Cell Construction and Operation – December 4, 2005
- Farming Transition Lease Agreement - January 6, 2006

5.2.1 Public Outreach Efforts

In an effort to encourage local labor and increase local employment, the SFWMD has undertaken various steps; including, education by the means of regional partnerships with Palm Beach Community College, Palm Beach School Board, Workforce Development and Community Based Organizations, holding workshops for vendors, and construction symposiums.

5.2.2 Additional Coordination

In addition to the efforts described above, additional information regarding coordination efforts on utilities and public infrastructure, including roads such as US 27 and SR 80, can be found in Annex G of the Draft PIR under the State Compliance Report. As of now, meetings have been held with:

- Florida Department of Transportation (FDOT)
- Florida Power and Light
- Palm Beach County

5.3 AGENCY/PUBLIC COMMENTS IN RESPONSE TO THE PROPOSED EAA STORAGE RESERVOIR A-1 PROJECT

The USACE and the SFWMD had anticipated that the SFWMD would accelerate construction and achievement of benefits of certain CERP projects by obtaining required permits and initiating construction upon completion of the Final EIS for the federal CERP project. The SFWMD submitted a permit application for the proposed EAA Storage Reservoir A-1 project in April 2005. A public notice for the proposed project was circulated on October 12, 2005, concurrent with the Draft PIR/EIS for the CERP EAA Storage Reservoirs project. This is consistent with normal regulatory procedures in that when

the USACE has identified an EIS is required for a permit action, the public notice for the permit application is released at the same time as the notice of availability of the Draft EIS.

Below are comments and coordination with the agencies and the public for the SFWMD's proposed EAA Reservoir A-1 Project including comments received in response to the Draft PIR/EIS which also pertain to the SFWMD's proposed EAA Reservoir A-1 Project.

5.3.1 FDEP

The FDEP is currently in the process of reviewing a CERPRA permit for a portion of the EAA Reservoir A-1 Project which includes the seepage collection canal, borrow pits, and interior excavation ditch. All outstanding issues with the FDEP have been resolved except for hazardous, toxic, and radioactive waste remediation at Woerner Farm 3. FDEP defers to USFWS on Eco-risk issues, as USFWS concurrence is required for Section 7 consultation. The SFWMD is currently working with the USFWS on resolution of this issue.

A meeting with FDEP was held on January 26th, 2006 to discuss any outstanding issues in the Seepage Canal application. FDEP is considering the construction application for the seepage canal substantially complete. It is anticipated that the FDEP will begin drafting the permit for issuance as soon as the concurrence from USFWS is received.

5.3.2 FFWCC

The FFWCC stated their concerns to the USACE in letters dated September 15, 2005 and November 21, 2005, for the Draft PIR/EIS and regulatory public notice, respectively. The FFWCC's main concern concerning the 404 permit application pertains to the potential for exposure of wildlife to contaminants as a result of project construction and inundation. One of the primary contaminants of concern is the persistent, bioaccumulative insecticide, toxaphene. This contaminant could become more biologically available due to soil disturbance associated with construction activities and subsequent, post-construction inundation. Wildlife, especially wading birds and birds of prey, foraging on-site, may be susceptible to ingestion of contaminated soils and/or prey items. The USACE is aware that the SFWMD is working closely with the USFWS Contaminants Division to investigate the potential risks to state and federally listed species and any additional remediation measures, if necessary. The USFWS is completing its review of final information provided by the SFWMD. This information will be incorporated into the Final EIS.

In response to the Draft PIR/EIS the FFWCC provided other concerns including inclusion of an ecological monitoring plan, embankment design modifications, creation of deepwater refugia, impacts of project seepage to Holey Land, public access for recreational purposes and panther refugia to the berms and levees. The Draft PIR/EIS did not include an ecological monitoring plan to evaluate effects of the project within the footprint and adjacent lands. An ecological monitoring plan to demonstrate that the environmental benefits of the project outweigh the impacts would be required as part of specific conditions of any issued Department of the Army permit. Both the SFWMD and the USACE have indicated that groundwater levels within Holey Land WMA would likely be affected by construction of a reservoir in the EAA. Ongoing coordination is in progress with the FFWCC regarding whether or not these changes, especially increases in groundwater levels, would be considered beneficial or adverse. The FFWCC recommends that the public be granted use of some or all of the boat ramps to be constructed for reservoir maintenance access, and that boat ramps also be provided for public access to those seepage canals that are wide enough (minimum width of approximately 50 feet) to accommodate motorized boats. One of the objectives of the SFWMD's proposed project is provide public access and recreational opportunities. Development of a recreation plan is currently underway and will be included in the Final EIS. Overall, the FWC stated that the Draft PIR/EIS satisfactorily addressed most of the agency's issues and represented well the efforts of the inter-agency team. The FWC stated the project was not inconsistent with Chapters 370 or 372, Florida Statutes, as included under the Florida Coastal Management Program.

5.3.3 FDOT

The FDOT provided initial comments on the Draft PIR/EIS (September 2005). The FDOT stated their concerns on the project impacts to their facilities and additionally requested that the USACE and SFWMD provide the final design plans for review. The USACE will provide the detailed design, monitoring and operational plans to the FDOT, as soon as they are available. The FDOT stated that they will submit their final comments to the Supplemental Draft EIS once it is published.

5.3.4 NOAA Fisheries

The regulatory public notice included a determination that the proposed Acceler8 project would not have an impact on essential fish habitat (EFH) or federally managed fisheries for which the NOAA Fisheries is responsible. The regulatory determination for the SFWMD's proposed EAA Reservoir A-1 Project was based on coordination efforts that had occurred between the USACE and NOAA Fisheries for the proposed CERP project. By letter dated November 17, 2005, the Habitat Conservation Division of the NOAA

Fisheries concurred with the USACE's proposal to construct the EAA Storage Reservoirs project stating reducing high-volume freshwater pulse releases from Lake Okeechobee should have a positive effect on EFH and other trust resources present in the St. Lucie and Caloosahatchee River estuaries, and the Indian River Lagoon. The NOAA Fisheries has indicated that the conclusion for the EAA Storage Reservoirs project is applicable for this proposed regulatory action since the goals and objectives of the projects are consistent.

Consultation with the Protected Resources Division of the NOAA Fisheries is ongoing. The USACE has determined that the EAA Storage Reservoirs project "may affect, but is not likely to adversely affect" the sea turtles in their aquatic habitat. This determination also applies to the SFWMD's proposed EAA Reservoir A-1 Project. A concurrence from the NOAA Fisheries is anticipated.

5.3.5 SHPO

The SHPO's initial response to the scoping letter for the EAA Storage Reservoirs project (DHR No. 2002-7052) stated that the potential exists for project activities to have an effect on cultural resources listed or eligible for listing in the National Register of Historic Places. A review of the Florida Master Site Files, in June 2002, indicated no recorded archaeological or historic sites within Compartment A, and a site visit in August 2002 showed extensive agricultural disturbance. Subsequent USACE correspondence with the SHPO, dated September 23, 2002, recommended that a cultural resources survey would not be necessary for Compartment A. The SHPO concurred in a letter (DHR No 2002-09656) dated December 13, 2002, that due to a previous Phase I level investigation in 1996, and the existing conditions, no cultural resources survey was necessary, subject to condition that a professional archaeologist is on-call and performs periodic monitoring throughout the construction phase of the project.

5.3.6 Coastal Zone Management (CZM)

A Coastal Zone Consistency from the State of Florida is required. Coordination with the State Clearinghouse is ongoing.

5.3.7 USEPA

The USEPA responded to the USACE public notice for the 404 Permit application on November 7, 2005 requesting additional time to provide comments due to a disparity in wetland jurisdictional acreages between the regulatory public notice and the USACE Draft PIR/EIS. On December 5, 2005, the USACE granted a 30-day extension to the Public Notice (PN)

extending the comment period until December 11, 2005. The USACE indicated a supplemental public notice would be published in January 2006. On December 8, 2005 the USEPA stated that they will provide comments once the supplemental PN is published and additional information is available They also noted the State CWA Section 401 Water Quality Certification (WQC) has not been completed. This Supplemental Draft EIS suffices as the additional public notice for the regulatory action. A clarification of the jurisdictional areas associated with the EAA Storage Reservoirs project and the SFWMD's proposed EAA Reservoir A-1 Project is addressed in Section 3 of this Supplemental Draft EIS. It should also be noted that at the regulatory public notice stage occurs early in the evaluation process of a project such that WQC normally has not been issued. A 404 permit will not be issued until WQC has been granted or waived. The Water Quality Monitoring Plan for this project will be coordinated with the FDEP during the 1502 permitting process. The BODR includes the proposed Operating Plan for the preferred alternative which is also addressed in Section 4 of this Draft EIS.

5.3.8 USFWS

Coordination with the USFWS is currently ongoing. By letter dated September 2, 2005, the Planning Division of the USACE provided an effect determination for the CERP EAA Storage Reservoir project referencing the Draft PIR as the Biological Assessment (BA). The determination included no affect to marine turtles or the Audubon's crested caracara, may affect but not likely to adversely affect West Indian manatee, snail kite, wood stork, bald eagle, eastern indigo snake, and the Okeechobee gourd; and may adversely affect the Florida panther. By letter dated October 3, 2005, the Regulatory Division of the USACE advised the USFWS that the effect determination, draft PIR, and BA for the EAA Storage Reservoirs project also serve as the Section 7 initiation package for the SFWMD's EAA Reservoir A-1 Project.

In a letter dated December 14, 2005 the USFWS concurred with USACE's determination that the CERP EAA Storage Reservoirs will have "no effect" on the leatherback, hawksbill, green and loggerhead sea turtles, and the Audubon's crested caracara. USFWS also concurred with USACE's determination that the project "may affect, but not likely to adversely affect" the West Indian Manatee, the Everglade snail kite, Eastern Indigo snake and Okeechobee gourd. Informal consultation for the wood stork and bald eagle and formal consultation for the Florida panther is currently ongoing. Specifically, the USFWS stated that additional information is required in order to prepare a Biological Opinion for the Florida Panther prior to completion of the Final EIS. The USFWS stated the letter serves as a response for concurrence to the USACE Planning Division for the proposed

CERP project and to the Regulatory Division for the SFWMD's proposed EAA Reservoir A-1 Project providing features are the same in both the Accleer8 and CERP designs. During a meeting on December 9, 2005, with the USACE and the USFWS slight differences in design were discussed and the USFWS advised that separate Biological Opinions for the panther would be required. The USFWS is currently completing a review of risk assessments and contaminant remediation for the Woerner Farm 3 property as provided by the SFWMD and is expected to issue a concurrence with the may affect not likely to adversely affect determination for the bald eagle and wood stork for the proposed Acceler8 project prior to completion of the Final EIS.

5.3.9 Sugar Cane Growers Cooperative of Florida

By letter dated October 25, 2005, the Sugar Cane Growers Cooperative of Florida requested an extension of the regulatory public notice comment period to coincide with the yet to be determined comment period of the Supplemental Draft PIR/EIS when the modeling assumptions and complete information for assurances is provided. This request was based on the Draft PIR analyzing the reservoir as a 30,000-acre unit with no analysis of the first phase or approximately 17,000 acres as a stand-alone project i.e., the SFWMD's proposed EAA Reservoir A-1 Project. Additionally, the Sugar Cane Growers Cooperative of Florida questioned the language on the back page of the public notice which stated no EIS is necessary under NEPA. By letter dated November 21, 2005, the USACE, responded stating that in preparation of the public notice, the statement that preliminary review indicates an Environmental Impact Statement (EIS) will not be required was inadvertently included. The letter clarified that the Regulatory Division of the USACE has determined that the SFWMD's proposed EAA Reservoir A-1 Project requires an EIS and that the EIS prepared by the Planning Division for the CERP EAA Storage Reservoirs Project would serve as the NEPA document for the regulatory action. Since that time, the SFWMD has decided not to wait for the completion of a Final EIS for the CERP EAA Storage Reservoirs project but to proceed with its Acceler8 project. Accordingly, a separate regulatory action is now being considered, and other information necessary to complete the NEPA evaluation for the EAA Reservoir A-1 as a stand-alone project is included in this Supplemental Draft EIS. The USACE also informed the Sugar Cane Growers Cooperative of Florida that the SFWMD will provide model runs for the EAA A-1 Reservoir during the 30 percent design phase and would re-circulate a 30-day public notice for the EAA Reservoir A-1 project when the information concerning model assumptions and assurances is provided. It should be noted that this project, if authorized, would be executed independent of CERP. This Supplemental Draft EIS serves to provide information which is necessary to evaluate the public interest factors. In order to issue a permit, it must be demonstrated

that the project, is in the interest of the public, consistent with the C&SF Project, as modified, and will not adversely impact water supplies or cause flood hazards.

5.4 FUTURE PUBLIC INVOLVEMENT FOR THE EAA RESERVOIR A-1 PROJECT

The EAA Reservoir A-1 Project will have impacts on the surrounding area and local communities. The list of stakeholders will continue to be developed as the design for the EAA Reservoir A-1 Project progresses. Stakeholders currently identified include the following:

- Audubon Society of Florida
- Bergeron
- Carroll, Jack E. and Larry G.
- EAA Environmental Protection District
- Florida Crystals Corporation
- Florida Department of Agriculture and Consumer Services
- Florida Department of Environmental Protection
- Florida Department of Transportation
- Florida Fish and Wildlife Conservation Commission
- Florida Ranch Enterprises, Inc.
- Florida Power & Light
- Okeelanta Corporation
- New Hope South, Inc.
- NLDS Acquisition Corporation
- Palm Beach County
- Star Ranch Enterprises, Inc.
- Sugar Farms Co-op
- Talisman Sugar Corporation
- Tri-Cities (South Bay, Pahokee, Belle Glade)
- U.S. Army Corps of Engineers
- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service
- U.S. Natural Resources Conservation Service

- U.S. Sugar Corporation
- Woerner South Inc
- Miccosukee Tribe of Indians of Florida
- Seminole Tribe of Florida

This Supplemental Environmental Impact Statement, for the SFWMD's proposed EAA Reservoir A-1 Project will be distributed to interested members of the public and made available at public venues such as libraries and governmental buildings. This will be accompanied by print and electronic publication of the event. Project information and points of contact will also be provided at the Jacksonville District web page: www.saj.usace.army.mil.

There will be a 45-day comment period after this Supplemental EIS has been published and a 30-day comment period after a Final EIS is published. Responses received from the public and agencies within the comment periods will be compiled and considered in the EAA Reservoir A-1 design.

As this project progresses, it is anticipated that previous public involvement work, such as that undertaken by the SFWMD and the USACE will continue and be expanded upon to address the specific issues of the proposed EAA Reservoir A-1 Project.

5.5 FEDERAL, STATE AND LOCAL PERMITS, LICENSES OR OTHER CONSULTATION REQUIREMENTS

SFWMD will be responsible for obtaining Federal, State and Local permits, Licenses or other consultation requirements for the proposed EAA Reservoir A-1 Project, as described in this section.

5.5.1 Spill Prevention, Control and Countermeasures (SPCC) Plans – CWA

Under the provisions of USEPA 40 CFR Part 112 - Oil Pollution Prevention, facilities which have above ground petroleum products storage of greater than 1,320 gallons aggregate or greater than 42,000 gallons below ground storage, are required to have a SPCC Plan which meets all of the requirements of this regulation. Part 112 of 40 CFR establishes procedures, methods and equipment, and other requirements to prevent the discharge of oil from facilities into or upon the navigable waters of the United States or adjoining shorelines. The SPCC Plan must be formulated under the supervision of and certified by a registered professional engineer and must be available at the facility for inspection by the FDEP and USEPA personnel. If above ground petroleum products storage exceeds the above thresholds, a SPCC Plan will be required.

5.5.2 National Pollution Discharge Elimination System Permits (NPDES)

Section 402 permits (NPDES) required under the Clean Water Act will also be required for the construction of project features (non-point source runoff). This program has been delegated by the USEPA. for implementation to FDEP. NPDES permits for construction of project features under the Acceler8 program prior to Federal approval and authorization of the Selected Plan for the federal EAA Storage Reservoirs project will be the responsibility of SFWMD.

5.5.3 Coastal Zone Management Act (CZMA)

The CZMA authorizes the National Oceanic and Atmospheric Administration to administer the federal Coastal Zone Management Program (CZMP). The purpose of CZMP is to preserve, protect, develop, and where possible, to restore or enhance, the resources of the nation's coastal zone. The federal CZMP has delegated the day-to-day management of the program in Florida to the Florida Department of Community Affairs, including determinations of consistency (FDEP 2005b).

CZMP coordinates state governmental activities related to the protection, preservation, and development of Florida's natural, cultural, and economic coastal resources. A network of 10 agencies implements the program (FDEP 2005b). As part of the 404 regulatory review, the project is reviewed for consistency. Issuance of a permit from the FDEP normally certifies that the project is consistent with the CZM plan.

5.5.4 Magnuson-Stevens Fishery Conservation and Management Act

Public Law 104-208 reflects the Secretary of Commerce and Fishery Management Council authority and responsibilities for the protection of EFH. Federal agencies that fund, permit, or carry out activities that may adversely impact EFH are required to consult with the NOAA Fisheries regarding the potential effects of their actions on EFH. The USACE is satisfied that the consultation procedures to implement the EFH provisions of the Magnuson-Stevens Act have been met.

5.5.5 Section 7 Endangered Species Act Consultation

Compliance with Section 7 of the Endangered Species Act is being handled through the Section 404 permit process.

5.5.6 Section 106 - Cultural Resources

The proposed project has been determined to be compliant with Section 106 of the National Historic Preservation Act.

5.5.7 Clean Air Act (CAA)

The northeast pump station proposed for the EAA Reservoir A-1 may affect air quality; thus compliance with this act will be required. However, under the current delegation agreement between the USEPA and FDEP, permit review is administered at the state level and reviewed for concurrence with CAA Requirements by the USEPA. Please refer to State Permitting Requirements below for further details.

5.5.8 State Permits

5.5.8.1 Comprehensive Everglades Restoration Plan Act (CERPRA)

The FDEP is responsible for reviewing the majority of environmental permits. Florida Statute 373.1502(3)(b) authorizes the FDEP to issue permits for the construction, operation and maintenance of CERP project components under the CERPRA. The SFWMD's proposed EAA Reservoir A-1 Project is considered part of the CERPRA.

5.5.8.2 Consumptive Use Permit

The SFWMD's proposed EAA Reservoir A-1 Project will be permitted under CERPRA, therefore, a Consumptive Use Permit will not be required in accordance with Florida Statute Section 373.323 F.S. During the CERPRA process, however, a consumptive use evaluation will be conducted. All pertinent information has been submitted with the CERPRA application (Dated June 2005).

5.5.8.3 Florida Department of Transportation Access Permit

An Access Permit is required from the FDOT for driveways, streets, turnouts, or other means of providing access to the state highway system. Rule 14-96 and 14-97 F.A.C. govern access permits. Any access roads constructed for the EAA Reservoir A-1 Project, which will connect to the state highway system, will require an access permit from the FDOT. A General Permit will be required for the construction of the planned bridge on U.S. 27, thus coordination with FDOT is ongoing. In addition, the proposed EAA Reservoir A-1 Project would be required to undergo Maintenance of Traffic review to determine any necessary traffic improvements resulting from the EAA Reservoir A-1 Project.

5.5.8.4 Clean Air (Title V) Permit

The FDEP is responsible for all Title V permits, which regulate both major and minor emitters. The District shall apply for these permits during the construction and operation phases.

5.5.8.5 Petroleum Storage Tanks

Petroleum storage tanks are regulated under the provisions of Rule 62-761 F.A.C. (Underground Storage Tanks – USTs) and Rule 62-762 F.A.C. (Aboveground Storage Tanks – ASTs). If the EAA Reservoir A-1 Project requires either UST storage capacity in excess of 110 gallons or AST storage capacity in excess of 550 gallons, then the project must comply with the applicable standards for engineering, construction and operation of the storage system. Additionally, all regulated storage tanks must be registered with the FDEP and will be subject to annual inspections by the Palm Beach County Department of Environmental Resource Management.

5.5.8.6 Hydrostatic Testing Permits

Hydrostatic test plans will be reviewed by FDEP and a permit determination will be made by the FDEP, if any testing is required in the proposed EAA Reservoir A-1 Project.

5.5.8.7 National Pollution Discharge Elimination System (NPDES) Permits

Construction activities associated with the EAA Reservoir A-1 Project will likely be permitted under FDEP's Generic Permit for Stormwater Discharge from Large and Small Construction Activities (GCP) pursuant to Section 62-21.300(4)(a) F.A.C. This NPDES permit requires development of a Storm Water Pollution Prevention Plan (SWPPP). In addition to the GCP, if any offsite discharges will occur due to construction dewatering activities, coverage under the NPDES General Permit for the Discharge of Produced Groundwater from any non-contaminated site activity may be required pursuant to Section 62-621.300(2) F.A.C.

5.5.8.8 Dam Safety Permit

The FDEP is responsible for the State of Florida Dam Safety Program; the water management districts within the State are also authorized to regulate dams. The permitting process for construction of dams within the State of Florida is found within Chapter 373 F.S. Additionally, the Federal Emergency Management Agency (FEMA) has published a report titled Federal Guidelines for Dam Safety (April 2004). The height and size of the

proposed berm around the EAA Reservoir A-1 will determine which provisions apply.

5.5.8.9 Local Permits

Local permitting authority for the EAA Reservoir A-1 Project resides with several county Departments and Divisions. Primary coordination of local permit review will be administered by Palm Beach County's Planning, Zoning and Building (PZB) Division. Following is a list of County Departments and Divisions which will be involved in review of the proposed EAA Reservoir A-1 Project.

Palm Beach County Planning, Zoning & Building (PZB) Division – Development Review

Under the County's Development Review Procedures, the EAA Reservoir A-1 Project may be required to obtain Zoning Approval and a Building Permit prior to construction. However, in discussions with County PZB Division staff, it was indicated that the County will first review the proposed EAA Reservoir A-1 Project to determine if it may be exempted from this process under the provisions of the EFA, Section 373.4592 F.S. If not, the following reviews will be conducted.

Palm Beach County Fire Rescue

As a component of building code compliance review, the proposed EAA Reservoir A-1 Project will be required to demonstrate compliance with County and National Fire Protection Association (NFPA) Fire Codes regarding fire protection facilities and emergency response capabilities.

Palm Beach County Health Department (CPHU)

The CPHU will be responsible for permitting any potable water or domestic waste facilities both during the construction and post-construction phases of the EAA Reservoir A-1 Project. If temporary sanitary facilities or holding tanks are required to temporarily support construction personnel, these facilities will need to be permitted by the CPHU. If permanent potable water and domestic waste facilities are planned, these facilities will require both construction and operation permits.

In addition, a permit is required for the construction, repair, or abandonment of any well unless specifically exempted by rule or law. The construction and/or repair of water wells, including monitoring wells, must be performed by a Florida-licensed water well contractor. Section 62-532 of the FDEP Rules regulates all such activities (DOH, 2005). The County Public Health Unit (CPHU) is delegated the authority for issuance of permits for wells less than four inches in diameter.

Palm Beach County Department of Environmental Resources Management
Vegetation removal activities in Palm Beach County are regulated under Article 14C of the Unified Land Development Code (ULD). In general, this ordinance requires a standard permit for vegetation removal on non-residential projects of any size. However, a "de minimis approval" may be available for projects involving removal of invasive and nuisance species only. Compliance review will be conducted by the Palm Beach County Department of Environmental Resource Management.

CHAPTER 6
LIST OF PREPARERS AND REVIEWERS

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CHAPTER 7
LIST OF AGENCIES, ORGANIZATIONS, AND PERSONS TO WHOM COPIES OF THE STATEMENT ARE SENT

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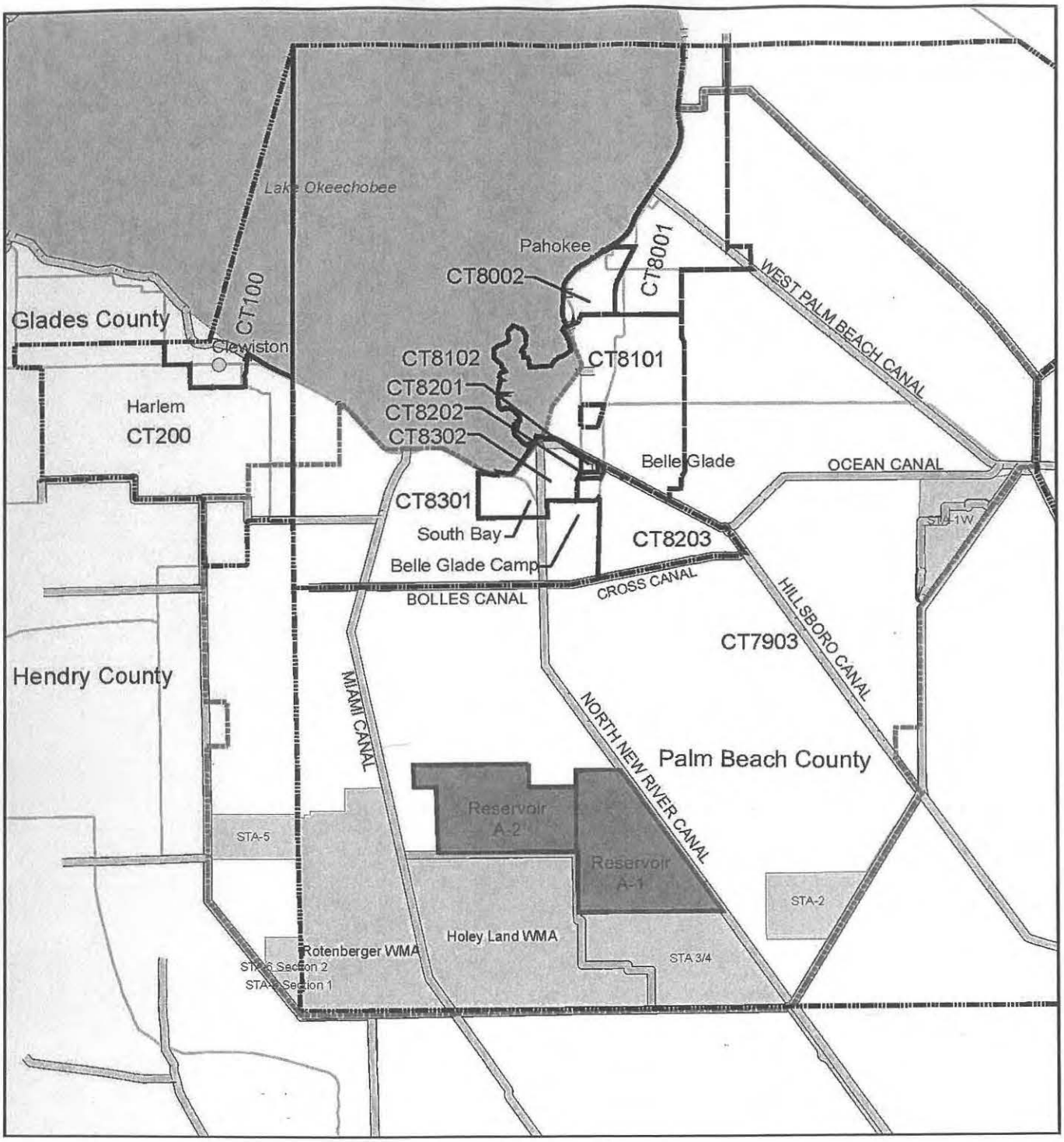
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APPENDIX A
FIGURES

Figure 14: Census Tracts in the EAA and Vicinity

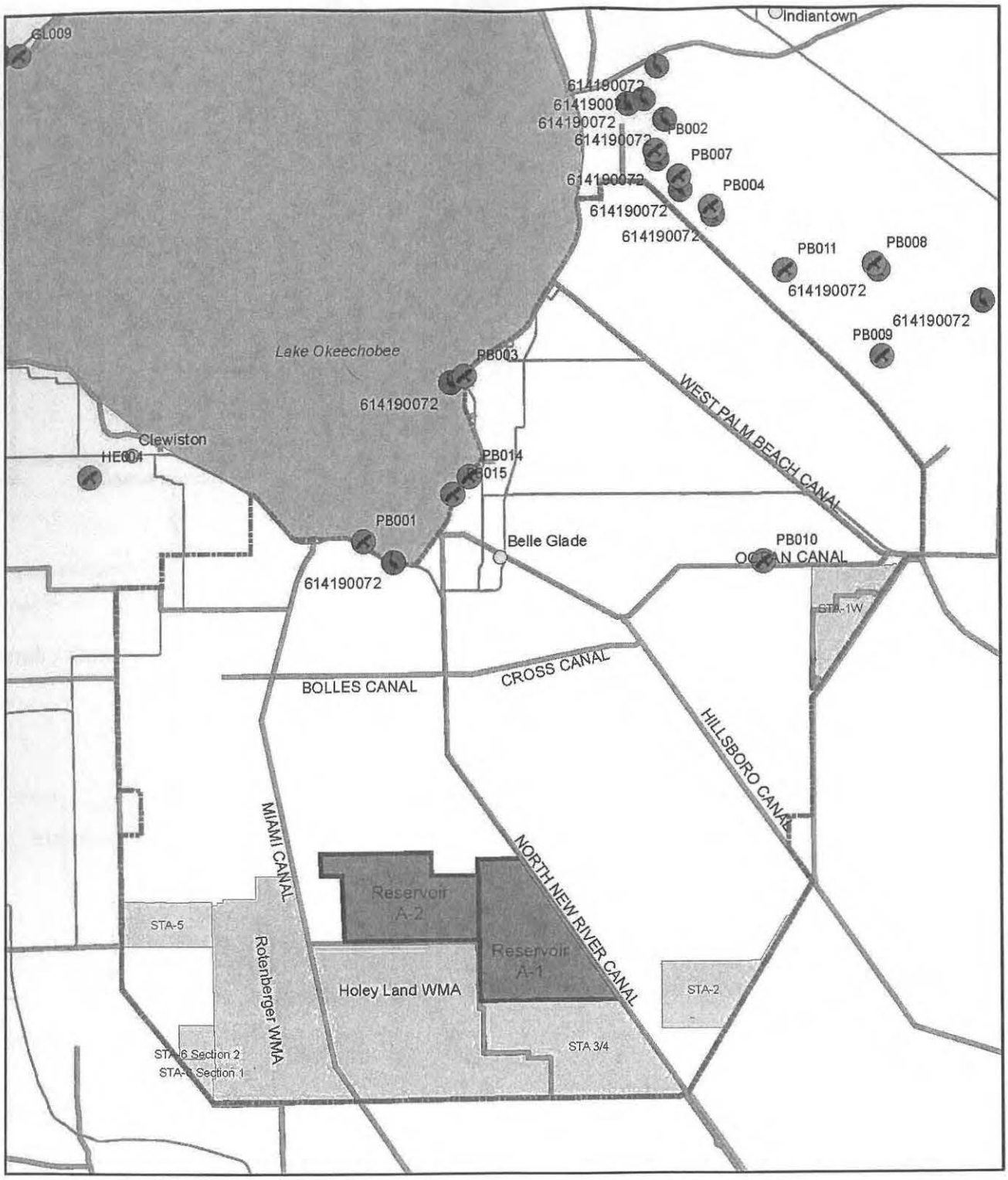


Legend

- Everglades Agricultural Area Boundary
- Compartment A
- Census Tracts

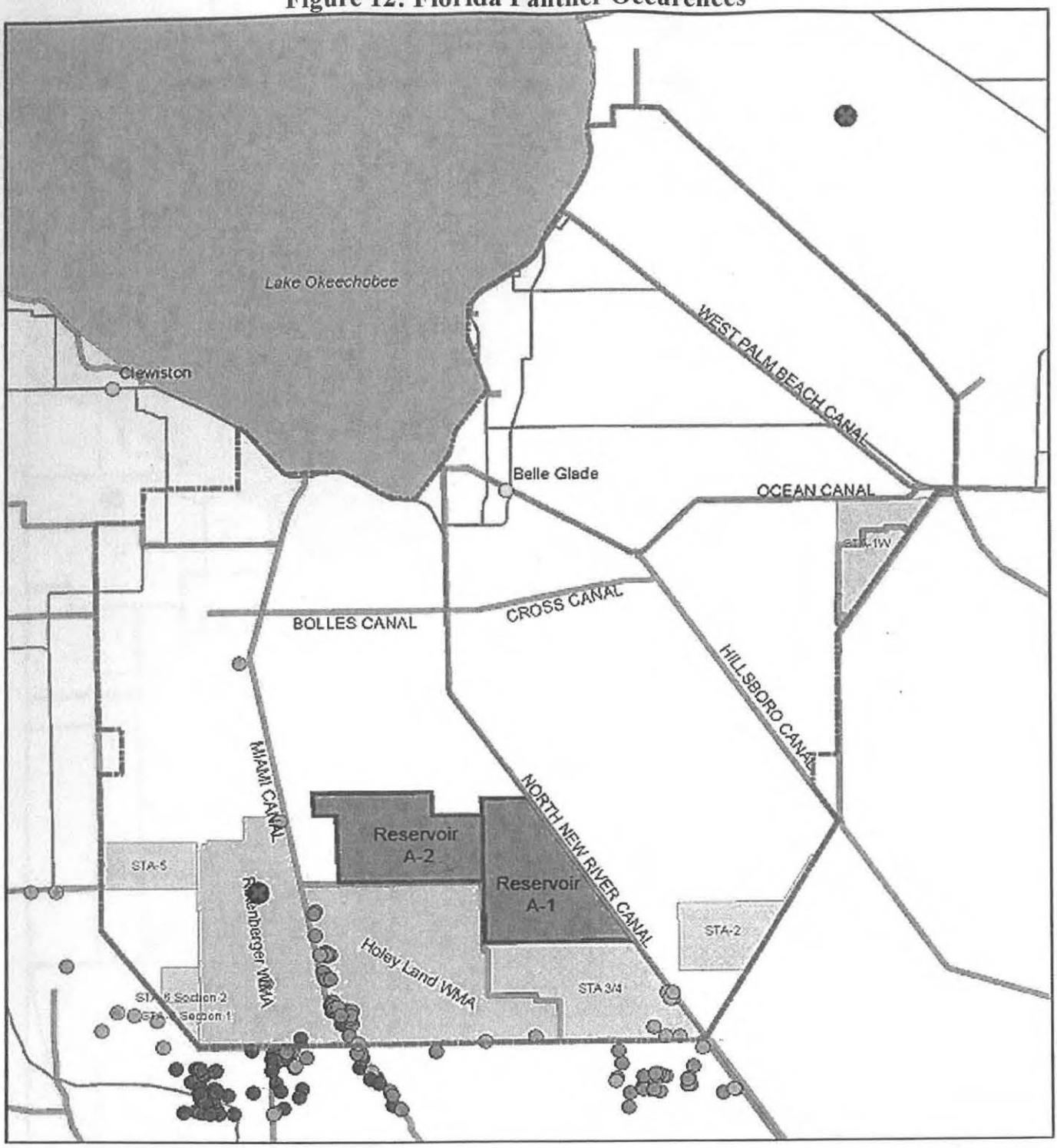
Census Tracts in the
Everglades Agricultural Area and Vicinity

Figure 13 Wading Bird Rookeries and Bald Eagle Nests

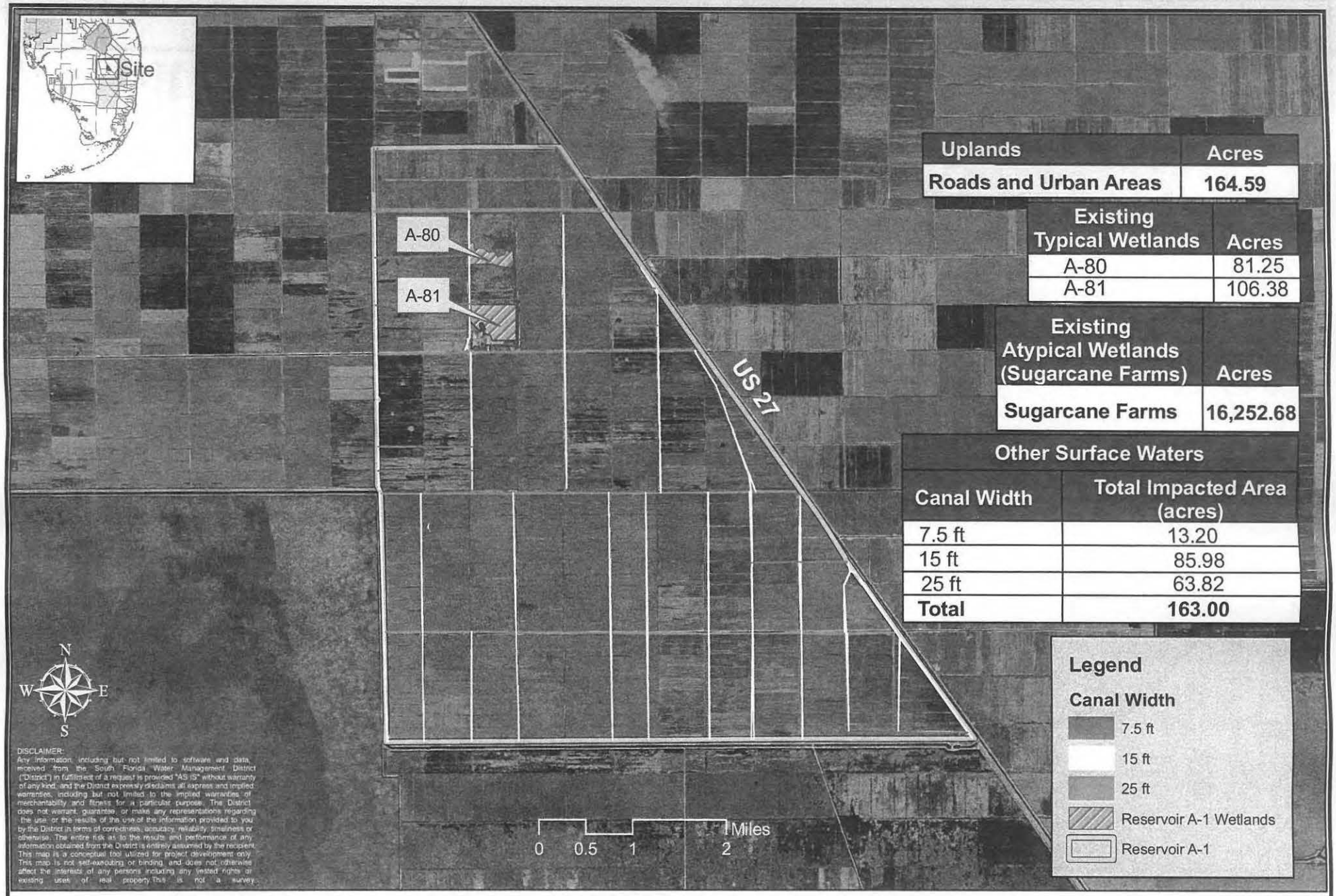


Wading Bird Rookeries and Bald Eagle Nests

Figure 12: Florida Panther Occurences



Florida Panther Occurrences



Uplands	Acres
Roads and Urban Areas	164.59

Existing Typical Wetlands	Acres
A-80	81.25
A-81	106.38

Existing Atypical Wetlands (Sugarcane Farms)	Acres
Sugarcane Farms	16,252.68

Other Surface Waters	
Canal Width	Total Impacted Area (acres)
7.5 ft	13.20
15 ft	85.98
25 ft	63.82
Total	**163.00**

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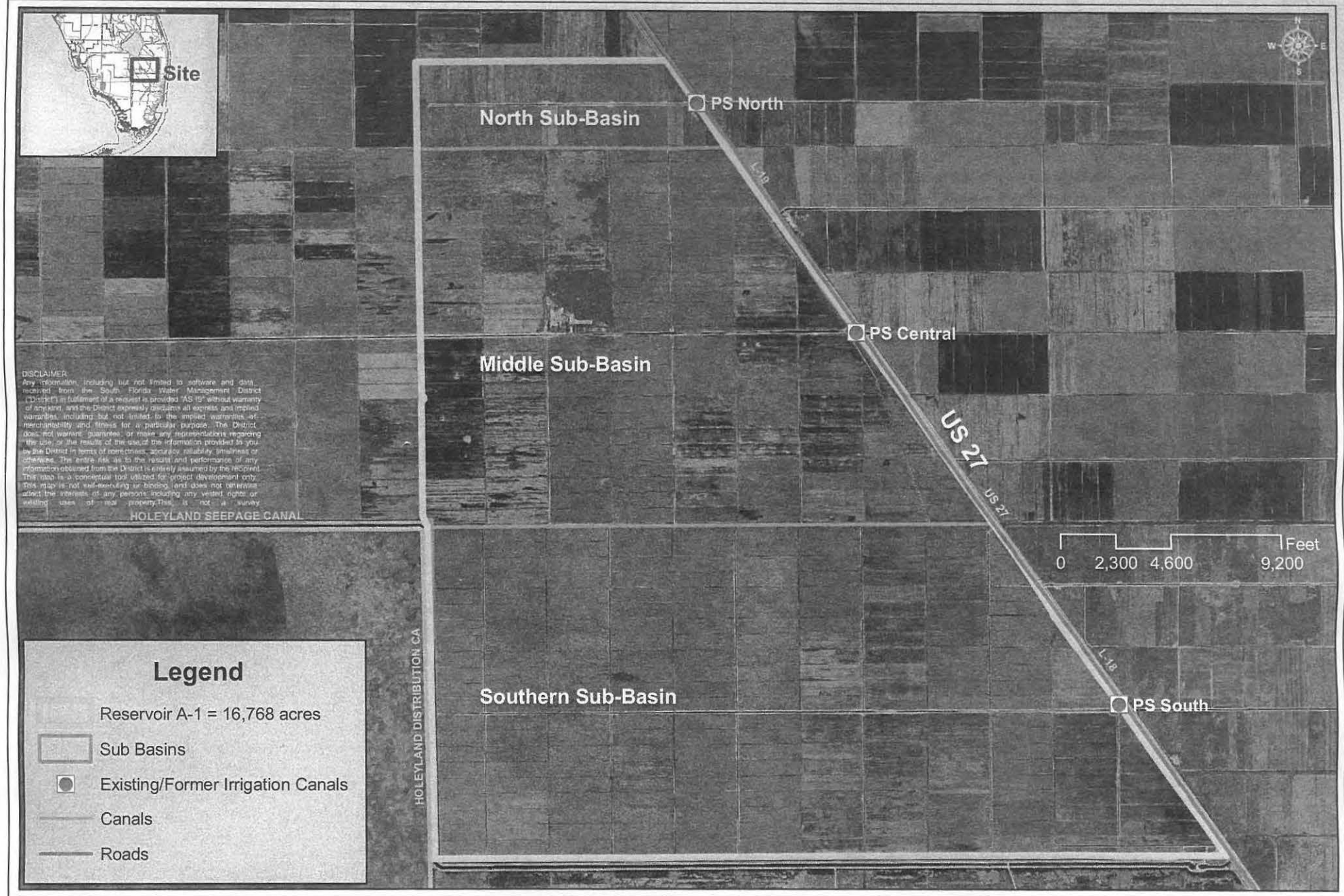
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FIGURE 11

EAA Reservoir A-1
Typical & Atypical Wetlands
And
Impacted Canals and Ditches

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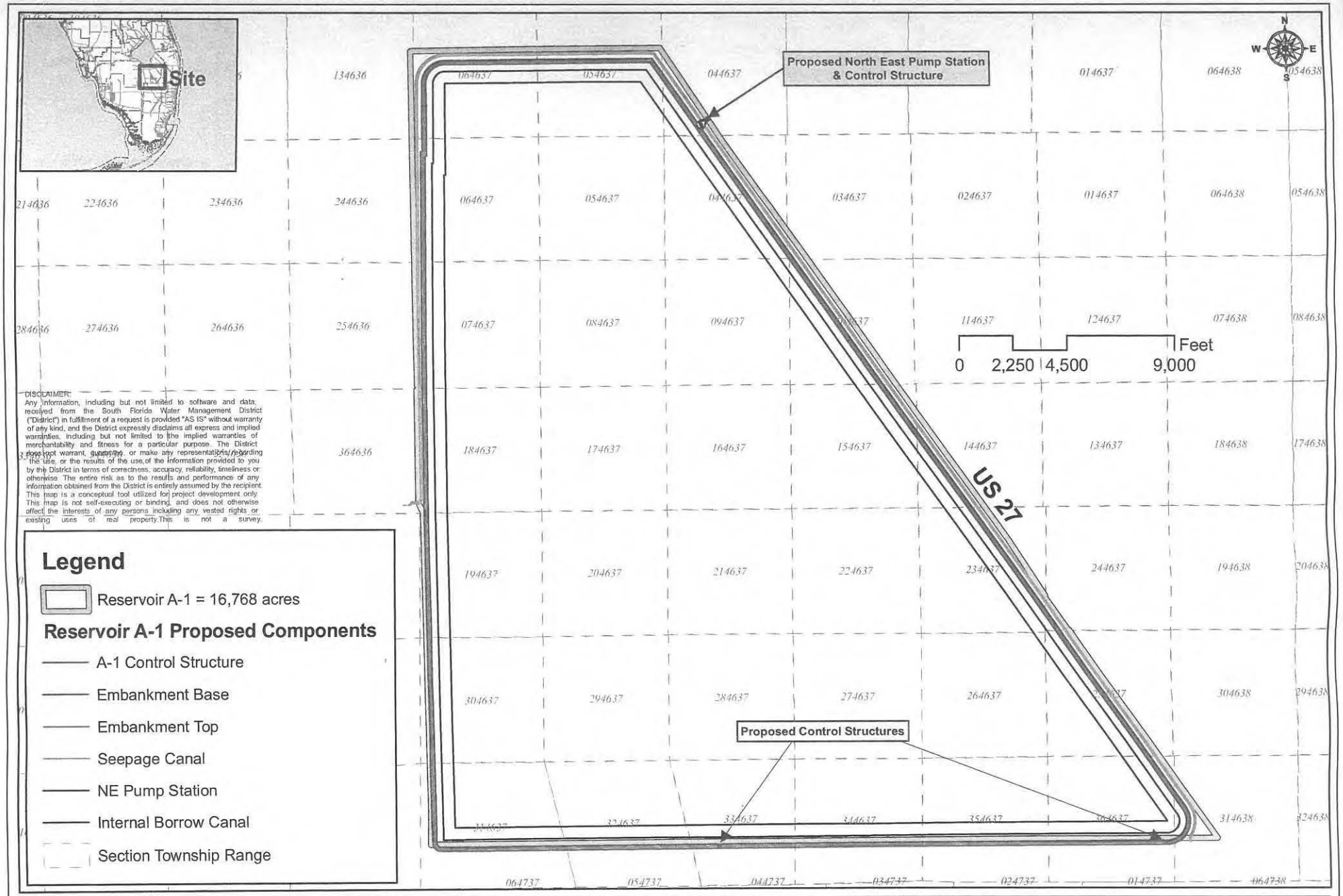
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West Palm Beach, FL 33409
Tel # (561) 242-5520

FIGURE 10

EVERGLADES AGRICULTURAL AREA
RESERVOIR A-1
HAZARDOUS, TOXIC
AND RADIOACTIVE WASTE MAP

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Reservoir A-1\EIS_Maps\Map_docs\HTRW.mxd



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FIGURE 9

EVERGLADES AGRICULTURAL AREA
RESERVOIR A-1
STRUCTURES AND CANALS LOCATIONS

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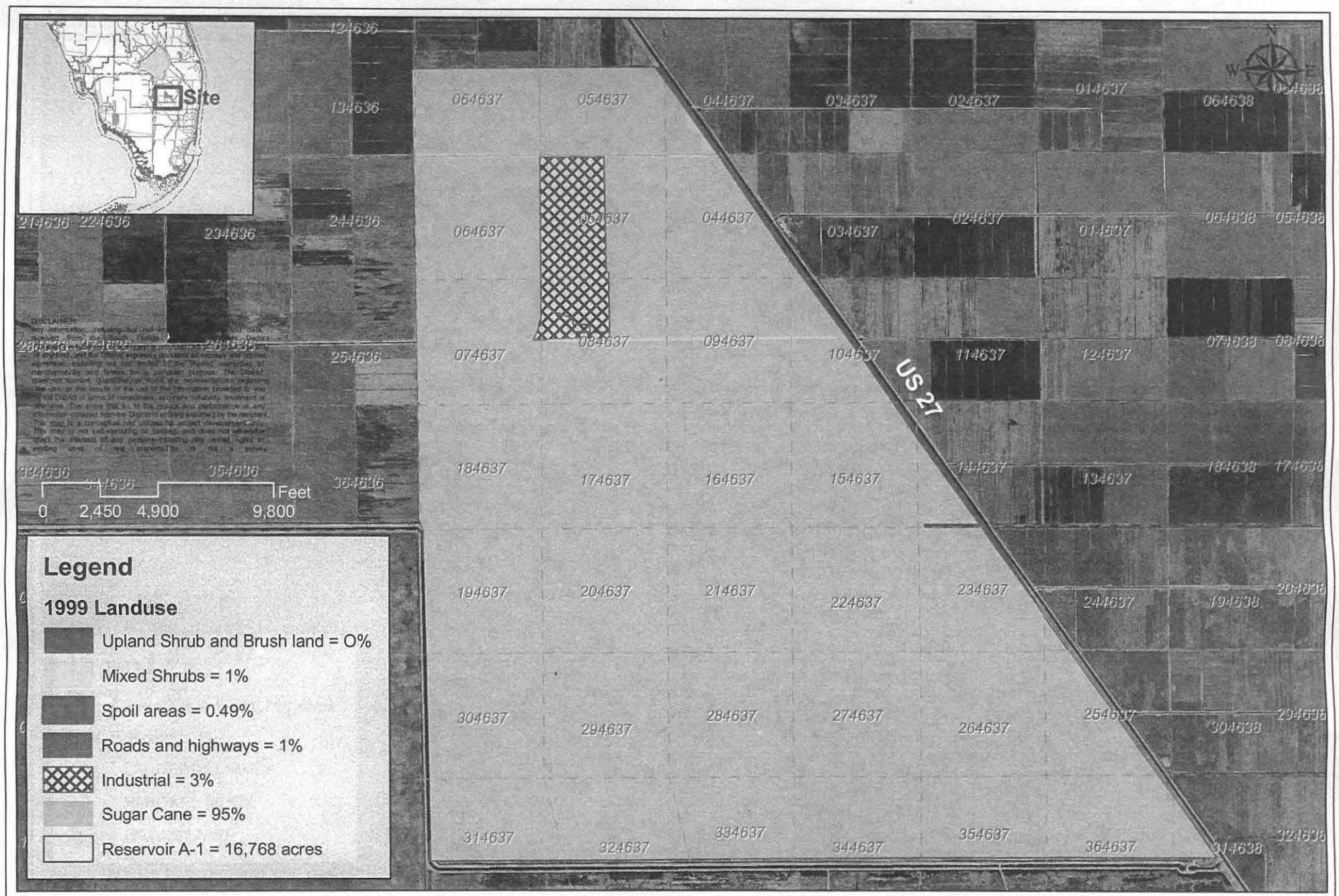


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FIGURE 8
EVERGLADES AGRICULTURAL AREA
RESERVOIR A-1
NRCS SOILS MAP

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Reservoir A-1\EIS_Maps\Map_docs\NRCS_Soils.mxd



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FIGURE 7
EVERGLADES AGRICULTURAL AREA
RESERVOIR A-1
EXISTING LANDUSE MAP

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Reservoir A-1\EIS_Maps\Map_docs\Existing_Landuse.mxd

Figure 6
Seepage Control Alternative #3 and Impact on Groundwater Levels at the Full EAA Reservoir A-1 Depth of 12 feet

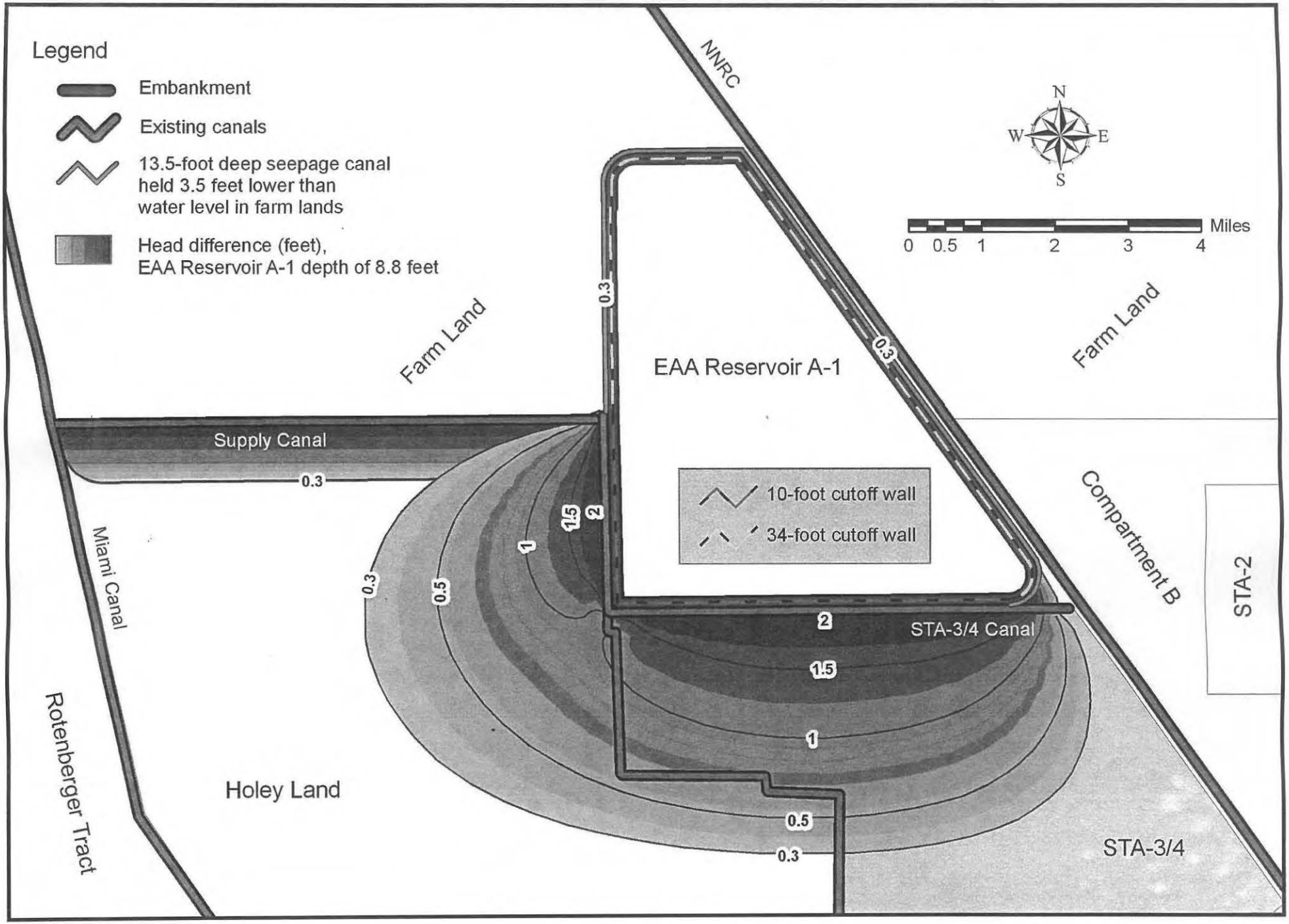
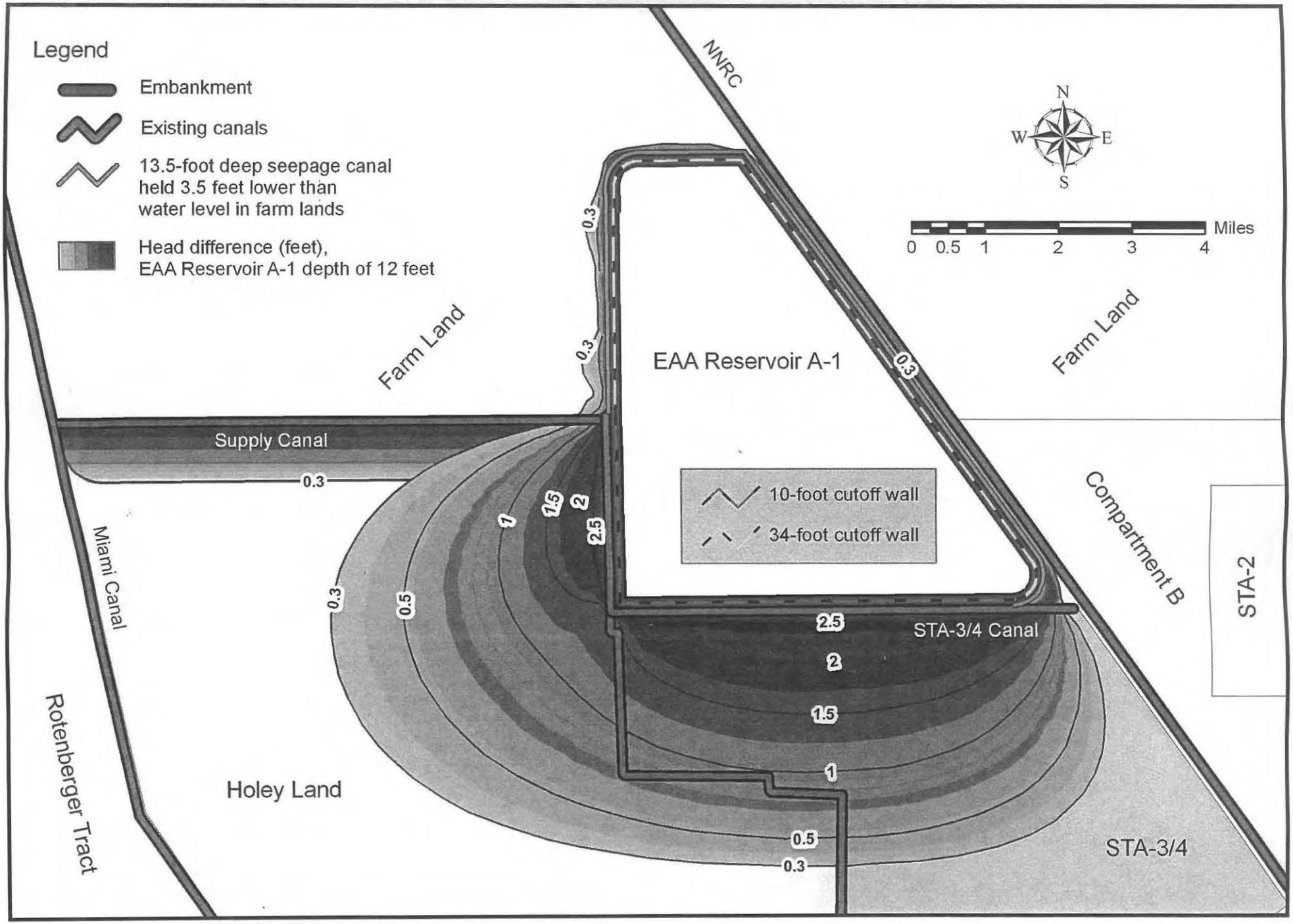
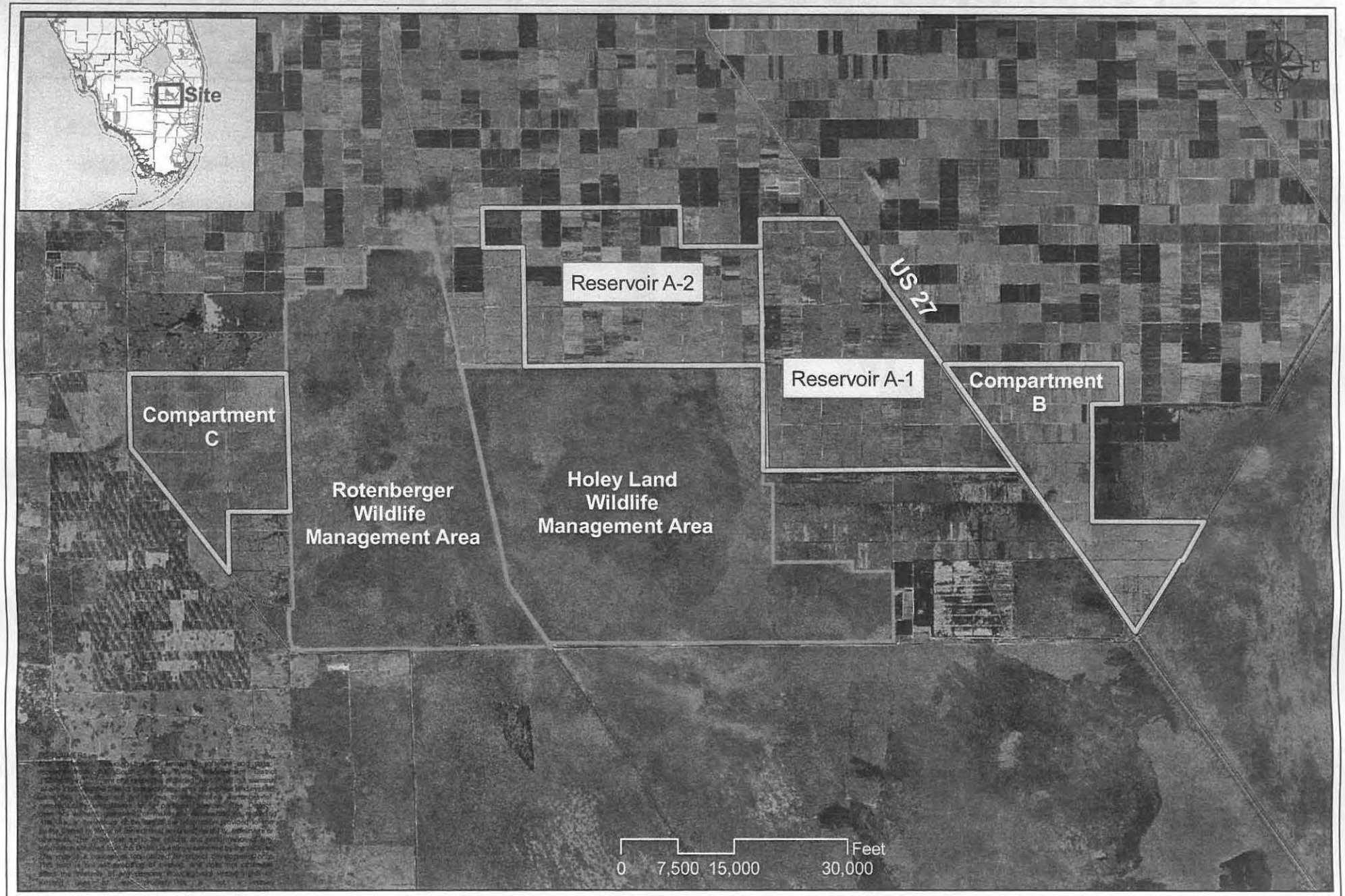


Figure 5

Seepage Control Alternative #3 and Impact on Groundwater Levels at the Average EAA Reservoir A-1 Depth of 8.8 Feet





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FIGURE 4

EVERGLADES AGRICULTURAL AREA PROJECTS

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Figure 3: EAA Reservoirs Project Study Area

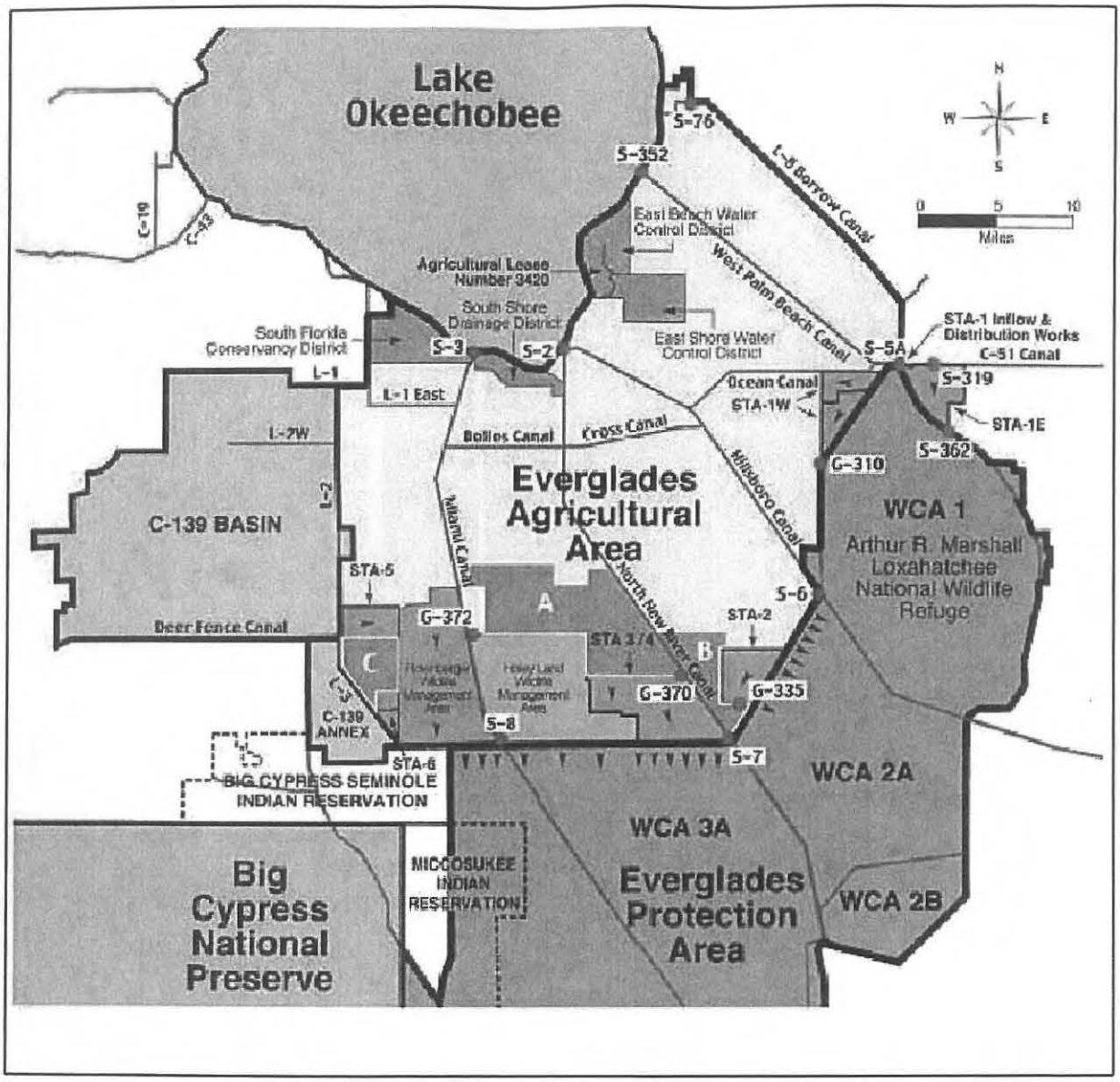
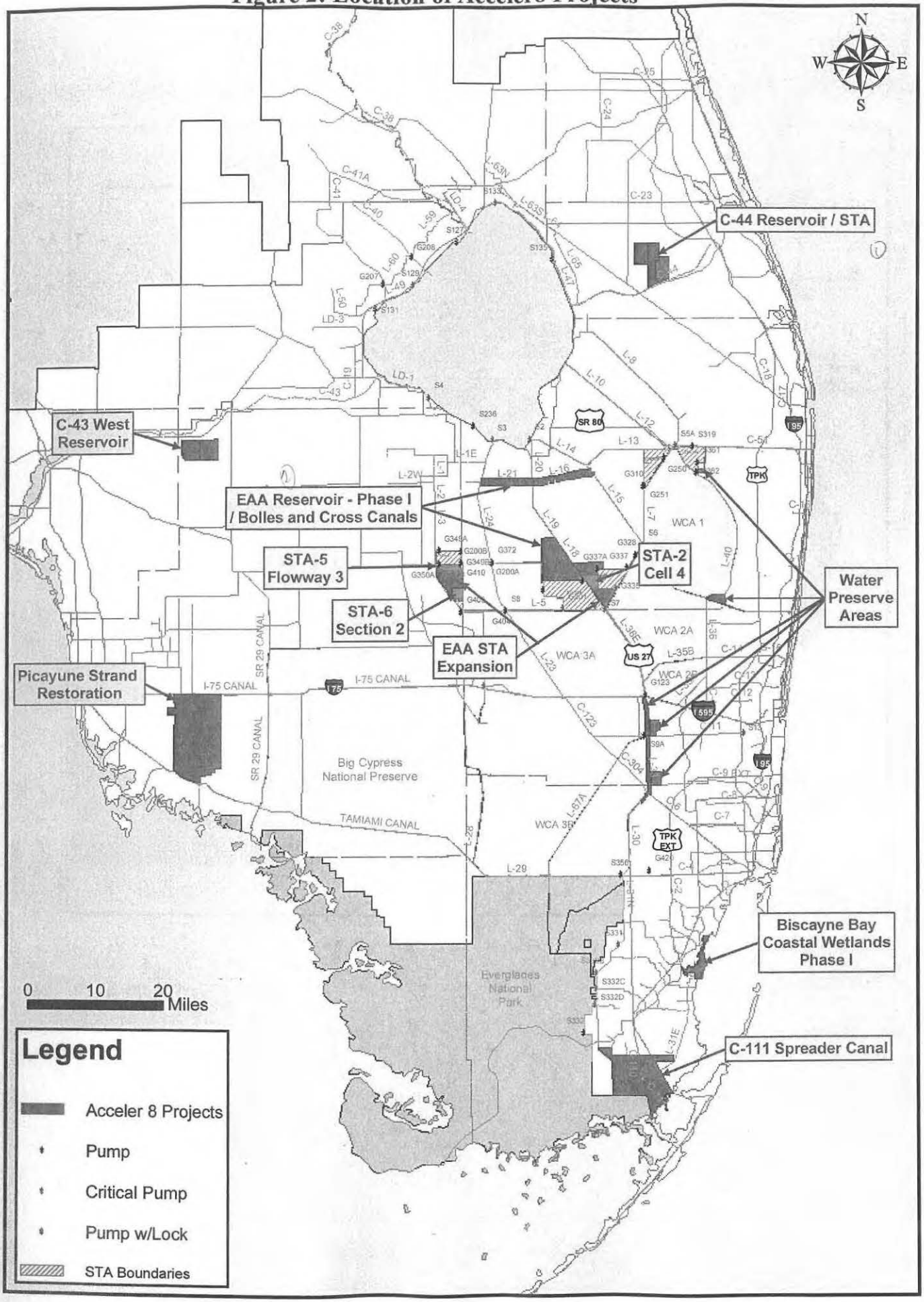


Figure 2: Location of Acceler8 Projects





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FIGURE 1
EVERGLADES AGRICULTURAL AREA
RESERVOIR A-1
PROJECT LOCATION MAP

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Reservoir A-1\EIS_Maps\Map_docs\Project_Location_Map.mxd

