Draft
Environmental Impact Statement
To Construct Stormwater Treatment Areas on Compartments B and C of the Everglades Agricultural Area, Florida

Appendices

June 2008

U.S. Army Corps of Engineers
JACKSONVILLE DISTRICT

Prepared for:

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Under South Florida Water Management District, West Palm Beach, FL
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APPENDIX A

FRAMEWORK AGREEMENT

FRAMEWORK AGREEMENT AMONG THE UNITED STATES DEPARTMENT OF THE INTERIOR THE UNITED STATES DEPARTMENT OF THE ARMY THE STATE OF FLORIDA, DEPARTMENT OF ENVIRONMENTAL PROTECTION AND THE SOUTH FLORIDA WATER MANAGEMENT DISTRICT

THIS AGREEMENT is entered into this 3rd day of October, 1996, by and among the UNITED STATES DEPARTMENT OF THE INTERIOR (hereinafter "Interior"), represented by its Assistant Secretary for Fish and Wildlife and Parks; the UNITED STATES DEPARTMENT OF THE ARMY (hereinafter "Army"), represented by its Assistant Secretary (Civil Works); the STATE OF FLORIDA, DEPARTMENT OF ENVIRONMENTAL PROTECTION (hereinafter "DEP"), represented by its Secretary; and the SOUTH FLORIDA WATER MANAGEMENT DISTRICT (hereinafter "SFWMD"), represented by its Governing Board and Executive Director, (hereinafter collectively "the parties")

WITNESSETH, THAT:

WHEREAS, reliable scientific evidence establishes a critical need to restore the ecological integrity of the Florida Everglades Restoration Area, which, for the purposes of this Agreement is broadly defined in Section 390 of the Federal Agriculture Improvement and Reform Act of 1996, Public Law 104-127, 110 Stat. 1022, as extending from the Kissimmee River Basin to Florida Bay in South Florida and generally includes lands and waters within the boundary of the SFWMD and contiguous near-shore coastal waters, (hereinafter the "Everglades ecosystem"); and

WHEREAS, the parties to this Agreement share a commitment to study, monitor, restore, and protect the Everglades ecosystem through a variety of means within their respective authorities and recognize that the best way to avoid disputes is through early and continual consultation; and

WHEREAS, Section 390 of Public Law 104-127, provides up to three hundred million dollars ($300,000,000.00) (hereinafter "Section 390 funds") to the Secretary of the Interior to fund or conduct restoration activities in the Everglades ecosystem, including the acquisition of real property and interests in real property located within the Everglades ecosystem and the funding of resource protection and resource maintenance activities in the Everglades ecosystem; and

WHEREAS, Section 390 also provides the Secretary of the Interior with the discretion to determine the use of Section 390 funds for restoration

purposes and with the responsibility to ensure that Section 390 funds are used for restoration purposes; and

WHEREAS, the Secretary of the Interior preserves, conserves, and protects the natural areas under his jurisdiction as set out in the National Park Service Organic Act, the enabling legislation for four units of the National Park System, the orders and statutes authorizing the creation of six wildlife refuges, the Wilderness Act, the Endangered Species Act, the Fish and Wildlife Act of 1956, the Fish and Wildlife Coordination Act, the Fish and Wildlife Conservation Act of 1980, the Fish and Wildlife Improvement Act of 1978, Executive Order 12996 on the Management and General Public Use of the National Wildlife Refuge System, and other statutes, treaties, executive orders, and regulations implementing and interpreting them; and

WHEREAS, the Army formulates plans, constructs features, and operates and maintains the components of the Central and Southern Florida Project (hereinafter the "C&SF Project") to provide a variety of benefits that include flood control, navigation, water supply (agricultural, municipal, and industrial), preservation of fish and wildlife, preservation of Everglades National Park, water supply to Everglades National Park, recreation, water quality, prevention of salt water intrusion, groundwater recharge, and protection of the natural values associated with Everglades National Park; and

WHEREAS, the SFWMD operates and maintains the components of the C&SF Project as local sponsor for the Army, constructs works of the District, and manages and controls water for a variety of benefits that include flood control; water storage; preservation of natural resources, fish and wildlife; water supply for the Everglades National Park, urban and agricultural areas, and Florida Bay; and Everglades restoration and

protection as set out in the Florida Water Resources Act of 1972 and the Everglades Forever Act of 1994; and

WHEREAS, it is the policy of the DEP that citizens shall be assured public ownership of natural areas for purposes of maintaining Florida's unique natural resources; protecting air, land and water quality; and providing lands for natural resource based recreation and acquiring lands within and buffering the Everglades ecosystem is essential to protecting water quantity and quality, biodiversity and an ecosystem of global significance; and

WHEREAS, the DEP and the SFWMD are committed to provide for effective stewardship of resources within their jurisdictions and desire to proceed with activities benefiting the Everglades ecosystem, including Everglades restoration and protection under the Everglades Forever Act, Chapter 94-115, Laws of Florida; and

WHEREAS, the parties expect that the prudent use of funds made available under Section 390, in conjunction with other restoration activities including those under the Everglades Forever Act, will yield a more natural and sustainable ecosystem in South Florida; and

WHEREAS, the parties desire to take action consistent with their authorities to restore a more natural hydro-pattern to the remnant Everglades ecosystem and acquire critical real property necessary to provide for the restoration of that hydro-pattern; and

WHEREAS, the parties desire to establish a framework within which the Secretary of the Interior may provide Section 390 funds to be used in concert with other funds provided by the parties for restoration activities in the Everglades ecosystem;

NOW, THEREFORE, Interior, the Army, DEP, and SFWMD agree as follows:

WATER MANAGEMENT PURPOSES IN CONNECTION WITH ARMY CORPS OF ENGINEERS PROJECTS

In order to restore the Everglades ecosystem, the Secretary of the Interior may provide, and the parties agree to use, Section 390 funds to acquire real property or to construct features that are intended to become a part of existing or future Army Corps of Engineers projects (hereinafter "Army projects") authorized by Congress. Except as otherwise provided by law or agreed to by the Secretary of the Interior, the parties agree that all Section 390 funds expended pursuant to this Article will be matched by non-federal funds on a dollar-for-dollar basis.

The respective federal and non-federal share of costs of such authorized Army Corps of Engineers projects shall be as set forth in law. Section 390 funds disbursed for the acquisition of real property or the construction of features shall count as federal funds for cost-sharing purposes for Army projects. Funds provided by non-federal parties to match federal funds provided under Section 390 will be treated as non-federal funds for cost-sharing purposes for Army projects. The value of real property acquired pursuant to this article shall be the acquisition cost of such real property for credit purposes under applicable cost-sharing principles.

The parties agree that any real property acquired or features constructed with funds pursuant to this Article shall be used to conduct restoration activities in the Everglades ecosystem. Any real property acquired pursuant to this Article shall contain an acknowledgment in the deed transferring title that the real property was acquired for Everglades ecosystem restoration activities with funds made available under Section 390.

The parties agree that the real property acquired pursuant to this

Article may be held for a period of years (hereinafter "the interim period") until it is incorporated into an Army project. The party holding the real property agrees that it will manage the real property during the interim period for existing uses or other short term uses that are not inconsistent with the purpose of restoring the Everglades ecosystem. If during the interim period the party holding the real property desires to change the existing use of the real property, it will develop, in consultation with the other parties to this agreement, an interim management and use plan.

If any party to this Agreement desires to change the management of water affecting such real property during the interim period, that party shall consult with the other parties to this Agreement. The proposed change in water management shall be evaluated by the Army in accordance with existing protocols between the SFWMD and the Army and, if necessary, the dispute provisions of this Article. If the party holding the real property would incur increased management costs as a result of a proposed change in water management, that party must concur with the change in water management before the change would occur.

The interim period shall end when the real property is incorporated into an Army project, which shall occur at the time the Army notifies the SFWMD in accordance with the Project Cooperation Agreement that the project is complete. Thereafter, the SFWMD shall manage the real property incorporated into an Army project in accordance with approved water control plans and operation and maintenance manuals for the project so long as the project remains authorized.

The Army agrees that it will collaborate with the other parties to this Agreement as it formulates its project plans, water control manuals, and operation and maintenance manuals for Army projects, and any

modifications thereto, that involve real property acquired pursuant to this Article. The Army will give good faith consideration to any comments provided by the parties. The parties acknowledge that the Secretary of the Army is the federal official responsible for final decisions regarding Army projects.

Should the parties agree that any real property acquired pursuant to this Article will not be used for an Army project, the party holding the real property may retain or dispose of the real property in accordance with the provisions of the funding agreements referred to in Article IV.

The parties agree that they will cooperate in good faith in pursuit of the activities discussed in this Article in an effort to avoid disputes. The parties shall exert their best efforts to resolve all disputes at the lowest organizational level possible before seeking to elevate any dispute. The following procedures shall apply if the parties are unable to resolve a dispute.

Should the dispute arise during the interim period, the parties shall set forth in writing the dispute and refer it to either the Assistant Secretary of Army (Civil Works) or the Assistant Secretary of Fish and Wildlife and Parks of the Department of Interior as appropriate given the nature of the dispute involved.

If the dispute involves a land management issue, the dispute shall be referred to the Assistant Secretary of Fish and Wildlife and Parks. The Assistant Secretary for Fish and Wildlife and Parks shall resolve the dispute in accordance with the dispute resolution provisions contained in the applicable funding agreements referred to in Article IV.

If the dispute involves a water management issue, the dispute shall be referred to the Assistant Secretary of Army (Civil Works) who shall resolve the dispute in accordance with the dispute resolution procedures of

any applicable Project Cooperation Agreements. If no Project Cooperation Agreement applies, the Assistant Secretary of Army (Civil Works) shall consult with the parties and exert his best efforts to resolve the dispute. If the dispute remains unresolved, the Assistant Secretary of Army (Civil Works) shall render a final decision resolving the dispute.

Should the dispute arise after the real property is incorporated into an Army project, the parties shall set forth in writing the dispute and refer it to the Assistant Secretary of the Army (Civil Works). Any dispute referred to the Assistant Secretary of the Army (Civil Works) between the Army and the SFWMD shall be resolved in accordance with dispute resolution procedures of applicable Project Cooperation Agreements.

Any dispute referred to the Assistant Secretary of Army (Civil Works) between the Army and Interior shall be the subject of discussions between the Assistant Secretary of Army (Civil Works) and the Assistant Secretary for Fish and Wildlife and Parks, who shall exert their best efforts to resolve the dispute. In the event the Assistant Secretary of Army (Civil Works) and the Assistant Secretary for Fish and Wildlife and Parks are unable to resolve the dispute, either Assistant Secretary may elect to refer the dispute to the Secretary of the Army and the Secretary of the Interior. The Secretary of the Army and the Secretary of the Interior shall consult with each other and exert their best efforts to resolve the dispute. If the dispute remains unresolved, the Secretary of the Army shall render a final decision resolving the dispute.

ARTICLE II - ACQUISITION OF REAL PROPERTY FOR CONSERVATION PURPOSES

In order to restore the Everglades ecosystem, the Secretary of the Interior may provide, and the parties agree to use, Section 390 funds to acquire real property for conservation purposes. Except as otherwise provided by law or agreed to by the Secretary of the Interior, the parties

agree that all Section 390 funds expended pursuant to this Article will be matched by non-federal funds on a dollar-for-dollar basis.

The parties agree that any real property acquired for conservation purposes pursuant to this Article will be subject to certain restrictions in order to meet the responsibilities of the Secretary of the Interior under Section 390 and the Secretary's authority to provide financial assistance. The parties will set out the terms of the restrictions in the individual funding agreements referred to in Article IV.

DEP and SFWMD agree that they will manage real property acquired for conservation purposes pursuant to this Article in accordance with applicable state and federal requirements for conservation lands.

Interior, DEP, and the SFWMD recognize that the restoration of the Everglades ecosystem will benefit from better consultation among managers of conservation lands and, therefore, agree to develop a process of effective collaboration among the managers of conservation lands.

The parties recognize that the conservation value of any lands acquired pursuant to this Article may depend upon the pattern of flow of water on and through such lands. The Army and SFWMD agree among themselves to exercise their respective authorities in connection with the C&SF Project to pursue the goal of more natural flows of water on and through such conservation lands to the maximum extent possible consistent with the authorized purposes of Army projects.

ARTICLE III - OTHER RESTORATION ACTIVITIES

In order to restore the Everglades ecosystem, the Secretary of the Interior may provide, and the parties may use Section 390 funds for restoration activities other than those covered by Articles I and II, including the funding of resource protection and resource maintenance activities in the Everglades ecosystem. Except as otherwise provided by

law or agreed to by the Secretary of the Interior, the parties agree that all Section 390 funds expended pursuant to this Article will be matched by non-federal funds on a dollar-for-dollar basis. The parties agree to set out the terms of the specific activities conducted pursuant to this Article in the individual funding agreements referred to in Article IV.

ARTICLE IV - FUNDING AGREEMENTS

The Secretary of the Interior will provide Section 390 funds pursuant to his authorities to provide financial assistance or to cooperate with the parties to this Agreement. The terms and conditions relevant to the provision of Section 390 funds under this Agreement for restoration activities shall be set forth in individual funding agreements involving Interior, Army, DEP, and SFWMD. Agreements between Interior and Army generally will use the standard forms and follow the standard procedures applicable to the transfer of funds between federal agencies. Agreements between Interior, DEP, and SFWMD generally will use the standard forms and follow the standard procedures of the U.S. Fish and Wildlife Service pertaining to the provision of funds, including grants or cooperative agreements whichever the case may be. The individual funding agreements shall set forth any provisions considered appropriate or necessary to further the restoration of the Everglades ecosystem, as well as any appropriate procedures for resolving disputes. In addition, the funding agreements shall set forth appropriate provisions governing the retention or disposal of real property that is acquired with Section 390 funds but is no longer used for restoration activities.

ARTICLE V - COLLABORATIVE ACTION IN SUPPORT OF EVERGLADES RESTORATION

The parties agree that a healthy environment is necessary to sustain the Everglades ecosystem and to provide a desirable place to live as well as a sustainable economy. The parties agree to continue to work together

consistent with existing funds and human resources to support collaborative conservation actions that further the goal of restoring the health of the Everglades ecosystem.

ARTICLE VI - REPORTING REQUIREMENTS

Each party agrees to provide the Secretary of the Interior, upon request, with information to enable him to meet his reporting requirements to Congress under Section 390(e).

ARTICLE VII - DESIGNATED REPRESENTATIVES

To provide for consistent and effective communication, each party, not later than 30 days after the effective date of this Agreement, shall designate a representative to serve as a point of contact to coordinate activities under this Agreement.

ARTICLE VIII - RELATIONSHIP OF THE PARTIES

In the exercise of their respective rights and obligations under this Agreement, each party acts in an independent capacity, and no one party is to be considered the officer, agent, or employee of the others.

ARTICLE IX - THIRD PARTY RIGHTS

This Agreement is enforceable only among the parties signing the Agreement and is not intended, and should not be construed, to create any right or benefit, substantive or procedural, enforceable at law by any person or entity that is not a party to the Agreement.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement, which shall become effective upon the date of final execution by the last person signing this document.

George T Frampton

GEORGE T. FRAMPTON, JR.
Assistant Secretary for Fish and Wildlife and Parks
United States Department of Interior

VIRGINIA B. WETHERELL
Secretary of the Department of Environmental Protection
State of Florida

H. MARTIN LANCASTER
Assistant Secretary of the Army (Civil Works)

VALERIE BOYD
Chairman of the Governing Board
South Florida Water Management District

Attest:

SAMUEL E. POOLE III, SECRETARY
South Florida Water Management District

APPENDIX B

SCOPING REPORT

Scoping Report

Environmental Impact Statement

To Construct Stormwater Treatment Areas on Compartments B and C of the Everglades Agricultural Area, Florida

Prepared by:
Tetra Tech EC, Inc.
1901 South Congress Ave, Suite 270
Boynton Beach, FL 33426

September 2007

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1.0 INTRODUCTION

The United States Army Corps of Engineers Jacksonville District (USACE) conducted public scoping meetings in July 2007 to initiate an Environmental Impact Statement (EIS) to evaluate the effects of a proposed action---to convert approximately 13,740 acres of publicly owned, primarily agricultural lands to additional stormwater treatment areas (STAs) in Compartments B and C of the Everglades Agricultural Area (EAA) in Palm Beach and Hendry Counties, Florida. The Notice of Intent (NOI) to prepare an EIS, which contained the dates of public scoping meetings, was released on July 11, 2007 (Appendix A). Public stakeholders, appropriate federal, state, and local agency representatives and federally recognized Indian tribes were contacted through mail as part of the scoping process. The purpose of the scoping process was to solicit input to help identify all relevant issues that should be addressed in the EIS.

This scoping report contains the details and a summary of the public scoping meetings. The appendices contain all the comments received by U.S mail, e-mail, comment cards, and oral comments given to a court reporter at the scoping meetings. Comments were received during the public scoping meetings, and one e-mail and one letter were received following the meetings.

1.1 BACKGROUND

The USACE, Jacksonville District, will be receiving a permit application for a U.S. Department of Army permit under Section 404 of the Clean Water Act from the South Florida Water Management District (SFWMD) to construct STAs on parcels of land identified as Compartments B and C of the EAA. This scoping report presents and summarizes the issues that the USACE will consider for the proposed additional STAs in Compartments B and C. In compliance with the National Environmental Policy Act of 1969 (NEPA), scoping meetings were announced to federal, state, and local agencies and officials; federally recognized Indian tribes; stakeholders; and other interested parties to determine the scope of issues to be addressed and to identify the significant issues related to the proposed action. The EIS is intended to be used by the USACE as the NEPA environmental document that will support their decision to issue, issue with conditions, or deny a permit for placement of dredge/fill material in Waters of the United States for construction of the STAs on these parcels of land.

The purpose of the project is to reduce nutrient loads of stormwater and runoff from the EAA and nutrient concentrations in water distributed into the Everglades Protection Area (EPA) from Lake Okeechobee to facilitate meeting legal requirements of the Everglades Forever Act and requirements set forth in the Consent Decree in *United States v. South Florida Water Management District.* Compartment B and C STAs are being constructed to meet the legal requirements of the Everglades Forever Act (Long-Term Plan) and the Everglades phosphorus criterion, and as a result will meet the intent of the Consent Decree. The State committed to

provide water of a sufficient quantity and quality needed to preserve and restore the unique flora and fauna of the Everglades National Park and the Loxahatchee Wildlife Refuge. The SFWMD completed the EAA Regional Feasibility Study in 2005, which evaluated additional treatment needed in order to reduce phosphorus loads to the EPA. The Notice of Intent (Appendix A) provides a detailed *Background* and *Purpose and Need* for the proposed project.

1.2 PURPOSE OF SCOPING

Under NEPA, all agencies are mandated to consider all environmental impacts for federal projects and federal rules. It requires agencies to cooperate with other federal agencies, and state and local governments, and to involve public stakeholders or citizens. NEPA created the Council on Environmental Quality (CEQ), which publishes NEPA regulations[1]. CEQ regulations 40 CFR § 1501.7, require that there shall be an early and open process for determining the scope of issues to be addressed and for identifying significant (and non-significant) issues related to the proposed action.

All persons and organizations that have a potential interest in the proposed action, including federal, state and local agencies; appropriate federally recognized Indian tribes; interested stakeholders; and minority, low-income, or disadvantaged populations are urged to participate in the NEPA environmental analysis process. Public participation opportunities are guided by CEQ regulations, which include: 1) Notice of Intent, 2) scoping, 3) minimum 45-day public review of draft EIS, 4) public meeting on draft EIS, and 5) minimum 30-day public review of the final EIS.

Throughout this process, the public may obtain information on the status and progress of the EIS by contacting Ms. Tori White, U.S. Army Corps of Engineers, Jacksonville District, 1400 Centrepark Boulevard, Suite 750, West Palm Beach, FL 33401, telephone (561)472-8888, email at *tori.white@usace.army.mil*, or by fax at (561)683-2418.

[1] Council on Environmental Quality, *Regulations for Implementing the Procedural Provisions of the National Environmental Act*, 40 CFR Parts 1500-1508.

2.0 SCOPING PROCESS SUMMARY

The USACE conducted two scoping meetings as an effort to help identify significant issues and data gaps and to assist in evaluating the alternatives, identifying other alternatives, and analyzing the potential impacts. The USACE will consider the results of the scoping process to develop a range of alternative actions, including the No Action Alternative, to implementing the proposed action.

The overall scoping process consisted of the following elements:

- Developing a Public Participation Plan, in accordance with NEPA, as guidance for conducting outreach to the public
- Publishing and announcing public scoping meetings in the *Federal Register*
- Distributing a public notice announcing public scoping meetings and locations to newspapers; federal, state, and local agencies and officials; stakeholders; and other interested parties
- Distributing a press release to media outlets
- Sending agency and tribal consultation letters by mail
- Holding two public scoping meetings to inform the public about the proposed action and to solicit oral and written comments on the issues that should be addressed in the EIS
- Reviewing and categorizing oral and written comments to be evaluated in the draft EIS

2.1 PUBLIC NOTICES AND DISTRIBUTION OF NOTICES

The scoping process was initiated when the NOI to prepare an EIS for the proposed buildout of Compartments B and C for STA's was published on July 11, 2007. The NOI provided information regarding the proposed action purpose and need, background, alternatives to be evaluated, and geographic locations of the project sites. The NOI included information to encourage public involvement and solicit comments regarding the proposed action by providing public scoping meeting dates, times and locations, and also provided point of contact information at the USACE to submit comments and receive additional information.

Scoping meeting notices were prepared and included information on the proposed action, as well as the dates and locations of the public scoping meetings (Appendix B). The notices were sent via U.S. mail to the project mailing list (Appendix C), which included federal agencies, state agencies, appropriate federally recognized American Indian tribes, local agencies and officials, stakeholders, and other interested parties. The mailing list was prepared using several lists of interested parties from an existing electronic mailing list provided by the SFWMD and the USACE. Notification was sent out to more than 2,500 people on the Corporate Communications "CERPPROJECTSPROGRAM@evergladesplan.org" e-notification list, which includes interested parties who have signed up to receive notifications on the www.evergladesplan.org

Web site or at previous USACE public meetings. List members include a broad spectrum of interested parties including private individuals; local, county, state, and federal government and agencies; businesses; educational institutions; elected officials at all levels; and special interest groups.

Additionally, the public scoping meetings and request for comments were announced on the USACE Jacksonville District Web site at http://www.saj.usace.army.mil/pao/hotTopics/compartmentB-C_EIS.htm.

As other interested parties are identified, they will be added to the mailing list, which will be updated continuously throughout the development and finalization of the EIS. Anyone requesting information regarding the EIS will be added to the mailing list. Persons who attended the public scoping meetings or other meetings have been added to the list.

2.2 ADVERTISEMENT OF PUBLIC MEETINGS IN NEWSPAPERS

Scoping meeting notices were published in several newspapers with distribution throughout the proposed action area (Table 2-1). A press release was also sent to local media outlets, as detailed in Table 2-2.

Table 2-1. Newspaper Public Notice Advertisement Publication Information

Date of Publication	Publication	Location
July 12 and 19, 2007	Sun-Sentinel	Broward County, Florida
July 11 and 18, 2007	Palm Beach Post	Palm Beach County, Florida
July 12 and 19, 2007	The Sun	Hendry County, Florida
July 12 and 19, 2007	The Clewiston News	Hendry County, Florida
July 12 and 19, 2007	Glades County Democrat	Hendry County, Florida

Table 2-2. Media Outlets That Received Press Release

Name	County
WPTV – 5	Palm Beach, Florida
WPEC – 12	Palm Beach, Florida
WFLX – 29	Palm Beach, Florida
Okeechobee News	Okeechobee, Florida
Sun Sentinel	Broward, Florida
Palm Beach Post	Palm Beach, Florida

2.3 GOVERNMENT-TO-GOVERNMENT CONSULTATION LETTERS

The USACE mailed a consultation letter to the U.S. Department of Interior (DOI), U.S. Fish and Wildlife Service on July 5, 2007 (Appendix D). In the letter, the USACE invited the DOI to become a cooperating agency on the EIS. By letter dated July 26, 2007, the DOI accepted cooperating agency status (Appendix D). A separate interagency scoping meeting was deemed not necessary, and instead combined with the public scoping meetings, due to early agency involvement via an EIS kickoff meeting in February 2007. Agencies were notified of the public

scoping meetings through the public notification process described in Sections 2.1 and 2.2, as well as through e-mail and in person at monthly interagency coordination meetings by the USACE (Tori White).

2.4 PUBLIC SCOPING MEETINGS

Public scoping meetings were held in the evening in Palm Beach and Hendry Counties on the dates and locations listed below:

- July 25, 2007 – South Florida Water Management District, West Palm Beach, Florida
- July 26, 2007 - University of Florida, Institute of Food and Agriculture Sciences, Belle Glade, Florida

These venues were chosen on the basis of accessibility of the public throughout the primary regions affected by the proposed action. An open house format was used at each meeting. Thirteen information stations with displays and handouts (Appendix E) were available for viewing. Subject matter experts from the USACE and environmental consultants were staffed at each station to provide information regarding the proposed action to meeting attendees, and to solicit comments from them. The stations presented information on the proposed action, alternatives, environmental and cultural resources, socioeconomic effects, water resources, and the NEPA process. In addition, a welcome station, media station, and court reporter station were available to provide information and accept oral and written comments.

Approximately seven stakeholders attended the scoping meeting located West Palm Beach and six stakeholders in Belle Glade. Attendees were welcomed at the entrance and asked to sign in (Appendix F). The attendees were provided a brochure (Appendix E) and were given instructions for viewing the displays and providing their comments. Comment cards were available at each of the stations for the attendees to fill out and place in the comment form repository.

2.5 PUBLIC COMMENTS

Written comments were accepted in person at the public scoping meetings or by U.S mail, e-mail or fax. A court reporter was also available at each meeting to accept oral comments (Appendix H). Comments were requested by August 27, 2007, and were to be addressed to Ms. Tori White, U.S. Army Corps of Engineers, Jacksonville District, 1400 Centrepark Boulevard, Suite 750, West Palm Beach, FL 33401, telephone (561)472-8888, e-mail at *tori.white@usace.army.mil*, or by fax at (561)683-2418.

Appendix G contains all scoping comments received through August 27, 2007 by issue area. Appendix H contains a copy of each original public comment by e-mail and comment card, and oral comments submitted at the meetings.

3.0 COMMENT ANALYSIS

The scoping process resulted in the submission of 12 comments by individuals and 1 government agency. The USACE received comments by U.S. mail, written and oral comments at the scoping meetings, and e-mail. The 12 comments were broken out by issue areas, which are described below.

3.1 REVIEW AND ORGANIZATION OF THE SCOPING COMMENTS

Each comment was reviewed and sorted into five issue categories, which are described in Table 3-1 and Appendix G. Many of the individual comments addressed more than one issue, which is reflected in Table 3-1.

Table 3-1. Issues Identified During Scoping Process

Issue	Number received
Water Resources/Water Supply	10
Biological and Natural Resources	6
Cultural and Archeological Resources	1
Socioeconomics (including Recreation)	5
Other (includes Land Use/Acquisition)	5

3.2 COMMENT ISSUE

The following sections expand on specific concerns identified in the public scoping comments for each of the issue categories.

3.2.1 Water Resources/Water Supply

The largest percentage of comments pertained to water resources, supply and flow. While all agree that STAs are beneficial and additional treatment is necessary to reduce phosphorus loads, some expressed concern that the existing STAs are undersized and inadequate to meet the treatment needs, and if the proposed STAs will be utilized to handle Lake Okeechobee water as well as runoff then they may be undersized. It was suggested to examine what treatment components could be added to Compartments B and C in the future. One of the 10 comments expressed concern with diverting water from the Arthur R. Marshall Loxahatchee National Wildlife Refuge (Refuge), noting that there could be adverse consequences from this action. Two comments suggested evaluation of a flow-way alternative to investigate a more natural conveyance and treatment of water delivered from Lake Okeechobee through parts of the EAA, to the Everglades.

Comments also suggested that the individual and joint water budgets be analyzed to determine if Compartment B and C are of sufficient size to have the capacity to handle Lake Okeechobee water in addition to field runoff. One comment suggests evaluating the capacity of the

SFWMD's rock pits to detain Lake releases for later treatment and delivery to the Everglades as opposed to sending it east and west where it may pose a threat to estuaries.

Another comment expressed concern with the water storage being too deep. An evaluation of the intention of the water storage and how fast it will be released needs to be addressed.

3.2.2 Biological and Natural Resources

All comments were consistent with preventing negative impacts to biological and natural resources. Three of the six comments addressed the conservation and addition of marshes to benefit waterfowl, maintaining and restoring habitat, and increasing and recreating natural habitat for native species. Also, if Compartments B and C are used by the Florida panther, corridors must be available for panthers to move through.

Negative impacts to the Refuge from the proposed action must be addressed. The USFWS has prepared a draft document estimating the water needs of the Refuge. The final document is anticipated to be complete prior to the completion of the EIS, and will be utilized for the EIS in evaluating the environmental impacts.

3.2.3 Cultural and Archeological Resources

One comment was received for this issue area, and it addressed preserving any archeological resources.

3.2.4 Socioeconomics

Recreation was addressed in four of the five comments received. Many of the comments stated the EIS should evaluate the unmet recreation demands of fishing, hunting, kayaking, and wildlife viewing. One of the comments stated that public access and recreation is an Everglades culture and provides economic benefit to the Everglades community.

The EIS should provide conceptual plans for recreation in the Compartments as part of the evaluation of the proposed action.

3.2.5 Other

Land Use

Of the five comments received, all addressed land use and land acquisition. The comments were consistent with utilizing and purchasing more land for STA use.

Climate

One comment stated that the EIS should address local, regional, and state plans to respond to the anticipated climatic response resulting from the land use change and STA operation.

3.3 RECOMMENDATIONS FOR EIS

Most of the comments that were received regarding the proposed action were in favor of the inclusion and evaluation of the alternatives initially offered. All comments will be assessed and considered both individually and collectively, and will be responded to according to NEPA guidance (40 CFR § 1503.4). Based on the information available, and comments received from the public and a federal agency, recommendations include: address the issues that have been raised; consider additions to the alternatives to be evaluated; and continue to obtain all relevant documents, studies, models and other information to prepare the draft EIS.

APPENDIX C

WILDLIFE AND T&E REPORTS

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

ECART, EAA Compartment B & EAA Compartment C

T&E Species Survey & Wetland Jurisdictional Determination

Wetland Evaluation Report (Final)

September 2007

Work Order No. CN040936-W036

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1.0 PROJECT DESCRIPTION

The project areas evaluated for this report consist of two main parts: The expansion of two existing Stormwater Treatment Areas (STAs) known as Compartments B and C; and upgrades and improvements to a series of canals known as the Everglades Agricultural Area (EAA) Conveyance and Regional Treatment (ECART) project. The goal of these projects is to improve water quality discharges to the Everglades Protection Area (EPA) by reducing Total Phosphorus (TP) loading rates originating from the EAA. The expansion area for Compartment B is an approximate 9,300-acre parcel of land located in southern Palm Beach County. The Compartment B expansion area does not include STA 2 Cell 4 acreage which increases the total Compartment B acreage to 13,740 acres. The expansion area for Compartment C is an approximate 6,400-acre parcel of land located in eastern Hendry County. The ECART project is located in southern Palm Beach County. (***Figure 1-1***)

Prior to flooding of the compartments agricultural ditches in Compartments B and C may be filled based on final construction plans. Compartments B and C will contain both Emergent-type (EMG) and Submersed Aquatic-type (SAV) Vegetation to aid in water quality treatment. Water originating from agricultural areas will be treated within the STAs to remove TP, nitrogen, and other nutrients prior to release of the water into the EPA. ECART canal improvements include canal expansions, bridge modifications, and control structure modifications to enable optimum flow conveyance to assist in redistributing flow and nutrient loads to the STAs.

This Wetland Evaluation Report was completed to provide information in support of environmental documentation for the projects. The wetland evaluation task included identification of wetlands existing within the boundaries of the project sites, mapping of approximate wetland boundaries, calculation of approximate wetland impacts resulting from construction of the projects, and calculation of functional units of wetland loss by performing the Uniform Mitigation Assessment Methodology (UMAM) for representative wetlands.

2.0 EXISTING WETLAND INVENTORY

The ECART and Compartments B and C project study areas were reviewed to identify, quantify, and map wetland communities and impacts within these study areas. In order to determine the approximate locations and boundaries of existing wetland communities within the project study area, the following information was first collected and assessed:

- True color aerials of the project study areas (1"=1000') 2004 and 2006;
- U.S. Department of Agriculture (USDA), Natural Resource Conservation Service (NRCS), Soil Survey of Palm Beach County, Florida, 1978;

- USDA, Natural Resource Conservation Service (NRCS), Soil Survey of Hendry County, Florida, 1990;
- Florida Association of Environmental Soil Scientists, Hydric Soils of Florida Handbook (Carlisle 1995);
- U.S. Geological Survey (USGS), Topographic Quadrangle Map, 1:250,000, West Palm Beach, 1972;
- U.S. Fish and Wildlife Service (USFWS), Classification of Wetlands and Deepwater Habitats of the United States (Cowardin, et. al. 1979);
- Florida Department of Transportation (FDOT), Florida Land Use, Cover and Forms Classification System, (FLUCFCS), 3rd edition, January 1999; and
- USFWS, National Wetlands Inventory, Wetlands Online Mapper (June 2006). http://wetlandsfws.er.usgs.gov/wtlnds/metadata/metadata.htm

2.1 METHODOLOGY

Using the referenced materials, the approximate boundaries and land use classifications of wetland communities located within the project study areas were mapped on aerial photographs. This process consisted of overlaying the existing soils, National Wetlands Inventory (NWI), and FLUCFCS data within the project study areas on true color aerial photographs at a scale of 1" to 1000'. Wetland signatures were determined based on contrasting color patterns and textures. The signatures were then verified against existing GIS land use data layers, including soils, NWI, and FLUCFCS.

Field reviews were conducted during May and June 2007 to verify and/or refine preliminary wetland boundaries and classification codes established through in-office literature reviews and aerial photo delineation based on visual interpretation. No additional digital processing was conducted on the aerial imagery to complete this task. Plant species identification was based on pedestrian surveys and visual inspection of the presence/absence of species within each habitat. Specific field methods are discussed in ***Section 2.3***.

The following subsections describe the soils, wetland communities, and individual wetlands that occur within the project study areas.

2.2 SOILS

2.2.1 Compartment B and ECART

Based on review of the USDA, NRCS, Soil Survey of Palm Beach County Area, Florida 1978, three (3) soil types were mapped within the Compartment B and ECART project study areas. ***Figures A-4 1*** through ***A-4 9*** show the approximate boundaries of these soils in the ECART project area while ***Figure B-4*** shows the approximate boundaries of these

soils in Compartment B. All three soils are classified as hydric by the Hydric Soils of Florida Handbook.

Listed below is each soil type mapped within the project study area, their corresponding NRCS reference number for soils of Palm Beach County, Florida, and a general description of their characteristics.

20-(La)–Lauderhill muck
Lauderhill muck is a nearly level, poorly drained, organic soil that rests on limestone at a depth of 20 to 36 inches. For 6 to 12 months a year, under natural conditions, the soil is either covered by water or the water table is within 10 inches of the surface. The surface layer is black granular muck about 8 inches thick. Below this is a layer about 10 inches thick of black muck that is slightly more fibrous. The next layer is dark reddish brown fibrous muck extending from a depth of 18 to 26 inches. This soil is classified as hydric by the Hydric Soils of Florida Handbook.

26-(Pa)–Pahokee muck
Pahokee muck is a poorly drained, organic soil that rests on limestone at a depth of 36 to 51 inches. For 6 to 12 months of the year, under natural conditions, the soil is either covered by water or the water table is within 10 inches of the surface. The upper 28 inches is black muck (sapric material). Below this is dark reddish brown muck extending to the limestone bedrock at a depth of 42 inches. The limestone has numerous solution holes. This soil is classified as hydric by the Hydric Soils of Florida Handbook.

43-(Tc)–Terra Ceia muck
Terra Ceia muck is a poorly drained, deep, organic soil. For 6 to 12 months of the year, under natural conditions, it is either covered by water or the water table is within 10 inches of surface. The surface layer is black muck (sapric material) about 8 inches thick. Below this is dark reddish brown muck that extends to a depth of 65 inches or more. This soil is classified as hydric by the Hydric Soils of Florida Handbook.

2.2.2 Compartment C

Based on review of the USDA, NRCS, Soil Survey of Hendry County Area, Florida 1990, nineteen (19) soil types are present within the project study area. ***Figure C-4*** shows the approximate boundaries of these soils. Fourteen (14) of the nineteen (19) soils are classified as hydric by the Hydric Soils of Florida Handbook. A general description of each of the soil types present in the Compartment C project study areas is provided below.

1–Boca sand
Boca sand is a poorly drained soil found on broad flatwoods. It has a water table within 10 inches of the surface under natural conditions for 2 to 4 months of the year. The surface layer is dark gray to gray sand about 7 inches thick. The subsurface layer is a light gray fine sand about 27 inches thick. The subsoil is dark grayish brown fine sand to a depth of about 28 inches. The next layer is brown fine sandy loam to a depth of about

33 inches. This is underlain by discontinuous limestone. This soil is not classified as hydric by the Hydric Soils of Florida Handbook but may contain up to 20% hydric soil inclusions.

7–Immokalee sand

Immokalee sand is a poorly drained organic soil found on broad flatwoods. It has a water table within 10 inches of the surface under natural conditions for 5 months of most years. During the dry periods, the water table is at a depth of 50 inches. The surface layer is very dark gray sand about 5 inches thick. The subsurface layer is gray to light gray to a depth of about 40 inches. The subsoil is sand stained with organic matter to a depth of about 70 inches. The substratum is light brownish gray sand to a depth of 80 inches or more. This soil is not classified as hydric by the Hydric Soils of Florida Handbook but may contain up to 20% hydric soil inclusions. A review of the Immokalee sand unit located within Compartment C by a NRCS soil scientist indicates that this soil unit is hydric. Soil pits were dug in several places within the NRCS mapped Immokalee unit. Hydric indicators found in the soils pits included, concretions, high organic content in the surface layer (greater than 70% organic coated sand grains), and organic streaking. Additionally, the water table in this unit was found to be within 15 inches of the surface with soil saturation occurring within 12 inches of the surface.

13–Gentry fine sand, depressional

This is a very poorly drained soil found in marshes, swamps, and depressions. The surface is slightly concave and slopes are less than 2 percent. Typically, the surface layer is fine sand about 22 inches thick. It is black in the upper part and very dark gray in the lower part. The subsoil is sandy clay loam to a depth of 75 inches. The substratum is gray sandy clay loam to a depth of 80 inches. This soil is ponded for more than six months in most years, and is classified as hydric by the Hydric Soils of Florida Handbook.

15–Myakka sand

Myakka sand is a poorly drained soil that, under natural conditions, has a water table within 10 inches of the surface for 1 to 5 months. During the dry periods, the water table is at a depth of 40 inches. The surface layer is very dark gray sand about 6 inches thick. The subsurface is gray sand to a depth of about 26 inches. The subsoil is sand stained with organic matter to a depth of about 60 inches. The substratum to a depth of 80 inches is grayish brown. This soil is not classified as hydric by the Hydric Soils of Florida Handbook but may contain up to 15% hydric soil inclusions.

17–Basinger sand

Basinger sand is a poorly drained soil found in depressional areas. It has a water table within 10 inches of the surface under natural conditions for 2 to 6 months of most years. For the remainder of the year, the water table is at a depth of less than 30 inches. The surface layer is very dark gray sand about 6 inches thick. The subsurface layer is light brownish gray sand to a depth of about 25 inches. The subsoil to a depth of about 50 inches is dark yellowish brown sand. The substratum to a depth of 80 inches is light brownish gray sand. This soil is classified as hydric by the Hydric Soils of Florida Handbook.

19–Gator muck
Gator muck is a poorly drained, organic soil. Under natural conditions, this soil is saturated and ponded by up to 12 inches of water for at least 9 months in most years. The soil is a black muck surface layer about 32 inches thick. The underlying material is black sandy loam to a depth of about 35 inches. To a depth of 51 inches, the soil is gray sandy clay loam containing carbonate nodules. This soil is classified as hydric by the Hydric Soils of Florida Handbook.

20–Okeelanta muck
Okeelanta muck is a poorly drained organic soil found in depressions and sloughs. Under natural conditions, it is ponded for 6 to 12 months in most years. This soil has a high water table rarely at a depth of less than 10 inches. The surface layer is a black muck about 35 inches thick. The underlying material to a depth of about 60 inches is dark to light grayish brown sand. This soil is classified as hydric by the Hydric Soils of Florida Handbook.

21–Holopaw sand
Holopaw sand is a poorly drained sand, which, under natural conditions, has a water table within 10 inches of the surface for 6 months in most years and is subject to sheet flow. This soil has a dark gray sand surface layer about 5 inches thick. The subsurface layer is light brownish gray to light gray sand to a depth of about 48 inches. The subsoil to a depth of about 65 inches is grayish brown sandy clay loam. The substratum to a depth of 80 inches is grayish brown sandy loam containing may carbonate nodules. This soil is classified as hydric by the Hydric Soils of Florida Handbook.

26–Holopaw sand, limestone substratum
Holopaw sand with limestone substratum is a poorly drained sandy soil which, under natural conditions, has a water table within 10 inches of the surface for 2 to 6 months in most years. The surface layer is dark grayish brown sand about 6 inches thick. The subsurface layer to a depth of about 40 inches is sand starting out brown to pale brown and ending with light gray. The subsoil to a depth of about 45 inches is brown sand, and to a depth of about 60 inches is gray sandy loam containing calcium carbonates. The subsoil is underlain by fractured limestone. This soil is classified as hydric by the Hydric Soils of Florida Handbook.

29–Oldsmar sand, limestone substratum
Oldsmar sand with limestone substratum is a nearly level, poorly drained soil which, under natural conditions, has a water table within 10 inches of the surface for about 3 months in most years and a depth of greater than 40 inches during the dry periods. The surface layer is black sand about 5 inches thick. The subsurface layer to a depth of about 38 inches is dark gray to light gray sand. The subsoil to a depth of about 63 inches is sand starting out very dark gray to black and ending with dark brown. The next layer is dark grayish brown sandy clay loam to a depth of about 73 inches. The subsoil is underlain by fractured limestone. This soil is not classified as hydric by the Hydric Soils of Florida Handbook but may contain up to 25% hydric soil inclusions.

44–Jupiter fine sand
Jupiter fine sand is a poorly-drained sand with a water table within 10 inches of the surface for 2 to 4 months during most years. The depth is at 10 to 40 inches during the dry periods. The surface layer is black to very dark grayish brown fine sand about 6 inches thick. This layer is underlain by fractured limestone containing numerous crevices and solution basins. This soil is not classified as hydric by the Hydric Soils of Florida Handbook but is listed as hydric by the NRCS. A site inspection by a NRCS soil scientist on September 5, 2007 indicated that this soil had muck presence therefore is considered hydric within the boundaries of Compartment C.

45–Pahokee muck
Pahokee muck is a very poorly drained, organic soil. Under natural conditions, it is saturated and ponded for 6 to 12 months in most years, except during prolonged droughts. The surface layer is black muck about 40 inches thick that is underlain by fractured limestone. This soil is classified as hydric by the Hydric Soils of Florida Handbook.

50–Delray sand, depressional
Delray sand is a very poorly drained depressional series, which, under natural conditions, has a water table within 10 inches of the surface for 6 to 9 months in most years, but may be ponded for 2 to 6 months of the year. The surface layer is black to very dark gray sand about 22 inches thick. The subsurface to a depth of about 50 inches is gray sand. The subsoil to a depth of about 62 inches is dark grayish brown sandy clay loam. The substratum to a depth of 80 inches is gray loamy fine sand containing fragments of calcareous material. This soil is classified as hydric by the Hydric Soils of Florida Handbook.

56–Terra Ceia muck
Terra Ceia muck is a poorly drained soil containing black muck to a depth of 70 inches. Under natural conditions, it is ponded by 12 inches of water for up to 6 months and rarely has a water table greater than 18 inches below the surface. This soil is classified as hydric by the Hydric Soils of Florida Handbook.

65–Plantation muck
Plantation muck is a nearly level, very poorly drained organic soil. It is ponded for 1 to 2 months in most years under natural conditions. A water table is within 10 inches of the surface for 2 to 6 months and within 20 inches the rest of the year. The surface layer is black muck about 12 inches thick. The next layer is black sand to a depth of 20 inches. The substratum to a depth of about 39 inches is pale brown sand and is underlain by hard limestone. This soil is classified as hydric by the Hydric Soils of Florida Handbook.

66–Margate sand
Margate sand is a nearly level, poorly drained sand that is ponded for 7 months during most years under natural conditions and rarely has a water table at a depth greater than 24 inches. The surface layer is black sand about 10 inches thick. The subsurface layer is brown sand to a depth of about 18 inches. The subsoil to a depth of about 24 inches is pale brown sand. The substratum is light yellowish brown gravelly sand to a depth of

about 30 inches and is underlain by hard limestone. This soil is classified as hydric by the Hydric Soils of Florida Handbook.

67–Lauderhill muck
Lauderhill muck is a very poorly drained organic soil that, under natural conditions, is ponded for 6 to 12 month during most years and rarely has a water table at a depth greater than 10 inches. This soil is muck to a depth of about 35 inches. It is black to a depth of about 24 inches, dark reddish brown to a depth of about 31 inches, and black below that depth. It is underlain by hard limestone. This soil is classified as hydric by the Hydric Soils of Florida Handbook.

68–Dania muck
Dania muck is a nearly level, very poorly drained black to dark reddish brown muck to a depth of about 14 inches. Under natural conditions, it is ponded for 6 to 12 months during most years and the water table rarely is at a depth greater than 10 inches. The underlying layer to a depth of about 18 inches is very dark gray fine sand underlain by hard limestone. This soil is classified as hydric by the Hydric Soils of Florida Handbook.

70–Denaud muck
Denaud muck is a very poorly drained soil that is ponded for 6 to 9 months in most years under natural condition and the water table rarely is below a depth of 20 inches. The surface layer is black muck about 11 inches thick. The subsurface layer is black fine sand to a depth of about 20 inches and dark gray fine sand to a depth of about 23 inches. The next layer is gray fine sandy loam to a depth of about 42 inches. Light gray gravelly fine sand follows to a depth of 80 inches containing shell and calcareous concretions. This soil is classified as hydric by the Hydric Soils of Florida Handbook.

2.3 EXISTING WETLAND COMMUNITIES

During May through June of 2007, environmental scientists familiar with Florida wetland communities conducted field reviews of the project study areas. The purpose of the review was to verify and/or refine preliminary wetland boundaries and classification codes established through literature reviews and photo-interpretation. The primary wetland delineation methodology used in this task was through aerial photo-interpretation. Field reviews were conducted to verify wetland signatures on aerial photographs and to identify vegetation and soils that were present in wetlands.

Representative wetlands found on the project study areas were chosen for further field examination. While site visits were made to these wetland areas, Army Corps of Engineers (USACE) field data sheets were completed (***Appendices A, B,*** and ***C***). As part of the wetland assessment process, the percent composition of wetland vegetation for the entire wetland area and indicator status were noted, soil pits were examined and compared to soil survey information, and wetland hydrologic indicators were noted. Additionally, photographs of the wetland were taken and GPS points along the wetland boundary were recorded. In addition to data sheets, UMAM assessments were also completed for each representative wetland. Photographs and UMAM data sheets for each

representative wetland are provided in ***Appendices A, B,*** and ***C***. Wetland (WL) and other surface water (OSW) boundaries were approximated using the criteria and procedures within Chapter 62-340 "Delineation of the Landward Extent of Wetlands and Surface Waters," Florida Administrative Code (FAC), and the 1987 USACE Wetland Delineation Manual (Technical Report Y-87-1).

2.4 DESCRIPTIONS OF WETLANDS AND OTHER SURFACE WATERS

The wetland and OSW habitat types that occur within the project study areas are identified below and summarized in ***Tables 2-1*** through ***2-3***. All wetland and OSW habitats were classified using FLUCFCS (FDOT, 1999) and the USFWS Classification Wetlands and Deepwater Habitats of the United States (Cowardin, et. al., 1979). Included with each description are the wetland's FLUCFCS and USFWS wetland classifications, listings of dominant vegetation, bordering habitat types, size, and connections to other wetlands. The approximate boundaries of each wetland within the project study areas are provided in ***Appendices A, B,*** and ***C***. ***Tables 2-1*** through ***2-3*** provide a summary of habitat type, FLUCFCS codes, USFWS classifications, and approximate acres within each of the three (3) project study areas.

2.4.1 Wetland Community Types Within ECART, Compartments B and C

Representative wetlands of each habitat type present within each project study area were assessed in detail. All four of the ECART canals were assessed (Other Surface Water (OSW)-1A – OSW-4A). In addition to the canals, one emergent marsh (Wetland (WL) 1A) and one atypical wetland (WL 2A) were assessed within the ECART study area. Within Compartment B, three wetlands (WL 1B – WL 3B) and one OSW (OSW 1B) were reviewed to represent existing wetland habitat types. WL 1B consists of an emergent marsh, WL 2B is a man-made reservoir located over hydric soils, WL 3B is an atypical wetland, and OSW 1B is a system of agricultural ditches located throughout the site. Compartment C contains the largest number of wetlands, thus has the most individual wetland communities assessed of all the study area (WL 1C – WL 9C and OSW 1C). WL 1C, WL 2C and WL 6C are scrub-shrub wetlands, WL 3C – WL 5C and WL 7C are freshwater emergent wetlands, WL 8C consists of a man-made reservoir located on hydric soils, and WL 9C is an atypical wetland. In addition, OSW 1C was chosen to represent the system of man-made agricultural ditches and canals that are located throughout the site. Detailed descriptions of each representative wetland and OSW assessed within each project study area are presented in the following ***Sections 2.4.1.1*** through ***2.4.1.3***.

2.4.1.1 ECART

Based on in-house and field reviews of the ECART study area, two wetland habitat types and one OSW habitat type occurs within this project study area. General descriptions of

wetlands and surface waters found within the ECART study area and specific descriptions of the representative wetland and OSW habitats are provided below. Acreages of different wetland types found within the ECART study area are presented in ***Table 2-1***.

TABLE 2-1
EXISTING WETLAND HABITAT TYPES WITHIN ECART
Wetland Evaluation Report

Wetland ID	Habitat Type	FLUCFCS Code	USFWS Classification	Acres within Project Study Area
OSW-1A OSW-4A	Streams and Waterways	510	R2OWHx	456.24
WL-1A	Emergent Wetland	641	PEM1C	3.72
WL-2A	Atypical Wetland*	215/242/260/ 261	PEM1C	414.40
N/A	Upland	260,747,814 833	N/A	277.72
Subtotal for Wetlands and Other Surface Waters				874.36
Subtotal for Uplands				277.72
Total for ECART Parcels				**1,152.08**

*For planning purposes only

Waterways found along the ECART study area consists primarily of excavated open water canals and ditches of various sizes and uses. Canals ranged from smaller agricultural canals used to bring irrigation water to agricultural fields, to large water conveyance canals such as the North New River Canal (L-18 and L-19). Canals within ECART project study area consist of North New River Canal (L-18 and L-19), East Bolles Canal (L-16), Hillsboro Canal (L-15), and Ocean Canal (L-13).

Vegetation along the ECART canals include common ragweed (*Ambrosia artemisiifolia*), beggar tick (*Bidens pilosa*), frogfruit (*Phyla nodiflora*), torpedo grass (*Panicum repens*), smutgrass (*Sporobolus indicus*), sugar cane (*Saccharum officinarum*), Brazilian pepper (*Schinus terebinthifolius*), saltbush (*Baccharis halimifolia*), and castor bean (*Ricinus communis*). The center channels within the ECART water conveyance canals consist of open flowing water. The Bolles Canal (L-16) contained an area of small mudflats and islands vegetated with cattail (*Typha latifolia*), castor bean, smartweed (*Polygonum* spp.), rosy camphor weed (*Pluchea rosea*), and primrose willow (*Ludwigia peruviana*).

One freshwater marsh area containing purple loosestrife (*Lythrum flagellare*), maidencane (*Panicum hemitomom*), blue maidencane (*Amphicarpum muhlenbergianum*), and nuttail thistle (*Cirsinum nuttalii*) was found within the ECART project area adjacent to the Ocean Canal (L-13).

Atypical wetland situations are areas with sufficient natural or human-induced alteration to significantly alter the area vegetation, soils, and/or hydrology. In the absence of wetland vegetation atypical wetlands are found within areas of positive indicators of hydric soils and wetland hydrology. According to the most recent NRCS soil survey, all agricultural fields located within the ECART study area are located on hydric soils. Because these fields are under numerous private ownerships and likely have many differing water management regiments, it is unknown if all these areas have maintained adequate wetland hydrology. These areas have been listed as atypical wetlands for planning purposes only. It is known that unaltered areas on hydric soils in these areas have adequate wetland hydrology and support wetland vegetation. It is recommended that further study of wetland hydrology be performed on these numerous parcels at a later date once the acquisition phase of the project has commenced.

WL-1A
FLUCFCS: 641 (Freshwater Marshes)
USFWS: PEM1C (Palustrine, Emergent, Persistent, Seasonally Flooded)

Wetland 1A is a freshwater emergent marsh located adjacent to Ocean Canal, at the intersection of CR 880 and Browns Farm Road, in the north portion of the ECART project study area. This marsh is highly disturbed as a result of its location within the road right-of-way (ROW). During the May and June 2007 field reviews, it was observed that adjacent areas had recently been mowed.

Dominant vegetation observed within this wetland consists of blue maidencane, smartweed, arrowhead (*Sagitteria latifolia*), wild taro (*Colocasia esculenta*), nuttail thistle, camphor, purple loosestrife and maidencane. Adjacent areas consist of the Ocean Canal to the north and CR 880 to the south.

WL-2A
FLUCFCS: 215/242/260/261 (Active and Fallow Cane/Sod Farms/Open Land – Atypical Wetland)
USFWS: PEM1C (Palustrine, Emergent, Persistent, Seasonally Flooded)

Wetland 2A was chosen as a representative of atypical wetlands located throughout the ECART project study area. These atypical wetlands consist of areas of active and fallow agricultural crops, which are located on hydric soils and may have adequate wetland hydrology. Adjacent areas consist of canals, roadways, and agricultural ditches. No soil pit was dug at this location, the NRCS soil survey was used to identify soil type.

OSW-1A
FLUCFCS: 510 (Streams and Waterways)
USFWS: R2OWHx (Riverine, Lower Perennial, Open Water/Unknown Bottom, Permanently Flooded, Excavated)

This surface water (North New River Canal/L-18 and L-19) is a man-made canal located between US 27 and the Compartment B. This canal consists of an open waterbody with rip-rap armored shorelines and steeply sloped banks. No vegetation is present within the

canal. The North New River Canal is adjacent to upland agricultural fields (i.e. sugar cane and turf) and is hydrologically connected to Bolles Canal. Vegetation present along the canal banks included common ragweed, beggartick, frogfruit, torpedograss, smutgrass, sugar cane, Brazilian pepper and saltbush.

OSW-2A
FLUCFCS: 510 (Streams and Waterways)
USFWS: R2OWHx (Riverine, Lower Perennial, Open Water/Unknown Bottom, Permanently Flooded, Excavated)

This surface water (Bolles Canal/L-16) is a man-made canal located between the North New River Canal (L-19) and the Hillsboro Canal (L-15). This canal consists of a primarily open waterbody with unmaintained, steeply sloped banks. Mudflat areas and herbaceous islands are also present within the canal. Vegetation on the islands includes cattail, primrose willow, rosy camphorweed, and smartweed.

This surface water is adjacent to CR 827 and sugar cane fields. OSW 2A is hydrologically connected to the North New River Canal and Hillsboro Canal. Vegetation on canal banks included common ragweed, castorbean, pricklypear cactus (*Opuntia* spp.*)*, rosy camphorweed, smartweed, wild taro, primrose willow, and pokeweed (*Phytolacca americana*).

OSW-3A
FLUCFCS: 510 (Streams and Waterways)
USFWS: R2OWHx (Riverine, Lower Perennial, Open Water/Unknown Bottom, Permanently Flooded, Excavated)

This surface water (Hillsboro Canal/L-15) is a man-made canal that begins at the Ocean Canal (L-13) near the intersection of CR 880 and Browns Farm Road, and runs southeast along Browns Farm Road, where it intersects with Bolles Canal. The Hillsboro Canal consists of an open waterbody with unmaintained, steeply sloped banks. The center channel consists of flowing open water. Dominant vegetation along its banks include beggartick, common ragweed, pepper grass (*Lepidium virginicum*), and primrose willow. Areas adjacent to this surface water include located CR 880 and Browns Farm Road, as well as sugar cane fields and sod farms.

OSW-4A
FLUCFCS: 510 (Streams and Waterways)
USFWS: R2OWHx (Riverine, Lower Perennial, Open Water/Unknown Bottom, Permanently Flooded, Excavated)

This surface water (Ocean Canal/L-13) begins at Sam Senter Road and runs southwest, terminating at the Hillsboro Canal. The Ocean Canal consists of an open waterbody with unmaintained, steeply sloped banks. Dominant vegetation present along its banks consists of beggartick, common ragweed, pepper grass, dog fennel (*Eupatorium capillifolium)*, wild taro, and castorbean. Adjacent areas include CR 880 to the east and

sugar cane fields to the west, Sam Senter Road to the north, and Hillsboro Canal to the south.

2.4.1.2 Compartment B

Based on in-house and field reviews of Compartment B, three (3) wetland habitat types and one (1) OSW habitat type occurs within this project study area. General descriptions of wetlands found in Compartment B and specific descriptions of the representative wetland and OSW habitats are provided below. Acreages of each wetland type found within the Compartment B study area are presented in ***Table 2-2***.

One large freshwater marsh is located within the south buildout area of Compartment B. The dominant vegetation observed within this marsh system included cattail, primrose willow, Brazilian pepper, Carolina willow (*Salix caroliniana)*, saltbush, torpedo grass, common ragweed, and flatsedge (*Cyperus* spp.). Additionally, there are three ponds (excavated reservoirs) on the east side of the project site. These ponds are surrounded by a littoral zone that consists of herbaceous wetland species including cattails, sawgrass (*Cladium jamaicense*), and Brazilian pepper. Additionally, there is a small pond located on the southwest border of the north Buildout area.

Agricultural ditches are found throughout Compartment B and are used for irrigation and drainage. The Compartment B canals include the North New River Canal (L-18 and L-19) and the various smaller agricultural canals.

Atypical wetlands located on Compartment B consist of fallow and active agricultural fields. Theses areas consist of former and active sugarcane and sod fields that do not contain wetland vegetation however are located on hydric soils. Soil pits dug within potential atypical wetlands on Compartment B confirmed presence of hydric soils, however no presence of primary hydrology indicators were found and only one secondary hydrologic indicator, local soil survey data, is present. At the time the soil pits were dug, active water pumping was being performed on Compartment B to support sod farm operations, therefore groundwater levels were artificially depressed. Discussions with the USACE (see ***Appendix D*** for phone conversation record) indicate that in situations where agricultural water management is taking place and ground water levels are mechanically lowered for a portion of the year, the USACE utilizes secondary hydrologic indicators to determine jurisdiction. One of these indicators is the retention of hydric characteristics by the soils in the area being assessed, even when water levels have been artificially lowered. Additionally, a review of the Compartment B Buildout Draft Geotechnical Report, April 2007, which was prepared for the Compartment B Basis of Design Review, indicates that groundwater levels in the north buildout area of Compartment B were within 12 to 18 inches of the muck surface in September 2006. A primary indicator of hydrology that the USACE uses is saturation of soil in the first 12 inches of the profile. If the ground water table is within 12 inches of the surface in a hydric soil then a primary indicator of hydrology is present. Additionally, because of soil capillary action if the water table is 18 inches below the surface it is likely that soil saturation will occur within 12 inches of the surface. This information leads to the conclusion that agricultural fields

located in the north build-out area located on hydric soils have adequate evidence of ground water hydrology and qualify as atypical wetlands.

TABLE 2-2
EXISTING WETLAND HABITAT TYPES WITHIN COMPARTMENT B
Wetland Evaluation Report

Wetland ID	Habitat Type	FLUCFCS Code	USFWS Classification	Acres within Project Study Area
OSW-1B	Streams and Waterways	510	R2OWHx	414.59
WL-2B	Reservoir less than 10 acres	534	POWHx	13.01
WL-1B	Freshwater Marsh	641,422	PEM1C	3,294.12
WL-3B	Atypical Wetland	215/242/260/261/422	PEM1C	5,310.53
N/A	Uplands	747,814,833	N/A	225.68
Subtotal for Wetlands and Other Surface Waters				9,032.25
Subtotal for Uplands				225.68
Total for Compartment B				**9,257.93**

WL-1B
FLUCFCS: 641 (Freshwater Marshes)
USFWS: PEM1F (Palustrine, Emergent, Persistent, Semi-permanently Flooded)

Wetland 1B is a freshwater herbaceous wetland located in the southern section of the Compartment B project study area, known as the South Buildout Area. Wetland 1B is dominated by cattail and contains several isolated open water ponds. Additional vegetation observed within this marsh system includes primrose willow, Brazilian pepper, Carolina willow, salt bush, torpedograss, common ragweed, and flatsedge.

The hydrology of Wetland 1B is controlled by water management structures on adjacent canals as well as a system of agricultural ditches which run north to south and east to west throughout the wetland. Adjacent areas consist of a power line easement and Water Conservation Area (WCA) 2 to the east, US 27 to the west, a mudflat to the north, and WCA 3 to the south.

WL-2B
FLUCFCS: 534 (Reservoirs less than 10 acres)
USFWS: POWHx (Palustrine, Open Water, Permanently Flooded, Excavated)

This representative wetland consists of three (3) man-made, isolated lakes located in the southern section of Compartment B. These lakes consist of open water bodies with littoral zones dominated by cattail, sawgrass and Brazilian pepper. These lakes are

surrounded by the power easement on the western side and are adjacent to the freshwater marsh in the South Buildout Area of Compartment B.

These lakes are located within the existing power easement in the eastern portion of the South Buildout Area of Compartment B. Wetland 1B is located to the west, WCA 2 is present on the east side of Wetland 2B, a mudflat is located to the north, and WCA 3 is located to the south of this wetland system.

WL-3B
FLUCFCS: 215/260/261/242/422 (Active Cane/Open Lands/Fallow Cane/Sod Farm/ Brazilian pepper - Atypical Wetlands)
USFWS: PEM1C (Palustrine, Emergent, Persistent, Seasonally Flooded)

This wetland area was chosen to represent atypical wetlands within the Compartment B project study area. These atypical wetlands are located in the north portion of Compartment B and consist of active and fallow sugar cane, and sod farms, which are located on hydric soils. Dominant vegetation within these wetlands consists of sugar cane, various turf grasses, bahiagrass (*Paspalum notatum*) and dog fennel (*Eupatorium capillifolium*). The two main atypical wetland polygons located in this area were fallow sugar cane fields that contained both cane and dog fennel and fallow sod fields that also contained some dog fennel. Adjacent areas include US 27 to the west, active and fallow sugar cane and sod fields to the north and northeast, and a mudflat to the south and east.

OSW-1B
FLUCFCS: 510 (Streams and Waterways)
USFWS: R2OWHx (Riverine, Lower Perennial, Open Water/Unknown Bottom, Permanently Flooded, Excavated)

These surface waters consist of excavated agricultural ditches and canals of various sizes that run north to south and east to west within Compartment B. These canals are open waterbodies with unmaintained, steeply sloped banks. The canal banks are dominated by common ragweed, beggartick, frogfruit, torpedograss, smutgrass, sugar cane, Brazilian pepper and salt bush. The center channel within most of these canals consists of open flowing water. These ditches and canals are hydrologically connected to associated larger canals running offsite.

2.4.1.3 Compartment C

Based on in-house and field reviews of Compartment C, four (4) wetland habitat types and one (1) OSW habitat type occurs within this project study area. General descriptions of wetlands found in Compartment C and specific descriptions of the representative wetland and OSW habitats are provided below. Acreages of each different wetland type found within the Compartment C study area are presented in ***Table 2-3***.

TABLE 2-3
EXISTING WETLAND HABITAT TYPES WITHIN COMPARTMENT C
Wetland Evaluation Report

Wetland ID	Habitat Type	FLUCFCS Code	USFWS Classification	Acres within Project Study Area
OSW 1C	Streams and Waterways	510	R2OWHx	364.95
WL 8C	Reservoir less than 10 acres	534	POWHx	4.40
WL 1C, 2C, and 6C	Wetland Scrub	631	PSS1C	316.55
W 3C, 4C, 5C, and 7C	Freshwater Marsh	641	PEM1C	1,688.66
WL 9C	Atypical Wetland	261, 329	PEM1C	3,544.12
N/A	Uplands	261, 329, 747, 814	N/A	475.96
Subtotal for Wetlands and Other Surface Waters				5,918.68
Subtotal for Uplands				475.96
Total for Compartment C				**6,394.64**

Agricultural ditches are found throughout Compartment C and are used for irrigation and drainage. The Compartment C canals included the L-3 canal and the various smaller agricultural canals that feed water to the agricultural ditches.

Scrub-shrub wetlands includes areas in topographic depressions with poorly drained soil. There are multiple isolated scrub wetlands within Compartment C that consist of an overstory of Carolina willow with a mid-level shrub layer of primrose willow and saltbush. Additionally, several herbaceous wetlands within Compartment C were fringed with a Carolina willow dominated shrub wetland.

Two types of freshwater marsh were found within Compartment C. The first type is herbaceous wetlands dominated by grasses including maidencane and blue maidencane. The second type is large freshwater marshes containing a variety of species including smartweed, arrowhead, thistle, purple loosestrife, and wild taro.

Atypical wetlands on Compartment C consist mainly of fallow sugar cane fields growing on hydric soils that have retained wetland hydrology; however, there are areas dominated by hydric soils and wetland hydrology where sugar cane has been replace by dog fennel or upland grasses including Bermuda (*Cynodon dactylon*) and bahia grass. Like sugar cane these species are listed as facultative upland species therefore these areas are also

listed as atypical wetlands. Several small reservoirs are located within an atypical wetland in the southeastern corner of the project. These excavated ponds have open water in the middle and coverage of cattail at the edges.

WL-1C, 2C, and 6C
FLUCFCS: 631 (Wetland Scrub-Shrub)
USFWS: PSS1C (Palustrine, Scrub-Shrub Broad-Leaved Deciduous, Seasonally Flooded)

These three (3) scrub-shrub wetlands were reviewed as representatives of scrub wetlands present throughout Compartment C. Wetland 1C is located near the center of Compartment C, Wetland 2C is located in the northeastern portion of Compartment C, and Wetland 6C is located in the northwestern portion of the site. Several similar scrub wetlands occur along the outer edges of emergent wetlands. Dominant vegetation within these wetlands includes Carolina willow, primrose willow, saltbush, Brazilian pepper, and elderberry (*Sambucus canadensis*), with an understory of nuttail thistle, bog hemp, smartweed, arrowhead, and paragrass (*Brachiaria mutica*). Adjacent areas consist of fallow sugar cane fields, emergent wetlands, agricultural canals, and upland shrub and brush land.

WL-3C, 4C, 5C, and 7C
FLUCFCS: 641 (Freshwater Marsh)
USFWS: PEM1C (Palustrine, Emergent, Persistent, Seasonally Flooded)

These five (5) emergent wetlands within Compartment C were reviewed as representatives of freshwater marsh wetlands located throughout this compartment. Wetland 3C and Wetland 4C are located in the northwest corner of Compartment C. Wetland 5C is located near the center of the project study area, and Wetland 7C is a large emergent wetland that encompasses much of the southeast portion of Compartment C. Dominant vegetation within these wetlands consists of maidencane, dog fennel, purple loosestrife, wild taro, smartweed, camphorweed, nuttail thistle, button bush, and arrowhead. Several of these features contain an outer fringe of Carolina willow, Brazilian pepper and elderberry. Adjacent areas consist of fallow sugar cane fields, agricultural canals and upland shrub and brush land.

WL-8C
FLUCFCS: 534 (Reservoirs – Less than 10 acres)
USFWS: POWHx (Palustrine, Open Water, Permanently Flooded, Excavated)

This wetland was chosen as a representative of reservoirs within the project study area. There are six (6) reservoirs located within the southeast portion Compartment C. These man-made features consist of large, permanently flooded ponds that are sparsely vegetated with cattail.

WL-9C
FLUCFCS: 261 (Fallow Cane / Atypical Wetland)
USFWS: PEM1C (Palustrine, Emergent, Persistent, Seasonally Flooded)

This wetland was chosen to represent atypical wetlands located throughout the Compartment C project study area. These atypical wetlands consist of areas of fallow sugar cane which are located on various types of hydric soils. Wetland 9C is located throughout the center portion of Compartment C. Adjacent areas consist of, emergent wetlands to the east and north, and a canal to the west. Five (5) reservoirs and various typical wetlands are present within this atypical wetland.

OSW-1C
FLUCFCS: 510 (Streams and Waterways)
USFWS: R2OWHx (Riverine, Lower Perennial, Open Water, Permanently Flooded, Excavated)

This surface water was chosen as a representative of the agricultural canals and ditches within the project site. Compartment C is divided by a series of man-made canals that run north to south and east to west in a grid pattern. Dominant vegetation within these canals consists of water lettuce, water hyacinth, and torpedo grass. The canal banks were predominantly vegetated with flatsedge, coin wort, primrose willow, and beggartick. Adjacent areas consist of fallow sugar cane fields, atypical wetlands, emergent wetlands and upland shrub and brush land. Several of these canals are located within wetlands or serve as barriers between wetland and upland habitats.

3.0 WETLAND IMPACT ANALYSIS

All three project study areas were evaluated for potential wetland impacts. For this evaluation, it is assumed that all areas within the boundaries of Compartments B and C are to be flooded. As a result, all wetlands within those areas have been included in the impact analysis. Since design plans for the ECART project are currently unavailable, the widest planning stage corridor of 350 feet was used to assess wetland impacts.

3.1 POTENTIAL WETLAND IMPACTS

The potential for impacts to wetlands have been evaluated based upon construction of three projects. Wetland and OSW impacts are listed by project and wetland type in ***Table 3-1*** through ***3-3***. These impacts are discussed by project segment in the following ***Sections 3.1.1*** through ***3.1.3***.

3.1.1 ECART

Construction of the ECART project, assuming a 350-foot wide corridor, will potentially impact approximately 874.36 acres of wetland and OSW. Of these impacts, 456.24 acres of OSW (canals) will be impacted, 3.72 acres of freshwater marsh will be impacted, and 414.40 acres of atypical wetlands will be impacted. Impacts will consist of widening the existing canals.

TABLE 3-1
WETLAND IMPACTS WITHIN ECART
Wetland Evaluation Report

Wetland ID	Habitat Type	FLUCFCS Code	USFWS Classification	Acres of Impact
OSW 1A and OSW 4A	Streams and Waterways	510	R2OWHx	456.24
WL 1A	Emergent Wetland	641	PEM1C	3.72
WL 2A	Atypical Wetland	215/242/260/261	PEM1C	414.40
Subtotal for Wetlands				418.12
Subtotal for Other Surface Waters				456.24
Total for ECART Parcels				**874.36**

3.1.2 Compartment B

Construction of the Compartment B project will impact approximately 9,032.25 acres of wetlands and OSW. Of the proposed wetland impacts, 414.59 acres of OSW (agricultural ditches and canals) will be impacted, 13.01 acres of reservoirs will be impacted, 3,294.12 acres of a freshwater marsh dominated by cattail will be impacted, and 5,310.53 acres of atypical wetland will be impacted. Impacts will consist of flooding the entire study area, in order to detain and treat stormwater runoff from adjacent agricultural areas prior to its release into the Everglades. As a result, the wetlands within the study area will become permanently inundated.

TABLE 3-2
WETLAND IMPACTS WITHIN COMPARTMENT B
Wetland Evaluation Report

Wetland ID	Habitat Type	FLUCFCS Code	USFWS Classification	Acres of Impact
OSW 1B	Streams and Waterways	510	R2OWHx	414.59
WL 2B	Reservoir less than 10 acres	534	POWHx	13.01
WL 1B	Freshwater Marsh	641	PEM1C	3,294.12
WL 3B	Atypical Wetland	215/242/260/261/422	PEM1C	5,310.53
Subtotal for Wetlands				8,617.66
Subtotal for Other Surface Waters				414.59
Total for Compartment B				**9,032.25**

3.1.3 Compartment C

Construction of the Compartment C project will impact approximately 5,918.68 acres of wetlands and OSWs. Of the proposed wetland impacts, 364.95 acres of OSW (agricultural ditches), 316.55 acres of scrub/shrub wetland, 1,688.66 acres of emergent wetland, 4.40 acres of reservoirs, and 3,544.12 acres of atypical wetland will be impacted. The proposed project consists of flooding the entire study area, for the purpose of treating stormwater runoff adjacent agricultural areas.

TABLE 3-3
WETLAND IMPACTS WITHIN COMPARTMENT C
Wetland Evaluation Report

Wetland ID	Habitat Type	FLUCFCS Code	USFWS Classification	Acres within Project Study Area
OSW 1C	Streams and Waterways	510	R2OWHx	364.95
WL 8C	Reservoir less than 10 acres	534	POWHx	4.40
WL 1C, 2C, and 6C	Wetland Scrub	631	PSS1C	316.55
W 3C, 4C, 5C, and 7C	Freshwater Marsh	641	PEM1C	1,688.66
WL 9C	Atypical Wetland	261	PEM1C	3,544.12
Subtotal for Wetlands				5,553.73
Subtotal for Other Surface Waters				364.95
Total for Compartment C				**5,918.68**

3.2 UNIFORM MITIGATION ASSESSMENT METHOD

The representative wetlands and surface waters that occur within the project study areas, and which will be impacted by the proposed projects were assessed using the UMAM per Chapter 62-345, FAC. Wetland values resulting from these assessments were then used as representative values for corresponding wetland types within each study area. UMAM is a method developed by the Florida Department of Environmental Protection (FDEP) and the Water Management Districts to determine the amount of mitigation needed to offset adverse impacts to wetlands. The methodology was designed to assess functions provided by wetlands, to assess the amount that those functions are reduced by a proposed impact, and to assess the amount of mitigation necessary to offset the proposed functional losses. This method is also used to determine the degree of improvement in ecological value that will be created by mitigation activities.

The UMAM assessment includes a Qualitative Characterization (Part 1) as well as a Quantitative Assessment and Scoring (Part 2). The variables described include the following:

- Significant nearby features;
- Water classifications;
- Assessment area size;
- Hydrology and relationship to contiguous offsite wetlands;
- Uniqueness of the assessment area;
- Functions of the assessment area; and
- Wildlife utilization

The Quantitative Assessment provides a score of the assessment area in both the current condition and "with impact" condition. The assessment scoring evaluates the following parameters:

- Location and landscape support;
- Water environment; and
- Vegetative community

3.2.1 Results of the UMAM

Tables 3-4 through ***3-6*** provide the existing condition score of each wetland and/or other surface water types which will be impacted by the proposed project. ***Appendices A, B,*** and ***C*** include corresponding UMAM assessment score sheets. For the purposes of this project only existing condition scoring was performed for the representative wetlands. Mitigation requirements will be calculated during the project's design and permitting stage. The UMAM existing conditions scores for each project study area are discussed in the following ***Sections 3.2.1.1*** through ***3.2.1.3***.

In addition to the UMAM assessment score sheets, a Routine Wetland Determination Data Form from the *1987 USACE Wetlands Delineation Manual* was also completed for each wetland that may be directly impacted by the proposed project. These forms are included as ***Appendices A, B,*** and ***C***.

TABLE 3-4
UMAM ANALYSIS RESULTS FOR EXISTING WETLAND CONDITIONS WITHIN ECART
Wetland Evaluation Report

		UMAM Components			
FLUCFCS Code	**USFWS Classification**	**Location & Landscape Support**	**Water Environment**	**Vegetation**	**UMAM Score**
510	R2OWHx	5	4	4	**0.43**
641	PEM1C	4	4	5	**0.43**
215/242/260/261	PEM1C	5	2	0	**0.23**

TABLE 3-5
UMAM ANALYSIS RESULTS FOR EXISTING WETLAND CONDITIONS WITHIN COMPARTMENT B
Wetland Evaluation Report

		UMAM Components			
FLUCFCS Code	**USFWS Classification**	**Location & Landscape Support**	**Water Environment**	**Vegetation**	**UMAM Score**
510	R2OWHx	5	4	4	**0.43**
534	POWHx	4	4	4	**0.40**
641	PEM1C	5	5	5	**0.50**
215/242/260/261	PEM1C	5	2	0	**0.23**

TABLE 3-6
UMAM ANALYSIS RESULTS FOR EXISTING WETLAND CONDITIONS WITHIN COMPARTMENT C
Wetland Evaluation Report

		UMAM Components			
FLUCFCS Code	**USFWS Classification**	**Location & Landscape Support**	**Water Environment**	**Vegetation**	**UMAM Score**
510	R2OWHx	6	5	4	**0.50**
534	POWHx	4	4	2	**0.33**
631	PSS1C	5	4	5	**0.47**
641	PEM1C	5	3	3	**0.37**
261	PEM1C	4	2	0	**0.20**

3.2.1.1 ECART

An analysis to determine the existing condition UMAM score was performed on each representative wetland or wetland system within the ECART project study area. Results of this analysis determined that the canals (OSWs) have an existing condition UMAM score of 0.43, the emergent marsh has an existing condition UMAM score of 0.43, and the atypical wetlands have an existing condition UMAM score of 0.23.

3.2.1.2 Compartment B

An analysis to determine the existing condition UMAM score was conducted on each representative wetland or wetland system within the Compartment B project study area. Based on this analysis, it was determined that the existing condition UMAM score for the canals/agricultural ditches is 0.43, the existing condition UMAM score for the reservoirs is 0.40, the existing condition UMAM score for the emergent wetland is 0.50, and the existing condition UMAM score for the atypical wetlands is 0.23.

3.2.1.3 Compartment C

An analysis to determine the existing condition UMAM score was conducted on each representative wetland or wetland system within the Compartment C project study area. It was determined that the existing condition UMAM score for the canals/agricultural ditches is 0.50, the existing condition UMAM score for the reservoirs is 0.33, the existing condition UMAM score for the scrub-shrub wetlands is 0.47, the existing condition UMAM score for the emergent wetlands is 0.37, and the existing condition UMAM score for the atypical wetlands is 0.20.

4.0 REFERENCES

Brown and Caldwell, 2007. *B509 Compartment B Build-out, Draft Basis of Design Report.* Prepared for South Florida Water Management District, April 2007.

Carlisle, V.W. 1995. *Hydric Soils of Florida Handbook.* Florida Association of Professional Soil Classifiers. Gainesville, Florida. 145 pp.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States.* U.S. Department of the Interior, Fish and Wildlife Service, Office of Biological Services. Technical Publication FWS/OBS-79/31. 131 pp.

Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual.* U.S. Army Engineers Waterways Experiment Station, Vicksburg, MS. Technical Report Y-87-1. 169 pp.

Florida Department of Transportation. 1999. *Florida Land Use, Cover and Forms Classification System.* Third Edition. 91 pp.

Florida Department of Agriculture and Consumer Services, 1997. *Forest Trees of Florida*. 17th Edition. 100 pp.

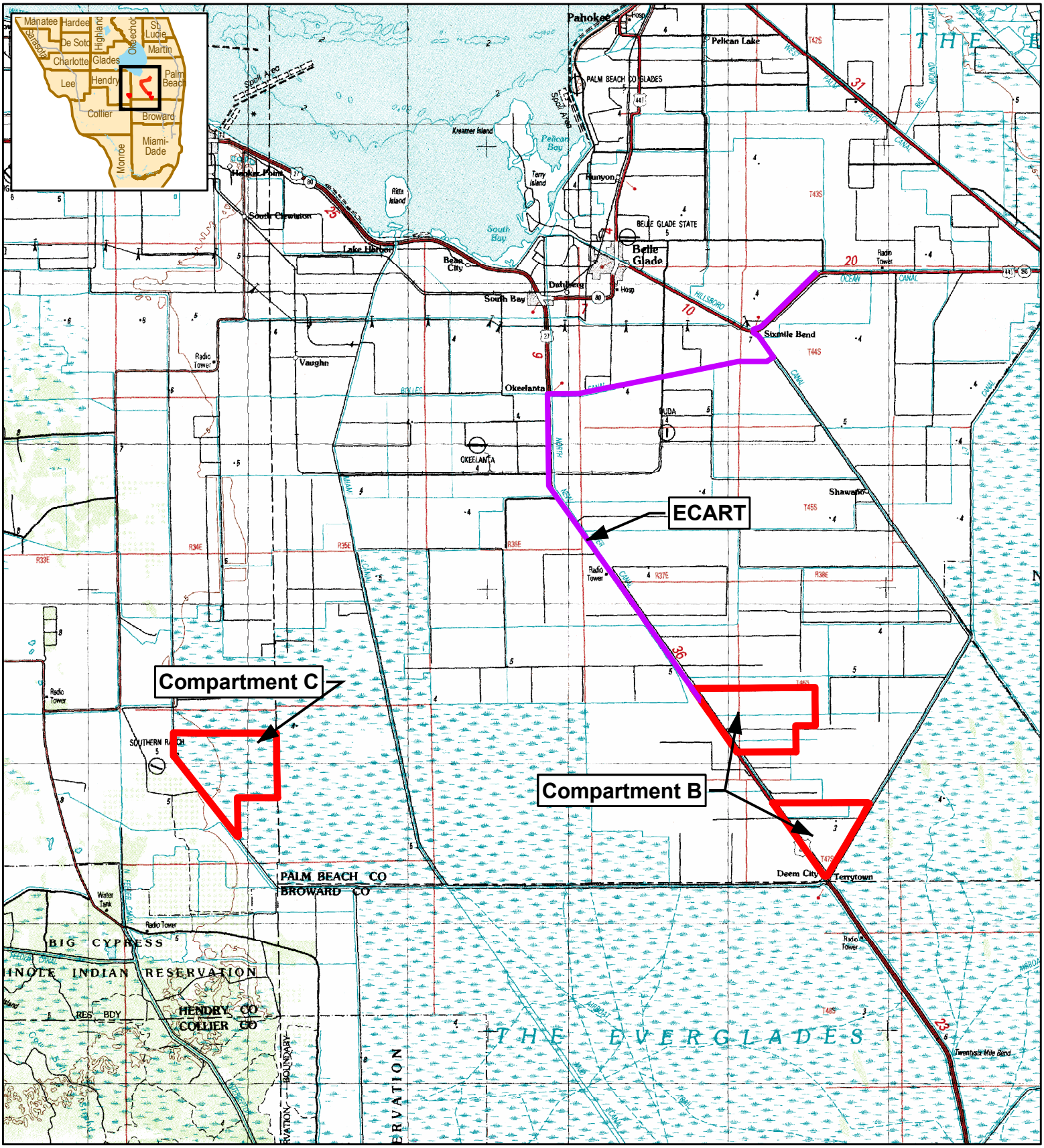
Tobe, J.D., et. al. 1998. *Florida Wetland Plants: An Identification Manual*. Florida Department of Environmental Protection. 598 pp.

U.S. Department of Agriculture (USDA), Natural Resource Conservation Service (NRCS), *Soil Survey of Palm Beach County, Florida.* 1978.

U.S. Department of Agriculture (USDA), Natural Resource Conservation Service (NRCS), *Soil Survey of Hendry County, Florida.* 1990.

U.S. Army Corps of Engineers. 2005. *Comprehensive Everglades Restoration Plan, 2005 Report to Congress*.

FIGURES



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Legend
- ECART Canals
- EAA Compartments

0 2.5 5 10 Miles

N W E S

South Florida Water Management District
2301 Center Park West Drive, Suite # 150
West Palm Beach, FL 33409
Tel # (561) 242-5520

FIGURE # 1-1

Location Map

Contract # CN040936

UPDATED
8/24/07

ECART/map_docs/Location.mxd

APPENDIX A
ECART INFORMATION

APPENDIX A-1
USACE DATA FORMS FOR ECART

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Ecart Canal Applicant/Owner: SFWMD Investigator: Murray / Railey	Date: 6-6-07 County: Hendry State: FL
Do Normal Circumstances Exist on the site? Yes (No) Is the site significantly disturbed (Atypical Situation)? (Yes) No Is the area a potential Problem Area? Yes (No) (If needed, explain on reverse.)	Community ID: WL-1A Transect ID: _____ Plot ID: _____

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Lythrum flagellare	Herb	OBL	9.		
2. Ludwigia nuttallii	Shrub	FAC	10.		
3. Bidens pilosa	Herb	FACW-	11.		
4. Bacopa caroliniana	Shrub	Facw+	12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100 %

Remarks:

/

HYDROLOGY

X Recorded Data (Describe in Remarks): ___ Stream, Lake, or Tide Gauge X Aerial Photographs ___ Other ___ No Recorded Data Available	Wetland hydrology Indicators: Primary Indicators: ___ Inundated ___ Saturated in Upper 12 Inches ___ Water Marks ___ Drift Lines ___ Sediment Deposits ___ Drainage Patterns in Wetlands Secondary Indicators (2 or more required): ___ Oxidized Root Channels in Upper 12" ___ Water-Stained Leaves ✓ Local Soil Survey Data ___ FAC-Neutral Test ___ Other (Explain in Remarks)
Field Observations: Depth of Surface Water: _____ (in.) Depth to Free Water in Pit: _____ (in.) Depth to Saturated Soil: 24 (in.)	

Remarks:

No hydrology indications observed - Aerial photographs show wetland signature.

SOILS

Map Unit Name (Series and Phase): Terra Ceia Muck

Drainage Class: _____

Taxonomy (Subgroup): _____

Field Observations
Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
to 24		10yr 2/1			

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ✓ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

Mucky texture with limestone pieces up to the surface - peat like.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

(Circle)
Is this Sampling Point Within a Wetland? (Yes) No

Remarks:

Wetland likely formed by altered hydrology from adjacent road and berm

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: ECART Applicant/Owner: SFWMD Investigator: Murray / Bailey	Date: 5-31-07 County: Palm Beach State: FL
Do Normal Circumstances exist on the site? Yes (No) Is the site significantly disturbed (Atypical Situation)? (Yes) No Is the area a potential Problem Area? Yes (No) (If needed, explain on reverse.)	Community ID: WL-2A Transect ID: _____ Plot ID: _____

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Saccharum officinarum	herb	FACU	9.		
2.			10.		
3.			11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). _____

Remarks:
Active sugar cane field located on hydric soils

HYDROLOGY

X Recorded Data (Describe in Remarks): __ Stream, Lake, or Tide Gauge X Aerial Photographs __ Other __ No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: __ Inundated X Saturated in Upper 12 Inches __ Water Marks __ Drift Lines __ Sediment Deposits __ Drainage Patterns in Wetlands Secondary Indicators (2 or more required): __ Oxidized Root Channels in Upper 12 Inches __ Water-Stained Leaves X Local Soil Survey Data __ FAC-Neutral Test __ Other (Explain in Remarks)
Field Observations: Depth of Surface Water: _____(in.) Depth to Free Water in Pit: _____(in.) Depth to Saturated Soil: _____(in.)	

Remarks:
No soil test conducted in field - info based on soil survey.
Aerial photographs show wetland signature.

SOILS

Map Unit Name (Series and Phase): Terra Ceia muck

Drainage Class: _____

Taxonomy (Subgroup): _____

Field Observations
Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
to 24"		10YR-2/1			

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- [X] Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:
Active sugar cane field on hydric soils.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes (No) (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

(Circle)
Is this Sampling Point Within a Wetland? Yes No

Remarks:

Approved by HQUSACE 2/92

DATA FORM 3

ATYPICAL SITUATIONS

Applicant Name: SFWMD | Application Number: _____ | Project Name: ECART, EAA Compartment B+C

Location: ECART study area. [W-2A] | Plot Number: _____ | Date: 8-20-07

A. VEGETATION:

1. Type of Alteration: Agricultural ditching has drained region. Monoculture of sugarcane has been planted throughout study area.

2. Effect on Vegetation: Hydrophytic vegetation has been replaced with Monocultures of sugarcane and sod fields.

3. Previous Vegetation: Previous vegetation thought to have been marsh grasses (Everglades vegetation) (Attach documentation) No documentation available.

4. Hydrophytic Vegetation? Yes _____ No X.

B. SOILS:

1. Type of Alteration: Agricultural ditching

2. Effect on Soils: Although water table has been lowered, soils appear to retain hydrology.

3. Previous Soils: Previous soils thought to have been Terra Ceia muck. No documentation available. (Attach documentation)

4. Hydric Soils? Yes X No _____.

C. HYDROLOGY:

1. Type of Alteration: Agricultural ditching

2. Effect on Hydrology: Water table throughout study area has been lowered.

3. Previous Hydrology: Previous hydrology thought to have been water table at or above ground surface. (Attach documentation)

4. Wetland Hydrology? Yes X No _____.

Characterized By: Railey

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: ECART Applicant/Owner: SFWMD Investigator: Murray / Railey	Date: 5-31-07 County: Palm Beach State: FL
Do Normal Circumstances exist on the site? (Yes) No Is the site significantly disturbed (Atypical Situation)? Yes (No) Is the area a potential Problem Area? Yes (No) (If needed, explain on reverse.)	Community ID: OSW 1A Transect ID: _____ Plot ID: _____

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Ambrosia artemisifolia	herb	FACU
2. Bidens alba	herb	FACU
3. Panicum repens	herb	FACW
4. Saccharum officinarum	herb	FACU
5. Phyla spp.	herb	FACW
6. Baccharis halimifolia	shrub	FAC
7.		
8.		

Dominant Plant Species	Stratum	Indicator
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). _____

Remarks:
No vegetation present in canal. Above listed vegetation was observed growing along banks.

HYDROLOGY

- (X) Recorded Data (Describe in Remarks):
  - ___ Stream, Lake, or Tide Gauge
  - (X) Aerial Photographs
  - ___ Other
- ___ No Recorded Data Available

Field Observations:

- Depth of Surface Water: _____ (in.)
- Depth to Free Water in Pit: _____ (in.)
- Depth to Saturated Soil: _____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- (X) Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- (X) Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:
No soil pit was dug - canal contains standing water. Aerial photographs show boundaries of canal.

SOILS

Map Unit Name (Series and Phase): Terra Ceia muck Drainage Class: _____

Taxonomy (Subgroup): _____ Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
___ Gleyed or Low-Chroma Colors
___ Concretions
___ High Organic Content in Surface Layer in Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks:

No soil test was done - info based on soil survey

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes (No) (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

(Circle)
Is this Sampling Point Within a Wetland? (Yes) No

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: ECART Applicant/Owner: SFWMD Investigator: Shaw / Greyson	Date: 5-31-07 County: Palm Beach State: FL
Do Normal Circumstances exist on the site? (Yes) No Is the site significantly disturbed (Atypical Situation)? Yes (No) Is the area a potential Problem Area? Yes (No) (If needed, explain on reverse.)	Community ID: OSW2A Transect ID: _____ Plot ID: _____

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Ambrosia artemisiifolia	Herb	FACW	9.		
2. Ricinus communis	Shrub	FAC	10.		
3. Cyperus spp	Herb	Var	11.		
4. Phytolacca americana	Herb	FACW	12.		
5. Polygonum densiflorum	Herb	OBL	13.		
6. Pluchea spp	Herb	OBL	14.		
7. Colocasia esculenta	Herb	OBL	15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 30%

Remarks:

All vegetation growing on Canal Bank

HYDROLOGY

- (X) Recorded Data (Describe in Remarks):
  - ( ) Stream, Lake, or Tide Gauge
  - (X) Aerial Photographs
  - ( ) Other
- ( ) No Recorded Data Available

Field Observations:

- Depth of Surface Water: _____ (in.)
- Depth to Free Water in Pit: _____ (in.)
- Depth to Saturated Soil: _____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- (X) Inundated
- ( ) Saturated in Upper 12 Inches
- ( ) Water Marks
- ( ) Drift Lines
- ( ) Sediment Deposits
- ( ) Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ( ) Oxidized Root Channels in Upper 12 Inches
- ( ) Water-Stained Leaves
- (X) Local Soil Survey Data
- ( ) FAC-Neutral Test
- ( ) Other (Explain in Remarks)

Remarks:

Aerial Photos Show Canal boundaries

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____

Taxonomy (Subgroup): _____ Field Observations
Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
___ Gleyed or Low-Chroma Colors
___ Concretions
___ High Organic Content in Surface Layer in Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks: No soil Pit Dug - Surface Water

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes (No) (Circle)
Wetland Hydrology Present? Yes No
Hydric Soils Present? (Yes) No

(Circle)
Is this Sampling Point Within a Wetland? (Yes) No

Remarks:

Surface Water - L-16 Bolles Canal

Approved by HQUSACE 2/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: ECART Applicant/Owner: SFWMD Investigator: Shaw/Grayson	Date: 5-31-07 County: Hendry State: FL
Do Normal Circumstances exist on the site? (Yes) No Is the site significantly disturbed (Atypical Situation)? Yes (No) Is the area a potential Problem Area? Yes (No) (If needed, explain on reverse.)	Community ID: OSW3A Transect ID: _____ Plot ID: _____

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Bidens alba	herb	FACW+
2. Ambrosia artemisiifolia	herb	FACU+
3. Leptochloa virginicum	herb	FACW
4. Ludwigia peruviana	shrub	OBL
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 10%

Remarks:
All Vegetation growing along Canal banks

HYDROLOGY

- (X) Recorded Data (Describe in Remarks):
  - ___ Stream, Lake, or Tide Gauge
  - (X) Aerial Photographs
  - ___ Other
- ___ No Recorded Data Available

Field Observations:

- Depth of Surface Water: _____ (in.)
- Depth to Free Water in Pit: _____ (in.)
- Depth to Saturated Soil: _____ (in.)

Wetland Hydrology Indicators:
Primary Indicators:
- (X) Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- (X) Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:
Aerial Photos Show boundaries of the Canal

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____

Field Observations

Taxonomy (Subgroup): _____ Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
___ Gleyed or Low-Chroma Colors
___ Concretions
___ High Organic Content in Surface Layer in Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks:

No Soil Pit dug - Surface Water

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes (No) (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

(Circle)
Is this Sampling Point Within a Wetland? (Yes) No

Remarks:

L-15 Hillsboro Canal

Approved by HQUSACE 2/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: ECART Applicant/Owner: SFWMD Investigator: Murray / Bailey	Date: 5-31-07 County: Palm Beach State: FL
Do Normal Circumstances exist on the site? (Yes) No Is the site significantly disturbed (Atypical Situation)? Yes (No) Is the area a potential Problem Area? Yes (No) (If needed, explain on reverse.)	Community ID: OSW-4A Transect ID: _____ Plot ID: _____

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Bidens alba	herb	FACW	9.		
2. Ambrosia artemisiifolia	herb	FACW	10.		
3. Lepidium virginicum	herb	FACW	11.		
4. Eupatorium capillifolium	herb	FACW	12.		
5. Colocasia esculenta	herb	OBL	13.		
6. Ricinus communis	herb	FAC	14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 15%

Remarks:
All vegetation was growing on the canal bank.

HYDROLOGY

- ✓ Recorded Data (Describe in Remarks):
  - ___ Stream, Lake, or Tide Gauge
  - X Aerial Photographs
  - ___ Other
- ___ No Recorded Data Available

Field Observations:

Depth of Surface Water: _____(in.)

Depth to Free Water in Pit: _____(in.)

Depth to Saturated Soil: _____(in.)

Wetland Hydrology Indicators:
Primary Indicators:
- X Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- X Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:
Aerial Photographs show boundaries of the canal

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____

Taxonomy (Subgroup): _____ Field Observations
Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
___ Gleyed or Low-Chroma Colors
___ Concretions
___ High Organic Content in Surface Layer in Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks:

No soil pit dug - Surface water

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes (No) (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

Is this Sampling Point Within a Wetland? (Circle) (Yes) No

Remarks:

L-13 Ocean Canal.

APPENDIX A-2
UMAM DATA SHEETS FOR ECART

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
ECART		ECART Canals (OSW-2A, 3A, & 4A)

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
510-Streams and Waterways	R20WHx	Impact	458.2 acres

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
	III	NA

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

These canals are predominantly surrounded by sugar cane fields both fallow and active, and fallow and active sod farms.

Assessment area description

Castor bean, beggarticks, common ragweed, and cattail

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
US 27, CR 880, CR 827, Wetland Conservation Area 2 (WCA 2), WCA 3, STA 2, S-7 and G-371 pump stations, active agricultural areas.	This surface water is not unique to the area.
Functions	**Mitigation for previous permit/other historic use**
Water management operations for flood control and water supply purposes.	No.
Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	**Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)**
Wading birds, alligators, turtles, snakes	tricolored heron - SCC, little blue heron - SCC, white ibis, SCC, American alligator - SCC, wood stork - E, roseate spoonbill - SCC, limpkin - SCC

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Wading birds - listed and unlisted, birds of prey, songbirds, alligators, turtles

Additional relevant factors:

Assessment conducted by:	Assessment date(s):
Erin Gregson and Rakelle Shaw	30-May-07

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
ECART		ECART Canals(OSW-2A, 3A, & 4A)
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Impact	Erin Gregson and Rakelle Shaw	30-May-07

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

		w/o pres or current	with
.500(6)(a) Location and Landscape Support	Adjacent areas consist of active sugar cane fields and sod farms. The canals are hydrolocically connected to each other, as well as agricultural ditches.	5	
.500(6)(b)Water Environment (n/a for uplands)	Water levels are low, due to ongoing drought, however sufficent water is present to support a variety of wildlife. Aquatic vegetation within the canal was not observed.	4	
.500(6)(c)Community structure 1. Vegetation and/or Benthic Community 2.	Current condition - banks are very steep and sparsely vegetated in areas. Canal consists mostly of open water, with the exception of some herbaceous islands in the Bolles Canal (L-16).	4	

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.43	

Delta = [with-current]
-0.43

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

If mitigation
Time lag (t-factor) =
Risk factor =

For impact assessment areas
FL = delta x acres = -0.43x458.2=-197

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
ECART		WL-1A

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
641 - Emergent Wetland	PEM1C	Impact	3.4 acres

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
	III	NA

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

This wetland is surrounded by fallow and active sugar cane fields and sod farms. A large canal is located adjacent and to the north of this wetland

Assessment area description

This wetland is located in between the Ocean Canal and CR 880. Dominant vegetation includes blue maidencane, smartweed, arrowhead, wild taro, button bush, nuttail thistle, camphor, purple loosestrife and maidencane.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
CR 880, Ocean Canal (L-13), active agricultural areas.	This wetland is not unique to the area.

Functions	Mitigation for previous permit/other historic use
Water quality and wildlife habitat.	No.

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
Wading birds, alligators, turtles, snakes	tricolored heron - SCC, little blue heron - SCC, white ibis, SCC, wood stork - E, roseate spoonbill - SCC

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

none

Additional relevant factors:

Assessment conducted by:	Assessment date(s):
Tobi Railey and Ted Murray	7-Jun-07

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
ECART		WL-1A
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Impact	Tobi Railey and Ted Murray	7-Jun-07

Scoring Guidance
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed

Optimal (10)	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support	w/o pres or current: 4	with:
This wetland is located within the ROW of CR 880 and is not hydrologically connected to any other wetlands within the vicinity.		
.500(6)(b)Water Environment (n/a for uplands)	w/o pres or current: 4	with:
Hydrophytic vegetation is present, although no other signs of hydrology in wetland. Wetland receives untreated stormwater runoff from adjacent road.		
.500(6)(c)Community structure 1. Vegetation and/or Benthic Community 2.	w/o pres or current: 5	with:
Appropriate percentage of hydrophytic vegetation present within wetland, although adjacent areas are subjected to regular maintenance.		

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.43	

Delta = [with-current]
-0.43

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

If mitigation
Time lag (t-factor) =
Risk factor =

For impact assessment areas
FL = delta x acres = -0.43 x 3.4=-1.5

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
ECART		WL-2A

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
215 - Cane Fields	PEM1C	Impact	457 acres

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
	III	NA

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

This atypical wetland is bisected by canals and shallow ditches. Roadways and other agricultural fields are located adjacent to this area.

Assessment area description

This wetland consists of active sugar cane fields that are located on hydric soils. The only vegetation present within this area consists of sugar cane. This wetland currently lacks hydrology due to ditching.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
CR 880, active agricultural areas.	This wetland is not unique to the area.

Functions	Mitigation for previous permit/other historic use
sugar cane production	No.

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
Wading birds, alligators, turtles, snakes	tricolored heron - SCC, little blue heron - SCC, white ibis - SCC, wood stork - E, roseate spoonbill - SCC

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

none

Additional relevant factors:

Assessment conducted by:	Assessment date(s):
Tobi Railey and Ted Murray	7-Jun-07

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
ECART		WL-2A
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Impact	Tobi Railey and Ted Murray	7-Jun-07

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support	w/o pres or current: 5	with:
This wetland is located adjacent to the canals and roadways throughout the project site. It is currently in crop production.		
.500(6)(b)Water Environment (n/a for uplands)	w/o pres or current: 2	with:
Because this wetland is being utilized for sugar cane production, water is currently being diverted via agricultural ditches.		
.500(6)(c)Community structure	w/o pres or current: 0	with:
This wetland contains a monoculture of sugar cane. No hydrophytic vegetation is present.		

1. Vegetation and/or Benthic Community 2.

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.23	

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

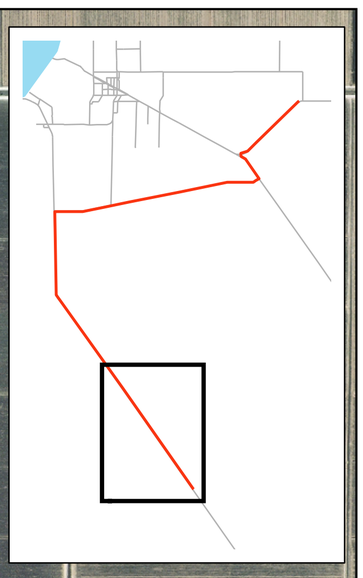
For impact assessment areas
FL = delta x acres = -0.23x457=-105.1

Delta = [with-current]
-0.23

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

APPENDIX A-3
WETLANDS ECART



NORTH NEW RIVER CANAL
(OSW-1A)
(R2OWHx)

Begin Project

Legend

Wetlands

- Upland
- Atypical, PEM1C
- Typical, PEM1C
- Surface Water, R2OWHx

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FIGURE # A-3
1
Wetlands ECART

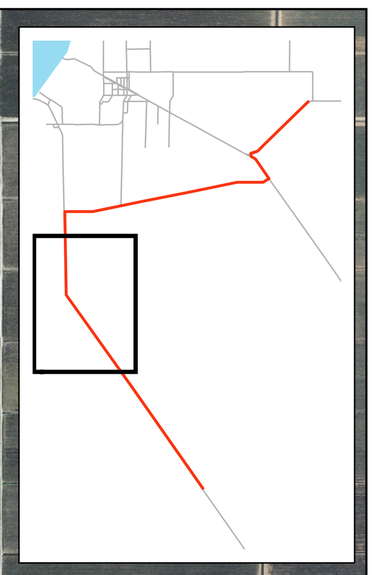
Contract # CN040936

N
W E
S

0 1,000 2,000 4,000 Feet

UPDATED
8/24/07

ECART/map_docs/wetland_canal.mxd



NORTH NEW RIVER CANAL
(OSW-1A)
(R2OWHx)

Legend

Wetlands

- Upland
- Atypical, PEM1C
- Typical, PEM1C
- Surface Water, R2OWHx

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FIGURE # A-3
2

Wetlands ECART

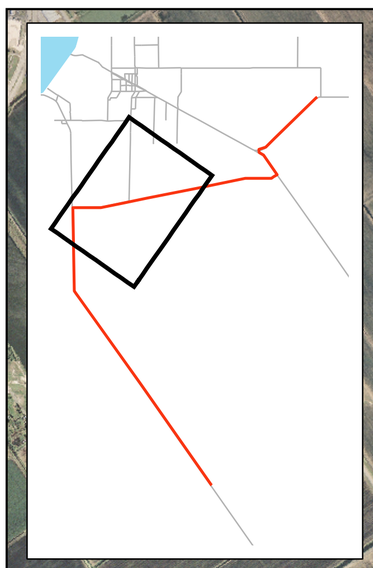
Contract # CN040936

N
W E
S

0 1,000 2,000 4,000 Feet

UPDATED
8/24/07

ECART/map_docs/wetland_canal.mxd



BOLLES CANAL
(OSW-2A)
(R2OWHx)

NORTH NEW RIVER CANAL
(OSW-1A)
(R2OWHx)

Legend

Wetlands

- Upland
- Atypical, PEM1C
- Typical, PEM1C
- Surface Water, R2OWHx

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FIGURE # A-3
3

Wetlands ECART

Contract # CN040936

0 1,000 2,000 4,000 Feet

UPDATED
8/24/07

ECART/map_docs/wetland_canal.mxd

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FIGURE # A-3
4

Wetlands ECART

Contract # CN040936

N W E S

0 1,000 2,000 4,000 Feet

UPDATED
8/24/07

ECART/map_docs/wetland_canal.mxd

OCEAN CANAL
(OSW-4A)
(R20WHx)

End Project

WL-2A
(PEM1C)

WL-1A
(PEM1C)

HILLSBORO CANAL
(OSW-3A)
(R2OWHx)

BOLLES CANAL
(OSW-2A)
(R2OWHx)

NORTH NEW RIVER CANAL
(OSW-1A)
(R2OWHx)

Begin Project

GPS point lat, long
OSW-1A 783952, 768135
OWS-2A 828437, 761698
OSW-3A 837144, 795402
OSW-4A 848477, 801870
WL-1A 840565, 794012
WL-2A 842971, 796738

Legend

- Wetland GPS points

Wetlands

- Upland
- Atypical, PEM1C
- Typical, PEM1C
- Surface Water, R2OWHx

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FIGURE # A-3
5

Wetlands Ground Truthing Locations For ECART

Contract # CN040936

N
W E
S

0 1,5003,000 6,000 Feet

UPDATED
8/24/07

ECART/map_docs/wetland_canal_GPS.mxd

APPENDIX A-4
SOILS ECART

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Legend
- 350' Study Corridor
- Soils - All Hydric

0 500 1,000 2,000 Feet

N W E S

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FIGURE # A-4 1

ECART Soils

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ECART/map_docs/soils_canal.mxd

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Legend

- 350' Study Corridor
- Soils - All Hydric

0 500 1,000 2,000 Feet

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FIGURE # A-4 2

ECART Soils

Contract # CN040936

UPDATED
8/24/07

ECART/map_docs/soils_canal.mxd

Soils
20 Lauderhill Muck *
26 Pahokee Muck *
43 Terra Ceia Muck*
99 Water

* Hydric Soils

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Legend

350' Study Corridor

Soils - All Hydric

0 500 1,000 2,000 Feet

N W E S

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FIGURE # A-4 3

ECART Soils

Contract # CN040936

UPDATED
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ECART/map_docs/soils_canal.mxd

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Legend

- 350' Study Corridor
- Soils - All Hydric

0 500 1,000 2,000 Feet

N W E S

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FIGURE # A-4 4

ECART Soils

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ECART/map_docs/soils_canal.mxd

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Legend

- 350' Study Corridor
- Soils - All Hydric

0 500 1,000 2,000 Feet

N W E S

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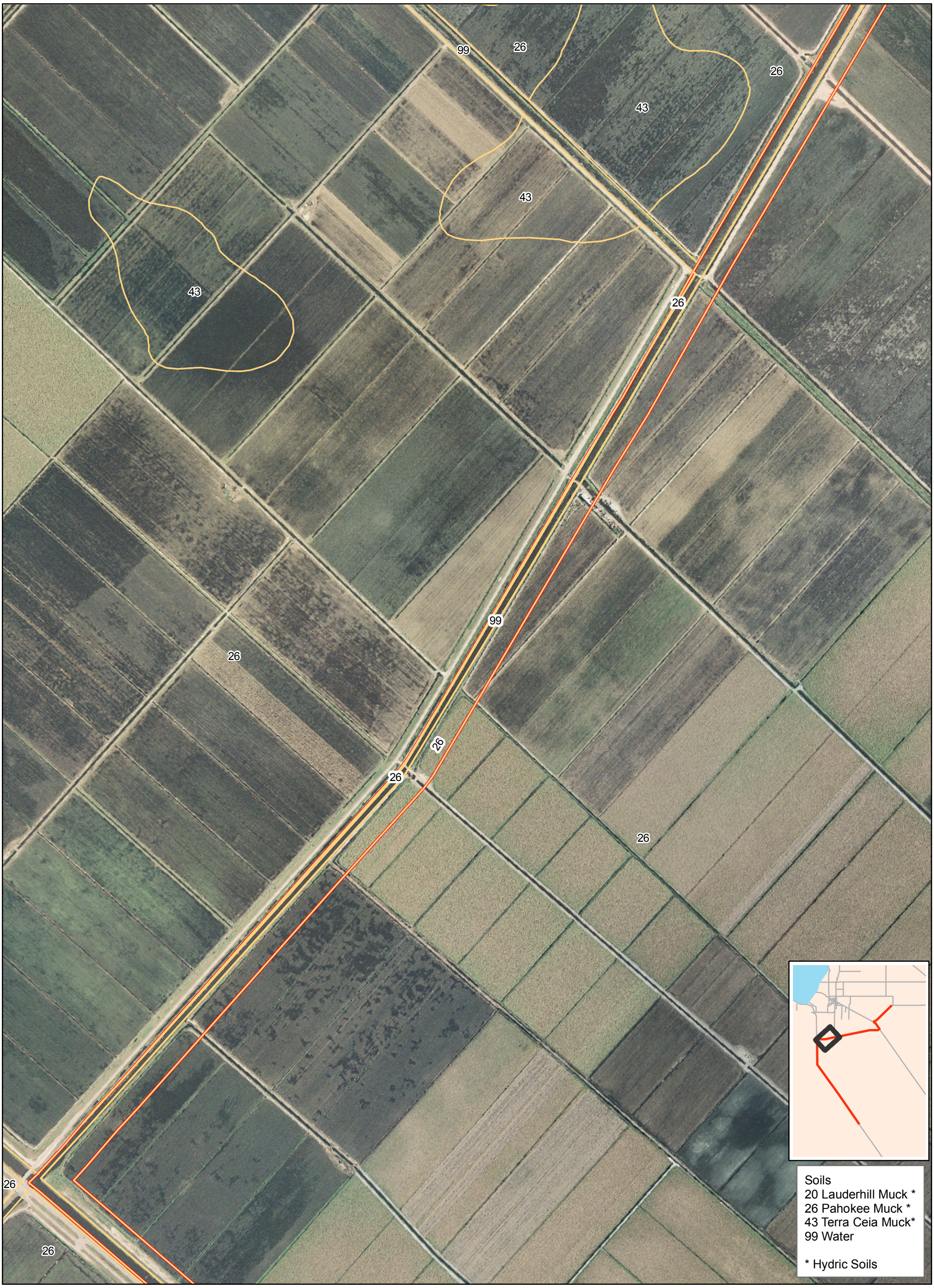
FIGURE # A-4 5

ECART Soils

Contract # CN040936

UPDATED
8/24/07

ECART/map_docs/soils_canal.mxd



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Legend

350' Study Corridor

Soils - All Hydric

0 500 1,000 2,000 Feet

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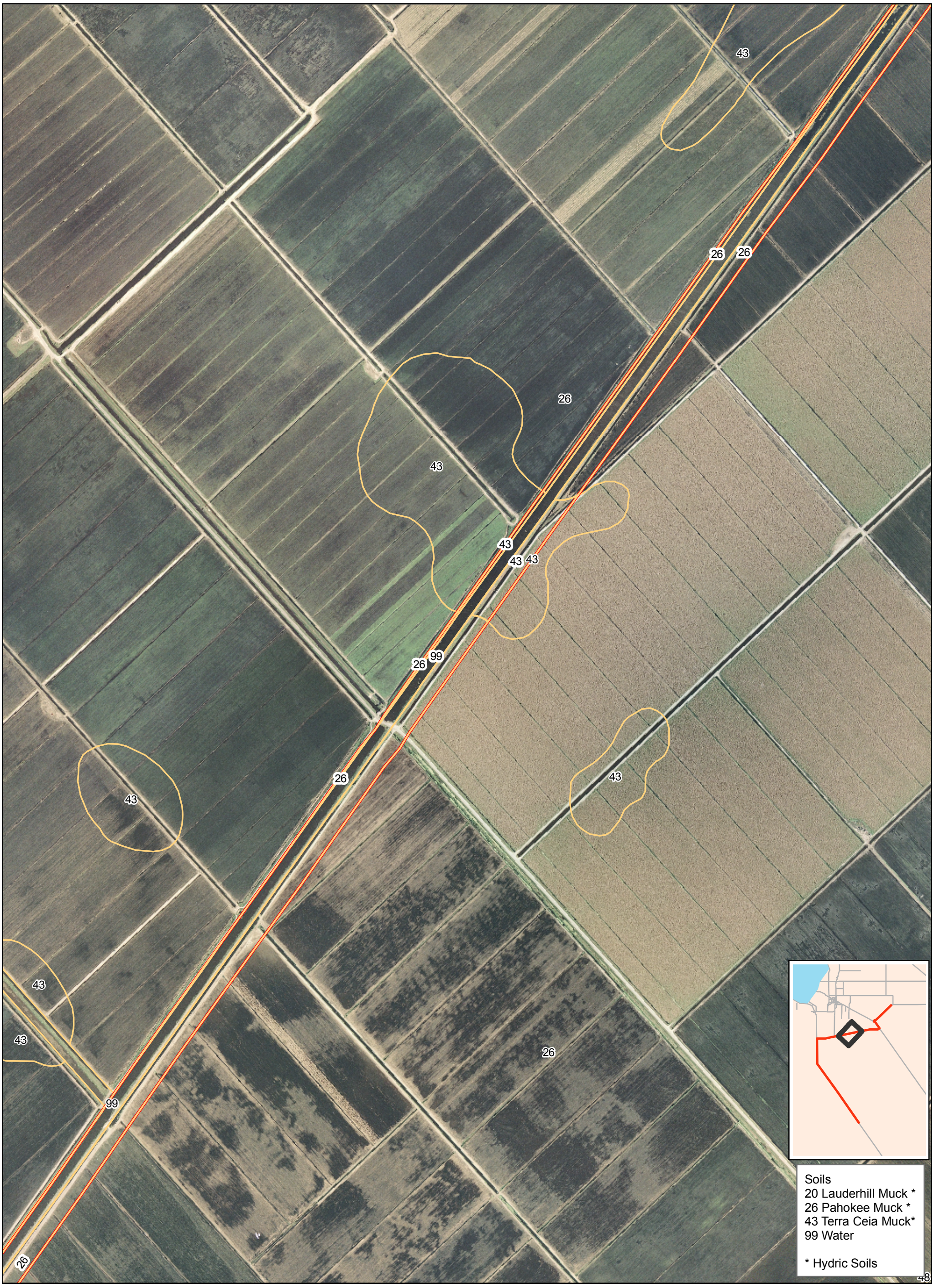
FIGURE # A-4 6

ECART Soils

Contract # CN040936

UPDATED
8/24/07

ECART/map_docs/soils_canal.mxd



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Legend

- 350' Study Corridor
- Soils - All Hydric

0 500 1,000 2,000 Feet

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FIGURE # A-4 7

ECART Soils

Contract # CN040936

UPDATED
8/24/07

ECART/map_docs/soils_canal.mxd

Soils
20 Lauderhill Muck *
26 Pahokee Muck *
43 Terra Ceia Muck*
99 Water

* Hydric Soils

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Legend

350' Study Corridor

Soils - All Hydric

0 500 1,000 2,000 Feet

N E S W

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FIGURE # A-4 8

ECART Soils

Contract # CN040936

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ECART/map_docs/soils_canal.mxd

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Legend

- 350' Study Corridor
- Soils - All Hydric

0 500 1,000 2,000 Feet

N W E S

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FIGURE # A-4 9

ECART Soils

Contract # CN040936

UPDATED
8/24/07

ECART/map_docs/soils_canal.mxd

APPENDIX A-5
WETLANDS PHOTOGRAPHS ECART

ECART Canal

OSW 2A (Bolles Canal)
FLUCFCS – 510-Streams and Waterways/USFWS – R20WHx - Riverine, Lower Perennial, Open Water, Unknown Bottom, Permanently Flooded, Excavated

OSW 3A (Hillsboro Canal)
FLUCFCS – 510- Streams and Waterways/USFWS – R2OWHx - Riverine, Lower Perennial, Open Water, Permanently Flooded, Excavated

OSW 4A (Ocean Canal)
FLUCFCS – 510- Streams and Waterways/USFWS – R2OWHx - Riverine, Lower Perennial, Open Water, Permanently Flooded, Excavated

W-1A
FLUCFCS – 641-Freswhwater Marsh/USFWS – PEM1C - Palustrine, Emergent, Persistent, Seasonally Flooded

APPENDIX A-6
LAND USE MAPS ECART

North New River Canal

North New River Canal

Land Use from Compartment B

Legend

- EAA Compartment B
- Land Use
- Upland
- Atypical Wetland
- Typical Wetland
- Surface Water

FLUCCS CODES
215 SUGAR CANE FIELDS
242 SOD FARM FIELDS
260 OPEN LAND
261 FALLOW CROP LAND
510 STREAMS AND CANALS
641 FRESHWATER MARSHES
747 DIKES AND LEVEES
814 ROADS AND HIGHWAYS
833 PUMP STATION

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FIGURE # A-6

1 of 5

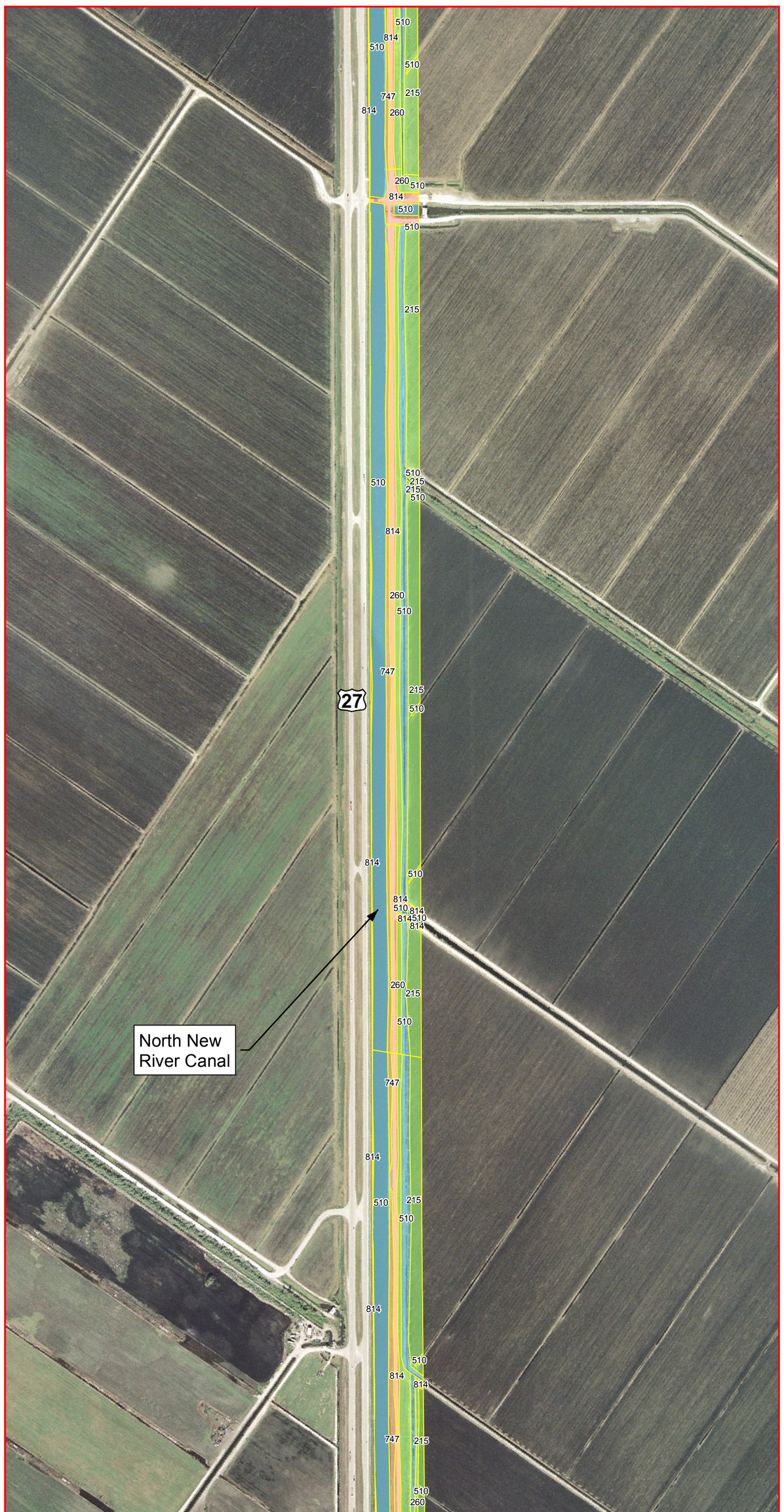
Land Use ECART

Contract # CN040936

0 500 1,000 2,000 Feet

UPDATED
8/13/2007

ECART/map_docs/LU_canal_d_size.mxd



FLUCCS CODES
215 SUGAR CANE FIELDS
242 SOD FARM FIELDS
260 OPEN LAND
261 FALLOW CROP LAND
510 STREAMS AND CANALS
641 FRESHWATER MARSHES
747 DIKES AND LEVEES
814 ROADS AND HIGHWAYS
833 PUMP STATION

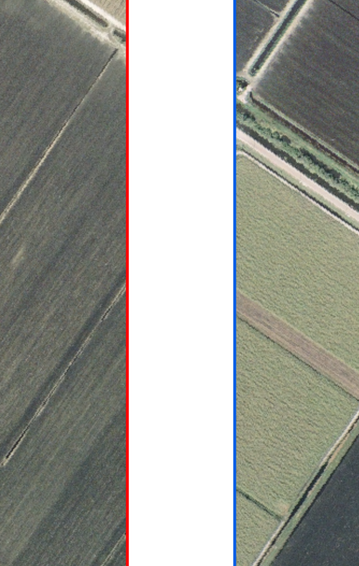


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FIGURE # A-6

2 of 5

Land Use ECART

Contract # CN040936

Legend

- Land Use
- Upland
- Atypical Wetland
- Typical Wetland
- Surface Water

0 500 1,000 2,000 Feet

UPDATED
8/13/2007

ECART/map_docs/LU_canal_d_size.mxd

North New River Canal

Bolles Canal

FLUCCS CODES
215 SUGAR CANE FIELDS
242 SOD FARM FIELDS
260 OPEN LAND
261 FALLOW CROP LAND
510 STREAMS AND CANALS
641 FRESHWATER MARSHES
747 DIKES AND LEVEES
814 ROADS AND HIGHWAYS
833 PUMP STATION

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

FIGURE # A-6

3 of 5

Land Use ECART

Contract # CN040936

Legend

- Land Use
- Upland
- Atypical Wetland
- Typical Wetland
- Surface Water

0 500 1,000 2,000 Feet

UPDATED
8/13/2007

ECART/map_docs/LU_canal_d_size.mxd

Hillsboro Canal

Bolles Canal

Bolles Canal

FLUCCS CODES
215 SUGAR CANE FIELDS
242 SOD FARM FIELDS
260 OPEN LAND
261 FALLOW CROP LAND
510 STREAMS AND CANALS
641 FRESHWATER MARSHES
747 DIKES AND LEVEES
814 ROADS AND HIGHWAYS
833 PUMP STATION

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FIGURE # A-6

4 of 5

Land Use ECART

Contract # CN040936

Legend

- Land Use
- Upland
- Atypical Wetland
- Typical Wetland
- Surface Water

0 500 1,000 2,000 Feet

UPDATED
8/13/2007

ECART/map_docs/LU_canal_d_size.mxd

Ocean Canal

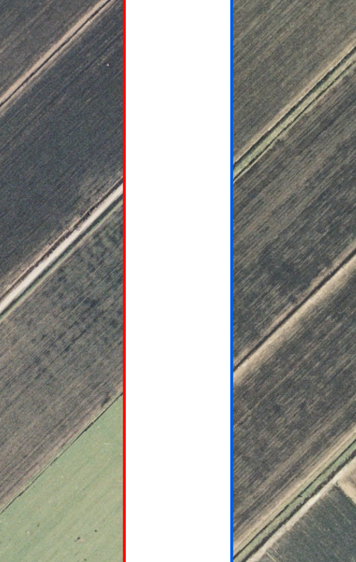
Hillsboro Canal

880

880

Ocean Canal

FLUCCS CODES
215 SUGAR CANE FIELDS
242 SOD FARM FIELDS
260 OPEN LAND
261 FALLOW CROP LAND
510 STREAMS AND CANALS
641 FRESHWATER MARSHES
747 DIKES AND LEVEES
814 ROADS AND HIGHWAYS
833 PUMP STATION



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Tel # (561) 242-5520

FIGURE # A-6

5 of 5

Land Use ECART

Contract # CN040936

Legend

- Land Use
- Upland
- Atypical Wetland
- Typical Wetland
- Surface Water

0 500 1,000 2,000 Feet

UPDATED
8/13/2007

ECART/map_docs/LU_canal_d_size.mxd

APPENDIX B
COMPARTMENT B INFORMATION

APPENDIX B-1
USACE DATA FORMS
FOR COMPARTMENT B

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Compartment B SouthBuildout SE side Applicant/Owner: SFWMD Investigator: K. Shaw & E. Gregson	Date: 6/3/07 County: Palm Beach State: FLorida
Do Normal Circumstances Exist on the site? (Yes) No Is the site significantly disturbed (Atypical Situation)? Yes (No) Is the area a potential Problem Area? Yes (No) (If needed, explain on reverse.)	Community ID: WL-IB Transect ID: Plot ID: GPS 125

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Cladium jamaicense	Herb	Obl	9.		
2. Schinus terebinthifolius	Shrub	FAC	10.		
3. Salix Caroliniana	Shrub	Obl	11.		
4. Ilex Cassine	Shrub	FACW	12.		
5. Persea borbonia	Shrub	FACW	13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100%

Remarks:

HYDROLOGY

✓ Recorded Data (Describe in Remarks): ___ Stream, Lake, or Tide Gauge ✓ Aerial Photographs ___ Other ___ No Recorded Data Available	Wetland hydrology Indicators: Primary Indicators: ✓ Inundated ___ Saturated in Upper 12 Inches ___ Water Marks ___ Drift Lines ___ Sediment Deposits ___ Drainage Patterns in Wetlands Secondary Indicators (2 or more required): ___ Oxidized Root Channels in Upper 12" ___ Water-Stained Leaves ✓ Local Soil Survey Data ___ FAC-Neutral Test ___ Other (Explain in Remarks)
Field Observations: Depth of Surface Water: ≈ 1 (in.) Depth to Free Water in Pit: _____ (in.) Depth to Saturated Soil: _____ (in.)	

Remarks:
Aerial photographs show wetland signature.

SOILS

Map Unit Name (Series and Phase): Pahokee muck

Drainage Class: _____

Taxonomy (Subgroup): _____

Field Observations
Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-10	Oa1-0	2/1	—	—	mucky

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
___ Gleyed or Low-Chroma Colors
___ Concretions
___ High Organic Content in Surface Layer Sandy Soils
___ Organic Streaking in Sandy Soils
✓ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

Is this Sampling Point Within a Wetland? (Yes) No (Circle)

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Compartment B Reservoir adj to Power easement	Date: 5/30/07
Applicant/Owner: SFWMD	County: Palm Beach
Investigator: R. Shaw, E. Gregson	State: Florida
Do Normal Circumstances Exist on the site? (Yes) No	Community ID: WL-2B
Is the site significantly disturbed (Atypical Situation)? Yes (No)	Transect ID:
Is the area a potential Problem Area? Yes (No)	Plot ID: GPS 111
(If needed, explain on reverse.)	

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Cladium jamaicense	herb	OBL	9.		
2. Typha sp.	herb	OBL	10.		
3. Schinus terebinthifolius	shrub	FAC	11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ✓ Aerial Photographs
- ___ Other

___ No Recorded Data Available

Field Observations:
- Depth of Surface Water: _____(in.)
- Depth to Free Water in Pit: _____(in.)
- Depth to Saturated Soil: _____(in.)

Wetland hydrology Indicators:
Primary Indicators:
- ✓ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12"
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:
Reservoir - no soil pit dug. Aerial photographs show wetland signature

SOILS

Map Unit Name (Series and Phase): Pahokee muck

Drainage Class: _____

Field Observations
Confirm Mapped Type? Yes No

Taxonomy (Subgroup): _____

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
___ Gleyed or Low-Chroma Colors
___ Concretions
___ High Organic Content in Surface Layer Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks: Reservoir - No soil taken.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? Yes No Unk

(Circle)
Is this Sampling Point Within a Wetland? (Yes) No

Remarks:

Approved by HQUSACE 3/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Compartment B
Applicant/Owner: SFWMD
Investigator: Murray / Bailey

Date: 5-31-07
County: Palm Beach
State: FL

Do Normal Circumstances exist on the site? Yes (No)
Is the site significantly disturbed (Atypical Situation)? (Yes) No
Is the area a potential Problem Area? (Yes) No
(If needed, explain on reverse.)

Community ID: WL-3B
Transect ID: _____
Plot ID: _____

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. ~~Pata~~ Paspalum notatum	Herb	FACUP+
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100%

Remarks: Sod Field

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water: _____ (in.)
Depth to Free Water in Pit: _____ (in.)
Depth to Saturated Soil: 24 (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in Upper 12 Inches
✓ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
✓ Other (Explain in Remarks)

Remarks: Geotech report by Brown and Caldwell, April 2007 for Compartment B, BODR. Borings indicate that water table in September 2006 was within 1 to 1.5 feet of ~~surface~~ rock surface in many areas in North Build out area. There is currently active pumping for sod operations that has lowered the ground water table. Aerial photographs show wetland signature.

SOILS

Map Unit Name (Series and Phase): Pahokee Muck

Drainage Class: _____

Taxonomy (Subgroup): _____

Field Observations
Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-24"		10YR 2/1			

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ✓ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ~~___~~ Listed on Local Hydric Soils List
- ✓ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes (No) (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

(Circle)
Is this Sampling Point Within a Wetland? (Yes) No

Remarks: Atypical wetland per SFWMD and ACOE direction - Natural hydrophytic vegetation would consist of ~~Mixed~~ freshwater marsh vegetation as verified by historic aerial photographs and surrounding unaltered sites.

Approved by HQUSACE 2/92

DATA FORM 3

ATYPICAL SITUATIONS

Applicant Name: SFWMD

Application Number: _____

Project Name: ECART, EAA Compartments B+C

Location: Compartment B WL-3B

Plot Number: _____

Date: 8-20-07

A. VEGETATION:

1. Type of Alteration: Agricultural ditching

2. Effect on Vegetation: Hydrophytic vegetation has been replaced with monocultures of sugar cane and sod fields.

3. Previous Vegetation: Previous vegetation thought to have been marsh grasses (Everglades). No documentation available.
(Attach documentation)

4. Hydrophytic Vegetation? Yes _____ No X

B. SOILS:

1. Type of Alteration: Agricultural ditching

2. Effect on Soils: Soils appear to retain hydrology, despite the ditching.

3. Previous Soils: Previous soils thought to have been Pahokee muck. No documentation available
(Attach documentation)

4. Hydric Soils? Yes X No _____

C. HYDROLOGY:

1. Type of Alteration: Agricultural ditching

2. Effect on Hydrology: Water table has been lowered in region.

3. Previous Hydrology: Previous hydrology thought to have been water table at ground surface (inundated)
(Attach documentation)

4. Wetland Hydrology? Yes X No _____

Characterized By: Railey

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Compartment B (internal Canals)	Date: 5/30/07
Applicant/Owner: SFWMD	County: Palm Beach
Investigator: R. Shaw & E. Gregson	State: Florida
Do Normal Circumstances Exist on the site? (Yes) No	Community ID: OSW-1B
Is the site significantly disturbed (Atypical Situation)? Yes (No)	Transect ID:
Is the area a potential Problem Area? Yes (No) (If needed, explain on reverse.)	Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Ambrosia artemisiifolia	herb	FAC,UP	9.		
2. Schinus terebinthifolius	shrub	FAC	10.		
3. Bidens pilosa	herb	FACW	11.		
4. Baccharis halimifolia	shrub	FAC	12.		
5. Saccharum officinarum	herb	FAC,UP	13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks: No vegetation was observed in the water only on the banks

HYDROLOGY

✓ Recorded Data (Describe in Remarks):	Wetland hydrology Indicators:
___ Stream, Lake, or Tide Gauge	Primary Indicators:
✓ Aerial Photographs	✓ Inundated
___ Other	___ Saturated in Upper 12 Inches
___ No Recorded Data Available	___ Water Marks
	___ Drift Lines
Field Observations:	___ Sediment Deposits
Depth of Surface Water: ___(in.)	___ Drainage Patterns in Wetlands
Depth to Free Water in Pit: ___(in.)	Secondary Indicators (2 or more required):
Depth to Saturated Soil: ___(in.)	___ Oxidized Root Channels in Upper 12"
	___ Water-Stained Leaves
	___ Local Soil Survey Data
	___ FAC-Neutral Test
	___ Other (Explain in Remarks)

Remarks: Canal - no soil pit dug. Aerial photographs show signature of wetland.

SOILS

Map Unit Name (Series and Phase): Pahokee muck

Drainage Class: _____

Taxonomy (Subgroup): _____

Field Observations
Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
___ Gleyed or Low-Chroma Colors
___ Concretions
___ High Organic Content in Surface Layer in Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks:

canal - no soil pit dug

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes (No) (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

(Circle)
Is this Sampling Point Within a Wetland? (Yes) No

Remarks:

Area is a surface water

Approved by HQUSACE 2/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Compartment B Applicant/Owner: SFWMD Investigator: R. Shaw + E. Gregson	Date: 5-30-07 County: Palm Beach State: FL
Do Normal Circumstances exist on the site? (Yes) No Is the site significantly disturbed (Atypical Situation)? Yes (No) Is the area a potential Problem Area? Yes (No) (If needed, explain on reverse.)	Community ID: U-1B Transect ID: _____ Plot ID: _____

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1.			9.		
2.			10.		
3.			11.		
4. no vegetation present			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). _____

Remarks:
The upland areas consist of roads running through and around wetlands.

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

X No Recorded Data Available

Field Observations:

Depth of Surface Water: _____(in.)

Depth to Free Water in Pit: _____(in.)

Depth to Saturated Soil: _____(in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): Fill material - unknown Drainage Class: _____

Taxonomy (Subgroup): _____ Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

Not a hydric soil. Roads consist of fill material.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes (No) (Circle)
Wetland Hydrology Present? Yes (No)
Hydric Soils Present? Yes (No)

Is this Sampling Point Within a Wetland? (Circle) Yes No

Remarks:

Fill roads adjacent to wetland areas.

APPENDIX B-2
UMAM DATA SHEETS
FOR COMPARTMENT B

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Compartment B		W-1B

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
641 - Freshwater marsh	PEM1C	Impact	3,302 acres

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Adjacent to a large freshwater marsh to the north and Wetland Conservation Area 2 (WCA 2) to the east, which are not hydrologically connected.

Assessment area description

Cattails, common ragweed, carolina willow, sawrass, primrose willow, brazilian pepper, sugar cane.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
US 27, Wetland Conservation Area 2 (WCA 2), STA 2, S-7 and G-371 pump stations, active agricultural area.	This wetland is not unique to the area.

Functions	Mitigation for previous permit/other historic use
Water quality, wildlife habitat	No.

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
Wading birds, alligators, turtles, snakes	Tricolored heron - SCC, Little Blue Heron - SCC, White Ibis, SCC, American Alligator - SCC, Wood Stork - E, Roseate Spoonbill - SCC

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Wading birds and alligators observed during field review

Additional relevant factors:

Assessment conducted by:	Assessment date(s):
Erin Gregson and Rakelle Shaw	30-May-07

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Compartment B		WL-1B
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Impact	Erin Gregson and Rakelle Shaw	30-May-07

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

		w/o pres or current	with
.500(6)(a) Location and Landscape Support	A canal is located around the perimeter of the wetland, water conservation areas (WCA 2 and 3) to the east and south, respectively, and sugar cane and sod farms to the north. The assessment area does not provide benefits to downstream or other hydrologically connected areas due to roads and canals prohibiting water flow to the entire wetland area, which in turn prohibits fish and wildlife from accessing the entire wetland area. The majority of the site is vegetated with nuissance and/or exotic wetland species.	5	
.500(6)(b)Water Environment (n/a for uplands)	Water quality is poor due to large concentrations of phosphorus in the water column from agricultural use. Due to changes in topography and roads and canals prohibiting water flow to the entire wetland area, certain areas of the wetland contain more water than others.	5	
.500(6)(c)Community structure 1. Vegetation and/or Benthic Community 2.	The majority of the wetland area is vegetated with nuissance exotic species.	5	

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.50	

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL = delta x acres =0.50 X 3302=1651

Delta = [with-current]
0.50

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Compartment B		W-2B

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
534-Reservoir less than 10 acres	POWHx	Impact	9.6 acres

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Adjacent to a large freshwater marsh to the west and Wetland Conservation Area 2 (WCA 2) to the east.

Assessment area description

Cattails, brazilian pepper, and sawgrass

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
US 27, WCA 2, STA 2, S-7 and G-371 pump station, active agricultural area.	This wetland is not unique to the area.

Functions	Mitigation for previous permit/other historic use
Water quality, wildlife habitat	No.

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
Wading birds, alligators, turtles, snakes	Tricolored heron - SCC, Little Blue Heron - SCC, White Ibis, SCC, American Alligator - SCC, Wood Stork - E, Roseate Spoonbill - SCC

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Alligators observed during field review

Additional relevant factors:

Assessment conducted by:	Assessment date(s):
Erin Gregson and Rakelle Shaw	30-May-07

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Compartment B		W-2B
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Impact	Erin Gregson and Rakelle Shaw	30-May-07

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current: 4 — with: 0	The assessment area does not provide benefits to downstream or other hydrologically connected areas since it is a small isolated wetland.
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current: 4 — with: 0	Water level is low due to lack of rain in recent months. Water quality is poor due to large concentrations of phosphorus in the sediment from agricultural use.
.500(6)(c)Community structure 1. Vegetation and/or Benthic Community 2. w/o pres or current: 4 — with: 0	Nuisance wetland vegetation is present.

Score = sum of above scores/30 (if uplands, divide by 20)		
current or w/o pres: 0.40	with: 0.00	

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL = delta x acres =

Delta = [with-current]

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Compartment B		W-3B

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
261 - Fallow Cane, 215 - Field Crops, 242 - Sod Farms	PEM1C	Impact	5,515.4 acres

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Adjacent to freshwater marsh and hydrogically connected to agricultural ditches.

Assessment area description

Vegetation present within this wetland consists of fallow and active sugar cane and sod farms.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
US 27, Wetland Conservation Area 2 (WCA 2), WCA 3, STA 2, S-7 and G-371 pump stations, active agricultural area.	This wetland is not unique to the area

Functions	Mitigation for previous permit/other historic use
sugar cane production	No.

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
snakes	None.

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

None

Additional relevant factors:

Assessment conducted by:	Assessment date(s):
Erin Gregson and Rakelle Shaw	30-May-07

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Compartment B		WL-3B
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Impact	Erin Gregson and Rakelle Shaw	30-May-07

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support	w/o pres or current: 5	with:
Canals are located throughout this wetland. A freshwater marsh is located to the south.		
.500(6)(b)Water Environment (n/a for uplands)	w/o pres or current: 2	with:
Wetland lacks appropriate hydroloogy due to ditching and recent ongoing drought.		
.500(6)(c)Community structure	w/o pres or current: 0	with:
1. Vegetation and/or Benthic Community 2. Wetland lacks hydrophytic vegetation. The only vegetation present is fallow sugar cane.		

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.23	

Delta = [with-current]
0.23

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

If mitigation
Time lag (t-factor) =
Risk factor =

For impact assessment areas
FL = delta x acres =0.23 X 5515=1269

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Compartment B		OSW-1B

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
510-Streams and Waterways	R20WHx	Impact	203.3

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

The internal canals are adjacent to upland? (we don't show any upland ares in Comp B) and wetland areas in Compartment B

Assessment area description

Cattails, common ragweed, carolina willow, sawrass, primrose willow, sawgrass, brazilian pepper, sugar cane.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
US 27, Wetland Conservation Area 2 (WCA 2), STA 2, S-7 and G-371 pump stations, active agricultural area.	This wetland is not unique unique to the area.

Functions	Mitigation for previous permit/other historic use
Water quality, wildlife habitat	No.

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
Wading birds, alligators, turtles, snakes	Tricolored heron - SCC, Little Blue Heron - SCC, White Ibis, SCC, American Alligator - SCC, Wood Stork - E, Roseate Sponnbill - SCC

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Wading birds and alligators observed during fied review

Additional relevant factors:

Assessment conducted by:	Assessment date(s):
Erin Gregson and Rakelle Shaw	30-May-07

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Compartment B		OSW-1B
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Impact	Erin Gregson and Rakelle Shaw	30-May-07

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

		w/o pres or current	with
.500(6)(a) Location and Landscape Support	These canals are located are mostly located within fallow sugar cane fields or sod farms. Many are hydrologically connected to other onsite wetlands.	5	
.500(6)(b)Water Environment (n/a for uplands)	Water levels are low, due to ongoing drought, however sufficent water is present to support a variety of wildlife. Aquatic vegetation within the canals was not observed.	4	
.500(6)(c)Community structure 1. Vegetation and/or Benthic Community 2.	Current condition - banks are very steep and sparsely vegetated in areas	4	

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.43	

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

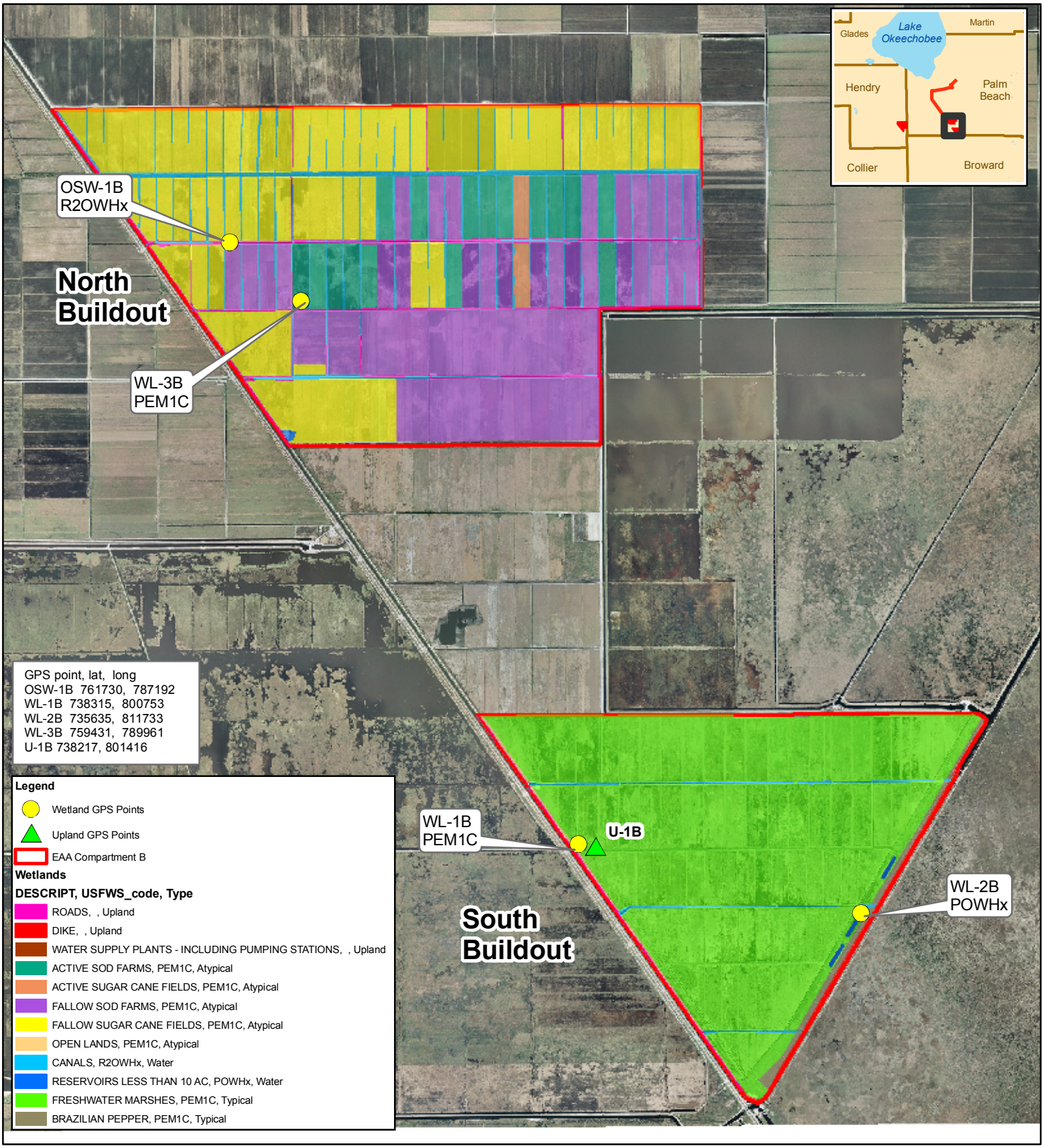
For impact assessment areas
FL = delta x acres =0.43 X 203.3=87.4

Delta = [with-current]
0.43

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

APPENDIX B-3
WETLANDS COMPARTMENT B



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0 2,500 5,000 10,000 Feet

N W E S

South Florida Water Management District
2301 Center Park West Drive, Suite # 150
West Palm Beach, FL 33409
Tel # (561) 242-5520

FIGURE # B-3

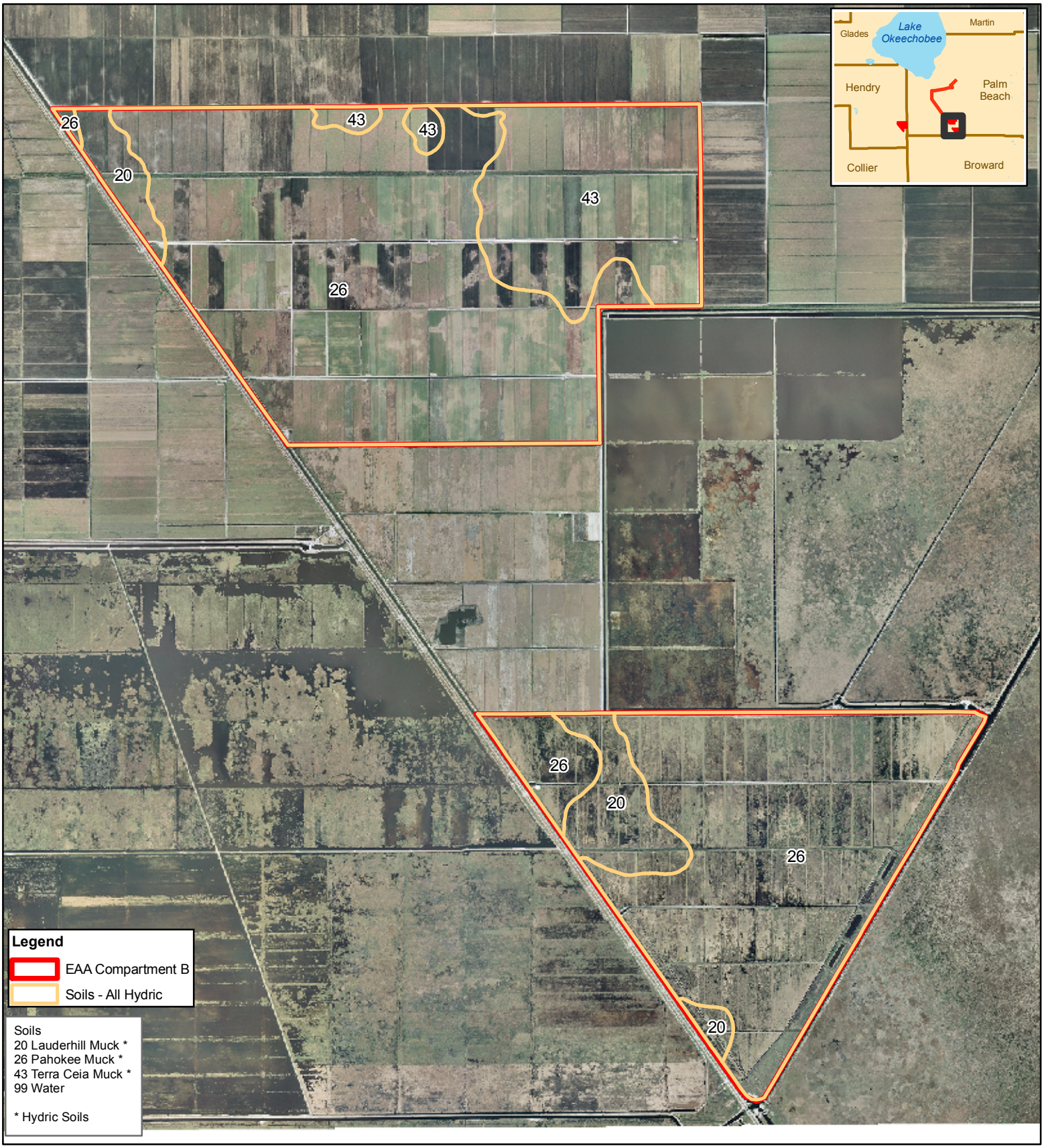
Wetland & Ground Truthing Locations for Compartment B

Contract # CN040936

UPDATED 8/24/07

ECART/map_docs/wetlands_B_GPS.mxd

APPENDIX B-4
SOILS COMPARTMENT B



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0 1,500 3,000 6,000 Feet

N W E S

sfwmd.gov

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

FIGURE # B-4
Compartment B Soils
Contract # CN040936

UPDATED
8/24/07

ECART/map_docs/Soils_B.mxd

APPENDIX B-5
WETLAND PHOTOGRAPHS
COMPARTMENT B

Compartment B

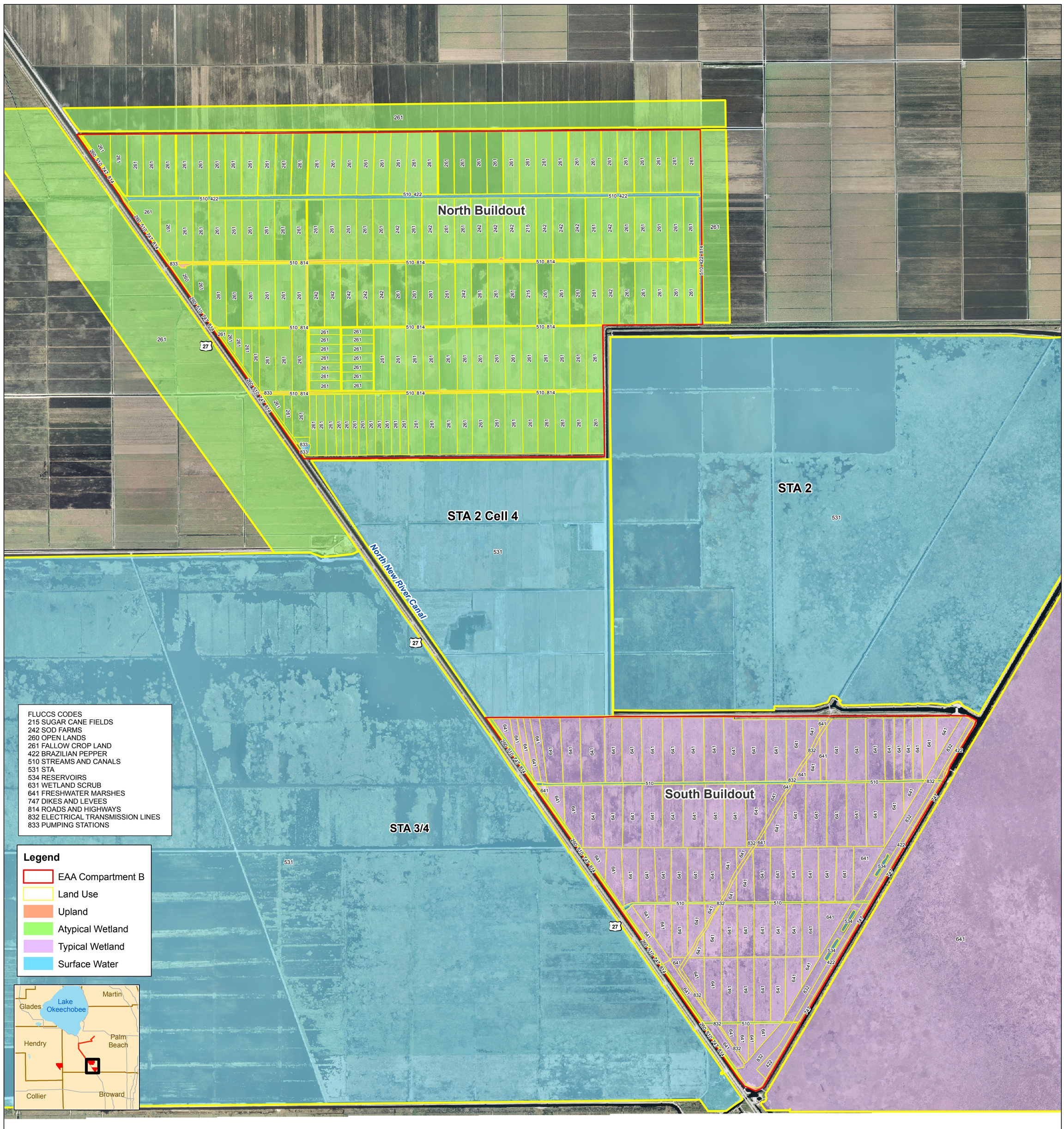
Wetland1B - South Buildout
FLUCFCS – 641-Freshwater Marsh/USFWS – PEMIF - Palustrine, Emergent, Persistent, Semi-permanently flooded

Wetland 2B - South Buildout
FLUCFCS – 531 Reservoir less than 10 acres/USFWS – POWHx - Palustrine, Open Water/Unknown Bottom, Permanently Flooded, Excavated

OSW 1B

FLUCFCS – 510- Streams and Waterways/USFWS – R2OWHx - Riverine, Lower Perennial, Open Water, Permanently Flooded, Excavated

APPENDIX B-6
LAND USE MAPS COMPARTMENT B



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South Florida Water Management District
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West Palm Beach, FL 33409
Tel # (561) 242-5520

FIGURE # B-6

Land Use For Compartment B

Contract # CN040936

N
W E
S

0 2,000 4,000 Feet

UPDATED
8/13/2007

ECART/map_docs/LU_B_D_Size.mxd

APPENDIX C
COMPARTMENT C INFORMATION

APPENDIX C-1
USACE DATA FORMS
FOR COMPARTMENT C

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Compartment C Applicant/Owner: SFWMD Investigator: Murray/Raley		Date: 5-29-07 County: Hendry State: FL
Do Normal Circumstances Exist on the site?	(Yes) No	Community ID: WL #7C
Is the site significantly disturbed (Atypical Situation)?	Yes (No)	Transect ID:
Is the area a potential Problem Area? (If needed, explain on reverse.)	Yes (No)	Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
* 1. Saccharum officinarum	shrub	FACU	9.		
2. Cirsium nuttallii	herb	FAC+	10.		
3. Boehmeria cylindrica	shrub	FACW+	11.		
4. Baccharis halimifolia	shrub	FAC	12.		
5. Salix caroliniana	shrub	OBL	13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 80 90

Remarks:

HYDROLOGY

- ✓ Recorded Data (Describe in Remarks):
  - ___ Stream, Lake, or Tide Gauge
  - X Aerial Photographs
  - ___ Other
- ___ No Recorded Data Available

Field Observations:

- Depth of Surface Water: _____ (in.)
- Depth to Free Water in Pit: _____ (in.)
- Depth to Saturated Soil: >24 (in.)

Wetland hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12"
- X Water-Stained Leaves
- X Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: Drought conditions have limited soil moisture. Aerial photograph shows signature of wetland.

SOILS

Map Unit Name (Series and Phase): Plantation muck

Drainage Class: _____

Taxonomy (Subgroup): _____

Field Observations
Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
8		3YR-2/1			
>8		4YR-2/1			

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ✓ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ✓ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:
Drought conditions limit soil moisture.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

(Circle)
Is this Sampling Point Within a Wetland? Yes No

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Compartment C Applicant/Owner: SEWMD Investigator: Murray / Keller	Date: 5-25-05 County: Henry State: FL
Do Normal Circumstances Exist on the site? Yes (No) Is the site significantly disturbed (Atypical Situation)? (Yes) No Is the area a potential Problem Area? (Yes) No (If needed, explain on reverse.)	Community ID: WL-2C Transect ID: _____ Plot ID: _____

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Brachiaria Mutica	Herb	FACW	9.		
2. Ludwigia peruviana	Shrub	OBL	10.		
3. Cirsium horridulum	Herb	FAC	11.		
4. Colocasia esculenta	Herb	FACW	12.		
5. Salix caroliniana	shrub	OBL	13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100%

Remarks:

HYDROLOGY

X Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- X Aerial Photographs
- ___ Other

___ No Recorded Data Available

Field Observations:

Depth of Surface Water: _____(in.)

Depth to Free Water in Pit: _____(in.)

Depth to Saturated Soil: 12" (in.)

Wetland hydrology Indicators:
Primary Indicators:
- ___ Inundated
- ✓ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12"
- ✓ Water-Stained Leaves
- ✓ Local Soil Survey Data
- ✓ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: Soil Pit Walls became moist at 12". Wetland signature apparent on aerial photograph.

SOILS

Map Unit Name (Series and Phase): Plantation Muck

Drainage Class: _____

Taxonomy (Subgroup): _____

Field Observations
Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
to 24"		10YR 2/1			

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ✓ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ✓ High Organic Content in Surface Layer Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

(Circle)
Is this Sampling Point Within a Wetland? (Yes) No

Remarks:

Highly disturbed wetland

Approved by HQUSACE 3/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Compartment C			Date: 5-29-07	
Applicant/Owner: SFWMD			County: Hendry	
Investigator: Murray / Railey			State: FL	
Do Normal Circumstances Exist on the site?	(Yes)	No	Community ID: U-2C	
Is the site significantly disturbed (Atypical Situation)?	Yes	No	Transect ID:	
Is the area a potential Problem Area? (If needed, explain on reverse.)	Yes	(No)	Plot ID: Upland	

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
* 1. Ambrosia	Herb	UPL	9.		
2. Baccharis glomeruliflora	Herb	FAC	10.		
3. Sugarcane	Herb	UPL	11.		
4. Digitaria	Herb	UPL	12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 25 %

Remarks:
Upland Berm NW to Wetland 2

HYDROLOGY

X Recorded Data (Describe in Remarks):	Wetland hydrology Indicators:
___ Stream, Lake, or Tide Gauge	Primary Indicators:
X Aerial Photographs	___ Inundated
___ Other	___ Saturated in Upper 12 Inches
___ No Recorded Data Available	___ Water Marks
	___ Drift Lines
Field Observations:	___ Sediment Deposits
Depth of Surface Water: _____(in.)	___ Drainage Patterns in Wetlands
Depth to Free Water in Pit: _____(in.)	Secondary Indicators (2 or more required):
Depth to Saturated Soil: _____(in.)	___ Oxidized Root Channels in Upper 12"
	___ Water-Stained Leaves
	___ Local Soil Survey Data
	___ FAC-Neutral Test
	___ Other (Explain in Remarks)

Remarks:
Aerial photograph shows signature of wetland

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____

Field Observations

Taxonomy (Subgroup): _____ Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
24+		10YR 7/1			Road Fill

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
___ Gleyed or Low-Chroma Colors
___ Concretions
___ High Organic Content in Surface Layer Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks:

Upland Berm next to wetland
Bernard Road Fill

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	(No)	(Circle)
Wetland Hydrology Present?	Yes	(No)	
Hydric Soils Present?	Yes	(No)	

Is this Sampling Point Within a Wetland? (Circle) Yes (No)

Remarks:

Upland Berm next to wetland 2

Approved by HQUSACE 3/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Wetland 3 - Compartment C Applicant/Owner: SFWMD Investigator: Railey / Murray	Date: 5-30-07 County: Hendry State: FL
Do Normal Circumstances Exist on the site? (Yes) No Is the site significantly disturbed (Atypical Situation)? Yes (No) Is the area a potential Problem Area? Yes (No) (If needed, explain on reverse.)	Community ID: WL3C Transect ID: _____ Plot ID: _____

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Salix caroliniana	shrub	OBL	9.		
2. Ludwigia peruviana	shrub	OBL	10.		
3. Panicum hemitomon	herb	OBL	11.		
4. Eupitorium capitellum	herb	FACW	12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 90%

Remarks: herbaceous marsh w/shrub fringe

HYDROLOGY

✓ Recorded Data (Describe in Remarks): ___ Stream, Lake, or Tide Gauge X Aerial Photographs ___ Other ___ No Recorded Data Available	Wetland hydrology Indicators: Primary Indicators: ___ Inundated ___ Saturated in Upper 12 Inches ___ Water Marks ___ Drift Lines ___ Sediment Deposits ___ Drainage Patterns in Wetlands Secondary Indicators (2 or more required): ✓ Oxidized Root Channels in Upper 12" ✓ Water-Stained Leaves ✓ Local Soil Survey Data ___ FAC-Neutral Test ___ Other (Explain in Remarks)
Field Observations: Depth of Surface Water: _____(in.) Depth to Free Water in Pit: _____(in.) Depth to Saturated Soil: _____(in.)	

Remarks: Adventitious roots on Ludwigia. Aerial photographs show wetland signature.

SOILS

Map Unit Name (Series and Phase): Okeelanta muck

Drainage Class: _____

Taxonomy (Subgroup): _____

Field Observations
Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
TU-24		10YR 2/2			

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ✓ Gleyed or Low-Chroma Colors
- ___ Concretions
- ✓ High Organic Content in Surface Layer Sandy Soils
- ✓ Organic Streaking in Sandy Soils
- ✓ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

Organic Streaking
Salt and Pepper

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

(Circle)
Is this Sampling Point Within a Wetland? (Yes) No

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Compartment C			Date: 5-20-07
Applicant/Owner: SFWMD			County: Hendry
Investigator: Murray-Varley			State: FL
Do Normal Circumstances Exist on the site?	(Yes)	No	Community ID: U-3C
Is the site significantly disturbed (Atypical Situation)?	Yes	No	Transect ID:
Is the area a potential Problem Area? (If needed, explain on reverse.)	Yes	No	Plot ID: (Upland)

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Cynodon dactylon	Herb	upl	9.		
2. Saccharum officinarum	Herb	upl	10.		
3. Conyza canadensis	Herb	FACU	11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 0%

Remarks: Upland in fallow cane field

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ____ Stream, Lake, or Tide Gauge
- ____ Aerial Photographs
- ____ Other

___ No Recorded Data Available

Field Observations:

Depth of Surface Water: _____(in.)

Depth to Free Water in Pit: _____(in.)

Depth to Saturated Soil: _____(in.)

Wetland hydrology Indicators:

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 Inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12"
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: No hydrologic indicators present.

SOILS

Myakka Fine Sand

Map Unit Name
(Series and Phase): ~~Immokalee Sand~~

Drainage Class: _____

Field Observations
Confirm Mapped Type? Yes (No)

Taxonomy (Subgroup): _____

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
5		10YR 5/1			
6-24		10YR 4/1			

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
___ Gleyed or Low-Chroma Colors
___ Concretions
___ High Organic Content in Surface Layer Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks:

Non-Hydric

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	(No)	(Circle)
Wetland Hydrology Present?	Yes	(No)	
Hydric Soils Present?	Yes	(No)	

Is this Sampling Point Within a Wetland? Yes (No) (Circle)

Remarks:

Fallow Corn Field

Approved by HQUSACE 3/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Compartment C Applicant/Owner: SFWMD Investigator: Murray / Railey	Date: 5-30-07 County: Hendry State: FL
Do Normal Circumstances Exist on the site? (Yes) No Is the site significantly disturbed (Atypical Situation)? Yes (No) Is the area a potential Problem Area? Yes (No) (If needed, explain on reverse.)	Community ID : WE-4C Transect ID: _____ Plot ID: _____

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Panicum hemitomon	herb	OBL	9.		
2. Amphicarpum muhlenbergianum		FACW	10.		
3. Polygonum densiflorum	herb	OBL	11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100%

Remarks:

HYDROLOGY

✓ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- X Aerial Photographs
- ___ Other

___ No Recorded Data Available

Field Observations:

Depth of Surface Water: _____(in.)

Depth to Free Water in Pit: _____(in.)

Depth to Saturated Soil: 12 (in.)

Wetland hydrology Indicators:
Primary Indicators:
- ___ Inundated
- X Saturated in Upper 12 Inches
- ___ Water Marks
- X Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12"
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:
Aerial photographs show signature of wetland.

SOILS

Map Unit Name
(Series and Phase): Okeelanta muck

Drainage Class: _____

Taxonomy (Subgroup): _____

Field Observations
Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
to 24"		10YR/2/1			

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ✓ Reducing Conditions
- ✓ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

(Circle)
Is this Sampling Point Within a Wetland? (Yes) No

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Compartment C Applicant/Owner: SFWMD Investigator: Murray / Railey	Date: 5-30-07 County: Hendry State: FL
Do Normal Circumstances Exist on the site? (Yes) No Is the site significantly disturbed (Atypical Situation)? Yes (No) Is the area a potential Problem Area? Yes (No) (If needed, explain on reverse.)	Community ID: U-4C Transect ID: ____ Plot ID: Upland

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Saccharum officinarum	herb	U	9.		
2. Cynodon dactylon	herb	U	10.		
3.			11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 0 %

Remarks:
Fallow sugar cane field

HYDROLOGY

___ Recorded Data (Describe in Remarks):
____ Stream, Lake, or Tide Gauge
____ Aerial Photographs
____ Other
___ No Recorded Data Available

Field Observations:
Depth of Surface Water: _____(in.)
Depth to Free Water in Pit: _____(in.)
Depth to Saturated Soil: _____(in.)

Wetland hydrology Indicators:
Primary Indicators:
____ Inundated
____ Saturated in Upper 12 Inches
____ Water Marks
____ Drift Lines
____ Sediment Deposits
____ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
____ Oxidized Root Channels in Upper 12"
____ Water-Stained Leaves
____ Local Soil Survey Data
____ FAC-Neutral Test
____ Other (Explain in Remarks)

Remarks:
No hydrologic indicators present.

SOILS

Myakka Fine Sand

Map Unit Name (Series and Phase): ~~Emmokalee Sand~~

Drainage Class: _____

Taxonomy (Subgroup): _____

Field Observations
Confirm Mapped Type? Yes (No)

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-4"		10YR 3/2			
4-12"		10YR 4/2			
12-24"		10YR 4/3			

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
___ Gleyed or Low-Chroma Colors
___ Concretions
___ High Organic Content in Surface Layer Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks:

Not hydric

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes (No) (Circle)
Wetland Hydrology Present? Yes (No)
Hydric Soils Present? Yes (No)

Is this Sampling Point Within a Wetland? (Circle) Yes (No)

Remarks:

Upland area adjacent to WL-4

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Compartment C Applicant/Owner: SFWMD Investigator: Murray / Harlow	Date: 5-31-07 County: Hendry State: FL
Do Normal Circumstances Exist on the site? (Yes) No Is the site significantly disturbed (Atypical Situation)? Yes (No) Is the area a potential Problem Area? Yes (No) (If needed, explain on reverse.)	Community ID: WL3SC Transect ID: _____ Plot ID: _____

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Polygonum sp.	Herb	OBL	9.		
2. Sagittaria lancifolia	Herb	OBL	10.		
3. Cirsium nuttallii	Herb	FAC	11.		
4. Schinus terebinthifolius	shrub	FAC	12.		
5. Salix caroliniana	shrub	OBL	13.		
6. Ludwigia peruviana	shrub	OBL	14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100%

Remarks:

HYDROLOGY

(X) Recorded Data (Describe in Remarks): ___ Stream, Lake, or Tide Gauge (X) Aerial Photographs ___ Other ___ No Recorded Data Available	Wetland hydrology Indicators: Primary Indicators: ___ Inundated (✓) Saturated in Upper 12 Inches ___ Water Marks ___ Drift Lines ___ Sediment Deposits ___ Drainage Patterns in Wetlands Secondary Indicators (2 or more required): (✓) Oxidized Root Channels in Upper 12" ___ Water-Stained Leaves (✓) Local Soil Survey Data ___ FAC-Neutral Test ___ Other (Explain in Remarks)
Field Observations: Depth of Surface Water: _____(in.) Depth to Free Water in Pit: _____(in.) Depth to Saturated Soil: 12"(in.)	

Remarks:
Aerial photographs show signature of wetland.

SOILS

Map Unit Name (Series and Phase): Okeelanta Muck

Drainage Class: _____

Taxonomy (Subgroup): _____

Field Observations
Confirm Mapped Type? Yes (No)

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-24		10YR 2/1			

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ✓ Reducing Conditions
- ✓ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ✓ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

Field observations indicate muck soil, likely Okeelanta muck, as this soil type occurs in adjacent areas.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes)	No	(Circle)
Wetland Hydrology Present?	(Yes)	No	
Hydric Soils Present?	(Yes)	No	

Is this Sampling Point Within a Wetland? (Yes) No (Circle)

Remarks:

Herbaceous wetland with Scrub/Shrub (Willow Salt bush) border

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Compartment C Applicant/Owner: SFWMD Investigator: Murray / Bailey		Date: 5-30-07 County: Hendry State: FL
Do Normal Circumstances Exist on the site? Is the site significantly disturbed (Atypical Situation)? Is the area a potential Problem Area? (If needed, explain on reverse.)	(Yes) No Yes (No) Yes (No)	Community ID: WL6C Transect ID: _____ Plot ID: _____

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Salix caroliniana	Shrub	OBL	9.		
2. Schinus terebe.	Shrub	FAC	10.		
3. Baccaris halimifolia	shrub	FAC	11.		
4. Axonophus spp	herb	OBL	12.		
5. Sagitarnia lancifolia	herb	OBL	13.		
6. Crysinum putdii	her	FACW	14.		
7. Cephalanthus ox.	her	OBL	15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100 90

Remarks:

HYDROLOGY

- [X] Recorded Data (Describe in Remarks):
  - [ ] Stream, Lake, or Tide Gauge
  - [X] Aerial Photographs
  - [ ] Other
- [ ] No Recorded Data Available

Field Observations:

- Depth of Surface Water: _____ (in.)
- Depth to Free Water in Pit: 12 (in.)
- Depth to Saturated Soil: 6 (in.)

Wetland hydrology Indicators:

Primary Indicators:
- [ ] Inundated
- [X] Saturated in Upper 12 Inches
- [X] Water Marks
- [X] Drift Lines
- [X] Sediment Deposits
- [X] Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- [ ] Oxidized Root Channels in Upper 12"
- [ ] Water-Stained Leaves
- [X] Local Soil Survey Data
- [X] FAC-Neutral Test
- [ ] Other (Explain in Remarks)

Remarks:
Aerial photographs show signature of wetland.

SOILS

Map Unit Name (Series and Phase): Okeelanta muck

Drainage Class: _____

Taxonomy (Subgroup): _____

Field Observations
Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-24"		10YR-2/1			

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- X Aquic Moisture Regime
- X Reducing Conditions
- X Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer Sandy Soils
- ___ Organic Streaking in Sandy Soils
- X Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

(Circle)
Is this Sampling Point Within a Wetland? (Yes) No

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Compartment C	Date: 5-31-07
Applicant/Owner: SFWMD	County: Hendry
Investigator: Murray / Railey	State: FL
Do Normal Circumstances Exist on the site? (Yes) No	Community ID: WL7C
Is the site significantly disturbed (Atypical Situation)? Yes (No)	Transect ID:
Is the area a potential Problem Area? Yes (No)	Plot ID:
(If needed, explain on reverse.)	

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Brachiara mutica	herb	FACW	9.		
2. Panicum hemitomon	herb	OBL	10.		
3. Pluchea spp	herb	FACW	11.		
4. Eupitorium capillifolium	herb	FACW	12.		
5. Salix caroliniana	shrub	OBL	13.		
6. Polygonum spp	herb	OBL	14.		
7. Typha latifolia	shrub	OBL	15.		
* 8. Lythrum flagellare	herb	OBL	16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100%

Remarks:

HYDROLOGY

- (X) Recorded Data (Describe in Remarks):
  - ( ) Stream, Lake, or Tide Gauge
  - (X) Aerial Photographs
  - ( ) Other
- ( ) No Recorded Data Available

Field Observations:

- Depth of Surface Water: _____ (in.)
- Depth to Free Water in Pit: _____ (in.)
- Depth to Saturated Soil: 12 (in.)

Wetland hydrology Indicators:
Primary Indicators:
- ( ) Inundated
- (X) Saturated in Upper 12 Inches
- ( ) Water Marks
- ( ) Drift Lines
- ( ) Sediment Deposits
- ( ) Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ( ) Oxidized Root Channels in Upper 12"
- ( ) Water-Stained Leaves
- (X) Local Soil Survey Data
- (X) FAC-Neutral Test
- ( ) Other (Explain in Remarks)

Remarks:
Aerial photographs show wetland signature.

SOILS

Map Unit Name (Series and Phase): Terra Ceia muck Drainage Class: _____

Taxonomy (Subgroup): _____ Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
to 24		10YR-2/1			

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ✓ Aquic Moisture Regime
- ___ Reducing Conditions
- ✓ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ✓ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

Is this Sampling Point Within a Wetland? (Circle) (Yes) No

Remarks:

Approved by HQUSACE 2/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Compartment C Applicant/Owner: SFWMD Investigator: Murray / Railey	Date: 5-30-07 County: Hendry State: FL
Do Normal Circumstances exist on the site? Yes (No) Is the site significantly disturbed (Atypical Situation)? Yes (No) Is the area a potential Problem Area? Yes (No) (If needed, explain on reverse.)	Community ID: WL-8C Transect ID: _____ Plot ID: _____

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Saccharum officinarum	herb	FACU
2. Typha latifolia	shrub	OBL
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). _____

Remarks:
Vegetation observed along banks - pond is open water

HYDROLOGY

- [X] Recorded Data (Describe in Remarks):
  - [ ] Stream, Lake, or Tide Gauge
  - [X] Aerial Photographs
  - [ ] Other
- [ ] No Recorded Data Available

Field Observations:

Depth of Surface Water: _____(in.)

Depth to Free Water in Pit: _____(in.)

Depth to Saturated Soil: _____(in.)

Wetland Hydrology Indicators:
Primary Indicators:
- [X] Inundated
- [ ] Saturated in Upper 12 Inches
- [ ] Water Marks
- [ ] Drift Lines
- [ ] Sediment Deposits
- [ ] Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- [ ] Oxidized Root Channels in Upper 12 Inches
- [ ] Water-Stained Leaves
- [ ] Local Soil Survey Data
- [ ] FAC-Neutral Test
- [ ] Other (Explain in Remarks)

Remarks:
No soil pit dug - pond contains standing water. Pond boundaries appear on aerial photographs.

SOILS

Map Unit Name (Series and Phase): Pahokee muck

Drainage Class: _____

Taxonomy (Subgroup): _____

Field Observations
Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
___ Gleyed or Low-Chroma Colors
___ Concretions
___ High Organic Content in Surface Layer in Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks:

No soil pit dug - pond contains standing water

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

(Circle)
Is this Sampling Point Within a Wetland? (Yes) No

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Compartment C Applicant/Owner: SFWMD Investigator: Murray / Bailey	Date: 5-31-07 County: Hendry State: FL
Do Normal Circumstances exist on the site? Yes (No) Is the site significantly disturbed (Atypical Situation)? (Yes) No Is the area a potential Problem Area? Yes (No) (If needed, explain on reverse.)	Community ID: WL9C Transect ID: _____ Plot ID: _____

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Saccharum officinarum	herb.	FACU	9.		
2.			10.		
3.			11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 0%

Remarks:
Fallow canefield located on hydric soil.

HYDROLOGY

- [X] Recorded Data (Describe in Remarks):
  - [ ] Stream, Lake, or Tide Gauge
  - [X] Aerial Photographs
  - [ ] Other
- [ ] No Recorded Data Available

Field Observations:

Depth of Surface Water:	_____ (in.)
Depth to Free Water in Pit:	12 (in.)
Depth to Saturated Soil:	7 (in.)

Wetland Hydrology Indicators:
Primary Indicators:
- [ ] Inundated
- [X] Saturated in Upper 12 Inches
- [ ] Water Marks
- [ ] Drift Lines
- [ ] Sediment Deposits
- [ ] Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- [ ] Oxidized Root Channels in Upper 12 Inches
- [ ] Water-Stained Leaves
- [X] Local Soil Survey Data
- [ ] FAC-Neutral Test
- [ ] Other (Explain in Remarks)

Remarks:
Aerial photographs show wetland signature.

SOILS

Map Unit Name (Series and Phase): Plantation muck

Drainage Class: _____

Taxonomy (Subgroup): _____

Field Observations
Confirm Mapped Type? Yes (No)

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-24"		10YR-2/1			

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- X Aquic Moisture Regime
- ___ Reducing Conditions
- X Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- X Listed on Local Hydric Soils List
- X Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes (No) (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

(Circle)
Is this Sampling Point Within a Wetland? (Yes) No

Remarks:

Fallow sugarcane field located on hydric soils.

DATA FORM 3

ATYPICAL SITUATIONS

Applicant Name: SFWMD | Application Number: | Project Name: ECART, EAA Compartments B+C

Location: Compartment C WL-9C | Plot Number: | Date: 8-20-07

A. VEGETATION:

1. Type of Alteration: Agricultural ditching

2. Effect on Vegetation: Hydrophytic vegetation has been replaced with monoculture of sugar cane.

3. Previous Vegetation: Previous vegetation thought to have been marsh grasses.
(Attach documentation)

4. Hydrophytic Vegetation? Yes ____ No X.

B. SOILS:

1. Type of Alteration: Agricultural ditching

2. Effect on Soils: Ditching has lowered the water table, however soils still retain hydrology.

3. Previous Soils: Previous soils thought to have been Plantation Muck (no documentation available)
(Attach documentation)

4. Hydric Soils? Yes X No ____.

C. HYDROLOGY:

1. Type of Alteration: Agricultural ditching

2. Effect on Hydrology: Water table in project study area has been lowered

3. Previous Hydrology: Previous hydrology thought to have been water table at surface (inundated)
(Attach documentation)

4. Wetland Hydrology? Yes X No ____.

Characterized By: Railey

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Compartment C Applicant/Owner: SWFWMD Investigator: Murray	Date: 9-5-87 County: Hendry State: FL
Do Normal Circumstances exist on the site? Yes (No) Is the site significantly disturbed (Atypical Situation)? (Yes) No Is the area a potential Problem Area? (Yes) No (If needed, explain on reverse.)	Community ID: W29C-A Transect ID: _____ Plot ID: _____

Former ~~Former~~ U-5C

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Conyza Canadensis	herb	FACW	9.		
2. Saccharum officinarum	herb	FACW	10.		
3.			11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 0%

Remarks: Fallow Sugar Cane fields

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

___ No Recorded Data Available

Field Observations:

Depth of Surface Water: _____ (in.)

Depth to Free Water in Pit: 15 (in.)

Depth to Saturated Soil: 12 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ✓ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ✓ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ✓ Local Soil Survey Data
- ___ FAC-Neutral Test
- ✓ Other (Explain in Remarks)

Remarks: NRCS soil scientist observed the Immokalee map unit soils to be saturated in the first 12" by feel and appearance method.

SOILS

Map Unit Name (Series and Phase): Immokalee Fine Sand Drainage Class: _____

Taxonomy (Subgroup): _____ Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
6-10	10YR 2/1 →				Concretions with muck present.
5-25	10YR 6/1 →				

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ✓ Concretions
- ✓ High Organic Content in Surface Layer in Sandy Soils
- ✓ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: Soil pits were dug in several locations hydric indicators included, concretions, high organic content in surface layers, and organic streaking.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes (No) (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

Is this Sampling Point Within a Wetland? (Circle) (Yes) No

Remarks:

Atypical Wetland

Approved by HQUSACE 2/92

DATA FORM 3

ATYPICAL SITUATIONS

Applicant Name: SFWMD | Application Number: | Project Name: ECART, EAA compartments B & C

Location: Compartment C WL9C-A | Plot Number: | Date:

A. VEGETATION:

1. Type of Alteration: Agricultural & Cultivation

2. Effect on Vegetation: Wetland vegetation replaced by sugar cane

3. Previous Vegetation: Freshwater Marsh Vegetation

(Attach documentation)

4. Hydrophytic Vegetation? Yes ~~X~~ No X.

B. SOILS:

1. Type of Alteration: Agricultural ditching

2. Effect on Soils: Ditching has lowered water table, however soils still retain hydric indicators

3. Previous Soils: Immokalee Fine Sand

(Attach documentation)

4. Hydric Soils? Yes X No.

C. HYDROLOGY:

1. Type of Alteration: Agricultural ditching

2. Effect on Hydrology: Ditching has lowered water table, however hydrology, ~~water tables~~ saturated soil within 12 inches of surface were found.

3. Previous Hydrology: Surface flow and ground water.

(Attach documentation)

4. Wetland Hydrology? Yes X No.

Characterized By:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Compartment C Applicant/Owner: SEWRPC Investigator: Murray	Date: 9-5-07 County: Hendry State: FL
Do Normal Circumstances exist on the site? Yes (No) Is the site significantly disturbed (Atypical Situation)? (Yes) No Is the area a potential Problem Area? (Yes) No (If needed, explain on reverse.)	Community ID: WL9C-B Transect ID: _____ Plot ID: _____

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Saccharum officinarum	herb	FACW	9.		
2.			10.		
3.			11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 0%

Remarks:

Fallow Sugar Cane.

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

___ No Recorded Data Available

Field Observations:

Depth of Surface Water: 1" (in.)

Depth to Free Water in Pit: _____ (in.)

Depth to Saturated Soil: _____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ✓ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:

Inundated conditions.

SOILS

Map Unit Name (Series and Phase): Jupiter Fine Sand Drainage Class: _____

Field Observations

Taxonomy (Subgroup): _____ Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-~~36~~	1	10YR 2-1			

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ✓ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ ~~High~~ Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

Presence of Muck, greater than 2" Mucky Mineral

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes (No) (Circle)

Wetland Hydrology Present? (Yes) No

Hydric Soils Present? (Yes) No

(Circle)

Is this Sampling Point Within a Wetland? (Yes) No

Remarks:

Atypical Wetland.

DATA FORM 3

ATYPICAL SITUATIONS

Applicant Name: SFWMD Application Number: _____ Project Name: ECART-EAST Compartments B&C

Location: Compartment C-WL9C-B Plot Number: _____ Date: 9-5-07

A. VEGETATION:

1. Type of Alteration: Agricultural Cultivation

2. Effect on Vegetation: Wetland Vegetation replaced by Sugar Cane.

3. Previous Vegetation: Freshwater Marsh Vegetation

(Attach documentation) _____

4. Hydrophytic Vegetation? Yes _____ No X.

B. SOILS:

1. Type of Alteration: Agricultural ditching

2. Effect on Soils: Lowering of water table, however soil has retained hydric characteristics.

3. Previous Soils: ~~Rita~~ Jupiter Fine Sand

(Attach documentation) _____

4. Hydric Soils? Yes X No _____.

C. HYDROLOGY:

1. Type of Alteration: Agricultural Ditching

2. Effect on Hydrology: Lowering of water table, however area was inundated at time of inspection.

3. Previous Hydrology: Surface flow and groundwater.

(Attach documentation) _____

4. Wetland Hydrology? Yes X No _____.

Characterized By: _____

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Compartment C Applicant/Owner: SWFWMD Investigator: Murray / Railey	Date: 5-29-07 County: Hendry State: FL
Do Normal Circumstances exist on the site? Yes (No) Is the site significantly disturbed (Atypical Situation)? (Yes) No Is the area a potential Problem Area? (Yes) No (If needed, explain on reverse.)	Community ID: WL-9C-L Transect ID: _____ Plot ID: _____

Former UIC

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Cynodon dactylon	Herb	FACW	9.		
2. Saccharum officinarum	Herb	FACW	10.		
3.			11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 0 %

Remarks:

Follow Sugar Cane

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

___ No Recorded Data Available

Field Observations:

Depth of Surface Water:	_____ (in.)
Depth to Free Water in Pit:	15 (in.)
Depth to Saturated Soil:	12 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ✓ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ✓ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:

Original Observations no Water in Pit - Nearby Observations on 9-5-07 indicate ground water in area within 30"

SOILS

Map Unit Name (Series and Phase): Margate Sand

Drainage Class: _____

Taxonomy (Subgroup): _____

Field Observations
Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0 to 10"		10YR 2/1			
10-18		10YR 5/3			

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ✓ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: Dark Horizon >70% covered grains

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes (No) (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

(Circle)
Is this Sampling Point Within a Wetland? (Yes) No

Remarks:

Atypical Situation

DATA FORM 3

ATYPICAL SITUATIONS

Applicant Name: SFWMD Application Number: _____ Project Name: EAA Compartment C

Location: WCA 3C-C Plot Number: _____ Date: 5/29 and 9/5 2007

A. VEGETATION:

1. Type of Alteration: Agricultural Ditching

2. Effect on Vegetation: Wetland vegetation replaced by Sugarcane

3. Previous Vegetation: Throughout to be marsh vegetation
(Attach documentation) _____

4. Hydrophytic Vegetation? Yes _____ No X

B. SOILS:

1. Type of Alteration: Agricultural Ditching and Water Control

2. Effect on Soils: Has lowered water table during active farming

3. Previous Soils: Margate Sand per NRCS
(Attach documentation) _____

4. Hydric Soils? Yes X No _____

C. HYDROLOGY:

1. Type of Alteration: Agricultural ditching

2. Effect on Hydrology: Lowering water table

3. Previous Hydrology: Surface flow and ground water
(Attach documentation) _____

4. Wetland Hydrology? Yes X No _____

Characterized By: Ted Murray

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Compartment C Applicant/Owner: SFWMD Investigator: Murray / Railey	Date: 5-30-07 County: Hendry State: FL
Do Normal Circumstances exist on the site? (Yes) No Is the site significantly disturbed (Atypical Situation)? Yes (No) Is the area a potential Problem Area? Yes (No) (If needed, explain on reverse.)	Community ID: OSW-1C Transect ID: _____ Plot ID: _____

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Cyperus spp.	herb	FACW
2. Ludwigia peruviana	shrub	OBL
3. Eichornia crassipes	herb	OBL
4. Pistia stratiotes	herb	OBL
5. Hydrocotyle spp	herb	OBL
6.		
7.		
8.		

Dominant Plant Species	Stratum	Indicator
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100%

Remarks:
Vegetation observed along banks - canal is open water

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

___ No Recorded Data Available

Field Observations:

Depth of Surface Water: _____(in.)

Depth to Free Water in Pit: _____(in.)

Depth to Saturated Soil: _____(in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:
Approximately 2' of water in canal

SOILS

Map Unit Name (Series and Phase): Plantation muck

Drainage Class: _____

Taxonomy (Subgroup): _____

Field Observations
Confirm Mapped Type? Yes (No)

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
___ Gleyed or Low-Chroma Colors
___ Concretions
___ High Organic Content in Surface Layer in Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks:
No soil pit dug - canal with standing water

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

(Circle)
Is this Sampling Point Within a Wetland? (Yes) No

Remarks:

Approved by HQUSACE 2/92

APPENDIX C-2
UMAM DATA SHEETS
FOR COMPARTMENT C

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Compartment C		W-1C

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
631 - Wetland Scrub/Shrub	PSS1C	Impact	321.6 acres

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
	III	NA

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Wetland 1C is located within a fallow sugar cane field. Several other scrub/shrub and emergent wetlands are located nearby. Canals run along the east and west sides of the wetland.

Assessment area description

Dominant vegetation present within Wetland 1C consists of Carolina willow, saltbus, nuttail thistle, and bog hemp. Wetland 1C was not inundated during the May and June 2007 field reviews

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
This wetland is located within a fallow cane field.	Scrub/shrub wetlands are not unique to the area.

Functions	Mitigation for previous permit/other historic use
Provides habitat and foraging for various birds, mammals, reptiles, and amphibians, as well as flood control for adjacent areas.	No

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
toad, frog, opossum, turtle, raccoon, deer, bobcat, feral hogs, wading birds	little blue heron - SSC, limpkin - SSC, tricolored heron - SSC, bald eagle - T for foraging/shelter

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

No wildlife observed during field review.

Additional relevant factors:

Assessment conducted by:	Assessment date(s):
Tobi Railey and Ted Murray of URS Corp	29-May-07

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Compartment C		W-1C
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Impact	Tobi Railey and Ted Murray of URS Corp.	**29-May-07**

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current: 5 with:	Adjacent areas consist of fallow sugar cane. Canals border the wetland to the east and to the west. A scrub/shrub wetland is located approximately 800 south of W-1C.	
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current: 4 with:	W-1C is highly impacted and lacks appropriate hydrology due to adjacent canals and recent drought.	
.500(6)(c)Community structure 1. Vegetation and/or Benthic Community 2. w/o pres or current: 5 with:	W-1C lacks appropriate cover of hydrophytic vegetation due to lack of hydrology.	

Score = sum of above scores/30 (if uplands, divide by 20)		
current or w/o pres: 0.47	with:	

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL = delta x acres = -0.47x321.6 = -151.2

Delta = [with-current]
-0.47

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG = delta/(t-factor x risk)

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Compartment C		W-3C

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
641 Emergent Wetland	PEM1C	Impact	1,729.6 acres

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
	III	NA

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Wetland 3C is located within a fallow sugar cane field. A shallow ditch is present along its perimeter.

Assessment area description

Dominant vegetation includes maidencane, smartweed, dog fennel, blue maidencane, lowland loosestrife, and thistle. Carolina willow and primrose willow fringe the wetland's outer edge.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
Wetland 3C is located within a fallow sugar cane field.	Emergent wetlands are not unique to the area.

Functions	Mitigation for previous permit/other historic use
Provides habitat and foraging for various birds, mammals, reptiles, and amphibians, as well as flood control for adjacent areas.	Yes

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
toad, frog, opossum, turtle, raccoon, deer, bobcat, feral hogs, wading birds	little blue heron - SSC, limpkin - SSC, tricolored heron - SSC, bald eagle - T, American alligator - SSC for foraging/shelter

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

No wildlife observed during field review.

Additional relevant factors:

Assessment conducted by:	Assessment date(s):
Tobi Railey and Ted Murray of URS Corp	30-May-07

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Compartment C		W-3C
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Impact	Tobi Railey and Ted Murray of URS Corp.	**30-May-07**

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current: 5 with:	A canal is located around the perimeter of the wetland. An emergent wetland is located approximately 1000' to the east.
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current: 3 with:	This wetland is highly impacted and lacks appropriate hydrology due to the adjacent ditching and ongoing drought.
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current: 3 with:	This wetland contains a heavy component of nuisance and exotic species.

Score = sum of above scores/30 (if uplands, divide by 20)	
current or w/o pres: 0.37	with:

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL = delta x acres = -0.37x1729.6 = -640

Delta = [with-current]
-0.37

If mitigation
Time lag (t-factor) =
Risk factor = 2

For mitigation assessment areas
RFG = delta/(t-factor x risk)

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Hydrologic Restoration of the Royce Unit Wildlife and Environmental Area		W-8C

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
534 Reservoirs less than 10 acres	POWHx	Impact	4.4 acres

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
	III	NA

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

W-8C is located within a fallow sugar cane field. Emergent marshes are located to the east and west of the cane field.

Assessment area description

The reservoir is devoid of vegetation, with a vegetated fringe of beggar tick, ragweed, sugar cane, and primrose willow The reservoir appears to remain flooded year-round.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
This reservoir is located within a fallow sugar cane field.	Reservoirs are not unique to the area.

Functions	Mitigation for previous permit/other historic use
Provides habitat and foraging for various birds, mammals, reptiles, and amphibians, as well as flood control for adjacent areas.	Yes

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
toad, frog, opossum, turtle, raccoon, deer, bobcat, wading birds, fish	little blue heron - SSC, limpkin - SSC, tricolored heron - SSC, bald eagle - T, American alligator - SSC for foraging/shelter

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Alligators observed during field review.

Additional relevant factors:

W-8C is a man-made reservoir located over hydric soils.

Assessment conducted by:	Assessment date(s):
Tobi Railey and Ted Murray of URS Corp	30-May-07

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Compartment C		W-8C
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Impact	Tobi Railey and ed Murray of URS Corp.	**30-May-07**

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current: 4 with:	Wetland 8C is located within a fallow sugar cane field field. Large emergent wetlands are present to the east and west of the field.
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current: 4 with:	Wetland 8C consists of an open water pond. Water level is low due to lack of rain in recent months.
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current: 2 with:	Wetland 8C lacks vegetation. The banks consist of falllow sugar cane.

Score = sum of above scores/30 (if uplands, divide by 20)	If preservation as mitigation,	For impact assessment areas
current or w/o pres: 0.33 with:	Preservation adjustment factor =	FL = delta x acres = -0.33 x 4.4 = -1.5
	Adjusted mitigation delta =	

Delta = [with-current]	If mitigation	For mitigation assessment areas
-0.33	Time lag (t-factor) =	RFG = delta/(t-factor x risk)
	Risk factor = 2	

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Compartment C		W-9C

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
261 - Fallow Cane	PEM1C	Impact	2,346.4 acres

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
	III	NA

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

This wetland is bisected by agricultural canals. Nearby wetlands include emergent and scrub-shrub wetlands. Adjacent upland areas consist of fallow sugar cane fields and upland scrub and brushland.

Assessment area description

Dominant vegetation includes maidencane, smartweed, dog fennel, blue maidencane, lowland loosestrife, and thistle. Carolina willow and primrose willow fringe the wetland's outer edge.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
Nearby features include canals, similar atypical wetlands, scrub/shrub wetlands, and emergent wetlands	Atypical wetlands are not unique to the area.

Functions	Mitigation for previous permit/other historic use
Provides habitat and foraging for various birds, mammals, reptiles, and amphibians, as well as flood control for adjacent areas.	Yes

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
toad, frog, opossum, turtle, raccoon, deer, bobcat, feral hogs, wading birds	little blue heron - SSC, limpkin - SSC, tricolored heron - SSC, bald eagle - T, American alligator - SSC for foraging/shelter

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

No wildlife observed during field review.

Additional relevant factors:

Assessment conducted by:	Assessment date(s):
Tobi Railey and Ted Murray of URS Corp	30-May-07

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Compartment C		W-9C
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Impact	Tobi Railey and Ted Murray of URS Corp.	**30-May-07**

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support	w/o pres or current: 4	with:
W-9C is bisected by agricultural canals. Emergent and scrub-shrub wetlands are also present in the vicinity. Upland areas consist of scrub and brushland and fallow cane.		
.500(6)(b)Water Environment (n/a for uplands)	w/o pres or current: 2	with:
This wetland is highly impacted and lacks appropriate hydrology due to the adjacent ditching and ongoing drought.		
.500(6)(c)Community structure	w/o pres or current: 0	with:
This wetlands contains a monoculture of fallow sugar cane. No hydrophytic vegetation present.		

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.20	

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL = delta x acres = -0.20 x 2346.4 = -469.3

Delta = [with-current]
-0.20

If mitigation
Time lag (t-factor) =
Risk factor = 2

For mitigation assessment areas
RFG = delta/(t-factor x risk)

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Compartment C		Canals

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
510 Streams and Waterways	R2OWHx	Impact	276.8 acres

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
	III	NA

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Adjacent areas consist of fallow cane fields. These canals are hydrologically connected to each other and with several of the wetlands within the project study area.

Assessment area description

Dominant vegetation within the canals includes water lettuce, water hyacinth, flat sedge, and torpedo grass. The banks are dominated by beggar tick, primrose willow, and sugar cane.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
These canals are located within fallow sugar cane fields.	Reservoirs are not unique to the area.

Functions	Mitigation for previous permit/other historic use
Provides habitat and foraging for various birds, mammals, reptiles, and amphibians, as well as flood control for adjacent areas.	Yes

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
toad, frog, opossum, turtle, raccoon, deer, bobcat, wading birds, alligator, fish	little blue heron - SSC, limpkin - SSC, tricolored heron - SSC, bald eagle - T, American alligator - SSC for foraging/shelter

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Alligators and ducks were observed within the canals during the field reviews.

Additional relevant factors:

These canals were created to drain adjacent areas.

Assessment conducted by:	Assessment date(s):
Tobi Railey and Ted Murray of URS Corp	30-May-07

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Compartment C		Canals
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Impact	Tobi Railey and Ted Murray of URS Corp.	**30-May-07**

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current: 6 — with:	These canals are located within fallow sugar cane fields. Many are hydrologically connected to other onsite wetlands.
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current: 5 — with:	Water levels are low, due to ongoing drought, however sufficent water is present to support aquatic vegetation and a variety of wildlife.
.500(6)(c)Community structure 1. Vegetation and/or Benthic Community 2. w/o pres or current: 4 — with:	These canals contain both appropriate hydrophytic vegetataion and nuisance exotics. The canal banks are dominated by various upland species and fallow sugar cane.

Score = sum of above scores/30 (if uplands, divide by 20)		
current or w/o pres	with	
0.50		

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL = delta x acres = -0.50 x 276.8 = -138.4

Delta = [with-current]
-0.50

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG = delta/(t-factor x risk)

APPENDIX C-3
WETLANDS COMARTMENT C

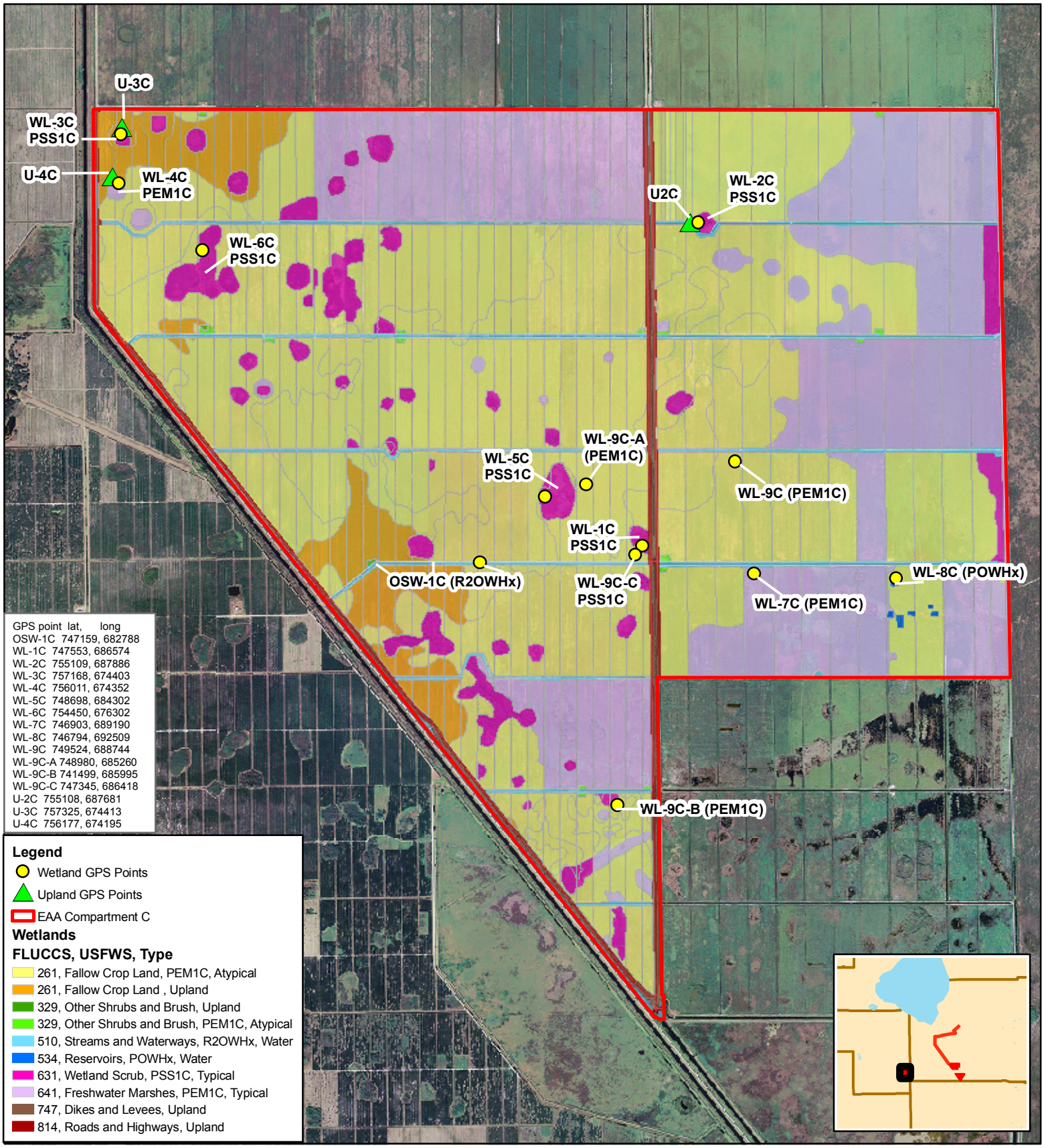

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FIGURE # C-3
Wetland & Ground Truthing Locations for Compartment C

Contract # CN040936

UPDATED 8/24/07

ECART/map_docs/wetlands_C_GPS.mxd

APPENDIX C-4
SOILS COMPARTMENT C

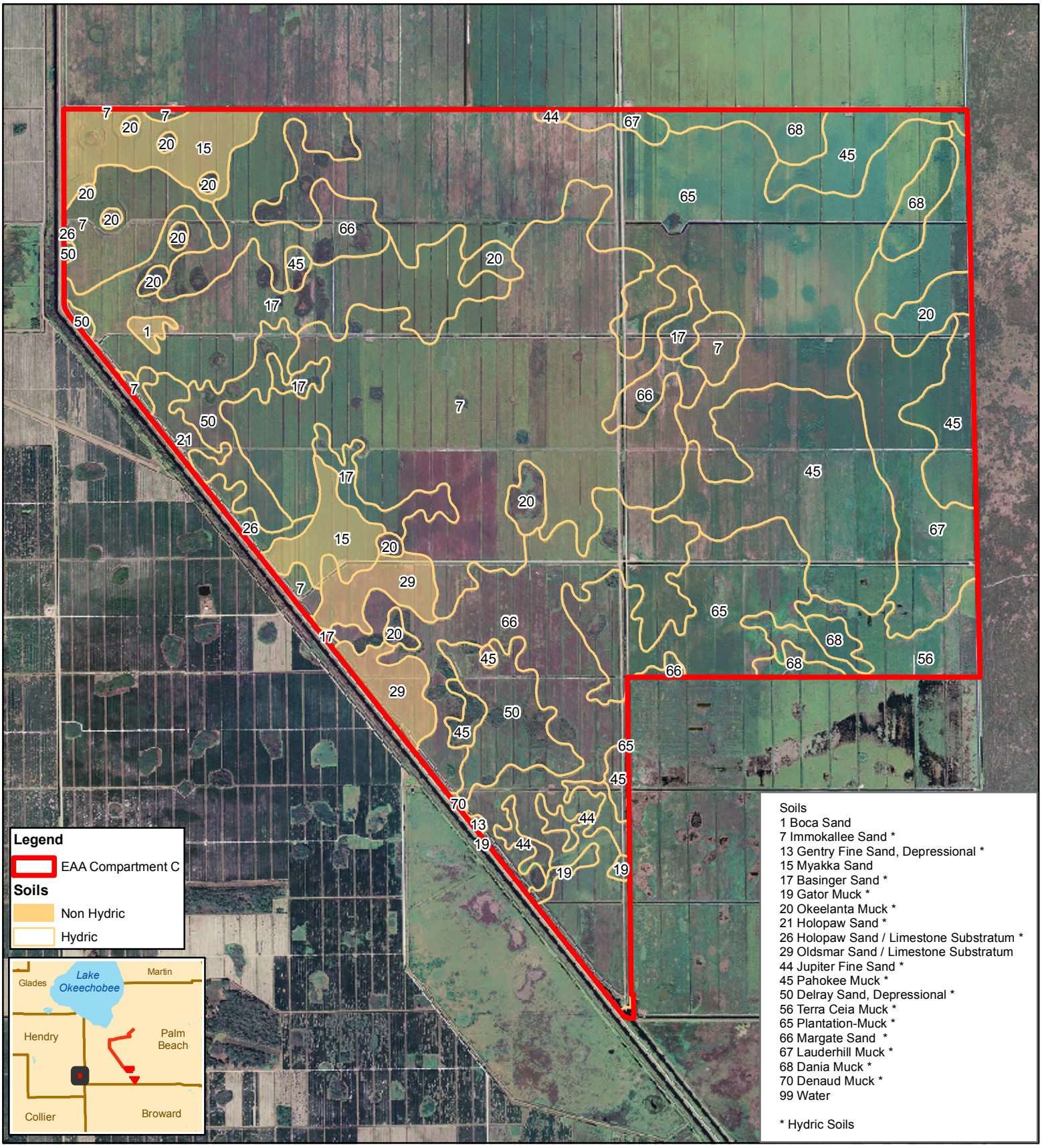

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FIGURE # C-4

Compartment C Soils

Contract # CN040936

UPDATED
8/24/07

ECART/map_docs/Soils_C.mxd

APPENDIX C-5
WETLAND PHOTOGRAPHS
COMPARTMENT C

Compartment C

Wetland 1C
FLUCFCS – 631-Wetland Scrub/USFWS – PSS1C-Palustrine, Scrub/Shrub, Broad-Leaved Deciduous, Seasonally Flooded

Wetland 2C
FLUCFCS – 631-Wetland Scrub/USFWS – PSS1C - Palustrine, Scrub/Shrub, Broad-Leaved Deciduous, Seasonally Flooded

Wetland 3C
FLUCFCS – 641-Freshwater Marsh/USFWS – PEM1C - Palustrine, Emergent, Persistent, Seasonally Flooded

Wetland 4C
FLUCFCS – 641-Freshwater Marsh/USFWS – PEM1C - Palustrine, Emergent, Persistent, Seasonally Flooded

Wetland 5C
FLUCFCS – 641-Freshwater Marsh/USFWS – PEM1C - Palustrine, Emergent, Persistent, Seasonally Flooded

Wetland 6C
FLUCFCS – 631/641-Wetland Scrub/Freshwater Marsh/USFWS – PSS1C/PEM1C - Palustrine, Emergent, Persistent, Seasonally Flooded/Palustrine Scrub-Shrub Broad-leaved Deciduous, Seasonally Flooded

Wetland 7C
FLUCFCS – 641-Freshwater Marsh/USFWS-PEM1C – Palustrine, Emergent, Persistent, Seasonally Flooded

OSW 1C
FLUCFCS – 510-Streams and Waterways/USFWS – R2OWHx - Riverine, Lower Perennial, Open Water, Permanently Flooded, Excavated

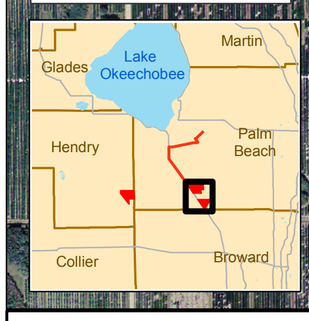
APPENDIX C-6
LAND USE MAPS COMPARTMENT C

STA-5

STA 6 Section 2

L-3 Canal

FLUCCS CODES
221 CITRUS GROVES
261 FALLOW CROP LAND
329 OTHER SHRUBS AND BRUSH
510 STREAMS AND CANALS
531 STA
534 RESERVOIRS
631 WETLAND SCRUB
641 FRESHWATER MARSHES
747 DIKES AND LEVEES
811 GRASS AIRPORTS
814 ROADS AND HIGHWAYS



Legend

- EAA Compartment C
- Land Use

Wetlands

- Upland
- Atypical Wetland
- Typical Wetland
- Surface Water

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FIGURE # C-6

Land Use For Compartment C

Contract # CN040936

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UPDATED
8/13/2007

ECART/map_docs/LU_C_D_size.mxd

APPENDIX D
USACE CONVERSATION RECORD

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RECORD OF PHONE CONVERSATION

Person Called: Myrna Lopez Phone No. 561-472-3517

Firm: ACOE Date of Call: 7/20/07

Call Originator: Ted Murray, URS Time of Call: 9:00 am

Other Parties to Call:

Purpose of Call: Discuss jurisdiction of atypical wetlands

Project: SFWMD TO 36

Project Name: Wetland Evaluation Compartments B & C, ECART

Details of Conversation:

I inquired about USACE's policy concerning claiming agricultural crops (sugar cane and sod) on hydric soils as atypical wetlands. Ms. Lopez stated that the Corps does claim these areas if hydric soils and hydrology exist even if the site if being actively cultivated. I asked how wetland hydrology is established is established in absence of a primary indicator and 2 secondary indicators. I explained that on one site we had hydric soil and the local soil survey as the only secondary indicator. She indicated that since these are atypical situations the Corps looks at other factors and uses the hydric characteristics found in the soil a another secondary indicator of hydrology. She stated that if the soil under agricultural management still retains hydric indicators that that is sufficient evidence of existing hydrology to use as a second indicator of hydrology.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

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SOUTH FLORIDA WATER MANAGEMENT DISTRICT

ECART, EAA Compartment B & EAA Compartment C

T&E Species Survey & Wetland Jurisdictional Determination Wildlife Evaluation Report (Final)

September 2007

Work Order No. CN040936-WO33

Prepared by:
URS Corporation
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Boca Raton, FL 33487

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APPENDICES

APPENDIX	DESCRIPTION
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G	**Non-Listed Wildlife Observed Within the Project Areas**

1.0 EXECUTIVE SUMMARY

This Wildlife Evaluation Report documents protected species survey work performed by URS Corporation for the South Florida Water Management District's (District's) Everglades Agricultural Area Conveyance and Regional Treatment (ECART), Compartments B and C Buildout Projects. This study was undertaken to collect information to support environmental documents for the expansion of the remaining portions of Stormwater Treatment Areas (STAs) Compartments B and C, along with associated ECART Project conveyance improvements.

The above described projects are being completed by Acceler8 (District) primarily to improve water quality of discharges to the Everglades Protection Area (EPA) to better meet long-term Everglades water quality goals. These projects have been implemented to expand the size and enhance the performance of existing STAs created as part of the Everglades Construction Project (ECP). The principal goal of these projects is to treat and remove phosphorous (TP) from agricultural stormwater runoff prior to the water entering the EPA.

Review of existing site-specific documents and literature, and field surveys of on-site habitats were performed to develop a list of Federal and State protected species that could potentially occur on the project sites. The list of protected species developed for these areas included 18 animal species and three (3) plant species (***Appendix A***). Field surveys for these species were conducted in May and June of 2007. Surveys were conducted using pedestrian transects, vehicles, airboat, swamp buggy, and helicopter. Of the 21 protected species that could potentially occur on the projects sites, seven (7) protected animal species were found utilizing the project sites during the field surveys. These species included two (2) Federal endangered bird species, four (4) State species of special concern bird species, and one (1) State listed reptile.

In addition, two (2) wading bird rookeries, located along the North New River Canal (L-18 and L-19), were also found in the project area. These rookeries contained chicks of several species of special concern listed by the State of Florida, and chicks of other non-listed species. These rookeries are Federally protected under the Migratory Bird Treaty Act, and coordination will need to occur with both the U.S. Fish and Wildlife Service (USFWS) and the Florida Fish and Wildlife Conservation Commission (FFWCC) prior to any activity in proximity to the rookeries.

2.0 PROJECT DESCRIPTION

This Wildlife Evaluation Report and associated protected species surveys covered areas only within the project limits for the ECART, and Compartments B and C Buildouts. These project components can be broken down into two main parts: 1) the expansion of two existing STAs (Compartments B and C), and 2) upgrades and improvements to a series of canals (ECART). The primary goal of these projects is to create STAs which will reduce nutrient concentration, which include TP levels flowing from the Everglades Agricultural Area (EAA) prior to stormwater runoff entering the EPA. Compartments B and C are components of the Long-Term Plan (LTP) and will require permits from the State of Florida and the US Army Corps of Engineers (USACE) to proceed to fulfillment of their obligations under the Everglades Forever Act (EFA, F.S. 373.4592). Both Compartments are buildouts of existing STAs. The Compartment B Buildout is the expansion of STA 2, and Compartment C is the expansion of STA 5 and STA 6. The Compartment B Buildout is an approximate 7,500-acre parcel of land located in southern Palm Beach County, and the Compartment C Buildout is an approximate 6,200-acre parcel of land located in eastern Hendry County (***Figure 1-1***).

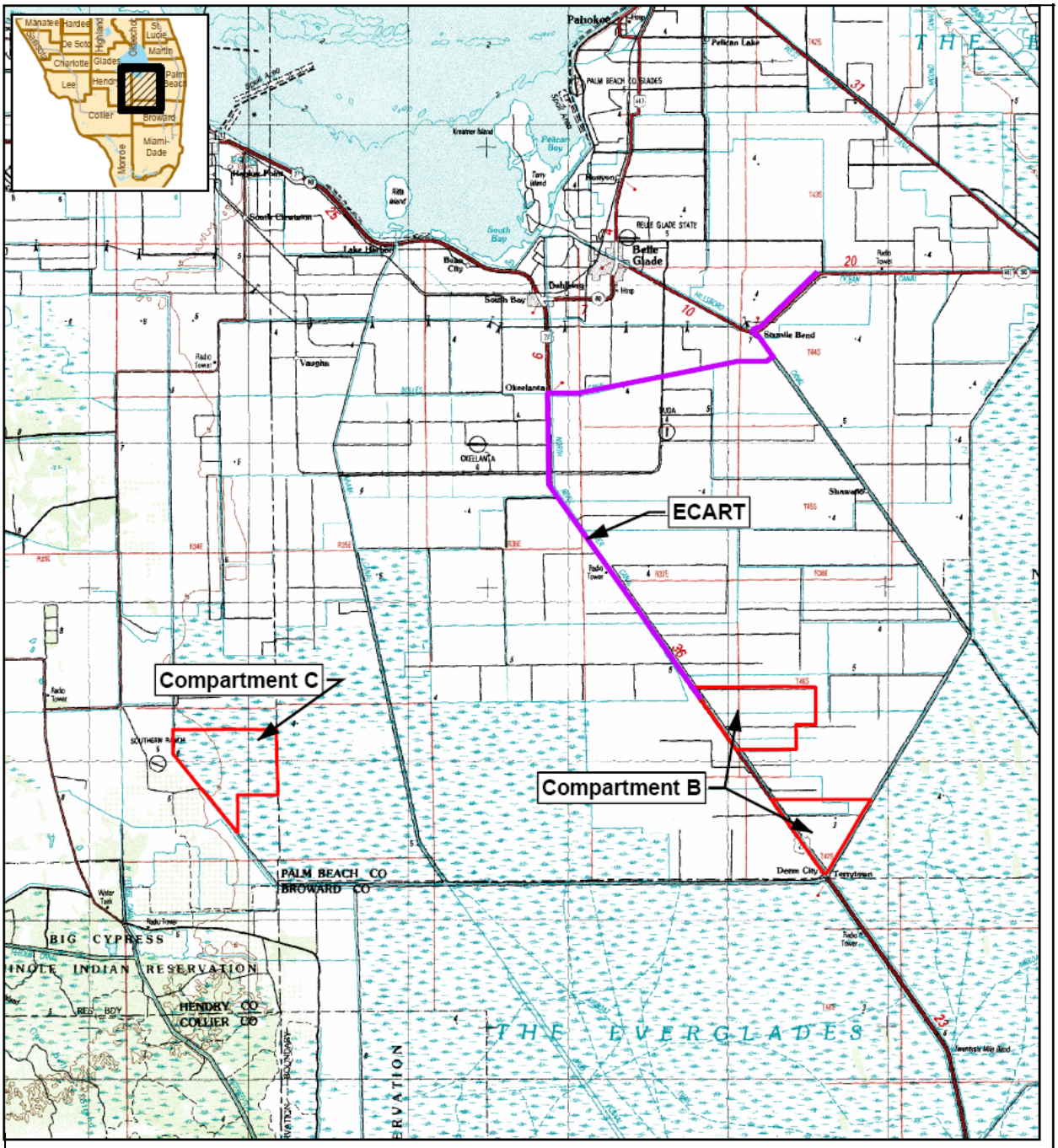
Compartments B and C will contain emergent wetland vegetation (EMG) and submersed aquatic vegetation (SAV) to aid in water quality treatment. Water originating from agricultural areas will be treated within the STAs to remove primarily TP and other nutrients prior to release of the water into the EPA.

The ECART project includes several integrated components of facility upgrades and new canal improvements including canal expansion, bridge modification, control structure modification and construction and appurtenant facility modifications and relocations. As a part of the proposed system improvements and auxiliary to the Comprehensive Everglades Restoration Plan (CERP), the intent for the District is to construct the required improvements to enable optimum flow conveyance to assist in redistributing flows and nutrient loads to the STAs and EAA Storage Reservoir.

This Wildlife Evaluation Report was completed to provide information in support of environmental documentation for the projects. The wildlife evaluation task included identification of Federal and State protected species that could potentially occur on the project sites, field reviews of the project sites for the presence of protected species, and the mapping of land uses and habitats on the project sites.

3.0 LISTED SPECIES REVIEW

The ECART and Compartments B and C project study areas were evaluated for potential occurrences of Federal and State listed protected plant and animal species in accordance with Section 7 of the Endangered Species Act of 1973 (as amended) and Chapters 5 and 68 of the Florida Administrative Code.



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Legend
- ECART Canals
- EAA Compartments

0 2.5 5 10 Miles

N W E S

sfwmd.gov	South Florida Water Management District 2301 Center Park West Drive, Suite # 150 West Palm Beach, FL 33409 Tel # (561) 242-5520	FIGURE # 1-1 Location Map Contract # CN040936	UPDATED 8/9/07 ECART/map_docs/Location.mxd

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Literature searches and a habitat field review were conducted to identify protected species and any critical habitat that might be expected to occur within the project study area.

The reviews and database searches included the following:

- U.S. Fish and Wildlife Service, *Endangered and Threatened Wildlife and Plants*, 50 CFR 17.11 and 17.12, 2007;
- Florida Fish and Wildlife Conservation Commission, June 2006, Florida's Endangered Species, Threatened Species, and Species of Special Concern;
- Florida Fish and Wildlife Conservation Commission, Eagle Nest Locator website (http://wld.fwc.state.fl.us/eagle/eaglenests/Default.asp);
- Rules for the Department of Agriculture and Consumer Services, Division of Plant Industry, Chapter 5B-40, Preservation of Native Flora of Florida, 2007;
- Florida Natural Areas Inventory (FNAI) maps and database; http://www.fnai.org/trackinglist.cfm
- U.S. Department of Agricultural, Natural Resources Conservation Service (NRCS), Soil Survey of Palm Beach County, Florida, 1978;
- U.S. Department of Agricultural, Natural Resources Conservation Service (NRCS), Soil Survey of Hendry County, Florida, 1990;
- U.S. Geological Survey (USGS), Topographic Quadrangle Map, 1:250,000, West Palm Beach, 1972;
- U.S. Fish and Wildlife Service, National Wetlands Inventory, Wetlands Online Mapper (June 2006); http://wetlandsfws.er.usgs.gov/wtlnds/metadata/metadata.htm
- Florida Department of Transportation (FDOT), Florida Land Use, Cover and Forms Classification System, 3rd edition, 1999;
- U.S. Fish and Wildlife Service (USFWS), Classification of Wetlands and Deepwater Habitats of the United States, (Cowardin, *et. al*. 1979); and
- True color aerials of the project study area, (1"=1000') 2004 and 2006.

The approximate boundaries of upland and wetland communities within the project study area were mapped on true color aerial photographs using reference information. Each community type was classified using the Florida Department of Transportation, Florida Land Use, Cover and Forms Classification System (FLUCFCS) (FDOT 1999). Wetlands were also classified using the USFWS, Classification of Wetlands and Deepwater Habitats of the United States (Cowardin, et. al. 1979).

Information from the USFWS and the FFWCC regarding the location of, or the potential for protected species in the vicinity of the project study area was requested from each agency. However, responses from the USFWS and the FFWCC have not yet been received.

3.1 METHODOLOGIES

In spring of 2007, environmental scientists familiar with Florida natural communities and wildlife conducted field surveys of Compartments B, C and the ECART canals. Protected species reviews included:

3.1.1 Helicopter and Airboat Surveys

A helicopter was used to survey for wading bird rookeries on May 16, 2007. The entire alignment of the ECART project was flown as were transects over Compartments B and C. A second helicopter survey specific to wood storks (*Mycteria americana*) will be performed in November 2007 during their nesting season. The ECART Canals were flown with one transect while Compartments B and C were covered on transects that were approximately 150 feet apart.

Additionally, a helicopter survey for wading birds was performed of the South Buildout area of Compartment B on the morning of June 4, 2007. A helicopter was used because of accessibility issues in this area. The helicopter transects were approximately 150 feet apart and began in the southern corner of the South Buildout area and proceeded north performing east-west transects to STA 2 Cell 4. These transects are shown on ***Figure B-2 (Appendix B)***.

An airboat was also used to perform wading bird surveys on May 29, 2007 in the South Buildout area of Compartment B on ***Figure B-2 (Appendix B)***; however, water levels were not adequate to allow efficient use of the airboat and the decision was to utilize the helicopter instead.

3.1.2 Stationary Stations, Pedestrian and Vehicular Surveys

Survey stations, pedestrian transects and vehicular surveys were conducted for Compartments B C on May 29 to June 1 and June 4 to 6, 2007 and for ECART canal system June 5 to 7, 2007. Stationary survey stations were used in the early morning (sunrise) and evening (sunset) hours. Additionally, pedestrian transects were started at the survey stations with orientation of the transects dependent on habitat conditions. Stationary survey stations were performed in 30 minute increments and wildlife observed by eye or with binoculars was recorded in field notes. Because mammals within Compartment C tend to congregate in or near wetlands, locations of some survey stations were skewed to locations near wetland areas. In the ECART survey area, pedestrian transects from survey stations on levees accessible by vehicle were within a 250-foot radius of the survey station. At stations that were not accessible (along the Bolles Canal) by vehicle, pedestrian transects extended approximately 500 to 700 feet depending on site conditions. On Compartment B the pedestrian transects were within a 250-foot radius of the survey station. On Compartment C pedestrian transects commenced at these stations and extended approximately 1,500 feet from the station. Transects were performed as to allow the best field of vision to observe wildlife. An additional pedestrian transect was completed along the Bolles Canal in the area of the islands. This pedestrian transect was approximately 3,000 feet. Locations of the survey stations and pedestrian transects in each of the three study areas are provided in ***Figures B1-B3 (Appendix B)***.

In Compartment B, stationary survey stations were only located in the North Buildout area of the site because given the topography of the South Buildout area, it was determined that a helicopter

survey supplemented by a vehicular survey around the outside and along the internal levees would be more appropriate.

Vehicular surveys were utilized in each project study area. Binoculars were used to identify species from afar. In the ECART project study area vehicles were driven along the levee of the North New River Canal and US 27 to observe both sides of the bank and adjacent areas. Along the Ocean Canal vehicles were driven along CR 880. To observe the Hillsboro Canal, Browns Farm Road was driven as well as a local farm road on the opposite side of the canal in order, to observe both banks and adjacent areas. To observe the Bolles Canal vehicular access was limited due to heavy vegetation along steeply sloped canal banks. All accessible levees around and within the project areas of Compartments B and C were surveyed. Vehicular survey areas are shown on ***Figures B1*** through ***B3 (Appendix B)***. Vehicular surveys were performed during late morning and afternoon hours.

Total time performing wildlife surveys utilizing the above referenced methodologies averaged seven (7) hours per day.

3.1.3 Swamp Buggy Surveys

Because of the thick coverage of vegetation on Compartment C, a swamp buggy was used on May 30 to 31, 2007 to access interior portions of the compartment. The swamp buggy was used primarily to access interior wetlands; however, wildlife observations were also made. A swamp buggy was not used in the ECART or Compartment B study areas because the existing road system provided adequate access. Locations of this survey are shown on ***Figure B-3 (Appendix B)***.

3.1.4 Natural Community Surveys

The purpose of the natural community reviews was to verify and/or refine preliminary habitat boundaries and classification codes established through in-office literature reviews and photo interpretation. Natural community reviews were conducted by driving along existing roads within the project study areas and performing pedestrian transects through each of the natural habitat types found on-site. During the reconnaissance, each upland and wetland community within the project study areas was visually inspected and plant species composition for each community evaluated. Exotic plant infestations, shifts in historical plant communities, and any other disturbances such as soil subsidence, clearing, canals, power lines, etc. were noted. Wildlife and signs of wildlife usage at each upland and wetland community were also evaluated. Additionally, photographs were taken of major representative communities (***Appendix F***).

3.2 EXISTING COMMUNITIES

Based on in-house and field reviews, nine (9) upland and ten (10) wetland communities were identified within and adjacent to the ECART and Compartments B and C project study areas. A description of each community type is provided below. Maps of land uses within project study areas and within 300 to 1,000 feet outside of project boundaries were produced as a result of the field reviews and are shown in ***Figures C-1*** through ***C-3 (Appendix C)***.

TABLE 3-1
LAND USE HABITATS WITHIN THE PROJECT BOUNDARIES

FLUCFCS[1]	USFWS Classification[2]	Description[1]	ECART (%)	Comp B (%)	Comp C (%)
Uplands					
260	Not Applicable	Field Crops	3.30	-	-
261	Not Applicable	Sod Farms	-	-	5.00
329	Not Applicable	Other Shrubs and Brush	-	-	0.001
747	Not Applicable	Fallow Crop Land	9.00	0.70	1.27
814	Not Applicable	Roads and Highways	11.70	1.70	1.00
Subtotal			**24.00%**	**2.40%**	**7.27%**
Wetlands					
215	Palustrine, Emergent, Persistent, Seasonally Flooded	Field Crops	22.65	0.70	-
242	Palustrine, Emergent, Persistent, Seasonally Flooded	Sod Farms	5.60	6.50	-
260	Palustrine, Emergent, Persistent, Seasonally Flooded	Other Open Lands (Rural)	7.53	0.50	0.02
261	Palustrine, Emergent, Persistent, Seasonally Flooded	Fallow Crop Land	0.30	49.60	55.30
422	Palustrine, Scrub-Shrub, Broad Leaved Evergreen, Seasonally Flooded	Brazilian Pepper	-	0.80	-
510	Riverine, Lower Perennial, Open Water/Unknown Bottom, Permanently Flooded, Excavated	Streams and Waterways	39.62	4.50	6.00
534	Palustrine, Open Water/Unknown Bottom, Permanently Flooded, Excavated)	Reservoirs Less than 10 acres	-	0.10	0.01
631	Palustrine, Scrub-Shrub, Broad Leaved Deciduous, Seasonally Flooded	Wetland Scrub	-	-	5.00
641	Palustrine, Emergent, Persistent, Seasonally Flooded	Freshwater Marsh	0.30	34.90	26.40
Subtotal			**76.00%**	**97.60%**	**92.73%**

Notes:

[1]Florida Department of Transportation. 1999. "Florida Land Use, Cover and Forms Classification System." Third edition. 91pp.

[2]Cowardin, et al. 1979. "Classification of Wetlands and Deepwater Habitats of the United States," FWS/OBS-79/31. U.S. Fish and Wildlife Service. 131pp.

3.2.1 Existing Upland Communities

Citrus Grove (Orange, Grapefruit, Tangerines, etc.)
FLUCFCS: 221

This category includes any type of citrus that is grown for agricultural purposes. The Citrus Grove community type was observed on the west boundary of Compartment C.

Other Open Lands (Rural)
FLUCFCS: 260

The other open lands (rural) category includes those agricultural lands whose intended usage cannot be determined. This community type was identified adjacent to all portions of the ECART canal. These open areas consisted of common ragweed (*Ambrosia artemisiifolia*), dog fennel (*Eupatorium capillifolium*) and beggar ticks (*Bidens pilosa*) and of buildings associated with sugar cane and sod farms.

Fallow Cropland
FLUCFCS: 261

The fallow cropland category includes land not currently in crop production. This community type was identified on upland soils on the western boundary of Compartment C. These areas consisted of overgrown/fallow sugar cane interspersed with common ragweed dog fennel and beggar ticks. These fallow cropland communities offer little habitat to protected birds as they do not contain appropriate foraging or roosting habitat. Protected reptiles such as the eastern indigo snake (*Drymarchon corais couperi*) and gopher tortoise (*Gopherus polyphemus*) can utilize fallow cropland if the site meets the species specific habitat requirements. Fallow cropland can also offer appropriate cover for prey species of the Florida panther.

Other Shrubs and Brush
FLUCFCS: 329

This category includes shrub and brush cover not specifically mentioned in other FLUCFCS codes. In Compartment C there were two upland areas adjacent to roads that previously housed equipment or structures. These areas now support various low-growing herbaceous species such as beggar ticks, bahia grass (*Paspalum notatum)*, and Bermuda grass (*Cynodon dactylon*). These areas do not offer appropriate foraging or roosting habitat for protected birds nor cover for prey of the Florida panther because the vegetation is mostly grasses. While these areas may offer suitable habitat for the gopher tortoise, indigo snake or Audubon's crested caracara (crested caracara), their small size and scattered locations make it unlikely they could support these species on the site.

Dikes and Levees
FLUCFCS: 747

This classification represents levees present within all project study areas. There are two types of levees located within the project study areas. The first levee type is general canal bank levees located along all of the major ECART canals. These levees were

vegetated with common ragweed, beggar ticks, and Bermuda grass. The second levee type is large embankments constructed as part of adjacent STAs. These levees are over ten feet in height, are designed to hold large amounts of water within the embankments, mostly unvegetated, and generally have unpaved roads constructed on top of them.

Roads and Highways
FLUCFCS: 814

The roads and highways classification is assigned to transportation facilities used for the movement of people and goods; and encompasses all areas used for interchanges and limited access right-of-way including pavement, medians, and buffers. Roads adjacent to the ECART canal project are US Highway 27, CR 827, Browns Farms Road, Timco Farms Road, and CR 880. Roads within Compartment B include US Highway 27 and many unpaved roads adjacent to agricultural ditches. Roads within and adjacent to Compartment C were unpaved.

Transmission Towers
FLUCFCS: 821

The transmission tower category includes airwave communication towers for television, radar, and cellular telephone. A cellular telephone tower is located on the west side of US 27, adjacent to the ECART North New River Canal (L-19).

Electrical Power Transmission Lines
FLUCFCS: 832

The electrical power transmission lines category includes all utility lines that carry electricity. There are two large sets of power transmission lines that traverse the South Buildout Area of Compartment B. On the eastern boundary of Compartment B, utility access roads have been constructed from the adjacent levee to provide access to the power poles. These access roads are mowed and maintained, and consist of fill material with bahia grass coverage. Wetland vegetation occurs under the transmission lines, therefore acreage under the lines have been included in wetland acreage calculations.

Water Supply Plants
FLUCFCS: 833

The water supply plants category includes treatment plants, settling basins, water storage towers and well fields. Pumping stations are located along the ECART canals, as well as within Compartments B and C project areas. These stations are used to convey water through the existing canals and to pump water to and from proposed and existing STAs.

3.2.2 Existing Wetland Communities

Field Crops
FLUCFCS: 215
USFWS: PEM1C (Palustrine, Emergent, Persistent, Seasonally Flooded)

Wheat, oat, hay, and grasses are the primary types of field crops found in this classification. Within the project study areas, this land-use type consisted exclusively of sugar cane (*Saccharum officinarum*) that is under current cultivation (being actively

farmed). This land use was found primarily in the northern section of Compartment B. Sugar cane fields also occupied large tracts of land adjacent to canals that comprise the ECART project area. Sugar cane fields are a monoculture community that offer little habitat for protected species likely to occur within the project study areas. These areas do not offer suitable foraging or roosting habitat for protected birds or foraging areas for protected reptiles. The sugar cane fields in the north buildout area of Compartment B have been determined by the USACE to be atypical wetlands and the sugarcane fields along the ECART project located on hydric soils have been designated as atypical wetlands for planning purposes.

Sod Farms
FLUCFCS: 242
USFWS: PEM1C (Palustrine, Emergent, Persistent, Seasonally Flooded)

This land-use type was dominated by turf grass under active cultivation. Turf grass farms were identified in the northern section of Compartment B and in areas adjacent to the North New River (L-18 and 19), Bolles (L-16), Ocean (L-13) and Hillsboro (L-15) canals that comprise the ECART project area. These areas offer suitable habitat for protected wading bird species during flood or high ground water conditions when insects are forced to the surface of the turf. Wood storks (*Mycteria americana*) and white ibis (*Eudocimus albus*) were observed foraging on turf grass farms adjacent to the North New River and Ocean canals. Sod farms are also appropriate habitat for the crested caracara (*Polyborus plancus audubonii*), which prefers open upland communities such as pastures and dry prairies. Sod farms in the north buildout area of Compartment B have been determined by the USACE to be atypical wetlands and the sod fields along the ECART project located on hydric soils have been designated as atypical wetlands for planning purposes.

Fallow Cropland
FLUCFCS: 261
USFWS: PEM1C (Palustrine, Emergent, Persistent, Seasonally Flooded)

The fallow cropland category includes land not currently in crop production. This community type was identified on hydric soils throughout Compartment C, in the north Buildout area of Compartment B, and along the ECART study area. These areas consisted of overgrown/fallow sugar cane and sod interspersed with common ragweed dog fennel and beggar ticks that are growing on hydric soil that retain wetland hydrology and have been identified by the USACE as atypical wetlands. These fallow cropland communities offer little habitat to protected birds as they do not contain appropriate foraging or roosting habitat. Protected reptiles such as the eastern indigo snake (*Drymarchon corais couperi*) and gopher tortoise (*Gopherus polyphemus*) can utilize fallow cropland if the site meets the species specific habitat requirements. Fallow cropland can also offer appropriate cover for prey species of the Florida panther.

Other Shrubs and Brush
FLUCFCS: 329
USFWS: PEM1C (Palustrine, Emergent, Persistent, Seasonally Flooded)

This category includes shrub and brush cover not specifically mentioned in other FLUCFCS codes. In Compartment C there are several of these communities that have been identified by the USACE as atypical wetlands. These areas adjacent to roads that previously housed equipment or structures. These areas now support various low-growing herbaceous species such as beggar ticks, bahia grass, and Bermuda grass (*Cynodon dactylon*). These areas do not offer appropriate foraging or roosting habitat for protected birds nor cover for prey of the Florida panther because the vegetation is mostly grasses. While these areas may offer suitable habitat for the gopher tortoise, indigo snake or crested caracara, their small size and scattered locations make it unlikely they could support these species on the site.

Brazilian Pepper
FLUCFCS: 422
USFWS: PSS3C (Palustrine, Scrub-Shrub, Broad Leaved Evergreen, Seasonally Flooded)

This category includes areas dominated by Brazilian pepper (*Schinus terebinthifolius)*, an exotic, invasive species typically found on disturbed sites. Brazilian pepper was found in Compartment B, primarily along canal banks and along the southern boundary of the Compartment. Areas of Brazilian pepper consist of a monoculture of dense vegetation that allows little ground cover to establish. These areas offer poor foraging habitat for wading birds; however, they do offer cover for small-and-medium sized mammals.

Streams and Waterways
FLUCFCS: 510
USFWS: R2OWHx (Riverine, Lower Perennial, Open Water/Unknown Bottom, Permanently Flooded, Excavated)

The streams and waterways classification includes rivers, creeks, canals, ditches and other linear water bodies. Within the project study areas, this habitat type consists of excavated open water canals and ditches of various sizes and uses. Canals ranged from smaller agricultural canals used to bring irrigation water to agricultural ditches, to large water conveyance canals such as the North New River Canal (L-18 and L-19). Agricultural ditches were found throughout Compartments B and C and are used for irrigation and drainage. Canals within ECART consist of North New River Canal (L-18 and L-19), Bolles Canal (L-16), Hillsboro Canal (L-15), and Ocean Canal (L-13). The Compartment B canals include the North New River Canal (L-18 and L-19) and the various smaller agricultural canals. Canals within Compartment C include agricultural canals and the L-3 canal that is located along the western border of the compartment.

Vegetation along the ECART canals and along agricultural canal banks within Compartments B and C include common ragweed, beggar tick, frogfruit (*Phyla nodiflora*), torpedo grass (*Panicum repens*), smutgrass (*Sporobolus indicus*), sugar cane, Brazilian pepper, saltbush (*Baccharis halimifolia*), and castor bean (*Ricinus communis*). Dense coverage of floating vegetation such as water hyacinth (*Eichhornia crassipes*) and

water lettuce (*Pistia stratiotes*) were observed within the agricultural canals of Compartments B and C; while the ECART canals had less than 2% coverage of floating vegetation. The center channel within the ECART water conveyance canals consists of mostly open flowing water. The Bolles Canal (L-16) contained an area of small mudflats and herbaceous islands vegetated with cattail (*Typha latifolia*), castor bean, smartweed (*Polygonum* spp.), rosy camphor weed (*Pluchea rosea*), and primrose willow (*Ludwigia peruviana*).

Shallow agricultural irrigation canals and agricultural ditches offer appropriate foraging habitat for protected wading bird species. Wood storks, white ibis, and roseate spoonbills (*Platalea ajaja*) were observed foraging in agricultural ditches and canals located adjacent to the ECART canals, and on mudflat areas located within the Bolles Canal (L-16). Two wading bird rookeries supporting chicks of various species including tricolor herons (*Egretta tricolor*), snowy egrets (*Egretta thula*), great egrets (*Casmerodius albus*) and yellow crowned night herons (*Nyctanassa violacea*) were found along the North New River Canal (L- 18 and L-19) (See ***Figure 3-1*** for location).

<u>Reservoirs larger than 500 acres</u>
FLUCFCS: 531
USFWS: POWHx (Palustrine, Open Water/Unknown Bottom, Permanently Flooded, Excavated

This reservoir classification includes artificial impoundments of water used for irrigation, flood control, municipal and rural water supplies, or recreation, and exceed 500 acres in size. This classification represents a large reservoir (EAA A-1 Reservoir) being constructed by SFWMD on the west side of US 27, directly opposite the northern portion of Compartment B and at the southern end of the ECART project.

<u>Reservoirs less than 10 acres</u>
FLUCFCS: 534
USFWS: POWHx (Palustrine, Open Water/Unknown Bottom, Permanently Flooded, Excavated)

This reservoir classification includes artificial impoundments of water used for irrigation, flood control, municipal and rural water supplies, or recreation, and are less than 10 acres in size. Within Compartment B there are three retention ponds on the east side of the project site and one pond on the western boundary of the north Buildout area. These ponds are surrounded by a littoral zone that consists of herbaceous wetland species including cattails, sawgrass (*Cladium jamaicense)*, and Brazilian pepper. An American alligator (*Alligator mississippiensis*) was observed in the reservoir.

There are six (6) small retention ponds located in the southeast corner of Compartment C. These ponds are sparsely vegetated with cattail; with banks dominated by beggar tick, ragweed, dog fennel, and sugar cane.

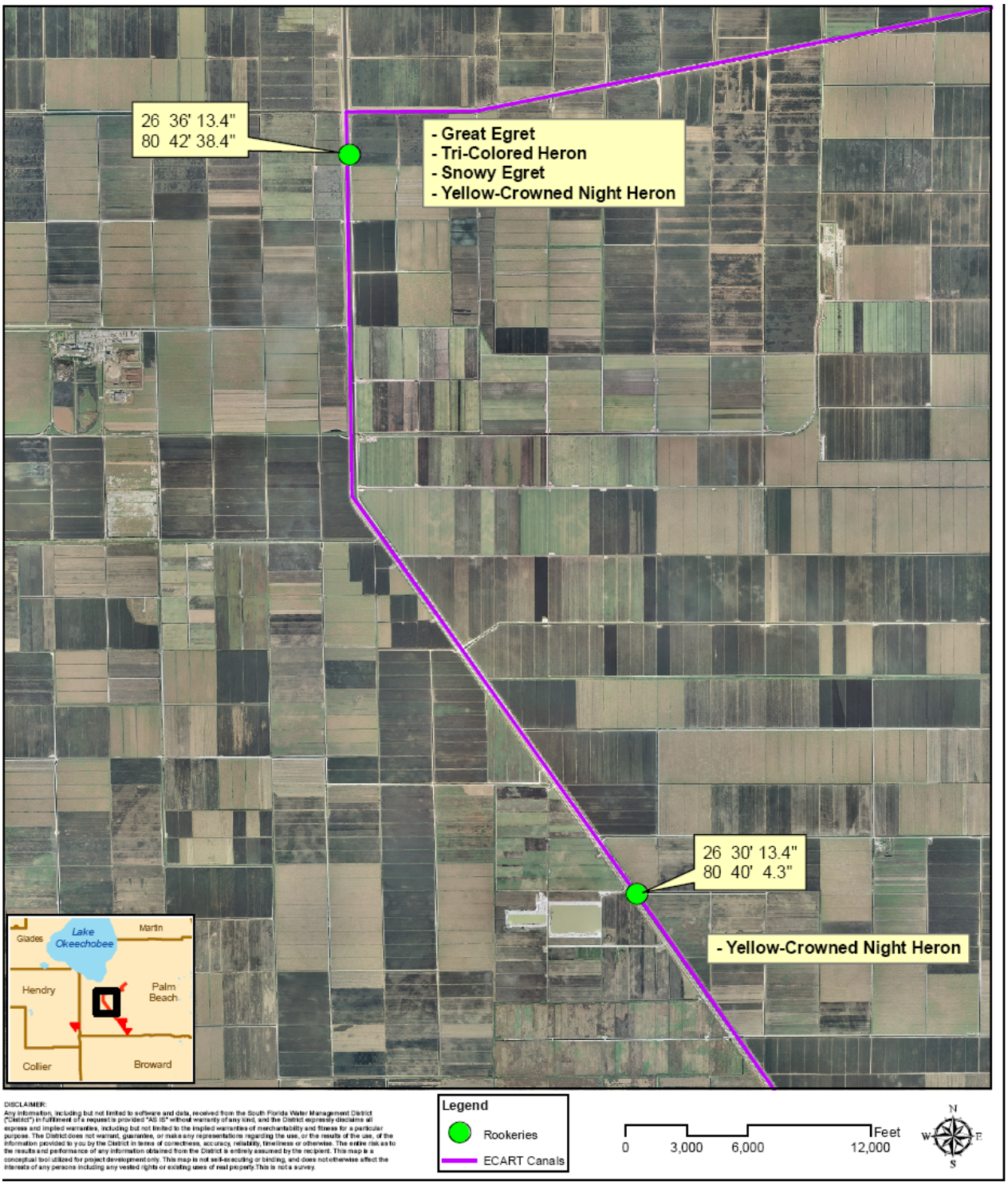

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FIGURE # 3-1
ECART Wading Bird
Rookery Locations
Contract # CN040936

UPDATED
8/13/07

ECART/map_docs/Rookery.mxd

Wetland Scrub
FLUCFCS: 631
USFWS: PSS1C (Palustrine, Scrub-Shrub, Broad Leaved Deciduous, Seasonally Flooded)

This classification includes areas in topographic depressions with poorly drained soil. There are many isolated scrub wetlands within Compartment C that consist of an overstory of Carolina willow (*Salix caroliniana*) with a mid-level shrub layer of primrose willow and saltbush. Additionally, several herbaceous wetlands within Compartment C were fringed with a Carolina willow dominated shrub wetland. These areas offer habitat for protected prey species of the Florida panther including wild hogs (*Sus scrofa*) and white-tailed deer (*Odocoileus virginianus*).

Freshwater Marshes
FLUCFCS: 641
USFWS: PEM1C (Palustrine, Emergent, Persistent, Seasonally Flooded)

The Freshwater marsh classification includes non-forested wetlands dominated by low, herbaceous species typically found in freshwater wetland systems. One freshwater marsh area containing purple loosestrife (*Lythrum flagellare*) and thistle (*Cirsinum nuttalii*) was found within the ECART project area adjacent to the Ocean Canal (L-13).

One large freshwater marsh was located within the south buildout area of Compartment B. The dominant vegetation observed within this marsh system included cattail, primrose willow, Brazilian pepper, Carolina willow, saltbush, torpedo grass, common ragweed, and flatsedge (*Cyperus* spp.).

Two types of freshwater marsh were found within Compartment C. The first type is small, isolated herbaceous wetlands dominated by grasses including maidencane (*Panicum hemitomom*) and blue maidencane (*Amphicarpum muhlenbergianum*). The second type are large freshwater marshes containing a variety of species including smartweed, arrowhead (*Sagitteria latifolia*), thistle, purple loosestrife, and wild taro (*Colocasia esculenta*).

These areas offer foraging habitat for a number of protected wading birds. Wading birds including wood storks, white ibis, snowy egrets, tricolored herons and little blue herons (*Egretta caerulea*) were commonly observed foraging in wetland marshes within Compartment B. Freshwater marshes in Compartment C were dry during the field reviews and were not being utilized by wading birds.

3.3 PROTECTED SPECIES EVALUATION RESULTS

A total of eight (8) Federal and 18 State listed animal species and one (1) Federal and three (3) State listed plant species were identified as potentially occurring within the project area. This list of species was developed based on review of previous documentation of the sites, and on available literature and review of the habitats which presently occur in the project sites. The Federal and/or State listed species that may be present are presented in ***Appendix A***. Tables in

Appendix A list the USFWS, FFWCC, and/or Florida Department of Agriculture and Consumer Services (FDA) protection status for each species.

During field reviews of the project study areas, several Federal and/or State listed species were observed. ***Appendix A*** lists the Federal and State listed species (respectively) observed and the portion of the project study area where each observation was made.

4.0 PROTECTED SPECIES CONCLUSIONS

4.1 ECART

Of the 18 animal and three (3) plant species shown in ***Appendix A***, six (6) animal species, two (2) of them being Federally protected and all six (6) being State protected species, were observed during field surveys along the ECART canals. The State listed protected species observed along the ECART canals included wood storks, white ibis, tricolored heron, snowy egret, little blue heron, and American alligator. The Federal listed protected species observed along the ECART canals included wood storks and American alligator. While the water segments of the canals do not provide habitat for foraging or feeding for protected species because of depth, the vegetation growing along the banks provides resting and roosting habitat for wading birds. A wading bird rookery (***Figure 3-1***) (Lat: 26° 36'13.4", Long: 80° 42' 38.4") found along the North New River Canal (L-19) contained chicks of wading birds (tricolored herons – 10 chicks, and snowy egrets – 2 chicks) listed by the State of Florida as Species of Special Concern, as well as chicks of the non-listed species, great egret (4 chicks) and yellow-crowned night heron (4 chicks). A second rookery (Lat: 26° 30'13.4", Long: 80° 40' 4.3") containing the non-listed yellow-crowned night heron was observed on the North New River Canal (L-18) (***Figure 3-1***). Both rookeries are protected by the USFWS under the Migratory Bird Treaty Act. Coordination with the USFWS and FFWCC will be required prior to undertaking any construction activities in the vicinity of the rookeries or other areas where migratory birds may be nesting. Additionally, dozens of protected wading birds, including wood storks and white ibis, were observed foraging in agricultural ditches within sod farms located in close proximity to the Ocean (L-13) and Bolles (L-16) canals.

4.2 COMPARTMENT B

Of the 18 animal and three (3) plant species shown in ***Appendix A***, seven (7) animal species, two (2) of them being Federally protected and all seven (7) being State protected species, were observed in Compartment B. The State listed protected species observed within Compartment B included roseate spoonbill, wood stork, white ibis, tricolored heron, snowy egret, little blue heron, and American alligator. The Federal listed protected species observed in Compartment B included wood storks and American alligator. The southern portion of Compartment B consists of a large freshwater marsh suitable for foraging and has attracted a wide variety of wading birds including the protected species previously mentioned. Additionally, Compartment B is on the edge of Snail Kite Critical Habitat; however, snail kites were not observed utilizing the marsh area for foraging, nor were apple snail egg casings observed. The northern portion of Compartment B consists of sugar cane and sod fields – both fallow and in cultivation. Several wood storks were observed in an agricultural ditch next to a sod field. STA 2 Cell 4 lies between

the northern and southern portions of the Compartment B project areas and is not included in this study. This area is slated for construction and currently consists of a large mudflat that has attracted a considerable number of foraging wading birds, including the protected species previously mentioned. To comply with the Migratory Bird Treaty Act prior to construction or flooding of the STA, the entire area must be carefully checked to ensure that migratory birds are not currently nesting.

4.3 COMPARTMENT C

Of the 18 animal and three (3) plant species listed in ***Appendix A***, three animal species, two (2) of them being Federally protected and all three (3) being State protected species, were observed during field surveys. The State listed protected species observed in Compartment C were Audubon's crested caracara, American alligator, and little blue heron. The Federally listed protected species observed in Compartment C included Audubon's crested caracara and American alligator. Most areas of Compartment C have limited habitat value for protected species because they remain in fallow sugar cane or are transitioning from fallow sugar cane to wetland. Crested caracara prefer open pastures and dry prairies, while the vegetation within the uplands of the compartment is tall and shrubby. Herbaceous and shrub wetlands that occur on-site have the potential to support foraging habitat for wading birds; however, none of the wetlands on site were holding water at the time of the field survey due to the current drought. These wetlands provide foraging habitat and cover for prey species of the Florida panther. During field reviews, numerous wild hogs and white-tailed deer were observed in these wetlands. To comply with the Migratory Bird Treaty Act, prior to construction or flooding of the STA the entire area must be carefully checked to ensure that migratory birds are not currently nesting.

5.0 LISTED SPECIES WITH POTENTIAL TO OCCUR IN PROJECT AREAS

The list of protected species with potential to occur in the project areas was generated based on a review of available literature and habitats that occur on the project sites. The Federally listed protected species are also State listed but will not be repeated in the State listed species section (Section 5.2). The protected species information was obtained from the FNAI tracking list for Palm Beach and Hendry Counties (http://www.fnai.org/bioticssearch.cfm). Protected species that were observed are listed first in both the Federal and State lists.

5.1 FEDERALLY LISTED SPECIES OBSERVED IN THE PROJECT AREA

5.1.1 American Alligator

The American alligator (*Alligator mississippiensis*) is a large (6 feet to 15 feet in length), primarily black reptile with a broadly rounded snout. This species is listed as threatened by the USFWS due to similarity of appearance to another listed species, the American crocodile. The American alligator resides in permanent bodies of fresh water, including marshes, swamps, lakes, and rivers, and occasionally, brackish waters. It is most active from spring through fall,

with nesting in late spring and hatching in summer. The American alligator has a high potential to occur within all three of the project study areas due to the presence of available habitat and because it was observed in all of the project areas during several field visits in May and June 2007.

5.1.2 Wood Stork

The wood stork (*Mycteria Americana*) is a large wading bird (generally 3 feet tall with a 3.5-foot wingspan) with white plumage, blackish-gray legs, pink feet, and a dark brown head. Its bill is long, down-curved and yellowish-brown in color. The wood stork is listed as endangered by the USFWS. The preferred nesting habitat for this species consists of inundated forested wetlands, including cypress strands, mixed hardwood swamps, sloughs, and mangroves. The USFWS Standard Local Operating Procedure for Endangered Species (SLOPES) defines the core foraging area for wood storks to be within an 18.6-mile radius of breeding colonies. Compartments B and C contain freshwater marshes which are preferred foraging habitats for wood storks. Based on agency databases, Compartment C and the ECART canals are located within the geographic range of the wood stork, but are not located within the 18.6-mile core foraging area (CFA) of any known active wood stork nesting colony. Compartment B is located within the CFA of one (1) active wood stork colonies (confirmed by USFWS on August 13, 2007) (***Appendix D***). The wood stork has a high potential to occur in all project sites and were observed in the Compartment B and ECART project study areas during the May and June 2007 field reviews.

5.1.3 Audubon's Crested Caracara

The crested caracara (*Polyborus plancus audubonii*) is a large raptor similar in appearance to the bald eagle. This species has a brownish-black body with a distinctive black crest on the top of its head, with white tips on the end of its wings, which are visible in flight. It has a large, blue, hook-shaped bill, bare orange facial skin, and long yellow legs. This species is listed as threatened by the USFWS. The crested caracara prefers open fields, pine flatwoods, dry prairie, and wet prairie. The USFWS SLOPES defines the primary protection zone for this species as 985 feet outward from a nesting tree. The secondary zone is 6,600 feet outward from an active nesting tree. The project study areas are located within a crested caracara consultation area ***Figure E-1 (Appendix E)***; however, none of the project sites contain preferred habitat for the crested caracara, and none are within 6,600 feet of a documented active crested caracara nest. Because the project is within a crested caracara consultation area Federal agencies such as the USACE, who will take Federal action with regard to the site will need to consult with USFWS about impacts of their action on the crested caracara. All free standing palm trees on Compartments B and C were checked for signs of crested caracara nesting activity. There were no signs of previous or new use of these trees as crested caracara nests. One crested caracara was observed within the northwest portion of Compartment C on June 7, 2007; however there is a low potential to utilize the project areas because of lack of preferred habitat. The crested caracara that was observed on June 7 was resting on a levee adjacent to Compartment C, then several minutes later was observed perching on a rubble pile. The bird was not spotted again that day. Of the seven (7) days of wildlife surveys on Compartment C this was the only sighting of a crested caracara. An informal USFWS crested caracara survey form was completed for this sighting and is included in ***Appendix E-1a***.

5.2 FEDERALLY LISTED SPECIES WITH POTENTIAL TO OCCUR IN THE PROJECT AREA BUT NOT OBSERVED DURING SURVEYS

5.2.1 Eastern Indigo Snake

The eastern indigo snake (*Drymarchon corais couperi*) is the largest non-venomous snake in North America. The indigo snake is black in color, can measure up to 104 inches in length, and has smooth, shiny scales and a reddish chin and throat. This reptile is listed a threatened by the USFWS. The indigo snake is found in a wide variety of habitats ranging from xeric sandhills to cabbage palm hammocks to hydric hardwood hammocks. Standard indigo snake construction practices should be established when constructing in habitats favored by this snake. Because the indigo snake is found in such a wide variety of habitats there is a high potential that indigo snakes can be found within any of the project areas. Indigo snakes were not observed in the project study area during field reviews but have been observed by others in the EAA A-1 Reservoir project, adjacent to ECART canal.

5.2.2 Florida Grasshopper Sparrow

The Florida grasshopper sparrow (*Ammodramus savannarum floridanus*) is a small bird with brown and black streaks on its back, a plain buffy breast, a large, flat head, and a short tail. This bird is listed as endangered by the USFWS. It is non-migratory and resides year round where it breeds. The Florida grasshopper sparrow prefers large areas of frequently burned, dry prairie habitat with patchy open areas sufficient for foraging. This species has a low potential to occur within the project areas because of lack of preferred habitat. None were observed during the May and June 2007 field reviews.

5.2.3 Florida Panther

The Florida panther (*Puma (=Felis) concolor coryi*) is a large cat (generally 70 to 150 pounds) with a long slender tail. Its fur is dark buff to tawny on its back, and light buff to white underneath, with a broad head and round ears. The Florida panther is listed as endangered by the USFWS. The Florida panther resides mainly in large forested wetland and upland habitats. Based on field reviews of the project areas and information received from the USFWS, FFWCC, and FNAI, there is a low potential for the Florida panther to occur within the project areas. None of the project sites contain habitats that are preferred by the panther for long term use. Compartments B and C fall within the panther secondary zone and there is a possibility of use of these site by the panther especially for hunting of prey. Panther telemetry data ***Figure E-2 (Appendix E)*** shows panthers at the edges of Compartments B and C; however, due to the lack of suitable habitat it is unlikely that panthers would utilize these areas for long periods of time. The USFWS's Panther Consultation Area maps ***Figure E-2 (Appendix E)***, which were revised in January 2007, indicate that approximately 65 acres of Compartment B and 2,300 acres of Compartment C fall within the Panther Consultation area. Based on the USFWS Panther Management guidelines it is possible that mitigation will be required for impacts to habitats within Compartments B and C. No panthers were observed during the May and June 2007 field reviews.

5.2.4 Everglades Snail Kite

The Everglades snail kite (*Rostrhamus sociabilis plumbeus*) is a medium-sized raptor, with a gray to black body, a white tail with a broad, dark band and pale terminal band, a long orange and black hooked bill, and orange-red legs. Adult females are brown, with streaking on head, throat, and underparts. The Everglades snail kite is listed as endangered by the USFWS. This species' preferred habitat consists of large open freshwater marshes and shallow water bodies containing low density EMG. This protected bird is non-migratory and depends on apple snails (*Pomacea paludosa*) as a primary food source. The project study areas are located within snail kite consultation area and Compartment B borders the snail kite Critical Habitat ***Figure E-3 (Appendix E)***; however, none were observed during the May 2007 and June 2007 field reviews. Because of the potential of this species to occur within the project study areas, USFWS-Approved Snail Kite Management Guidelines should be adhered to during construction of the project. These guidelines may prohibit or limit certain activities during snail kite nesting season, which occurs from December 1 to July 1.

5.2.5 Manatee

The manatee (*Trichechus manatus*) is a large, gray, hairless, aquatic mammal with a broad, round, flat tail. It has a broad head that is undifferentiated from the body and has front, flipper-like limbs with three nails. The manatee is listed as endangered by the USFWS. This species prefers coastal waters, bays, and rivers. It requires warm waters such as springs and water effluents in colder months. Manatee barriers have been placed to preclude manatee access to Everglades region canals from Lake Okeechobee at water control structures S-351, S-352 and S-354. These structures regulate the flow of water into the L-14 Canal (Hillsboro Canal) the L-20 Canal (North New River), the L-10 Canal (West Palm Beach Canal) and the L-25 Canal (Miami River), respectively. The potential of manatees within the ECART project is low because of the presence of the barriers. Additionally, provisions have been made to release manatees that have become trapped behind the barriers after they were put in place. No manatees were observed during the field reviews.

5.2.6 Okeechobee Gourd

The Okeechobee gourd (*Cucurbita okeechobeensis*) is a flowering vine with long tendrils and slender stems that either run along the ground or climbs trees up to 40 feet tall. Its leaves are 6 to 8 inches and are broad, rough-hairy, alternate, paired with tendrils, broadly heart shaped, slightly too deeply lobed, and lightly toothed. The flowers are 2.5 to 3 inches long, light yellow, bell shaped with a ribbed tube and five rounded lobes and are present in spring and summer. The Okeechobee gourd is listed as endangered by the USFWS. This species has a low potential of occurrence within the project study areas, as its preferred habitat consists of Lake Okeechobee shores and islands, and floodplain forests along the St. Johns River ***Figure E-4 (Appendix E)***. No Okeechobee gourds were observed during the field reviews.

5.3 STATE LISTED SPECIES OBSERVED IN THE PROJECT AREA

5.3.1 Roseate Spoonbill

The roseate spoonbill (*Platalea ajaja*) is a medium-sized wading bird with a bright pink body, white neck, long legs, and a distinctive long flat spoon-shaped bill. The roseate spoonbill is listed as a species of special concern by the FFWCC. This bird forages in shallow water of variable salinity, including tidal pools, coastal marshes, and freshwater ponds and marshes. It nests in mixed species colonies on coastal mangrove islands or in Brazilian pepper on man-made dredge spoil islands near suitable foraging habitat. The roseate spoonbill has a high potential to occur within the Compartment B and ECART project study areas, and was observed foraging within these areas during the May and June 2007 field reviews.

5.3.2 Little Blue Heron

The little blue heron (*Egretta caerulea*) is a medium-sized wading bird with a slate blue body, long slender, purplish neck and head, and long, pointy bill with a black tip. The little blue heron is listed as a species of special concern by the FFWCC. This species forages in shallow freshwater, brackish, and saltwater habitats. It nests in a variety of woody vegetation types and breeds in mixed species colonies in flooded vegetation or on islands. The little blue heron has a high potential to occur within the project study areas and was observed within all of the project study areas during the May and June 2007 field reviews.

5.3.3 Snowy Egret

The snowy egret (*Egretta thula*) is a medium sized solid white wading bird with a white plume on the back of its neck. Its bill is black, pointed and slender with a yellow base. It has long black legs with yellow feet. The snowy egret is listed as a species of special concern by the FFWCC. It has a high potential to occur within the project areas and was observed within Compartment B during the May and June 2007 field reviews. This species resides in both inland and coastal wetlands, with nests placed in many types of shrubs, especially mangroves and willows. Snowy egret chicks were found in a roost within the ECART project study area (***Figure 3-1***).

5.3.4 Tricolored Heron

The tricolored heron (*Egretta tricolor*) is a medium-sized wading bird with a slender neck and long, orange and black pointed bill. The top of its body is dark bluish-gray, and the underside is white. A reddish brown and white streak extends along the front of its neck. During the breeding season, adults have white head plumes and shoulders. The tricolored heron is listed as a species of special concern by the FFWCC. This bird nests on mangrove islands and willow thickets and forages in seasonally flooded wetlands, canals, and roadside ditches and is a permanent resident to Florida. The tricolored heron has a high potential to occur within the project study areas, and was observed in Compartment B during the May and June 2007 field reviews. Tricolored heron chicks were found in a roost within the ECART project study area (***Figure 3-1***).

5.3.5 White Ibis

The white ibis (*Eudocimus albus*) is a medium sized solid white wading bird with a long, orange, downward-curving bill, long orange legs and orange coloration on exposed flesh around face. Black tips on the end of its wings are visible in flight. The white ibis is listed as a species of special concern by the FFWCC. The preferred habitat for this species consists of freshwater and brackish marshes, salt flats, salt marsh meadows, wet prairies, forested wetlands, swales, and open fields. The white ibis was observed within Compartment B and the ECART project study areas during the May and June 2007 field reviews.

5.4 STATE LISTED SPECIES WITH POTENTIAL TO OCCUR IN THE PROJECT AREA BUT NOT OBSERVED DURING SURVEYS

5.4.1 Gopher Tortoise

The gopher tortoise (*Gopherus polyphemus*) is a moderate-sized tortoise with a grayish-brown, unmarked carapace, and a golden-yellow plastron. The gopher tortoise is found in dry, sandy, xeric sites that offer low-growing plants such as grasses for forage. The tortoise digs a burrow ranging in size from 20 - 30 feet long to six to eight feet deep. This species is listed as a species of special concern and may soon be listed as threatened by the FFWCC. None of the project sites offer appropriate habitat for the gopher tortoise as the sites are dominated by hydric soils or compacted fill. No gopher tortoises were observed during the field reviews in May or June 2007.

5.4.2 Florida Burrowing Owl

The Florida burrowing owl (*Athene cunicularia*) is a small, brown and white spotted owl with large yellow eyes and long legs. This bird is listed as a species of special concern by the FFWCC. The Florida burrowing owl resides in high, sparsely vegetated sandy ground, such as dry prairie and sandhill habitats. It nests in burrows within the ground. Although this species will use gopher tortoise and armadillo (*Dasypus novemcinctus)* burrows, most excavate their own burrows. The Florida burrowing owl has a moderate potential to occur within Compartment C because it had previously inhabited the site; however, it was not observed during the May and June 2007 field reviews. A U.S. Sugar Corporation produced map dated 2004 ***Figure E-6*** (***Appendix E***) shows several burrowing owl locations. It is unknown if these were active burrows at the time the most recent update of the map was produced. Field reviews of the locations shown on the maps indicated that proper burrowing owl habitat no longer existed because the area was no longer kept clear of tall vegetation. Areas that could support burrowing owls on Compartment C were field checked, however no owls were observed. Photographs of the areas on Compartment C that were previously utilized by burrowing owls are found in ***Appendix F***.

5.4.3 Limpkin

The limpkin (*Aramus guarana*) is a large wading bird with a long, slender neck and long pointed, slightly downcurved bill. Its body is dark brown with white spots. The limpkin is listed as a species of special concern by the FFWCC. This species forages in mangroves, freshwater

swamps and marshes, springs and spring runs, and pond and river marshes. It nests in a variety of areas, including mounds of aquatic vegetation and marsh grasses, cypress swamps, and within trees. The limpkin has a moderate potential to occur within the project study areas because of the availability of habitat. None were observed during the May and June 2007 field reviews.

5.4.4 Bald Eagle

The bald eagle (*Haliaeetus leucocephalus*) is a large predatory bird with a white head and tail, and a large, hook-shaped yellow bill. Its plumage is evenly brown, and its tail is slightly wedge-shaped. The bald eagle is listed as threatened by the FFWCC. This species forages in coastal areas, bays, lakes, and other water bodies. It requires mature coniferous or hardwood trees for perching, roosting, and nesting. The FFWCC regulates construction activities proposed to occur within 660 feet of any active bald eagle nests. The FFWCC's Eagle Nest Locator website (http://wld.fwc.state.fl.us/eagle/eaglenests/Default.asp) was accessed to determine the presence of any known bald eagle nest sites within the project areas. According to the FFWCC web database, no bald eagle nests have been documented within one mile of any of the project areas as shown on ***Figure E-5 (Appendix E)***. The closest documented active bald eagles' nests are located 3.2 miles west of Compartment C and 3.6 miles east of ECART canals. The ECART canals contain open water and Compartments B and C contain freshwater marshes which are potential eagle habitat, however, no bald eagles were observed during the May and June 2007 field reviews.

5.4.5 Florida Black Bear

The Florida black bear (*Ursus americanus floridanus*) is a large mammal (3 feet to 3.5 feet tall at the shoulder) with a glossy black coat and brown muzzle. Its tail is short and inconspicuous, and its ears are rounded and widely separated. The Florida black bear is listed as threatened by the FFWCC. This species resides in a wide variety of forested communities and has a low potential to occur within the project study areas due to lack of suitable habitat. Compartment C is in the edge of the secondary habitat area for the black bear. None were observed during the field observations.

5.4.6 Celestial Lilly

The celestial lily (*Nemastylis floridana*) is a flowering perennial herb with a slender stem and a few, basal, grass-like leaves. The flowers are 1.5 inches in diameter, with six dark blue petals and three coiled, yellow anthers in the center. It flowers between 4 and 6 pm, August through October. The celestial lily is listed as endangered by the FDA. The lily is found in wet flatwoods, prairies, marshes and cabbage palm hammocks that are frequently burned. This plant has a low potential to occur within the project study areas because of lack of a burn regime, and none were observed in any of the project areas during the field reviews.

5.4.7 Curtiss' Narrowleaf Hoarypea

The Curtiss' narrowleaf hoarypea (*Tephrosia angustissima var. curtissii*) is a perennial herb with straggling or arching stems. The leaves are compound, with opposite leaflets, and the flowers are small, white to pink, and typically pea-shaped. The Curtiss' narrowleaf hoarypea is listed as endangered by the FDA. It is typically found in scrub or sandy areas and has a low potential to

be found on any of the project areas, because of lack of deep sands on the project sites. No narrowleaf hoarypeas were observed during the field reviews.

6.0 NON-LISTED SPECIES

A table of non-listed species that were observed during the wildlife surveys is found in ***Appendix G***.

7.0 REFERENCES

Bell, C. R. and B. J. Taylor. 1982. *Florida Wildflowers and Roadside Plants*. Laurel Hill Press, Chapel Hill, NC. 308 pp.

Chafin, L.G. 2000. *Field guide to the Rare Plants of Florida*. Florida Natural Areas Inventory, Tallahassee, Florida.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. U.S. Department of the Interior, Fish and Wildlife Service, Office of Biological Services. Technical Publication FWS/OBS-79/31. 131 pp.

Florida Department of Transportation. 1999. *Florida Land Use, Cover and Forms Classification System*. Third Edition. 91 pp.

Florida Fish and Wildlife Conservation Commission, Eagle Nest Locator website (http://wld.fwc.state.fl.us/eagle/eaglenests/Default.asp)

Florida Fish and Wildlife Conservation Commission, June 2006, *Florida's Endangered Species, Threatened Species, and Species of Special Concern*.

Florida Natural Areas Inventory (FNAI) maps and database (http://www.fnai.org/trackinglist.cfm).

Hipes, D., D.R. Jackson, K. NeSmith, D. Printiss, and K. Brandt. 2000. *Field Guide to the Rare Animals of Florida*. Florida Natural Areas Inventory, Tallahassee, Florida.

Rules for the Department of Agriculture and Consumer Services, Division of Plant Industry, Chapter 5B-40, Preservation of Native Flora of Florida, 2007.

Sibley, D.A. 2003. *The Sibley Field Guide to Birds of Eastern North America*. Alfred A. Knopf, Inc, New York, NY. 431 pp.

Taylor, W.K. 1992. The Guide to Florida Wildflowers. Taylor Trade Publishing, Lanham, Maryland. 320 pp.

Tobe, J.D., *et al*. 1998. *Florida Wetland Plants: An Identification Manual*. Florida Department of Environmental Protection, Tallahassee, FL. 598 pp.

U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS), *Soil Survey of Hendry County, Florida*, 1990;

U.S. Department of Agricultural, Natural Resources Conservation Service (NRCS), *Soil Survey of Palm Beach County, Florida*, 1978;

U.S. Fish and Wildlife Service, National Wetlands Inventory, Wetlands Online Mapper (June 2006) (http://wetlandsfws.er.usgs.gov/wtlnds/metadata/metadata.htm).

U.S. Fish and Wildlife Service, Endangered and Threatened Wildlife and Plants, 50 CFR 17.11 and 17.12, 2007

Wunderlin, R.P., and B.F. Hansen. 2004. *Atlas of Florida Vascular Plants*. (http://www.plantatlas.usf.edu) [S.M. Landry and K.N. Campbell (application development), Florida Center for Community Design and Research] Institute for Systematic Botany, University of South Florida, Tampa.

APPENDIX A

PROTECTED SPECIES POTENTIALLY OCCURING WITHIN THE PROJECT STUDY AREAS

TABLE A-1
FEDERALLY PROTECTED SPECIES POTENTIALLY OCCURRING WITHIN THE PROJECT STUDY AREAS
ECART, EAA Compartment B and EAA Compartment C

Common Name	Scientific Name	Habitat Preference	USFWS Designation	Observed within the Project Study Areas / Date of Observation		
Mammals				**Compartment B**	**Compartment C**	**ECART**
Florida Panther	*Puma (=Felis) concolor coryi*	High pine, tropical hardwood hammock, scrub, maritime hammock, mesic temperate hammock, pine rockland, scrubby flatwoods, mesic pine flatwoods, hydric pine flatwoods, dry prairie, wet prairie, freshwater marsh, seepage swamp, pond swamp, mangrove	E	No	No	No
Manatee	*Trichechus manatus*	Coastal waters, bays, rivers, and (occasionally) lakes; estuarine waters	E	No	No	No
Birds						
Audubon's Crested Caracara	*Polyborus plancus audubonii*	Mesic temperate hammock, mesic pine flatwoods, hydric pine flatwoods, dry prairie, wet prairie	T	No	6/7/07	No
Everglade Snail Kite	*Rostrhamus sociabilis plumbeus*	Hydric pine flatwoods, freshwater marsh, pond swamp	E	No	No	No
Florida Grasshopper Sparrow	*Ammodramus savannarum floridanus*	Prairies and Pastures	E	No	No	No
Wood Stork	*Mycteria americana*	Hydric pine flatwoods, wet prairie, freshwater prairie, seepage swamp, flowing water swamp, pond swamp, mangrove, saltmarsh, seagrass	E	5/29/07, 5/30/07, 6/4/07	No	6/5/07, 6/6/07
Reptiles						
American Alligator	*Alligator mississippiensis*	Hydric pine flatwoods, wet prairie, freshwater marsh, seepage swamp, pond swamp, mangrove, flowing water swamp	T S/A	5/29/07, 5/30/07, 6/4/07	5/29/07, 5/30/07, 6/4/07	6/4/07, 6/5/07, 6/6/07
Eastern indigo snake	*Drymarchon corais couperi*	Mesic flatwoods, upland pine forest, sandhill scrub	T	No	No	No
Plants						
Okeechobee Gourd	*Cucurbita okeechobeensis ssp. Okeechobeensis*	Freshwater marsh, Pond swamp	E	No	No	No

USFWS = U.S. Fish and Wildlife Service
T = Threatened
E = Endangered
SSC = Species of Special Concern
(S/A) = Listed due to similarity of appearance to a listed species

TABLE A-2
STATE PROTECTED SPECIES POTENTIALLY OCCURRING WITHIN THE PROJECT STUDY AREAS
ECART, EAA Compartment B and EAA Compartment C

Common Name	Scientific Name	Habitat Preference	FFWCC/FDA Designation	Observed within the Project Study Areas / Date of Observation		
Mammals				**Compartment B**	**Compartment C**	**ECART**
Florida Panther	*Puma (=Felis) concolor coryi*	High pine, tropical hardwood hammock, scrub, maritime hammock, mesic temperate hammock, pine rockland, scrubby flatwoods, mesic pine flatwoods, hydric pine flatwoods, dry prairie, wet prairie, freshwater marsh, seepage swamp, pond swamp, mangrove	E	No	No	No
Florida Black Bear	*Ursus americanus floridanus*	Forested communities-forested wetlands and bayheads for cover and dens	T	No	No	No
Manatee	*Trichechus manatus*	Coastal waters, bays, rivers, and (occasionally) lakes; estuarine waters	E	No	No	No
Birds						
Limpkin	*Aramus guarauna*	Mangroves, freshwater marshes, swamps, springs, pond and river margins	SSC	No	No	No
Audubon's Crested Caracara	*Polyborus plancus audubonii*	Mesic temperate hammock, mesic pine flatwoods, hydric pine flatwoods, dry prairie, wet prairie	T	No	6/7/07	Ni
Florida Grasshopper Sparrow	*Ammodramus savannarum floridanus*	Prairies and pastures	E	No	No	No
Burrowing owl	*Athene cunicularia*	Dry prairie, sandhill habitats	SSC	No	No	No

TABLE A-2 (continued)
STATE PROTECTED SPECIES POTENTIALLY OCCURRING WITHIN THE PROJECT STUDY AREAS
ECART, EAA Compartment B and EAA Compartment C

Common Name	Scientific Name	Habitat Preference	FFWCC/FDA Designation	Observed within the Project Study Areas Date of Observation		
				Compartment B	Compartment C	ECART
Bald Eagle	*Haliaeetus leucocephalus*	High pine, scrubby high pine, maritime hammock, mesic temperate hammock, pine rockland, scrubby flatwoods, mesic pine flatwoods, hydric pine flatwoods, dry prairie, wet prairie, freshwater marsh, seepage swamp, flowing water swamp, pond swamp, mangrove, saltmarsh, seagrass	T	No	No	No
Little Blue Heron	*Egretta caerulea*	Coastal marshes, freshwater marshes, wet prairies, mangrove swamps, open water, and sand, mud flats	SSC	5/29/07, 5/30/07, 6/4/07,	6/7/07	6/4/07, 6/6/07
Snowy Egret	*Egretta thula*	Coastal marshes, freshwater marshes, wet prairies, mangrove swamps, open water, and sand, mud flats	SSC	5/29/07, 5/30/07, , 6/4/07,	No	6/4/07,6/5/07, 6/6/07,6/7/07
Tricolored Heron	*Egretta tricolor*	Coastal marshes, freshwater marshes, wet prairies, mangrove swamps, open water, and sand, mud flats	SSC	5/29/07, 6/4/07	No	6/5/07, 6/6/07,6/7/07
White Ibis	*Eudocimus albus*	Coastal marshes, freshwater marshes, wet prairies, mangrove swamps, open water, and sand, mud flats	SSC	5/29/07, 5/30/07, 6/4/07,	No	6/4/07, 6/5/07, 6/6/07, 6/7/07
Everglade Snail Kite	*Rostrhamus sociabilis plumbeus*	Hydric pine flatwoods, freshwater marsh, pond swamp	E	No	No	No

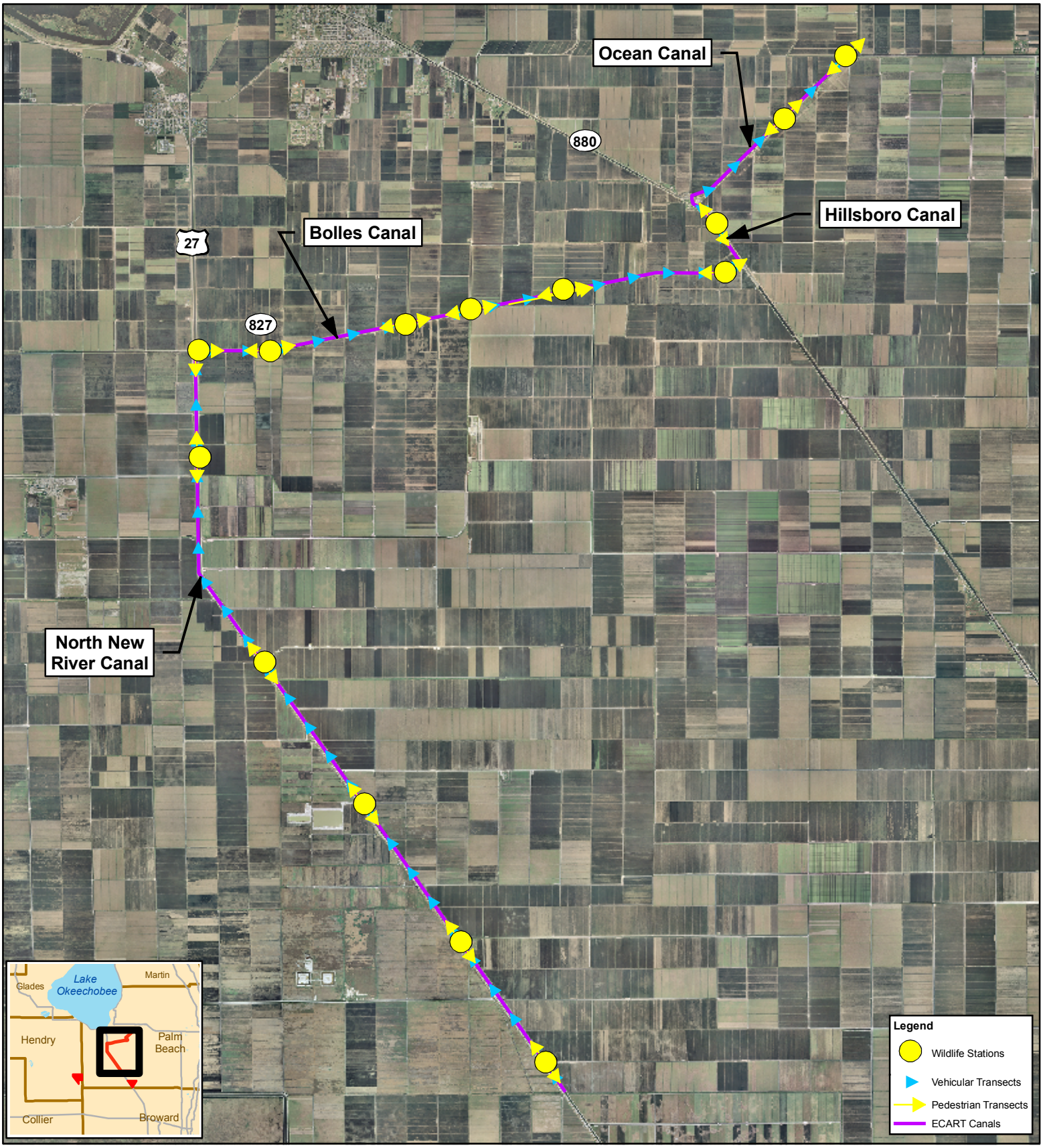
TABLE A-2 (continued)
STATE PROTECTED SPECIES POTENTIALLY OCCURRING WITHIN THE PROJECT STUDY AREAS
ECART, EAA Compartment B and EAA Compartment C

Common Name	Scientific Name	Habitat Preference	FFWCC/FDA Designation	Observed within the Project Study Areas Date of Observation		
				Compartment B	Compartment C	ECART
Wood Stork	*Mycteria Americana*	Hydric pine flatwoods, wet prairie, freshwater prairie, seepage swamp, flowing water swamp, pond swamp, mangrove, saltmarsh, seagrass	E	5/29/07, 5/30/07, 6/4/07	No	6/5/07, 6/6/07
Roseate spoonbill	*Platalea ajaja*	Estuarine habitats, herbaceous wetlands	SSC	6/4/07	No	No
Reptiles						
American Alligator	*Alligator mississippiensis*	Hydric pine flatwoods, wet prairie, freshwater marsh, seepage swamp, pond swamp, mangrove, flowing water swamp	SSC	5/29/07, 5/30/07, 6/4/07	5/29/07, 5/30/07, 6/4/07	6/4/07, 6/5/07, 6/6/07
Eastern indigo snake	*Drymarchon corais couperi*	Mesic flatwoods, upland pine forest, sandhill scrub	T	No	No	No
Gopher tortoise	*Gopherus polyphemus*	Sandhill, scrubby, flatwoods, xeric hammock	SSC	No	No	No
Plants						
Okeechobee Gourd	*Cucurbita okeechobeensis ssp. Okeechobeensis*	Freshwater marsh, Pond swamp	E	No	No	No
Celestial Lilly	*Nemastylis floridana*	Wet flatwoods, prairies, marshes	E	No	No	No
Curtiss Narrowleaf Hoarypea	*Tephrosia angustissima var. curtissii*	Sandy areas, scrub	E	No	No	No

Notes: FFWCC = Florida Fish and Wildlife Conservation Commission E = Endangered SSC = Species of Special Concern
(S/A) = Listed due to similarity of appearance to a listed species T = Threatened FDA = Florida Dept. of Agriculture

APPENDIX B

WILDLIFE SURVEY STATIONS



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0 1 2 4 Miles

N W E S

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Tel # (561) 242-5520
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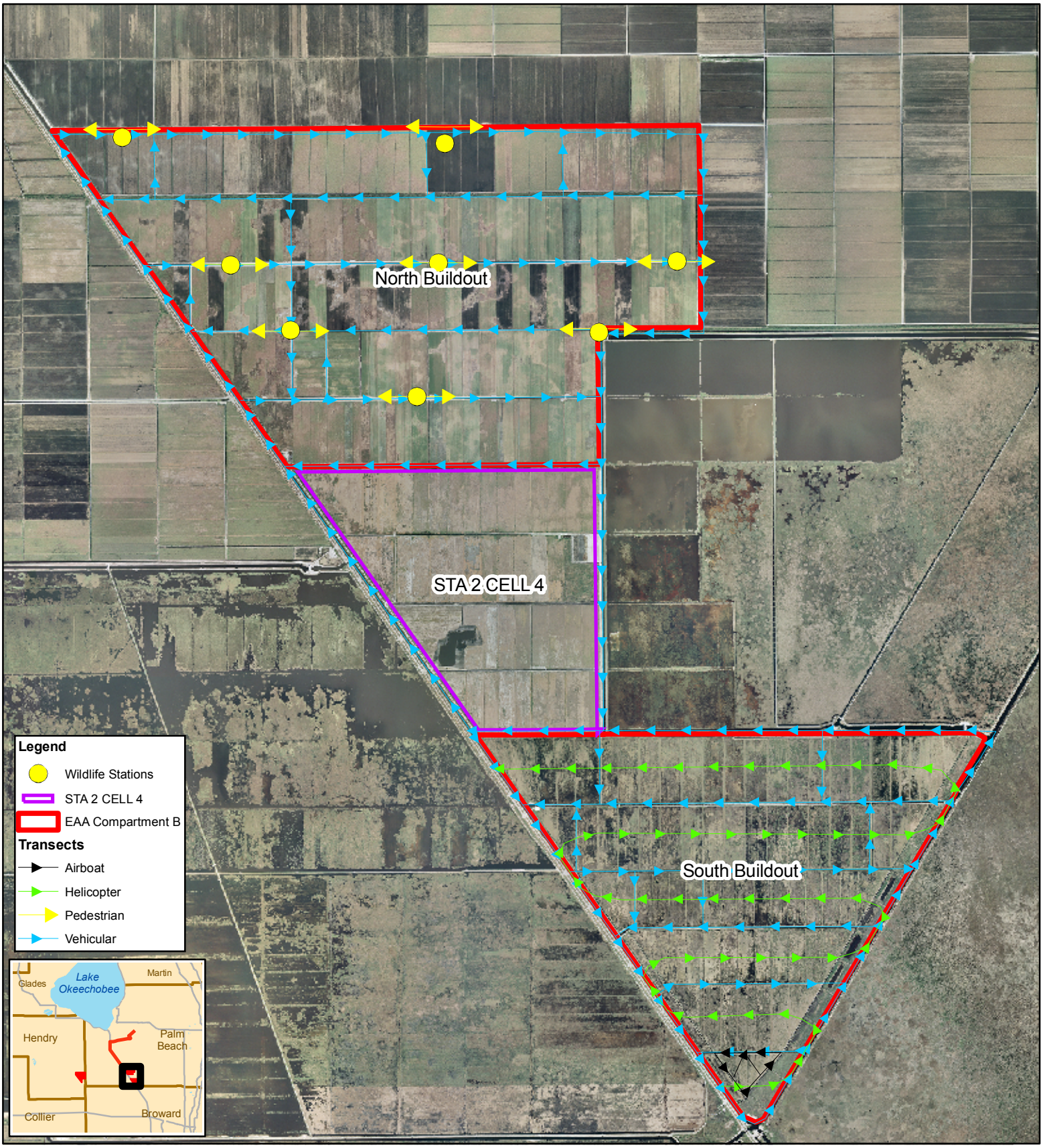
FIGURE # B-1
Wildlife Survey Locations
ECART
Contract # CN040936

UPDATED
8/9/07

ECART/map_docs/Stations_canal.mxd



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0 1,500 3,000 6,000 Feet

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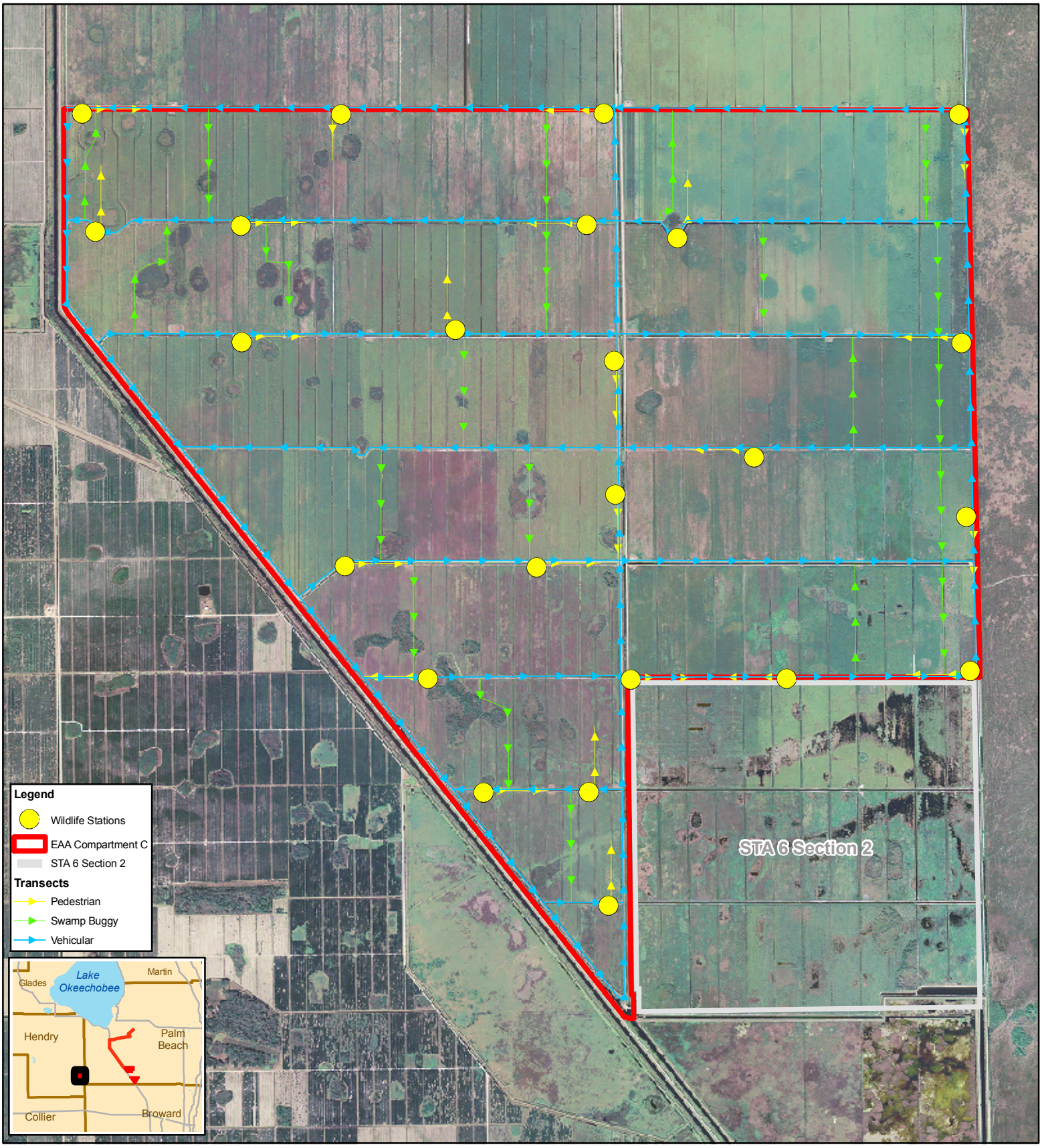
FIGURE # B-2
Wildlife Survey Locations
Compartment B
Contract # CN040936

UPDATED
8/4/07

ECART/map_docs/Stations_B.mxd



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0 1,500 3,000 6,000 Feet

N W E S

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FIGURE # B-3

Wildlife Survey Locations
Compartment C

Contract # CN040936

UPDATED
8/13/2007

ECART/map_docs/Stations_C.mxd

APPENDIX C

LAND USE

FLORIDA LAND USE, COVER AND FORMS CLASSIFICATION SYSTEM (FLUCFCS) MAP LEGEND

215 - Field Crops
221 - Citrus Groves
242 - Sod Farms
260 - Other Open Lands (Rural)
261 - Fallow Cropland

329 - Other Shrubs and Brush

422 - Brazilian Pepper

510 - Streams and Waterways
531 - Reservoirs Larger Than 500 Acres
534 - Reservoirs Less Than 10 Acres

631 - Wetland Scrub
641 - Freshwater Marsh

747 - Dikes and Levees

811 - Airport
814 - Roads and Highways
821 - Transmission Towers
832 - Electrical Power Transmission Lines
833 - Water Supply Plants

Source: Florida Department of Transportation (FDOT), Florida Land Use, Cover and Forms Classification System, 3rd edition, 1999

North New River Canal

North New River Canal

Land Use from Compartment B

Legend

- EAA Compartment B
- Land Use
- Upland
- Atypical Wetland
- Typical Wetland
- Surface Water

FLUCCS CODES
215 SUGAR CANE FIELDS
242 SOD FARM FIELDS
260 OPEN LAND
261 FALLOW CROP LAND
510 STREAMS AND CANALS
641 FRESHWATER MARSHES
747 DIKES AND LEVEES
814 ROADS AND HIGHWAYS
833 PUMP STATION

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FIGURE # C-1

1 of 5

Land Use ECART

Contract # CN040936

0 500 1,000 2,000 Feet

UPDATED
8/13/2007

ECART/map_docs/LU_canal_d_size.mxd

North New River Canal

North New River Canal

27

27

FLUCCS CODES
215 SUGAR CANE FIELDS
242 SOD FARM FIELDS
260 OPEN LAND
261 FALLOW CROP LAND
510 STREAMS AND CANALS
641 FRESHWATER MARSHES
747 DIKES AND LEVEES
814 ROADS AND HIGHWAYS
833 PUMP STATION

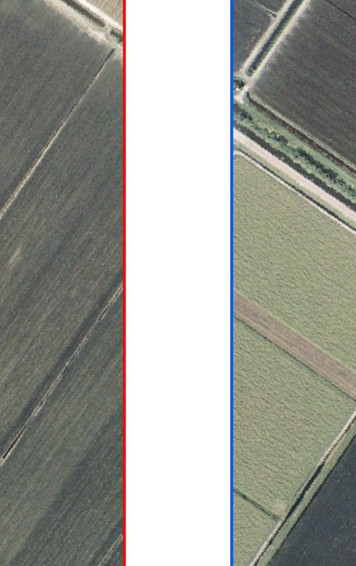

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FIGURE # C-1

2 of 5

Land Use ECART

Contract # CN040936

Legend

- Land Use
- Upland
- Atypical Wetland
- Typical Wetland
- Surface Water

0 500 1,000 2,000 Feet

UPDATED
8/13/2007

ECART/map_docs/LU_canal_d_size.mxd

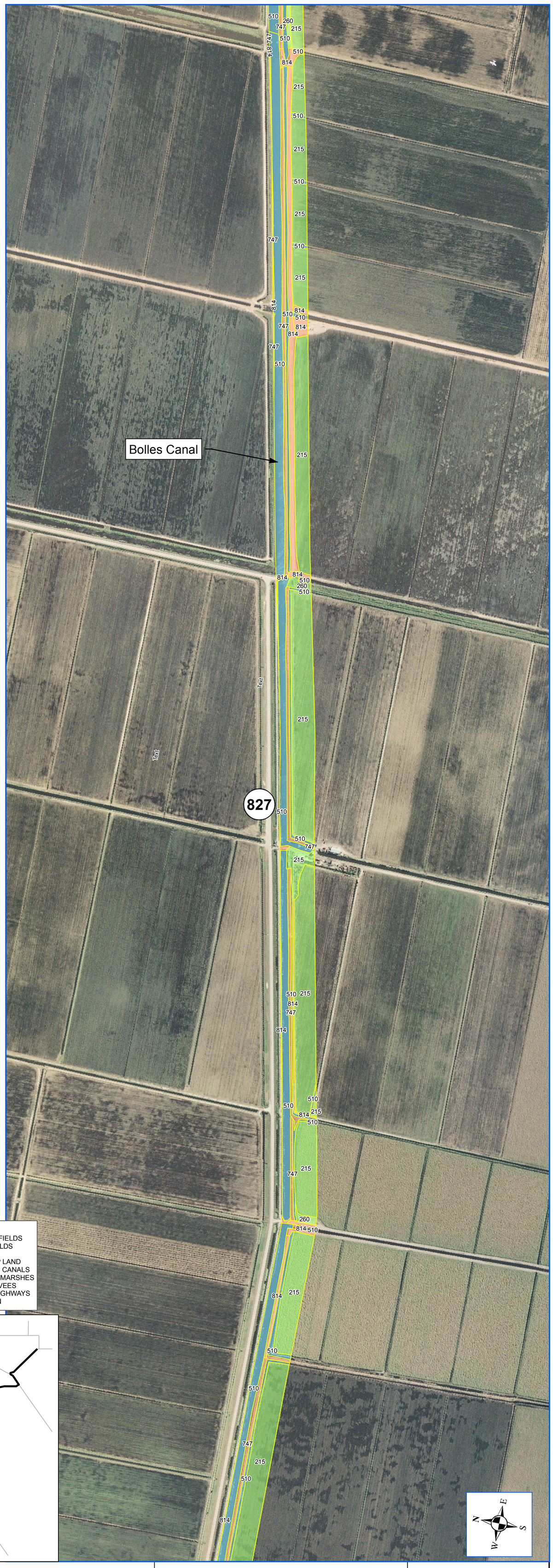

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FIGURE # C-1

3 of 5

Land Use ECART

Contract # CN040936

Legend

- Land Use
- Upland
- Atypical Wetland
- Typical Wetland
- Surface Water

0 500 1,000 2,000 Feet

UPDATED
8/13/2007

ECART/map_docs/LU_canal_d_size.mxd

Bolles Canal

Hillsboro Canal

FLUCCS CODES
215 SUGAR CANE FIELDS
242 SOD FARM FIELDS
260 OPEN LAND
261 FALLOW CROP LAND
510 STREAMS AND CANALS
641 FRESHWATER MARSHES
747 DIKES AND LEVEES
814 ROADS AND HIGHWAYS
833 PUMP STATION

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FIGURE # C-1

4 of 5

Land Use ECART

Contract # CN040936

Legend

- Land Use
- Upland
- Atypical Wetland
- Typical Wetland
- Surface Water

0 500 1,000 2,000 Feet

UPDATED
8/13/2007

ECART/map_docs/LU_canal_d_size.mxd

Ocean Canal

880

Hillsboro Canal

880

Ocean Canal

FLUCCS CODES
215 SUGAR CANE FIELDS
242 SOD FARM FIELDS
260 OPEN LAND
261 FALLOW CROP LAND
510 STREAMS AND CANALS
641 FRESHWATER MARSHES
747 DIKES AND LEVEES
814 ROADS AND HIGHWAYS
833 PUMP STATION

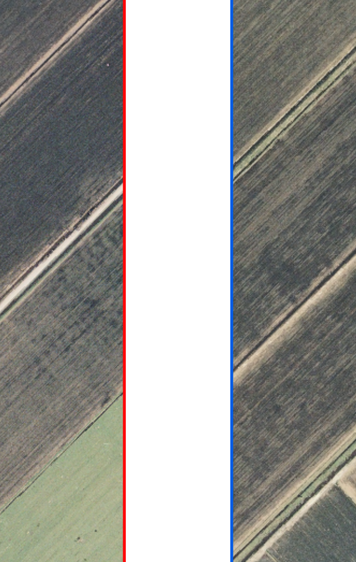

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FIGURE # C-1

5 of 5

Land Use ECART

Contract # CN040936

Legend

- Land Use
- Upland
- Atypical Wetland
- Typical Wetland
- Surface Water

0 500 1,000 2,000 Feet

UPDATED
8/13/2007

ECART/map_docs/LU_canal_d_size.mxd

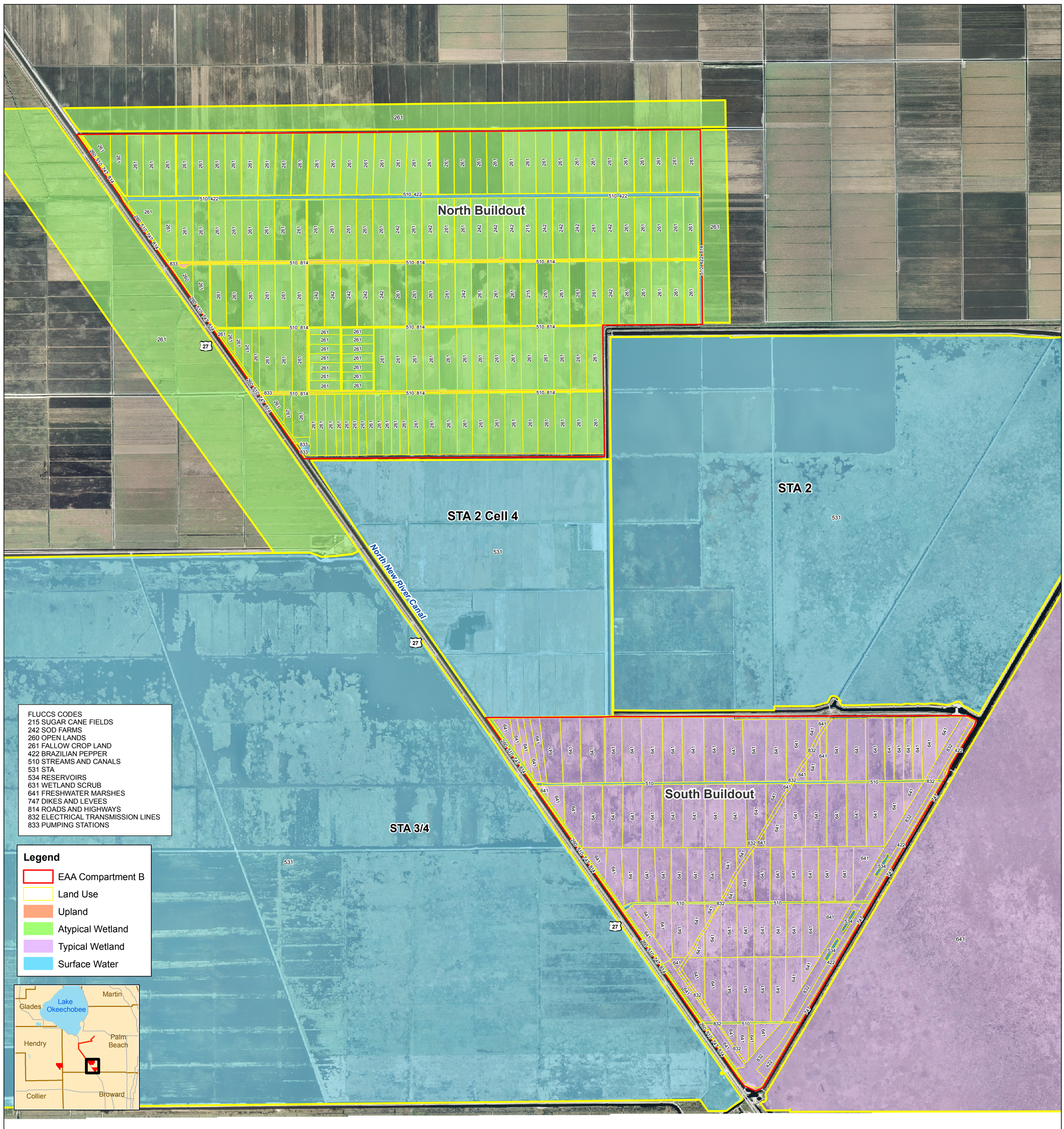

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FIGURE # C-2

Land Use For Compartment B

Contract # CN040936

N
W E
S

0 2,000 4,000 Feet

UPDATED
8/13/2007

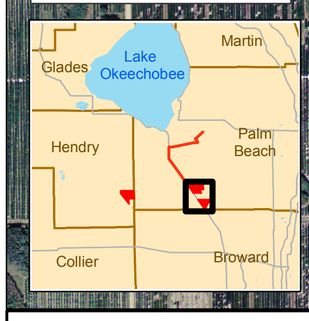
ECART/map_docs/LU_B_D_Size.mxd

STA-5

STA 6 Section 2

L-3 Canal

FLUCCS CODES
221 CITRUS GROVES
261 FALLOW CROP LAND
329 OTHER SHRUBS AND BRUSH
510 STREAMS AND CANALS
531 STA
534 RESERVOIRS
631 WETLAND SCRUB
641 FRESHWATER MARSHES
747 DIKES AND LEVEES
811 GRASS AIRPORTS
814 ROADS AND HIGHWAYS



Legend
- EAA Compartment C
- Land Use
- Upland
- Atypical Wetland
- Typical Wetland
- Surface Water

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FIGURE # C-3

Land Use For Compartment C

Contract # CN040936

N W E S

0 1,000 2,000 4,000 Feet

UPDATED
8/13/2007

ECART/map_docs/LU_C_D_size.mxd

APPENDIX D

WOOD STORK CORE FORAGING AREAS

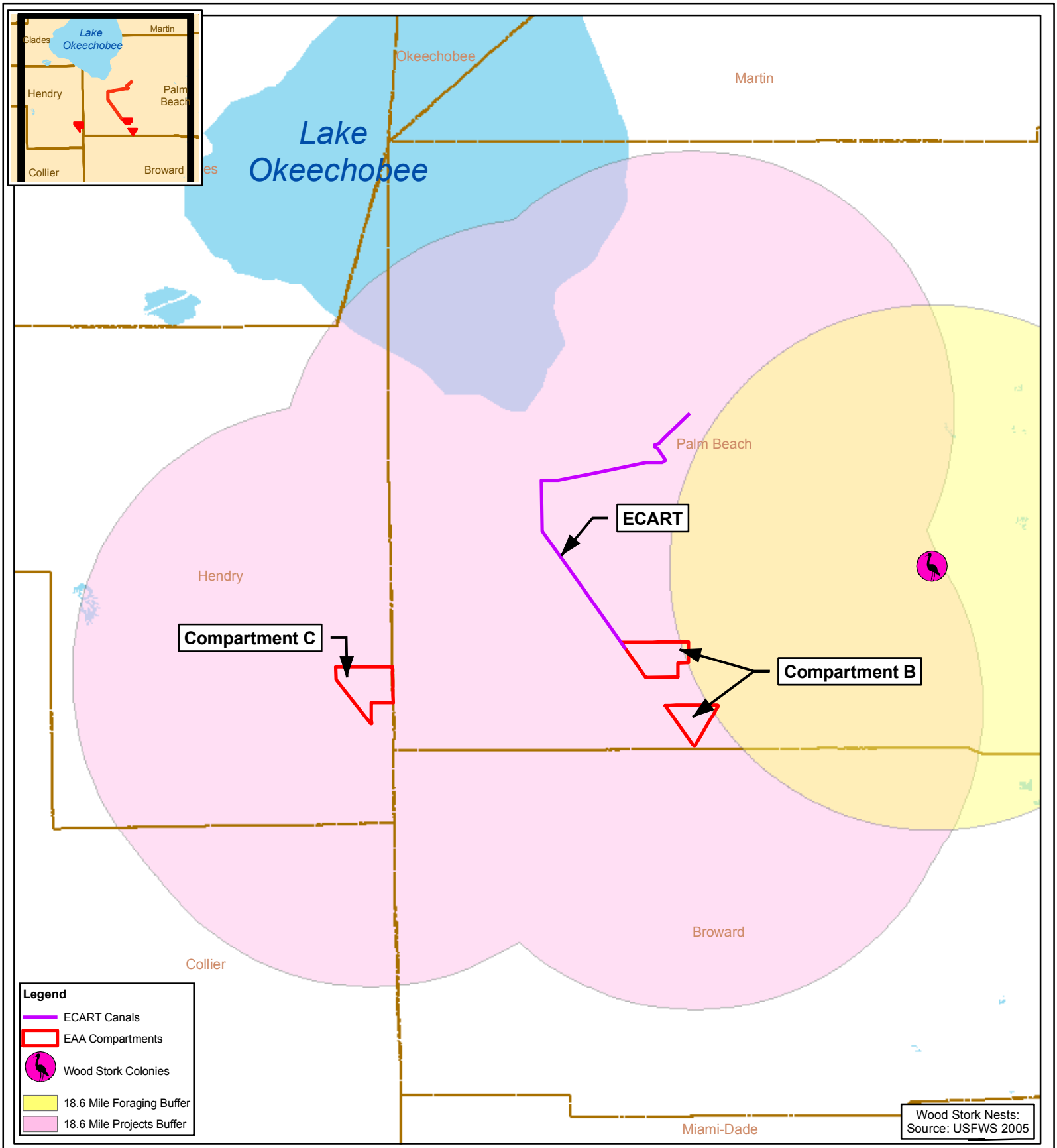

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FIGURE # D

Wood Stork Core Foraging Areas

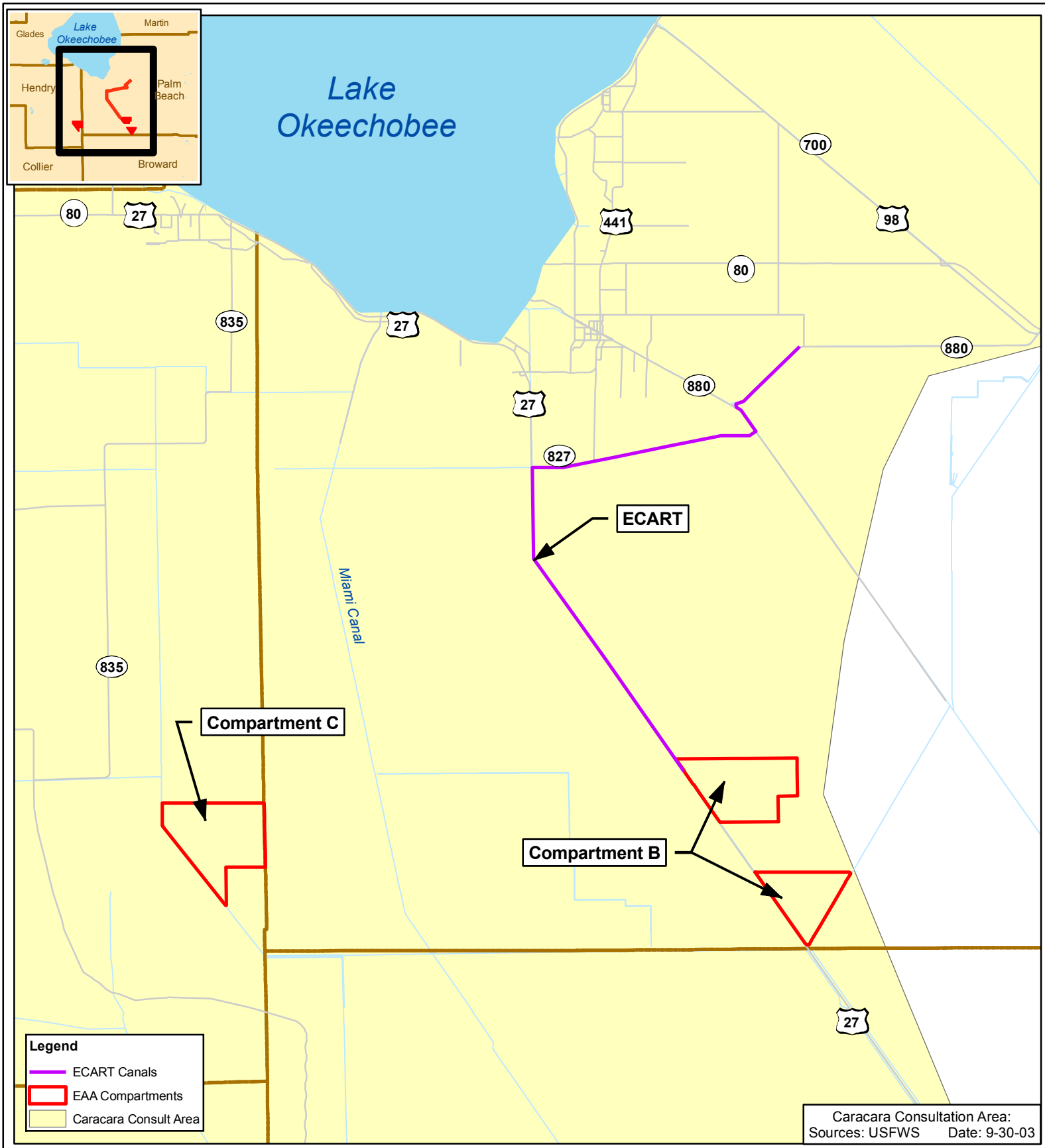
Contract # CN040936

UPDATED
8/13/07

ECART/map_docs/woodstork.mxd

APPENDIX E

PROTECTED SPECIES CONSULTATION AREAS AND CRITICAL HABITATS



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0 2 4 8 Miles

N W E S

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FIGURE # E-1

Crested Caracara Consultation Area

Contract # CN040936

UPDATED
8/9/07

ECART/map_docs/Caracara.mxd

APPENDIX E-1a

Crested Caracara Monitoring
Field Data Form

Date: 6-7-07 Start Time 7:30 Stop Time 11:30 Monitor Murray / Railey

Site Name and Location: **Include latitude and longitude**, section, township, and range, and county.

Compartment C; 80°56'37.786"W/26°24'37.681"N, S9-T47S-R34E

Weather Data

Time	Temp	Wind Speed/Direction	% Cloud Cover	Cloud Type	Rain
Start	74°F	Unknown	60%	stratocumulus	No
Finish	79°F	Unknown	70%	stratocumulus	No

Flight Data

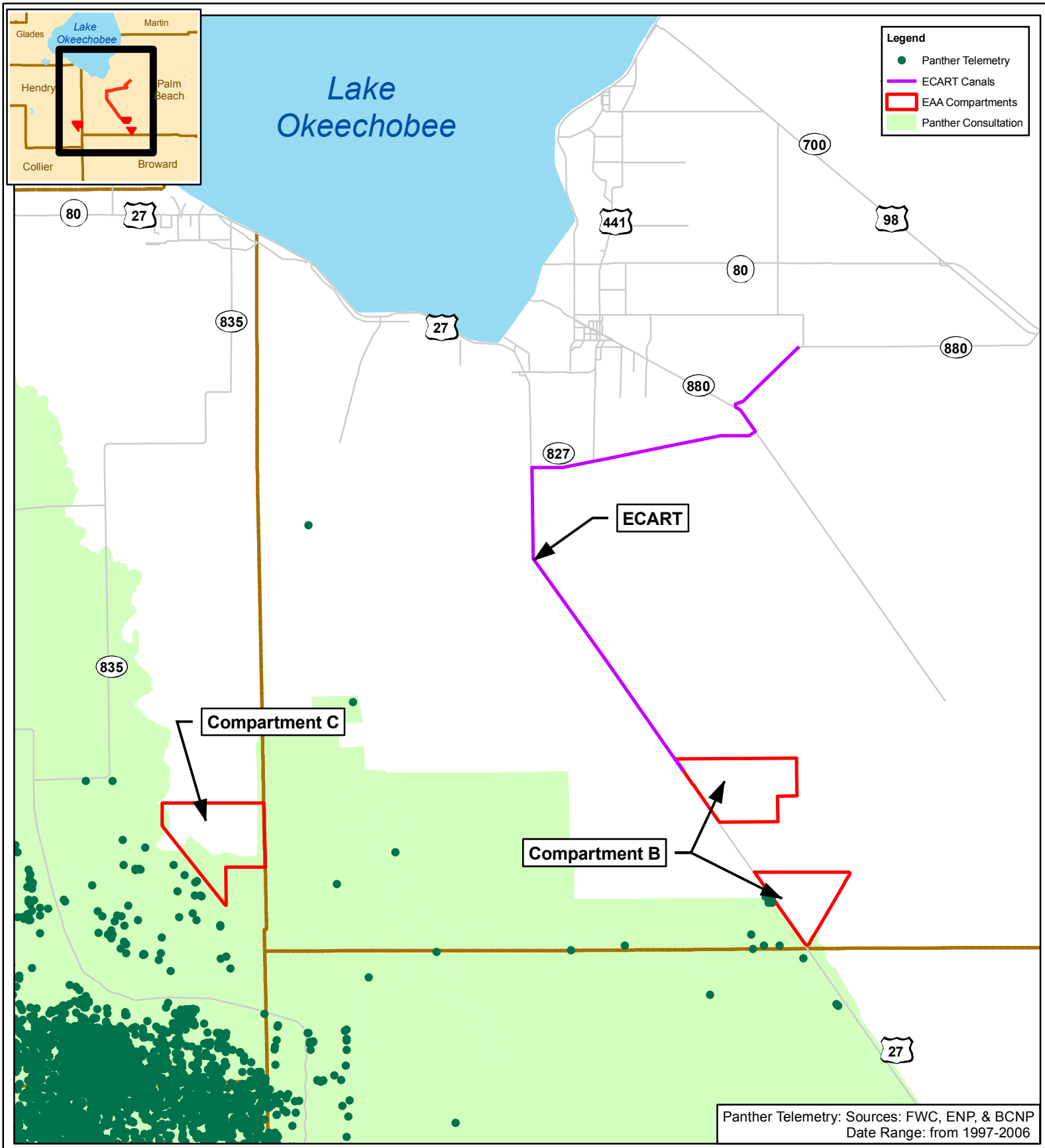
#	Age A/Im	Time	Description
1	A	2 min	Flew over head from fallow canefield in NE portion of site and landed in tree located in fallow canefield near center of site

Nesting Data: Observed Activity N/A - not nesting
(perching, preening, courtship, feeding, nest building, incubation, head color change, head throwback, diving)

#	Age A/Im	Time	Description

General Observations - Did not appear to be affected by other entities.
(crested caracara reaction to passing planes, trains, trucks, pedestrians, other birds, etc.)

#	Age A/Im	Time	Description



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0 2 4 8 Miles

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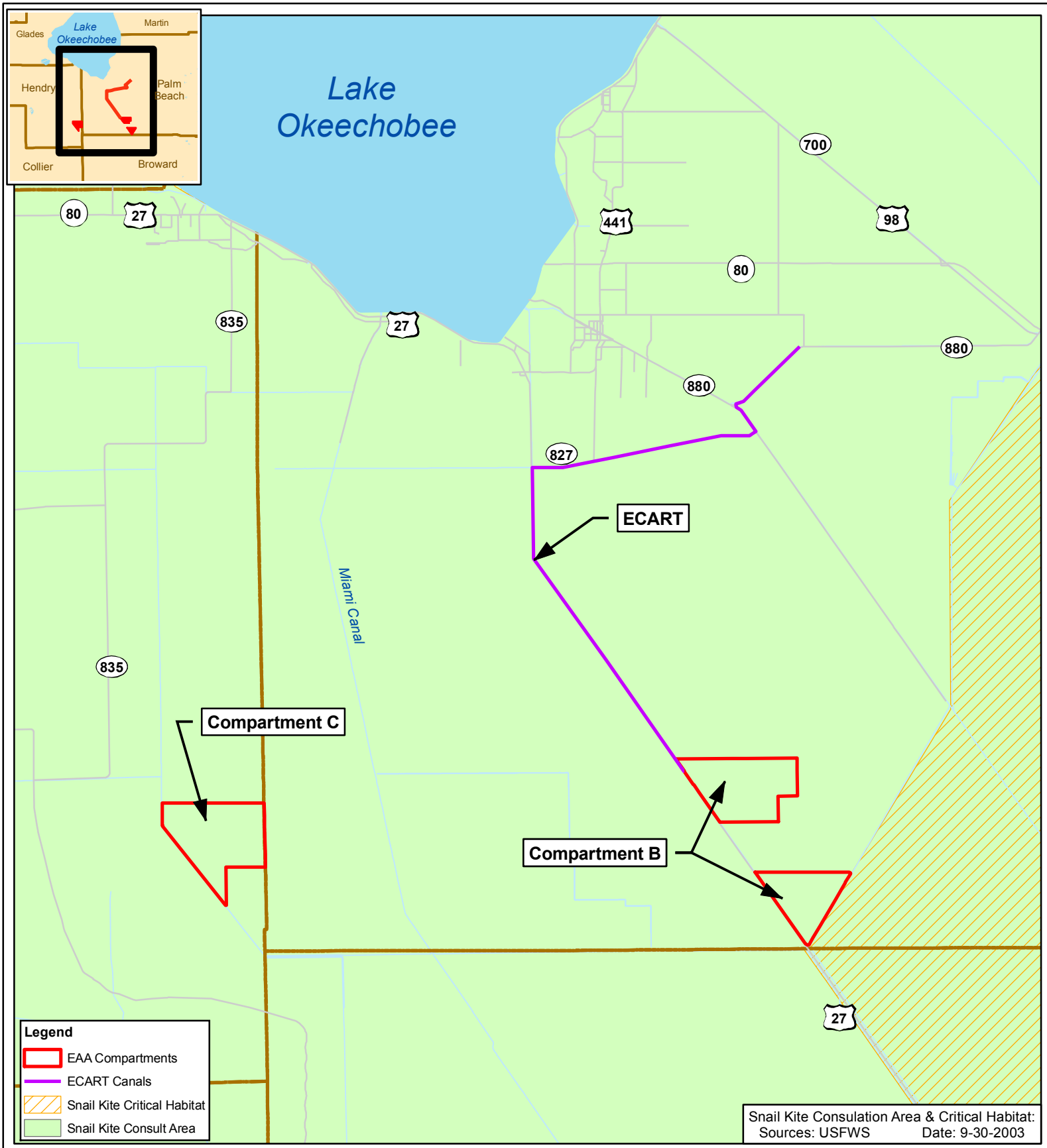
FIGURE # E-2

Florida Panther Boundary & Telemetry

Contract # CN040936

UPDATED 8/9/07

ECART/map_docs/Panther.mxd



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0 2 4 8 Miles

N W E S

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Tel # (561) 242-5520

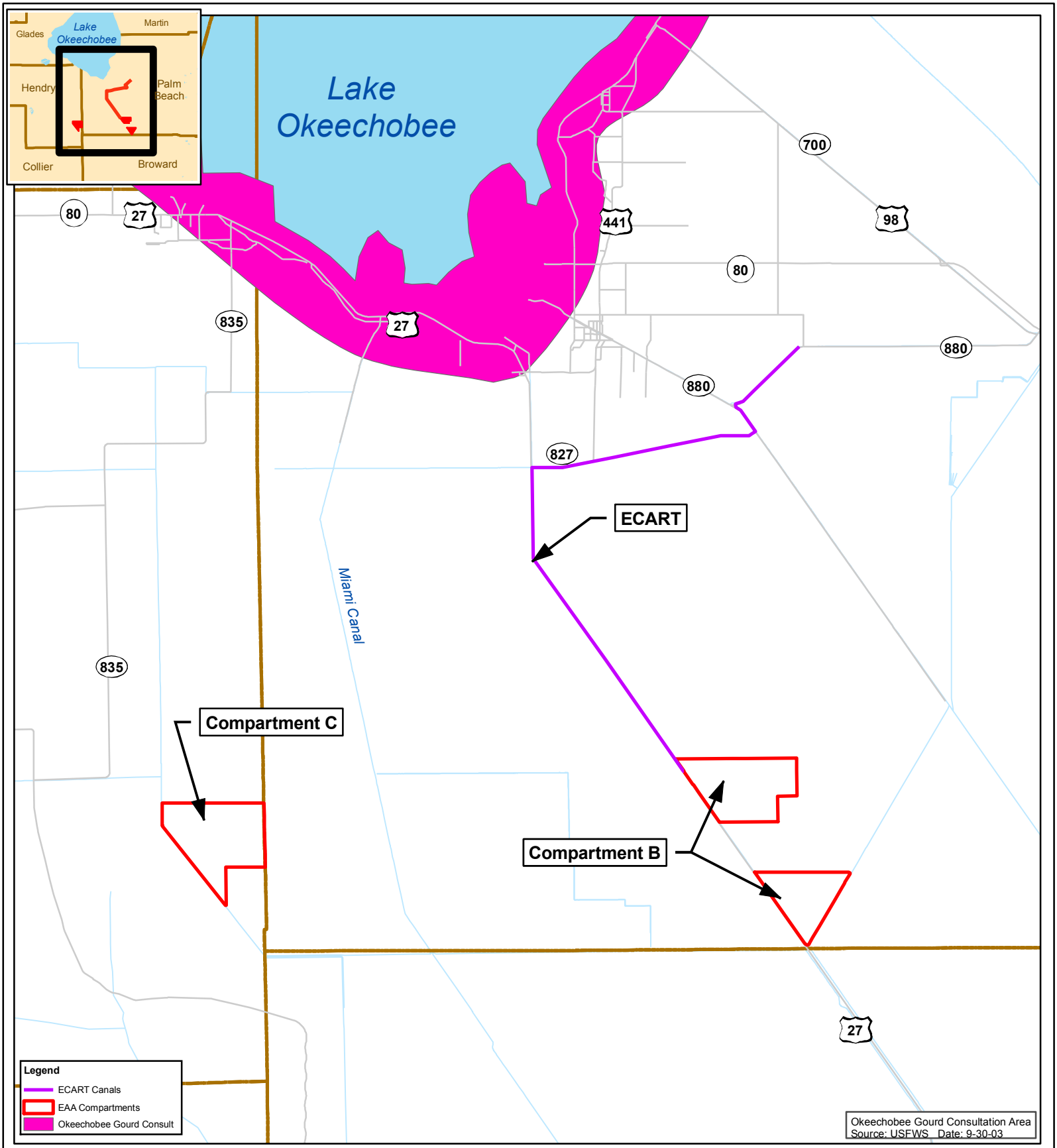
FIGURE # E-3

Everglades Snail Kite
Designated Critical Habitat
& Consultation Area

Contract # CN040936

UPDATED
8/13/07

ECART/map_docs/snail_kite.mxd



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0 2 4 8 Miles

N W E S

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Tel # (561) 242-5520

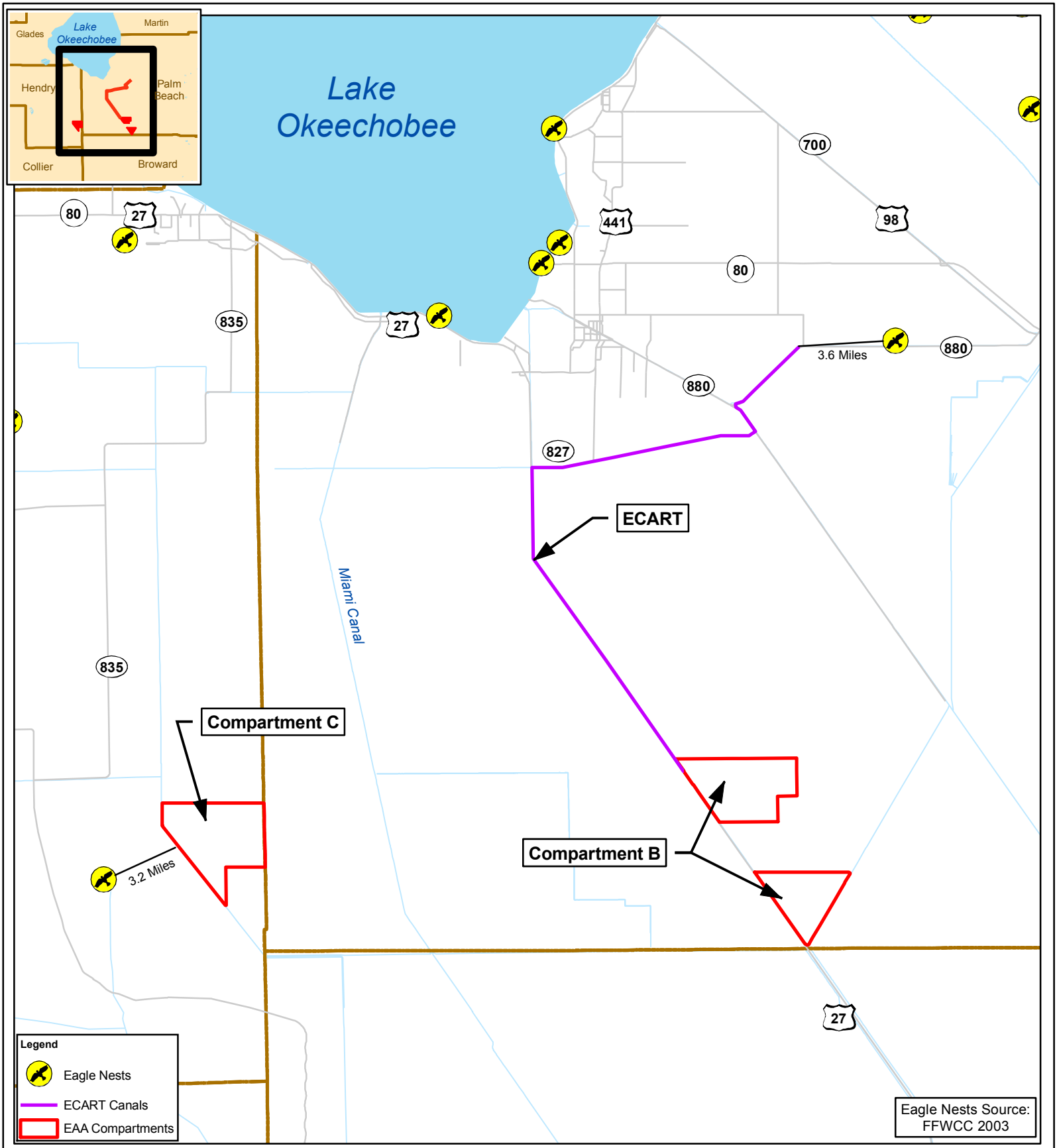
FIGURE # E-4

Okeechobee Gourd Consultation Area

Contract # CN040936

UPDATED 8/13/07

ECART/map_docs/Gourd.mxd



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0 2 4 8 Miles

N W E S

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

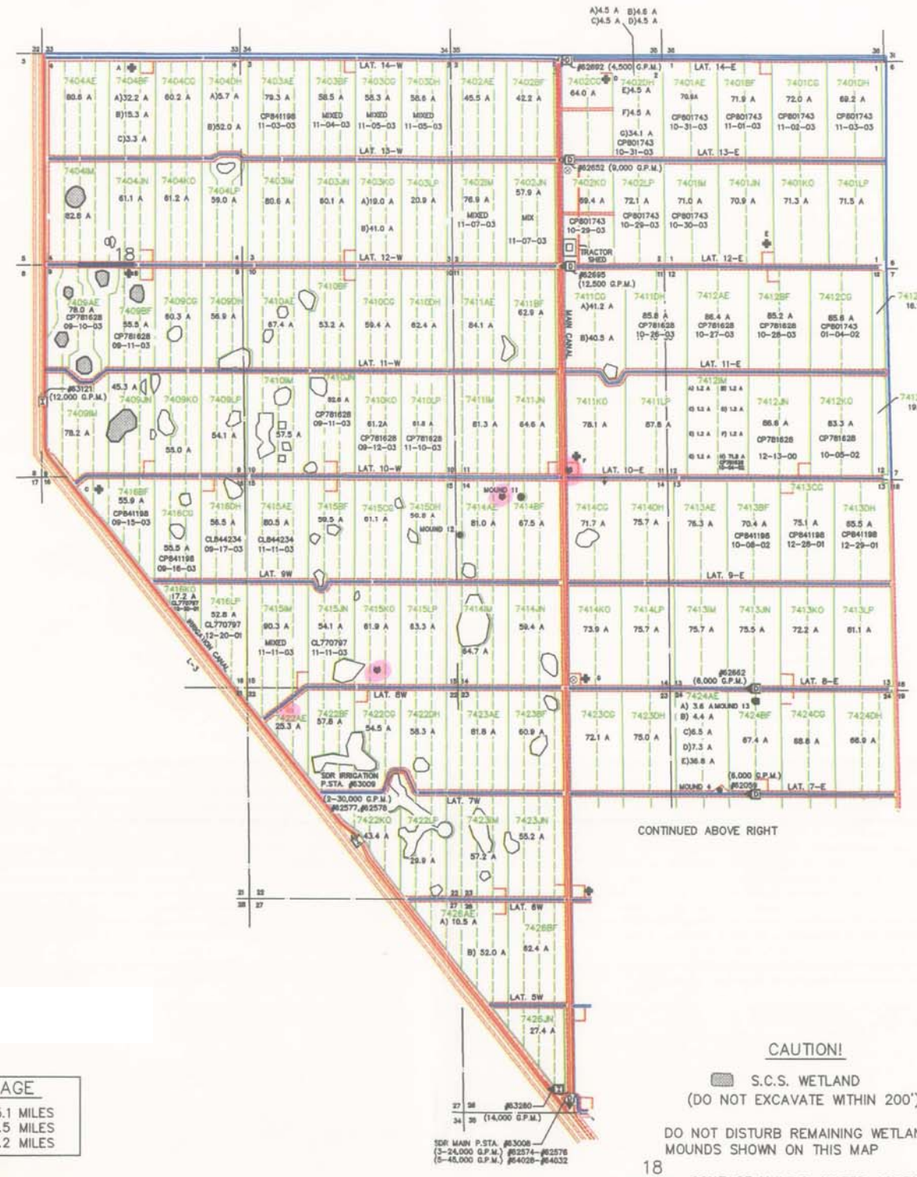
FIGURE # E-5

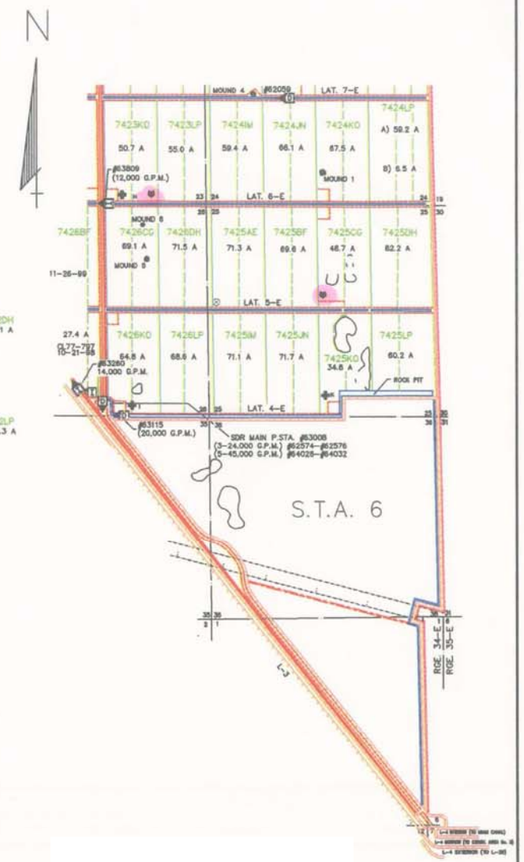
Bald Eagle Nests

Contract # CN040936

UPDATED 8/13/07

ECART/map_docs/eagle.mxd





BURROWING OWL NEST LOCATION

DISCLAIMER:
Any information, including but not limited to software and data, received from the South Florida Water Management District ("District") in fulfillment of a request is provided "AS IS" without warranty of any kind, and the District expressly disclaims all express and implied warranties, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. The District does not warrant, guarantee, or make any representations regarding the use, or the results of the use,of the information provided to you by the District in terms of correctness, accuracy, reliability, timeliness or otherwise. The entire risk as to the results and performance of any information obtained from the District is entirely assumed by the recipient. This map is a conceptual tool utilized for project development only. This map is not self-executing or binding, and does not otherwise affect the interests of any persons including any vested rights or existing uses of real property.This is not a survey.

TOTAL THIS PAGE
CANALS = 15.1 MILES
LATERALS = 47.5 MILES
FIELD DITCHES = 174.2 MILES

CAUTION!
S.C.S. WETLAND
(DO NOT EXCAVATE WITHIN 200')
DO NOT DISTURB REMAINING WETLANDS & MOUNDS SHOWN ON THIS MAP
18 CONTACT U.S.S.C. WATER COMPL. DEPT. BEFORE CLEANING THESE AREAS

UNITED STATES SUGAR CORPORATION
MOTT FARM
(SOUTHERN DIVISION – UNIT 2)
CULTIVATION MAP
2004 SCALE 1"=3,000'

12

South Florida Water Management District
2301 Center Park West Drive, Suite # 150
West Palm Beach, FL 33409
Tel # (561) 242-5520

FIGURE # E-6

Compartment C Burrowing Owl Nest Locations
Contract # CN040936

UPDATED
8/15/07

ECART/map_docs/Owlnests.mxd

APPENDIX F

REPRESENTATIVE PHOTOS OF UPLAND AND WETLAND COMMUNITIES

ECART Canal

Bolles Canal - ECART Canal
FLUCFCS – 510-Streams and Waterways/USFWS – R20WHx - Riverine, Lower Perennial, Open Water, Unknown Bottom, Permanently Flooded, Excavated

North New River Canal - ECART Canal-Wading Bird Rookery
FLUCFCS – 510-Streams and Waterways/USFWS – R20WHX - Riverine, Lower Perennial, Open Water, Unknown Bottom, Permanently Flooded, Excavated

Hillsboro Canal-ECART canal
FLUCFCS – 510- Streams and Waterways/USFWS – R2OWHx - Riverine, Lower Perennial, Open Water, Permanently Flooded, Excavated

Wetland -ECART canal
FLUCFCS – 641-Freswhwater Marsh/USFWS – PEM1C - Palustrine, Emergent, Persistent, Seasonally Flooded

Compartment B

Compartment B North Buildout
FLUCFCS – 215-Sugar Cane

Compartment B North Buildout
FLUCFCS – 242-Sod Farms

Compartment B North Buildout
FLUCFCS – 261-Fallow Cropland

Compartment B South Buildout
FLUCFCS – 422-Brazilian Pepper

Wetland -Compartment B South Buildout
FLUCFCS – 531 Reservoir less than 10 acres/USFWS – POWHx - Palustrine, Open Water/Unknown Bottom, Permanently Flooded, Excavated

Wetland-Compartment B South Buildout
FLUCFCS – 641-Freshwater Marsh/USFWS – PEMIF - Palustrine, Emergent, Persistent, Semi-permanently flooded

Compartment C

Compartment C-Near Center of Parcel
FLUCFCS – 261-Fallow Sugar Cane

Compartment C
FLUCFCS – 329-Upland Shrub/Brushland

Wetland - Compartment C
FLUCFCS – 631-Wetland Scrub/USFWS – PSS1C-Palustrine, Scrub/Shrub, Broad-Leaved Deciduous, Seasonally Flooded

Wetland-Compartment C
FLUCFCS – 631-Wetland Scrub/USFWS – PSS1C - Palustrine, Scrub/Shrub, Broad-Leaved Deciduous, Seasonally Flooded

Wetland -Compartment C
FLUCFCS – 641-Freshwater Marsh/USFWS – PEM1C - Palustrine, Emergent, Persistent, Seasonally Flooded

Wetland-Compartment C
FLUCFCS – 641-Freshwater Marsh/USFWS – PEM1C - Palustrine, Emergent, Persistent, Seasonally Flooded

Wetland-Compartment C
FLUCFCS – 641-Freshwater Marsh/USFWS – PEM1C - Palustrine, Emergent, Persistent, Seasonally Flooded

Wetland-Compartment C
FLUCFCS – 631/641-Wetland Scrub/Freshwater Marsh/USFWS – PSS1C/PEM1C - Palustrine, Emergent, Persistent, Seasonally Flooded/Palustrine Scrub-Shrub Broad-leaved Deciduous, Seasonally Flooded

Wetland-Compartment C
FLUCFCS – 641-Freshwater Marsh/USFWS-PEM1C – Palustrine, Emergent, Persistent, Seasonally Flooded

Canal in Center of Property-Compartment C
FLUCFCS – 510-Streams and Waterways/USFWS – R2OWHx - Riverine, Lower Perennial, Open Water, Permanently Flooded, Excavated

APPENDIX G

NON-LISTED SPECIES OBSERVED WITHIN THE PROJECT AREAS

TABLE G-1
ADDITIONAL WILDLIFE OBSERVATIONS

Common Name	Scientific Name	Observation Location
Birds		
Mallard duck	*Anas platyrhynchos*	Compartment B
Red winged blackbird	*Agelaius phoeniceus*	Compartments B, C and ECART
Anhinga	*Anhinga anhinga*	Compartment B and ECART
Great Egret	*Ardea alba*	Compartments B, C and ECART
Great Blue Heron	*Ardea herodias*	Compartment B
Cattle egret	*Bubulcus ibis*	Compartments B and C
Red-tailed hawk	*Buteo jamaicensis*	Compartment C
Red-shouldered hawk	*Buteo lineatus*	Compartments B, C and ECART
Green heron	*Butorides virescens*	Compartments B, C and ECART
Northern cardinal	*Cardinalis cardinalis*	Compartments B and C
Turkey vulture	*Cathartes aura*	Compartments B, C and ECART
Killdeer	*Charadrius vociferus*	Compartments B, C, and ECART
Common night hawk	*Chordeiles minor*	Compartment C
Common ground dove	*Columbina passerina*	Compartment C and ECART
Black vulture	*Coragyps atratus*	Compartments B, C and ECART
Quail	*Coturnix* spp.	Compartment C
Black-bellied whistling duck	*Dendrocygna autumnalis*	ECART
Swallow-tailed kite	*Elanoides forficatus*	Compartment C
American Coot	*Fulica americana*	Compartment B
Moorhen	*Gallinula Chloropus*	Compartments B, C, and ECART
Black-necked stilt	*Himantopus mexicanus*	Compartment B
Least bittern	*Ixobrychus exilis*	ECART
Loggerhead shrike	*Lanius ludovicianus*	Compartment C
Yellow-crowned night heron	*Nyctanassa vioacea*	Compartment B
Osprey	*Pandion haliaetus*	Compartment B
Double-crested cormorant	*Phalacrocorax auritus*	Compartments B, C and ECART
Glossy ibis	*Plegadis falcinellus*	Compartment B
Purple gallinule	*Porphyrio martinica*	Compartment C
Boat-tailed grackle	*Quiscalus major*	Compartments B, C and ECART

TABLE G-1 (cont.)
ADDITIONAL WILDLIFE OBSERVATIONS

Common Name	Scientific Name	Observation Location
King Rail	*Rallus elegans*	ECART
Collared dove	*Streptopelia decaocto*	Compartment C
Mourning dove	*Zenaida macroura*	Compartment B
Mammals		
Bobcat	*Lynx rufus*	Compartment C
White-tailed deer	*Odocoileus virginianus*	Compartments B and C
Common raccoon	*Procyon lotor*	Compartments B and C
Brown rat	*Rattus norvegicus*	Compartment C
Feral hogs	*Sus scrofa*	Compartment C
Marsh Rabbit	*Sylvilagus palustris*	Compartment C, ECART
Eastern Cottontail	*Sylvilagus floridanus*	Compartment C, ECART
Reptiles		
Black racer	*Coluber constrictor*	Compartment C
Soft shell turtle	*Trionyx ferox*	Compartment B
Snapping turtle	*Chelydra serpentina*	Compartment C

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

URS

7800 Congress Avenue, Suite 200
Boca Raton, FL 33487

South Florida Water Management District
3301 Gun Club Road • West Palm Beach, Florida 33406
561-686-8800 • FL WATS 1-800-432-2045 • www.sfwmd.gov
MAILING ADDRESS: P.O. Box 24680 • West Palm Beach, FL 33416-4680

sfwmd.gov

APPENDIX D

CULTURAL RESOURCES SURVEY

U.S. Army Corps of Engineers and Southwest Florida Water Management District are consulting and coordinating with Native American tribes on cultural resources.

APPENDIX E

NOTICE OF INTENT

Place of Meeting: Ronald Reagan Building and International Trade Center, 1300 Pennsylvania Avenue, NW., Washington, DC 20004.

Purpose of Meeting: Review and evaluate the Commission's report and the findings and recommendations related to the Commission's mission to examine the care provided to wounded service members.

Subject to seating availability this meeting is open to the public.

The Commission will discuss its report and recommendations; consequently there will be no oral public forum. Any person desiring to make a written submission must provide the point of contact listed below with one copy of the written submission by 18 July 2007 5 p.m. Point of Contact is Major Teresa Barnes or Leslie Smith. Telephone number is toll free (877) 588–2035 or Fax (703) 588–2046.

FOR FURTHER INFORMATION ON SUBMITTING STATEMENTS CONTACT: Major Teresa Barnes or Leslie Smith, toll free (877) 588–2035 or fax (703) 588–2046.

SUPPLEMENTARY INFORMATION:

Meeting agenda:

11 a.m. to 11:15 a.m. (Not Open to the Public) Administrative Work Meeting.

11:15 a.m. To Be Determined (Public Session) Review and Evaluation of Commissions Findings and Recommendations.

Dated: July 5, 2007.

L.M. Bynum,

Alternate OSD Federal Register Liaison Officer, DoD.

[FR Doc. 07–3389 Filed 7–9–07; 11:15 am]

BILLING CODE 5001–06–M

DEPARTMENT OF DEFENSE

Office of the Secretary

Meeting of the President's Commission on Care for America's Returning Wounded Warriors

AGENCY: Department of Defense.

ACTION: Federal Advisory Committee Meeting Notice.

SUMMARY: Pursuant to the Federal Advisory Committee Act of 1972 (5 U.S.C., Appendix, as amended), the Sunshine in the Government Act of 1976 (5 U.S.C. 552b, as amended) and 41 Code of Federal Regulations (CFR) 102–3.140 through 160, the Department of Defense announces the cancellation of the public meeting referenced below:

Name of Commission: President's Commission on Care for America's Returning Wounded Warriors (hereafter referred to as the Commission).

Date of Meeting: July 16, 2007.

Time of Meeting: 10 a.m. to (To Be Determined).

Place of Meeting: Ronald Reagan Building and International Trade Center, 1300 Pennsylvania Avenue, NW., Washington, DC 20004.

Dated: July 5, 2007.

L.M. Bynum,

Alternate OSD Federal Register Liaison Officer, DoD.

[FR Doc. 07–3390 Filed 7–9–07; 8:45 am]

BILLING CODE 5001–06–M

DEPARTMENT OF DEFENSE

Department of the Army: Corps of Engineers

Intent To Prepare a Draft Environmental Impact Statement (EIS) for a Permit Application for Compartments B and C, Palm Beach and Hendry Counties, FL

AGENCY: U.S. Army Corps of Engineers, Jacksonville District, DoD.

ACTION: Notice of Intent (NOI).

SUMMARY: The U.S. Army Corps of Engineers (Corps), Jacksonville District, will be receiving a permit application for a Department of the Army permit under Section 404 of the Clean Water Act from the South Florida Water Management District (SFWMD) to construct Stormwater Treatment Areas (STAs) on parcels of land identified as Compartments B and C of the Everglades Agricultural Area (EAA) (Proposed Action). As part of the permit process, the Corps is evaluating the environmental effects associated with construction of STAs on these parcels in order to provide additional treatment to assist the existing STAs in the overall goal of improving the quality of water delivered and to be delivered to the Everglades Protection Area (EPA) in order to prevent further environmental degradation.

The primary federal involvement associated with the Proposed Action is the discharge of fill material (including permanent inundation) within federal jurisdictional areas and Waters of the United States. In addition, the Proposed Action could have potential significant effects on the human environment. Therefore, the Corps will prepare an EIS in compliance with the National Environmental Policy Act (NEPA) to render a final decision on the SFWMD's permit application. The Corps' decision will be to either issue or deny a Department of the Army permit for the Proposed Action. The Draft EIS is intended to be sufficient in scope to address federal, state, and local requirements and environmental issues concerning the Proposed Action and permit reviews.

FOR FURTHER INFORMATION CONTACT: Questions about the Proposed Action and Draft EIS should be directed to Ms. Tori White, Corps Regulatory Project Manager, by telephone at (561) 472–8888 or by e-mail at *tori.white@usace.army.mil.* Written comments should be addressed to the U.S. Army Corps of Engineers, South Florida Restoration Program Office, Attn: Ms. Tori White, 1400 Centrepark Boulevard, Suite 750, West Palm Beach, Florida 33401 or by facsimile at (561) 683–2418. Information about the Proposed Action and Draft EIS can also be obtained from the Jacksonville District Web site at *http://www.saj.usace.army.mil.*

SUPPLEMENTARY INFORMATION:

1. *Project Site and Background Information.* The Proposed Action is located at Compartments B and C of the EAA. Compartment B is located within USGS Quadrangles of Deem City, North of Deem City and West of Big Lake, Sections 23, 24, 25 and 36, Township 46 south, Range 37 east; Sections 19, 20, 21, 28, 29, 30, 31, 32 and 33, Township 46 south, Range 38 east; Sections 05, 06, 08, 09, 10, 11, 14, 15, 16, 17, 21 and 22, Township 47 south, Range 38 east. More specifically it is located in southern Palm Beach County east of Highway U.S. 27, and west of Water Conservation Area 2A and STA 2 in Southern Palm Beach County, Florida. Compartment C is located within the USGS Quadrangle of Everglades 2NW and Everglades 2SW, Sections 09, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23, 24, 26 and 27, Township 47 south, Range 34 east. More specifically, it is located west of the Rotenberger Wildlife Management Area and east of the L–3 Canal between STA–5 and STA–6 in eastern Hendry County, Florida.

(a) *Background.* On October 4, 1996, the Corps published a Final Programmatic Environmental Impact Statement (PEIS) for the initial Everglades Construction Project (ECP) which consisted of six STAs comprising approximately 44,000 acres. The ECP was implemented by the SFWMD as a result of nutrient loads of stormwater and runoff and high phosphorus loads from the EAA, Lake Okeechobee, and other contributory basins which discharge into the EPA. The EPA includes Water Conservation Areas 1 (Arthur R. Marshall Loxahatchee National Wildlife Refuge), 2A, 2B, 3A, 3B and Everglades National Park. The initial ECP was intended to achieve an interim target discharge of a long-term

annual flow-weighted mean phosphorus concentration of approximately 50 parts per billion (50 ppb). Pursuant to the Consent Decree in *United States* v. *South Florida Water Management District,* the State committed to provide water quantity and quality needed to preserve and restore the unique flora and fauna of the Everglades National Park and the Loxahatchee Wildlife Refuge. The Everglades Forever Act (EFA) embodies the same goals. The SFWMD's Long-Term Plan for Achieving Water Quality Goals, October 27, 2003 and the November 2004 revision recommend further studies that will help provide the additional detailed information required for making a more informed decision. In 2005, the SFWMD completed the EAA Regional Feasibility Study as part of the November 2004 revision to the Long-Term Plan. The Feasibility Study evaluated additional treatment needed in order to reduce phosphorus loads to the EPA and comply with the EFA including construction of STAs on Compartments B and C.

(b) *Purpose and Need.* The overall project purpose is to reduce nutrient loads of stormwater and runoff from the EAA and nutrient concentrations in water delivered from Lake Okeechobee prior to distribution into the EPA in order to meet legal requirements. The six existing STAs included in the ECP were built and operated pursuant to the requirements of the EFA and contain approximately 40,000 acres of effective treatment area. Subsequent to the design and construction of these STAs, the inflow volumes and phosphorus concentrations loads were updated to incorporate best available information, including several years of actual STA inflow data and outflow performance data. One of the key assumptions during the design of the original STAs was that EAA Best Management Practices (BMPs) would result in a 20% reduction in inflow volumes; however, recent historic data has shown that although the required BMPs reduced phosphorus loads, the assumed inflow volume reductions have not occurred. The Consent Decree assumed that flow lost to BMPs would be replaced with additional flow from Lake Okeechobee; however, neither the original ECP design flow nor the 2001 Basin-Specific Feasibility Studies (ECP update with enhanced STAs) provided treatment capacity for those additional flows. In addition to higher than originally assumed stormwater runoff volumes from the EAA, the STA inflow phosphorus concentrations have also shown notable increases in the past several years, likely a result of long-term increasing trends in Lake Okeechobee phosphorus concentrations, further amplified by the 2004 and 2005 hurricanes, as well as additional lake regulatory release volumes. The higher-than-anticipated EAA runoff volumes, flows and loads from Lake Okeechobee, and STA inflow concentrations have resulted in impacts to existing STA performance.

(c) *Proposed Action.* The SFWMD proposes to convert approximately 13,740 acres of publicly owned, primarily agricultural lands to additional STAs. The Compartment B STA will consist of approximately 6,700 acres of effective treatment area, and will be operated in close coordination with the existing STA–2 and STA–3/4 to assist in optimizing the phosphorus removal performance of these two STAs. Depending upon the hydrologic and hydraulic conditions, the Compartment B STA can assist in the reduction of inflows to STA–1W and STA–1E, which discharges into the WCA–1. The Compartment C STA will consist of approximately 6,200 acres of effective treatment area, and can be operated in close coordination with existing STA–5 and STA–6 to assist in the phosphorus reduction capability of these two STAs, which discharge into WCA–3A.

2. *Alternatives.* Alternatives to the Proposed Action initially being considered include:

(a) Construction of Compartment B STA and Compartment C STA to treat additional runoff in the EAA.

(b) Construction of Compartment B STA to recover ability to treat Lake Okeechobee volumes originally intended to be treated by STA–3/4 and construction of Compartment C STA to treat additional runoff in the EAA.

(c) Construction of Compartment B STA to treat a combination of Lake Okeechobee volumes and EAA runoff and construction of Compartment C STA to treat additional runoff in the EAA.

(d) Construction of STAs on additional parcels of land.

(e) Additional Treatment Technologies including but not limited to hyacinth and algae turf scrubber application.

(f) No Action.

3. *Draft EIS Scoping Process.*

(a) The Corps is furnishing this notice to: (1) Advise other Federal and state agencies, affected Tribes, and the public of our intentions; (2) announce the initiation of a 30-day scoping period; and (3) obtain suggestions and information on the scope of issues and alternatives to be included in the Draft EIS. The Corps invites comments from all interested parties to ensure that the full range of issues related to the permit request is addressed and that all significant issues are identified. We will accept written comments until 30 days after the date of publication of this notice.

(b) Significant issues to be analyzed in the Draft EIS include: Aesthetics/visual quality, agricultural resources, air quality, biological resources, cultural resources, cumulative impacts, environmental justice, flood protection, geology/soils, growth inducement, land use/planning, noise/vibration, public health and safety, public services/utilities, recreation, socioeconomics, threatened and endangered species, traffic/circulation, water resources including wetlands, and other issues identified through scoping, public involvement, and interagency coordination.

(c) The Corps will conduct an environmental review of the Proposed Action in accordance with the requirements of NEPA, 1969 as amended, (42 U.S.C. 4321 *et seq.*) and its implementing regulations (40 Code of Federal Regulations, Section 1500 *et seq.*), Corps Procedures for Implementing NEPA (33 Code of Federal Regulations, Section 230 *et seq.*), and with other appropriate federal laws and regulations, policies, and procedures of the Corps for compliance with those regulations. The Proposed Action, through the Corps permit review process, will require consultation under Section 7 of the Endangered Species Act and Section 106 of the National Historic Preservation Act. Additionally, the proposed action would involve evaluation for compliance with the Section 404(b)(1) Guidelines of the Clean Water Act; the Magnunson-Stevens Fishery Conservation and Management Act; Water Quality Certification pursuant to Section 401 of the Clean Water Act; certification of state lands, easements and right of ways; and determination of Coastal Zone Management Act consistency. Additionally, the EIS will include an evaluation of modifying land for new uses which also involves zoning, land use planning, water management, and other regulatory requirements at the local, state, and federal level. The Compartments B and C lands were purchased using funds appropriated to the Department of Interior (DOI) under the authority of the 1996 Farm Bill (Federal Agriculture Improvement and Reform Act of 1996, Public Law 104–127, 110 Stat. 1022). The DOI, Corps, Florida Department of Environmental Protection, and the SFWMD are parties to a Framework Agreement under which

all interim uses of lands acquired with these funds must be consistent with the ultimate use of the property in a congressionally authorized federal project for Everglades restoration. The SFWMD will be required to obtain a land use approval from the DOI prior to construction.

4. *Scoping Meeting.* Public scoping meetings will be held on the Proposed Action on July 25, 2007, at 6 p.m. at the B1–Auditorium, SFWMD, 3301 Gun Club Road, West Palm Beach and on July 26, 2007, at 5 p.m. at the Institute of Food and Agricultural Sciences, 3200 E. Palm Beach Road, Belle Glade, Florida. The meetings will give agencies and the public an opportunity to receive more information on the Proposed Action and to provide comments and suggestions on the scope of the EIS.

5. *Availability of the Draft EIS.* The Corps currently expects the Draft EIS to be made available to the public in April 2008. A public meeting will be held during the public comment period for the Draft EIS. Written comments will be accepted at the meeting.

Dated: July 3, 2007.

David S. Hobbie,

Chief, Regulatory Division, Jacksonville District.

[FR Doc. E7–13401 Filed 7–10–07; 8:45 am]

BILLING CODE 3710–AJ–P

DEPARTMENT OF EDUCATION

Office of Postsecondary Education; Overview Information; Developing Hispanic-Serving Institutions (HSI) Program; Notice Inviting Applications for New Awards for Fiscal Year (FY) 2007

Catalog of Federal Domestic Assistance (CFDA) Number: 84.031S.

Dates:

Applications Available: July 11, 2007.

Deadline for Transmittal of Applications: August 10, 2007.

Eligible Applicants: Institutions of higher education (IHEs) that qualify as eligible HSIs are eligible to apply for new Individual Development Grants and Cooperative Arrangement Development Grants under the HSI Program. To be an eligible HSI, an IHE must—

(1) Be accredited or preaccredited by a nationally recognized accrediting agency or association that the Secretary has determined to be a reliable authority as to the quality of education or training offered;

(2) Be legally authorized by the State in which it is located to be a junior college or to provide an educational program for which it awards a bachelor's degree;

(3) Be designated as an ''eligible institution'' by demonstrating that it: (A) Has an enrollment of needy students as described in 34 CFR 606.3; and (B) has low average educational and general expenditures per full-time equivalent (FTE) undergraduate student as described in 34 CFR 606.4;

(4) Have an enrollment of undergraduate FTE students that is at least 25 percent Hispanic students at the end of the award year immediately preceding the date of application.

Effective September 30, 2006, the Third Higher Education Extension Act of 2006 (Pub. L. 109–292) amended section 502(a) of the Higher Education Act of 1965, as amended (HEA), by requiring that institutions report their undergraduate Hispanic FTE percentage at the end of the award year immediately preceding the date of application. Funds for the Developing HSI Program are awarded each fiscal year, thus, for this program, the end of the award year refers to the end of the fiscal year prior to the application due date. The end of the fiscal year occurs on September 30. Therefore, for purposes of making the determination described in paragraph (4) IHEs must report their undergraduate Hispanic FTE percentage based on the student enrollment count closest to, but not after, September 30, 2006.

The Third Higher Education Extension Act of 2006 also amended section 502(a) of the HEA by eliminating the requirement in the HSI Program that an institution applying for a grant provide an assurance that not less than 50 percent of the institution's Hispanic students are low-income individuals.

The Notice Inviting Applications for Designation as Eligible Institutions for FY 2007 was published in the **Federal Register** on January 8, 2007 (72 FR 670). The HSI eligibility requirements are in 34 CFR 606.2 through 606.5 and can be accessed from the following Web site: *http://www.access.gpo.gov/nara/cfr/waisidx_01/34cfr606_01.html.*

The regulations in 34 CFR part 606 do not reflect the changes made by the Third Higher Education Extension Act of 2006 that are mentioned above.

Relationship Between HSI and Title III, Part A Programs

Note 1: A grantee under the HSI Program, which is authorized by Title V of the HEA, may not receive a grant under any HEA, Title III, Part A Program. The Title III, Part A Programs include: The Strengthening Institutions Program, the American Indian Tribally Controlled Colleges and Universities Program; and the Alaska Native and Native Hawaiian-Serving Institutions Programs. Further, a current HSI Program grantee may not give up its HSI grant in order to receive a grant under any Title III, Part A Program.

Note 2: An HSI that does not fall within the limitation described in Note 1 may apply for a FY 2007 grant under all Title III, Part A Programs for which it is eligible, as well as under the HSI Program. However, a successful applicant may receive only one grant.

Note 3: An eligible HSI that submits more than one application may only be awarded one Individual Development Grant or one Cooperative Arrangement Development Grant in a fiscal year. Furthermore, we will not award a second Cooperative Arrangement Development Grant to an otherwise eligible HSI for the same award year as the HSI's existing Cooperative Arrangement Development Grant.

Note 4: The Department will cross-reference for verification, data reported to the Integrated Postsecondary Education Data System (IPEDS), the IHE's State-reported enrollment data, and the institutional annual report. If there are any differences in the percentages reported in IPEDS and the percentages reported in the grant application, the IHE should justify the differences as a part of its eligibility documentation.

Estimated Available Funds: $17,181,510.

Estimated Range of Awards: $550,000–$713,000.

Estimated Average Size of Awards: Individual Development Grant: $575,000. Cooperative Arrangement Development Grant: $713,000.

Maximum Awards: Individual Development Grant: $575,000; Cooperative Arrangement Development Grant: $713,000. We will not fund any application at an amount exceeding these maximum amounts for a single budget period of 12 months. We may choose not to further consider or review applications with budgets that exceed the maximum amounts specified, if we conclude, during our initial review of the application, that the proposed goals and objectives cannot be obtained with the specified maximum amount.

Estimated Number of Awards: Individual Development Grant: 15. Cooperative Arrangement Development Grant: 12.

Note: The Department is not bound by any estimates in this notice. Applicants should periodically check the HSI Program Web site for further information. The address is: *http://www.ed.gov/programs/idueshsi/index.html.*

Project Period: Up to 60 months.

Full Text of Announcement

I. Funding Opportunity Description

Purpose of Program: The HSI Program provides grants to assist HSIs to expand

APPENDIX F

PUBLIC INVOLVEMENT

US Army Corps of Engineers®
Jacksonville District

NEWS RELEASE

Release No.: 0737
For Release: July 24, 2007
P.O. Box 4970 Jacksonville, FL 32232-0019
Contact: Sonya Goines, CCO
Phone: 904- 607-1472 FAX: 904-232-2237
Email: sonya.b.goines@saj02.usace.army.mil

FOR IMMEDIATE RELEASE

CORPS OF ENGINEERS HOLDS PUBLIC SCOPING WORKSHOPS ON PROPOSED STORMWATER TREATMENT AREAS IN EVERGLADES AGRICULTURAL AREA

WEST PALM BEACH, Fla. – The U.S. Army Corps of Engineers (Corps), Jacksonville District, Regulatory Division, invites you to attend public scoping workshops on the proposed permit application from the South Florida Water Management District (SFWMD) to construct additional Stormwater Treatment Areas (STAs) on parcels of land referred to as Compartments B and C of the Everglades Agricultural Area (EAA) in Palm Beach and Hendry Counties. The meetings will be held:

Wednesday, July 25, 2007, 6:00 to 9:00 p.m.
South Florida Water Management District
3301 Gun Club Road, B-1 Auditorium
West Palm Beach, FL 33406

AND

Thursday, July 26, 2007, 5:00 to 8:00 p.m.
University of Florida, Institute of Food and Agricultural Sciences
Everglades Research and Education Conference Center
3200 E. Palm Beach Road
Belle Glade, FL 33430

The purpose of the workshops is to provide information and take public comment. Information will be provided at a series of interactive stations with no formal presentation. As part of the permit review process, the Corps is evaluating the environmental effects associated with construction and operation of the STAs. The Corps will prepare an Environmental Impact Statement (EIS) in compliance with the National Environmental Policy Act (NEPA) to render a final decision on the SFWMD's permit application. Comments may be submitted by August 27, 2007, to

Ms. Tori White
U.S. Army Corps of Engineers
1400 Centrepark, Suite 750
West Palm Beach, Florida 33401
561-683-2418 (fax)
tori.white@saj02.usace.army.mil

###

US Army Corps of Engineers

PUBLIC SCOPING MEETING

July 25, 2007, 6:00 to 9:00 p.m.
South Florida Water Management District
3301 Gun Club Road
West Palm Beach 33406
561-686-8800
AND
July 26, 2007, 5:00 to 8:00 p.m.
University of Florida
Institute of Food and Agriculture
3200 E. Palm Beach Rd
Belle Glade 33430
561-993-1500

The U.S. Army Corps of Engineers (Corps) invites you to a public scoping meeting to receive more information and comment on the proposed permit application from the South Florida Water Management District to construct additional Stormwater Treatment Areas (STAs) on parcels of land referred to as Compartments B and C of the Everglades Agricultural Area (EAA).

The purpose of the proposed action is to provide additional treatment to assist the existing STAs in the overall goal of improving water quality entering the Everglades Protection Area (EPA). As part of the permit review process, the Corps is evaluating the environmental effects associated with the construction of the STAs.

Comments may be mailed
to Ms. Tori White by August 27, 2007,
at the address below:

Ms. Tori White
U.S. Army Corps of Engineers
1400 Centrepark, Suite 750
West Palm Beach, Florida 33401
561-683-2418 (fax)

After the public meeting and scoping process,
the Corps will consider public comments,
and an Environmental Impact Statement will be prepared.

1201219

US Army Corps of Engineers

PUBLIC SCOPING WORKSHOPS

July 25, 2007, 6:00 to 9:00 p.m.
South Florida Water Management District
B-1 Auditorium
3301 Gun Club Road, West Palm Beach 33406
561-686-8800

AND

July 26, 2007, 5:00 to 8:00 p.m.
University of Florida
Institute of Food and Agriculture
Everglades Research and Education Conference Center
3200 E. Palm Beach Road, Belle Glade 33430
561-993-1500

The U.S. Army Corps of Engineers (Corps), Jacksonville District, Regulatory Division, invites you to a public scoping workshop on the proposed permit application from the South Florida Water Management District (SFWMD) to construct additional Stormwater Treatment Areas (STAs) on parcels of land referred to as Compartments B and C of the Everglades Agricultural Area (EAA) in Palm Beach and Hendry Counties.

The purpose of the workshop is to provide information and take public comment. Information will be provided at a series of interactive stations with no formal presentation. As part of the permit review process, the Corps is evaluating the environmental effects associated with construction and operation of the STAs. The Corps will prepare an Environmental Impact Statement (EIS) in compliance with the National Environmental Policy Act (NEPA) to render a final decision on the SFWMD's permit application.

Submit comments by August 27, 2007, to

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tori.white@saj02.usace.army.mil

US Army Corps
of Engineers ®

Public Scoping Workshops

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B-1 Auditorium • 3301 Gun Club Road
West Palm Beach, FL 33406 • **561-686-8800**

&

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1400 Centrepark • Suite 750 • West Palm Beach • Florida 33401
561-683-2418 (fax) • tori.white@saj02.usace.army.mil

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US Army Corps of Engineers®

PUBLIC SCOPING WORKSHOPS

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561-683-2418 (fax)
tori.white@saj02.usace.army.mil

Fold Here

U.S. Army Corps of Engineers
ATTN: Ms. Tori White
1400 Centrepark – Suite 750
West Palm Beach, Florida 33401

Fold Here

Issue Area: Water Resources/Water Supply

Author Name: T. Joan Lawrence for Terrence Salt
Organization: U.S. Department of the Interior
Comment Type: Consultation Letter
*note: full consultation letter in Attachment D

Pleased to note Compartment B STA will be operated in close coordination with the existing STA 2 and STA 3/4 to assist in optimizing the phosphorus removal performance of these two STA's. Operational regime will assist in maximizing the operational performance of the EAA Storage Reservoir Project, an important project for Everglades restoration.

Vital component of the operational regime will deal with the potential adverse consequences of diverting water from the Refuge. The Notice states that depending upon the hydrologic and hydraulic conditions, the Compartment B STA can assist in the reduction of inflows to STA's -1W and 1E, which discharge into the Arthur R. Marshall Loxahatchee National Wildlife Refuge (Refuge). The Department believes that the scope of the EIS should include an analysis of the potential impacts of proposed operational alternatives on Refuge water quality, water inflow quantities, and ecology.

Author Name: Newton E. Cook
Organization: United Waterfowlers - Florida
Comment Type: Comment Card

Maintenance of ground water resources to recharge aquifer is imperative

---

Author Name: Charles Shinn
Organization: Florida Farm Bureau Federation
Comment Type: Comment Card

Compartment C buildout is essential for additional treatment for phosphorus loading coming from the C-139 basin.

Author Name: Anonymous
Organization: Local Resident/Nongovernmental Organization
Comment Type: Comment Card

Use natural water flows. Purchase more land for STA's

Author Name: Drew Martin
Organization: Sierra Club/Nongovernmental Organization
Comment Type: Comment Card

Look at additional land for STA's and additional technologies - alternative F and alternative E

Author Name: Drew Martin
Organization: Sierra Club/Nongovernmental Organization
Comment Type: Oral Comment – Court Reporter
*Entire transcript of comment in Appendix J

Our largest goal is to see sheet flow restored in the Everglades Agricultural Area. So we would like to see a reevaluation of the original plan option 6 to reestablish sheet flow as part of the strategy. We

want to see connectivity, environmental connectivity, between the lake south which means at some point we would like to see a natural flow from the lake itself into progressively cleaner STAs and one of our concerns with this program that we see tonight is the water storage is too deep, but also what is the intention of water storage? Is it to hold water for dry years or what is the purpose of this storage and how will it be used? And how fast will the storage be released?

We like the idea of new technologies (Alternative F). We think that you should look at using conservation easements and working with the existing property owners to see if you could use those areas also as a form of STA to help clean the water and that we oppose all back pumping from the EAA back into Lake Okeechobee.

We would also like for the South Florida Water Management District to review the BMPs for the agricultural areas to see if we could reduce the phosphorus load through improved farming practices.

It is very important that ultimately the long term plan have a flow way running form Lake Okeechobee all the way through the EAA, Everglades Agricultural Area, and that this flow way should mimic the original sheet flow and operate as if it were an STA which would provide cleaning of the water.

Author Name: Patricia D. Curry
Organization: Local Resident
Comment Type: Comment Card

No additional permits should be issued for development

Author Name: Dr. Joseph R. Orsenigo
Organization: Local Resident
Comment Type: E-mail Comment post scoping meetings

My major topical comment is that an EIS on B and C Compartments, as well as the entire STA complex, is incomplete without individual and joint water balances (water budget). EIS should address all inputs to and losses of water from the units, individually and collectively (sources, routes and effect).

Author Name: Martha Musgrove
Organization: Decision Makers Forum, Inc/Nongovernmental Organization
Comment Type: Oral Comment – Court Reporter
*Entire transcript of comment in Appendix J

When evaluating canal modifications to also treat water from STA 1 East and 1 West, please evaluate or assess the capacity of the South Florida Water Management District's rock pits to store water. Too often projects are considered in isolation to what else is happening. The "what else" is this context is how to treat Lake Okeechobee water in order to send it south, rather than east and west, where is poses a threat to estuaries. If Compartments B and C are to handle Lake Okeechobee water in addition to field runoff, they are probably undersized. What components can be added to B and C at a later date if needed?

Purchase of landfill by the Solid Waste Authority next to the Arthur R. Marshall national Wildlife Refuge on the EAA side. The construction of a large landfill similar to that which exists of Jog Road has the potential of changing water quality to be treated in Compartment B.

Author Name: Alexandra Larson
Organization: Unknown
Comment Type: Oral Comment – Court Reporter
*Entire transcript of comment in Appendix J

The environmental impact statement, the area should be expanded to include up to – you know there is a place called the sector plan in the Loxahatchee area and they will probably understand this when they look at it. Also instead of the alternatives that they have listed here, they should look into the alternative of the flow way and there is and area south on the south end of Lake Okeechobee called Hooker's Point. And instead of all the much, it's a very sandy, it's a very broad area and it would make an excellent area to do a flow way situation instead of doing this STA crap which doesn't work. They have several STAs in operation at this time that are not living up to their modeling or expectations, the STA situation.

Issue Area: Biological and Natural Resources

Author Name: T. Joan Lawrence for Terrence Salt
Organization: U.S. Department of the Interior
Comment Type: Consultation Letter
*note: full consultation letter in Attachment D

The Department supports the concept of exploring alternatives that will eliminate phosphorus loads beyond the design capacity of STA's 1W and 1E. The Department is concerned that additional diversion of inflows away from the Refuge could have negative ecological consequences. A document estimating the water needs of the Refuge has been drafted and should be available prior to the completion of the STA operating protocols and the EIS.

Author Name: Newton E. Cook
Organization: United Waterfowlers - Florida
Comment Type: Comment Card

Addition to and conservation of marshes is needed to benefit waterfowl.

Author Name: Anonymous
Organization: Local Resident/Nongovernmental Organization
Comment Type: Comment Card

Make areas appear natural. Maintain, restore and increase natural habitat.

Author Name: Drew Martin
Organization: Sierra Club/Nongovernmental Organization
Comment Type: Comment Card

Support Option 6 to create sheetflow/flowway

Author Name: Drew Martin
Organization: Sierra Club/Nongovernmental Organization
Comment Type: Oral Comment – Court Reporter

*Entire transcript of comment in Appendix J

We would like to see this whole process really incorporate wildlife into each thing that is done. We would like to recreate some of the original habitat that was there pre-European. We would like to see habitat that would suit the animal species that were originally there and make sure that it is part of the process, so if you have a berm or something that you put some tree vegetation on it that might have been there originally, like pond apple cypress and as many types of habitat as you can possibly get in the project.

We want to make sure that they look to see if any of these areas are used by the Florida panther and if they are, to make sure that there are corridors that the Florida panther can use to move through the area.

Author Name: Patricia D. Curry
Organization: Local Resident
Comment Type: Comment Card

Please fix the Everglades!

Issue Area: Cultural /Archeological Resources

Author Name: Drew Martin
Organization: Sierra Club/Nongovernmental Organization
Comment Type: Comment Card

Preserve any archeological resources

Issue Area: Socioeconomics

Author Name: Newton E. Cook
Organization: United Waterfowlers, Florida – Nongovernmental Organization
Comment Type: Comment Card

Public access and recreation is a "GLADES" culture.
Recreation, including fishing and hunting are economic benefits to the "GLADES".

Author Name: Charles Shinn
Organization: Florida Farm Bureau Federation – Nongovernmental Organization
Comment Type: Comment Card

The construction and proper/efficient operation of reservoirs/STAs is essential to the agricultural industry in the region. It is imperative for farms to remain viable in this region. The alternative of development is not acceptable.

Author Name: Anonymous
Organization: Anonymous
Comment Type: Comment Card

Would like to see recreational features similar to Lake Lanier, Georgia. Would like to see pictures or a conceptual plan at the draft EIS public meeting of what the recreation activities in Compartments B and C will look like – boat ramps, boardwalks, sightseeing stands. Would like to see a "Park" made in Compartments for jet skiing, swimming, etc.

Author Name: Anonymous
Organization: Local Resident/Nongovernmental Organization
Comment Type: Comment Card

Bird Watching, Kayaking, Fishing, Wildlife Viewing

Author Name: Drew Martin
Organization: Sierra Club/Nongovernmental Organization
Comment Type: Comment Card

Look to create wildlife areas for recreation, prefer non-motorized uses that create minimal impacts.

Issue Area: Other

Author Name: T. Joan Lawrence for Terrence Salt
Organization: U.S. Department of the Interior
Comment Type: Consultation Letter

Land Use: Compartments B and C purchased as part of Talisman acquisitions using fund appropriated to the Department to be used to acquire lands for Everglades restoration under the authority of the 1996 Farm Bill (Federal Agriculture Improvement and Reform Act of 1996). Lands acquired with these funds must be consistent with the ultimate use of the property for Everglades resoration.

Author Name: Patricia D. Curry
Organization: Local Resident
Comment Type: Comment Card

Land Acquisition: while the STA's seem a good start, clearly we need to acquire large sections of the EAA to achieve the sheet flow for restoration. How much land is owned by governmental entities and leased to farmers in the EAA?

Author Name: Dr. Joseph R. Orsenigo
Organization: Local Resident
Comment Type: E-mail Comment post scoping meetings

The EIS should also local, regional, and state climatic responses to STA operation.
Other lesser project EIS relevance:

1. Area maps indicate a "Belle Glade Camp" – I assume that the circle indicates the Okeechobee unit of the Belle Glade Housing Authority. What purpose does the "camp" serve"
2. One of the information panels includes a photograph of some six (6) truck-mounted overhead irrigation units. What was the purpose of the illustration? The photo does not represent EAA water source, EAA agriculture or EAA water use. It does represent Homestead winter-crop productions, a beneficiary of the water system. Again, purpose?
3. Another information panel includes a photgraph of celery harvester "mule-trains". The photograph appears to be of South Bay Growers equipment, and if so, the photograph is out-of-date since that organization no longer exists. I believe that only one celery grower continues to operate in the EAA and I doubt that "mule-trains" are used at harvest. Again, what was the purpose of the illustration?

Author Name: Martha Musgrove
Organization: Decision Makers Forum, Inc/Nongovernmental Organization
Comment Type: Oral Comment – Court Reporter

Land Ownership: The Solid Waste Authority of Palm Beach County has acquired land and is proposing to construct a landfill next to the Arthur R. Marshall National Wildlife Refuge on the EAA side. The fact that land is already in public ownership, it is possible that it could be converted for use to an STA that would resolve the question of how to improve operations of the overloaded STA 1 East. That assumes that the Regulatory Division of the Corps (U.S. Army Corps of Engineers) talks to the Planning Division of the Corps and the Regulatory Division does not rush to approve a landfill.

Author Name: Drew Martin
Organization: Sierra Club/Nongovernmental Organization
Comment Type: Oral Comment – Court Reporter
*Entire transcript of comment in Appendix J

Land Ownership:
We like the idea of STA's, but would like to see more land purchased. We don't think it's adequate at this time to meet the needs of fresh water flowing all the way to the Everglades natural park area.

We like the idea of purchasing more land which the way it is phrased here we think is alternative E, but we want to make sure it's understood that we want to use all the land already purchased and then look for additional land.

Everglades Agricultural Area Compartments B and C (B&C) Environmental Impact Statement

Submit Scoping Comments by August 27, 2007

U.S. Army Corps of Engineers
JACKSONVILLE DISTRICT

U.S. Army Corps of Engineers, Jacksonville District
ATTN: Ms. Tori White
1400 Centrepark, Suite 750
West Palm Beach, FL 33401-7402
Phone: (561) 472-8888, Fax: (561) 683-2418
E-mail: Tori.White@usace.army.mil

Comment Form

The U.S. Army Corps of Engineers, Jacksonville District, welcomes your input on the issues and concerns that should be addressed in the Environmental Impact Statement for the Proposed Construction and Operation of Additional Stormwater Treatment Areas on Parcels of Land Referred to as Compartments B and C of the Everglades Agricultural Area.

In order to assist in planning for the EIS, please submit your scoping comments by August 27, 2007 to the address on the reverse side of this form.

I. Please check the affiliation that best represents your role/interest in the EAA Compartments B and C EIS (please check only one):

- ☐ Local Resident
- ☐ State Agency
- ☐ Local Agency
- ☐ Federal Agency
- ☐ Elected Official
- ☐ Native American Tribe
- ☐ Academic Institution
- ☐ Industry/Commercial
- ☐ Nongovernmental Organization
- ☐ Other

II. Demographic information

Name (optional) _____

County _____

Address _____

City _____ State _____ ZIP _____

III. Issue areas (If you need more space for comments, please attach additional sheets of paper.)

Water Resources/Water Supply:

Biological and Natural Resources:

Cultural/Archeological Resources:

Socioeconomics:

Other:

Oral Comments Roster

Belle Glade, FL 7/26/07

Public scoping meeting for the Environmental Impact Statement for the Construction and Operation of Additional Stormwater Treatment Areas on Compartments B and C of the Everglades Agricultural Area

Last Name	First Name	Affiliation	Address	City	State	Postal Code
Musgrove	Martha	Nelson Miles Foss	2432 Edgewater Dr	W Palm Bch	FL	33406

July 26, 2007

Attendee Roster

~~Compartments~~ B&C EIS · Belle Glade, Florida

If you wish to have your name listed in the administrative record, please enter your name and address below.
(Please print clearly)

☑ I would like my name added to the administrative record as having participated in the scoping meetings

☑ I would like my name added to the mailing list to receive updates regarding the EIS

☑ I would like to receive a copy of the EIS by: ☐ e-mail ftp site; or ☐ CD

Name: Wayne Berquistrom
Organization: Tetra Tech EC
Address: 759 N. Federal Hwy
City, State, ZIP: Stuart FL
Phone:
E-mail:

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Name: Commissioner John Wilson
Organization: Commissioner South Bay
Address: 250 SW 6 Ave
City, State, ZIP: South Bay FL 33493
Phone: 561-983-5181 OR 561-441-6996
E-mail: JOHN WILSON 448 @ YAHOO.COM

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Name: Martha Musgrove
Organization: Decision Makers Forum
Address: 2432 Edgewater DR
City, State, ZIP: West Palm Beach, Fla 33406
Phone: 561-965-9409
E-mail: Malmusgrove@yahoo.com

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Name: Peter Magnuson
Organization: USDA
Address: P.O. Box 112
City, State, ZIP: Lake Harbor FL 33459
Phone: 561 309 9050
E-mail: Pete_Mag@Bellsouth.Net

A hard copy of the Draft EIS will be mailed upon request

Your information will not be used for any purpose other than for this EIS.

July 26, 2007 **Attendee Roster**

· Compartments B&C EIS · Belle Glade, Florida

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Name: J. R ORGENIEG

Organization: SFI — AGRA

Address: P O Box 1069

City, State, ZIP: BELLE GLADE, FL 33430-1069

Phone: 561/996-7099

E-mail:

☐ I would like my name added to the administrative record as having participated in the scoping meetings

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Name: KEN HARDIN

Organization: Janus Research

Address: 1300 N Westshore Blvd

City, State, ZIP: Tampa FL 33609

Phone: (813) 636-8700

E-mail: kenneth.hardin@janus-research.com

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Name: BRIAN WATSON

Organization: TETRA TECH

Address: 2110 Powers Ferry Road Suite 202

City, State, ZIP: Atlanta, Georgia 30339

Phone: 770-850-0949

E-mail: BRIAN.WATSON@TETRATECH.COM

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Name: Kelly Gracie

Organization: TTECI

Address: 1901 S Congress Ave, Suite ~~209~~ 270

City, State, ZIP: Boynton Beach, FL 33334

Phone: (561) 735-0482 x207

E-mail: Kelly.Gracie@ttech.com

A hard copy of the Draft EIS will be mailed upon request

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July 26, 2007 **Attendee Roster**

Compartments B&C EIS · Belle Glade, Florida

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Name: Millie Radzikhovsky
Organization: South Fl Water Management District
Address:
City, State, ZIP:
Phone: 561-242-5520 x4048
E-mail: mradzikc@sfwmd.gov

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Name: Steven Davie
Organization: Tetra Tech
Address: 2110 Powers Ferry Road, Ste. 202
City, State, ZIP: Atlanta, GA 30339
Phone: 770-850-0949 x. 102
E-mail: steven.davie@tetratech.com

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Name: SHARON NIEMCZYK
Organization: Tetra Tech
Address: 1901 S. Congress Ave Suite 270
City, State, ZIP: BOYNTON BEACH, FL 33435
Phone: (561) 735-0482
E-mail: Sharon.Niemczyk@tteci.com

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Name: Lesley Bertolotti
Organization: Tetra Tech
Address: 1901 S Congress Ave., Ste 270
City, State, ZIP: Boynton Beach, FL 33426
Phone: 561 735 0482 x2006
E-mail: lesley.bertolotti@tteci.com

A hard copy of the Draft EIS will be mailed upon request

Your information will not be used for any purpose other than for this EIS.

July 26, 2007 **Attendee Roster**

· Compartments B&C EIS · Belle Glade, Florida

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Name: MIKE HIND

Organization: SFWMD - ACCELER8

Address: _____

City, State, ZIP: WPB

Phone: 561 242 5520 x4033

E-mail: MHind@sfwmd.gov

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Organization: _____

Address: _____

City, State, ZIP: _____

Phone: _____

E-mail: _____

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July 26, 2007 **Attendee Roster**

Compartments B&C EIS · Belle Glade, Florida

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☑ I would like to receive a copy of the EIS by: ☐ e-mail ftp site; or ☑ CD

Name: Rev Richard John Rios

Organization: 100 Black Men of PBC.

Address: P.O. Box 1067

City, State, ZIP: Belle Glade, FL. 33430

Phone: 561-261-0517

E-mail: REVMTMOVER@AOL.com

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Name: Eric Dohner

Organization: Tetra Tech

Address: 1900 Eagle Valley Ct.

City, State, ZIP: Lawrenceville, GA 30043

Phone: 678-377-7272

E-mail: Eric.dohner@tetratech.com

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Name: _____

Organization: _____

Address: _____

City, State, ZIP: _____

Phone: _____

E-mail: _____

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Name: _____

Organization: _____

Address: _____

City, State, ZIP: _____

Phone: _____

E-mail: _____

A hard copy of the Draft EIS will be mailed upon request

Your information will not be used for any purpose other than for this EIS.

July 26, 2007 **Attendee Roster**

Compartments B&C EIS · Belle Glade, Florida

If you wish to have your name listed in the administrative record, please enter your name and address below.
(Please print clearly)

☐ I would like my name added to the administrative record as having participated in the scoping meetings
☑ I would like my name added to the mailing list to receive updates regarding the EIS
☑ I would like to receive a copy of the EIS by: ☐ e-mail ftp site; or ☑ CD
Name: Michael Tust
Organization: SWC
Address: 1031 Ives Dairy Rd.
City, State, ZIP: Miami, FL 33179
Phone: 305-651-7061
E-mail: mike@swcinc.net

☐ I would like my name added to the administrative record as having participated in the scoping meetings
☐ I would like my name added to the mailing list to receive updates regarding the EIS
☐ I would like to receive a copy of the EIS by: ☐ e-mail ftp site; or ☐ CD
Name: Kathy Collins
Organization: SFWMD
Address: 3301 Gun Club Rd
City, State, ZIP: WPB, FL 33406
Phone: 561 242-[redacted]5520 X-4024
E-mail: Kcollin@sfwmd.gov

☑ I would like my name added to the administrative record as having participated in the scoping meetings
☑ I would like my name added to the mailing list to receive updates regarding the EIS
☑ I would like to receive a copy of the EIS by: ☑ e-mail ftp site; or ☐ CD
Name: CHARLES SIMMN
Organization: FLORIDA FARM BUREAU FEDERATION
Address: PO Box 690342
City, State, ZIP: VERO BEACH, FL 32969-0342
Phone: 352-538-0853
E-mail: CHARLES.SIMMN@FFBF.ORG

☑ I would like my name added to the administrative record as having participated in the scoping meetings
☐ I would like my name added to the mailing list to receive updates regarding the EIS
☐ I would like to receive a copy of the EIS by: ☐ e-mail ftp site; or ☐ CD
Name: Brenda Mills
Organization: SFWMD
Address: 3301 Gun Club Rd
City, State, ZIP: WPB FL 33406
Phone: 561. 242. [redacted]5520 X4013
E-mail: BMills@SFWMD.GOV

A hard copy of the Draft EIS will be mailed upon request

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July 25, 2007 Attendee Roster

· Compartments B&C EIS · West Palm Beach, Florida

If you wish to have your name listed in the administrative record, please enter your name and address below.
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Name: Brenda Mills
Organization: SFWMD
Address: 3301 Gun Club Rd
City, State, ZIP: WPB FL 33406
Phone: 561.242.5520 x4013
E-mail: BMILLS@SFWMD.GOV

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Name: Eric Dohner
Organization: Tetra Tech
Address: 1960 Eagle Valley Ct
City, State, ZIP: Lawrenceville, GA 30043
Phone: 678-377-7292
E-mail: Eric.dohner@tetratech.com

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Name: _____
Organization: _____
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City, State, ZIP: _____
Phone: _____
E-mail: _____

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Phone: _____
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~~7/26~~ 7/25

July 25, 2007 **Attendee Roster**

· Compartments B&C EIS · West Palm Beach, Florida

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Name: MIKE HIND
Organization: SFWMD - ACCELER 8
Address: C/O SFWMD - ACCELER8 OFFICE
City, State, ZIP: WPB
Phone: 561 242 5520 x 4033
E-mail: MHind@SFWMD.gov

~~☐~~ ☑ I would like my name added to the administrative record as having participated in the scoping meetings

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~~☐~~ ☑ I would like to receive a copy of the EIS by: ☐ e-mail ftp site; or ~~☐~~ ☐ CD

Name: ALEXANDRIA LARSON
Organization:
Address: 16933 W. Alexa Dr
City, State, ZIP: Lox Fla 33470
Phone: 791-0875
E-mail:

☑ I would like my name added to the administrative record as having participated in the scoping meetings

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☑ I would like to receive a copy of the EIS by: ☐ e-mail ftp site; or ☐ CD

Name: Steven Davie
Organization: Tetra Tech
Address: 2110 Powers Ferry Rd. Ste 202
City, State, ZIP: Atlanta, GA 30339
Phone: 770-850-0949 x.102
E-mail: steven.davie@tetratech.com

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Name: ICEN HARDIN
Organization: Jams Research
Address: 1300 N Westshore Blvd
City, State, ZIP: Tampa FL 33607
Phone: (813) 636-8200
E-mail: icenek-hardin@jams-rogers.com

A hard copy of the Draft EIS will be mailed upon request

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7/25

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Compartments B&C EIS · West Palm Beach, Florida

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Name: DREW MARTIN

Organization: SIERRA CLUB

Address: 500 LAKE AVE

City, State, ZIP: 33460

Phone: 561-533-6814

E-mail: DMandCd@aol.com

☐ I would like my name added to the administrative record as having participated in the scoping meetings

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Organization: _____

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Phone: _____

E-mail: _____

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Name: Newton Cook
Organization: United Waterfowlers - FL, Inc.
Address: 45 Poplar Rd
City, State, ZIP: Tequesta FL 33469
Phone: 561-339-0243
E-mail: newtoncook@bellsouth.net

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Name: Jock Merriam
Organization: SHAW
Address: 153 Oakwood Ln
City, State, ZIP: PB Gardens 33410
Phone: 561-691-0912
E-mail: merriamj@shawgrp.com

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Name: Patricia D Curry
Organization: N/A
Address: 12390 59 Street N.
City, State, ZIP: Royal Palm Bch 33411
Phone: 793 8546
E-mail: [redacted] Gremlin Ltd@aol.com

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☐ I would like to receive a copy of the EIS by: ☐ e-mail ftp site; or ☐ CD

Name: FRED SCHOLZ
Organization: N/A
Address: 2827 BAYONNE DR
City, State, ZIP: PBG, FLA 33410
Phone:
E-mail:

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7/25

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Compartments B&C EIS · West Palm Beach, Florida

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☑ I would like to receive a copy of the EIS by: ☐ e-mail ftp site; or ☐ CD
Name: Sandra Walters
Organization: SWC
Address: 6410 5th Street Suite 3
City, State, ZIP: Key West, FL 33040
Phone: 305-294-1238
E-mail: sandy@swcinc.net

☑ I would like my name added to the administrative record as having participated in the scoping meetings
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☐ I would like to receive a copy of the EIS by: ☐ e-mail ftp site; or ☑ CD
Name: ROSA DURANDO
Organization: Aud Soc. Ev.
Address: 10308 Heritage Fms
City, State, ZIP: L. W. Fl. 33467
Phone: 561 / 965-2420
E-mail:

☑ I would like my name added to the administrative record as having participated in the scoping meetings
☑ I would like my name added to the mailing list to receive updates regarding the EIS
☑ I would like to receive a copy of the EIS by: ☐ e-mail ftp site; or ☑ CD
Name: BRIAN WATSON
Organization: TETRA TECH
Address: 2110 Powers Ferry Road) Suite 201
City, State, ZIP: ATLANTA, GA 30339
Phone: 770 850-0949 x101
E-mail: BRIAN.WATSON@TETRATECH.COM

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☐ I would like to receive a copy of the EIS by: ☐ e-mail ftp site; or ☐ CD
Name: Stan Geberer
Organization: FISHKIND
Address: 10251 Corporate Blvd
City, State, ZIP: Orl FL 32817
Phone: 407-382-3256
E-mail: Stang@FISHKIND.com

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Name: Kelly Gracie
Organization: Tetra Tech EC
Address: 1901 S Congress Ave, Suite 270
City, State, ZIP: Boynton Beach, FL 33334
Phone: (561) 735-0482 x 207
E-mail: Kelly.Gracie@tteci.com

☒ I would like my name added to the administrative record as having participated in the scoping meetings

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Name: Lesley Bertollotti
Organization: Tetra Tech EC
Address: 1901 S Congress Ave, Suite 270
City, State, ZIP: Boynton Beach, FL 33334
Phone: (561) 735-0482 x206
E-mail: Lesley.Bertollotti@tteci.com

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Name: Jayne Bergstrom
Organization: Tetra Tech EC
Address: 759 S Federal Hwy, Suite 100
City, State, ZIP: Stuart, FL 34994
Phone: 1-772-781-3420
E-mail: jayne.bergstrom@tteci.com

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Name: Michael TUST
Organization: SWC, Inc.
Address: 1031 Ives Dairy Rd.
City, State, ZIP: Miami, FL, 33179
Phone: 305-651-7061
E-mail: mike@swcinc.net

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Comments are due by August 27, 2007

Send Comments to:

U.S. Army Corps of Engineers
Attn: Ms. Tori White
1400 Centrepark, Suite 750
West Palm Beach, FL 33401-4702

Email: Tori.White@usace.army.mil
Fax: 561.683.2418

Public Scoping Meetings

Everglades Agricultural Area Compartments B and C (B&C) Environmental Impact Statement

July 25, 2007

6:00 p.m. - 9:00 p.m.

South Florida Water Management District
3301 Gun Club Road
West Palm Beach, FL 33406

July 26, 2007

5:00 p.m. - 8:00 p.m.

University of Florida
Institute of Food and Agriculture
3200 East Palm Beach Rd.
Belle Glade, FL 33430

U.S. Army Corps of Engineers
JACKSONVILLE DISTRICT

U.S. Army Corps of Engineers
JACKSONVILLE DISTRICT

What is the purpose of this scoping meeting?

Public participation promotes open communication. The purpose of these scoping meetings is to seek input from individuals, community organizations, Native American tribes, and Federal, State, and local agencies in defining the scope for the Everglades Agricultural Area (EAA) Compartments B and C Environmental Impact Statement (EIS).

What is an Environmental Impact Statement?

An Environmental Impact Statement (EIS) is a summary of a detailed study that analyzes the environmental effects of a proposed action and its alternatives. It also includes an extensive public involvement process. The potential for significant environmental effects or high public interest associated with a proposed action is usually the basis for preparing an EIS.

An EIS analyzes the effects of a proposed action on environment, the natural and human—such as water, biological, and cultural resources and on socioeconomic conditions. It describes the baseline (affected environment) against which effects are evaluated and then identifies potential consequences and appropriate mitigation measures.

Why is an EIS being prepared?

This EIS is being prepared under an agreement between the US Army Corps of Engineers, Jacksonville District (USACE) and the South Florida Water Management District (District). The District is proposing to construct additional stormwater treatment areas (STAs) as part of the regional effort to improve the quality of water entering the Everglades Protection Area. The District must obtain a permit under Section 404 of the federal Clean Water Act to construct these STAs, and will apply to the USACE for the permit. The USACE will prepare the EIS to assess the potential environmental effects from construction and operation of the proposed project. The EIS will provide the USACE with analysis and documentation to aid in the permitting decisions for the proposal.

The EIS will be a complete evaluation of the environmental effects, including direct, indirect (or secondary) and cumulative effects, associated with the proposed action. The EIS will analyze the full range of environmental resources, including soils/geology, water, vegetation/wetlands, fish and wildlife, threatened and endangered species, cultural resources, land use/recreation, public services and facilities, and socioeconomics.

The EIS will also evaluate a range of alternatives to the proposed action, including the no action alternative. The no action alternative will represent a continuation of currently permitted activities.

Information obtained through the public scoping process will be considered in finalizing the alternatives to be evaluated in the EIS.

What is the Proposed Action?

The proposed action is to construct and operate stormwater treatment areas (STAs) on Compartments B and C of the Everglades Agricultural Area. The B&C STAs will assist the currently permitted STAs in meeting the *Everglades Protection Area Tributary Basins Long-Term Plan for Achieving Water Quality Goals*.

The South Florida Water Management District (SFWMD) is proposing to construct Stormwater Treatment Areas (STAs) on parcels of land identified as Compartments B and C of the Everglades Agricultural Area (EAA) (Proposed Action). The overall project purpose is to reduce nutrient loads of stormwater and runoff from the EAA and nutrient concentrations in water delivered from Lake Okeeshobee prior to distribution into the EPA in order to meet legal requirements. As part of the permit process, the Corps is evaluating the environmental effects associated with construction of STAs on these parcels in order to provide additional treatment to assist the existing STAs in the overall goal of improving the quality of water delivered and to be delivered to the Everglades Protection Area (EPA) in order to prevent further environmental degradation.

What is the National Environmental Policy Act?

The National Environmental Policy Act (NEPA) of 1969 is intended to help public officials make decisions that are based on an understanding of the environmental consequences of proposed actions. NEPA ensures that environmental factors are considered equally with the technical and engineering components of a decision. NEPA requires federal agencies to identify all potential environmental effects and any adverse effects that cannot be avoided and to evaluate alternatives to the proposed action.

NEPA is a *full disclosure* law with provisions for public access to and full participation in the federal decision-making process. The Act's intent is to protect, restore, or enhance the environment through well-informed federal decisions.

There will be three major NEPA compliance documents associated with this action:

- a Draft Environmental Impact Statement (EIS)
- a Final EIS
- a Record of Decision (ROD)

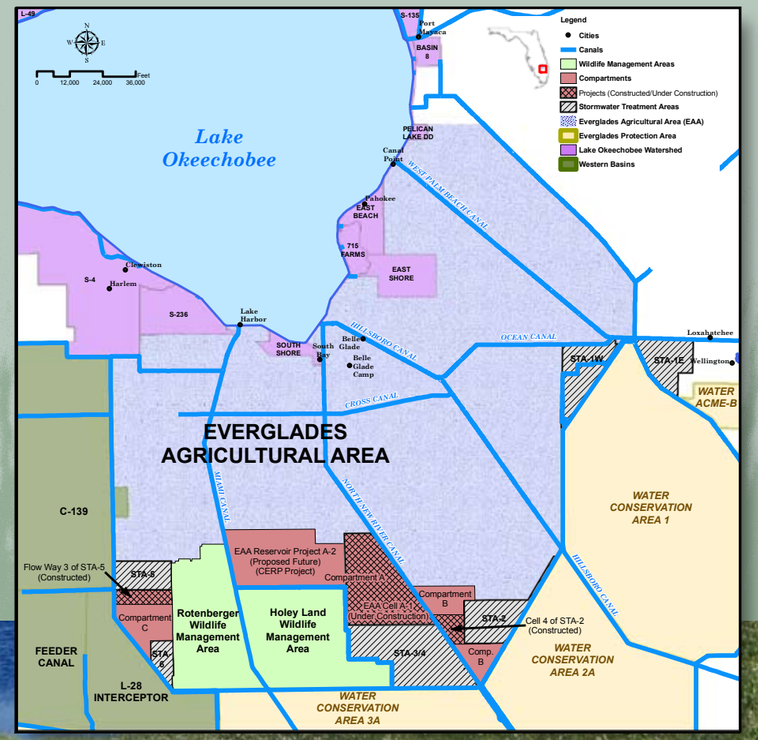
The Draft EIS will evaluate and analyze significant environmental and socioeconomic effects of alternative actions and will be distributed for public comment. The Final EIS will address public comments and recommend mitigation actions for significant effects. Finally, the ROD will document the USACE decision on the proposed permit action and specify the needed mitigation measures and monitoring programs on the basis of the information presented in the EIS.

Will there be opportunities for public involvement?

There will be multiple opportunities to participate in the NEPA process. Comments can be submitted after tonight's meeting to:

U.S. Army Corps of Engineers
Attn: Ms. Tori White
1400 Centrepark, Suite 750
West Palm Beach, FL 33401-4702
Email: Tori.White@usace.army.mil
Fax: 561.683.2418

Written and oral comments submitted by August 27, 2007 will be considered in a report summarizing the scoping process. However, comments will be collected throughout the development of the EIS. After completion of the Draft EIS, a series of public meetings will be held to present the findings of the report and receive public comment.



A Duda & Sons		Ed	Hamilton		P.O. Box 208	Belle Glade	FL	33430
A Duda & Sons		Craig	Bartoshuk		P.O. Box 788	LaBelle	FL	33975
Apelgren Corporation		Mark	Sodders		P.O. Box 200	Pahokee	FL	33476
Atlantic Sugar Association		John	Fanjul		26400 County 880	Belle Glade	FL	33430
Boyers Agricultural Services, Inc.					1824 West Canal St S.	Belle Glade	FL	33430
Dairy Farmers Inc.		Art	Darling		166 Lookout Place, Suite 100	Maitland	FL	32751
Duda Farm Fresh		Drew	Duda		PO Box 2015	Belle Glade	FL	33430
E.L. Pope & Sons		Norman	Pope		P.O. Box 697	Pahokee	FL	33476
Ed Barber & Associates		Ed	Barber		P.O. Box 838, Hwy 228 South	MacClenny	FL	32063-0838
Florida Citrus Mutual					P.O. Box 89	Lakeland	FL	33802
Florida Crystals Corp.					One N. Clematis St, Suite 200	West Palm Beach	FL	33401
Florida Cyrstals Corporation		Michael	Lorenz		P.O. Box 86	South Bay	FL	33493
Florida Farm Bureau Federation		Mayann	Gosa		5700 SW 34th Street	Gainsville	FL	32608
Florida Farm Bureau Federation	Government & Community Affairs	Charles	Shinn	Assistant Director	P.O. Box 690342	Vero Beach	FL	32969-0342
Florida Sugar Cane League		John	Dunkelman		PO drawer 1208	Clewiston	FL	33440-1208
Flo-sun Inc.					1 N Clematis St, Ste 200	West Palm Beach	FL	33401-5551
Gulf Citrus Growers					P.O. Box 1319	LaBelle	FL	33975
Hooker Jones Farms					1109 NE 31st St	Bell Glade	FL	33430
Hudley Farms		John	Hudley		P.O. Box 309	Loxahatchee	FL	33470
Indian River Citrus League		Phil	Strazzulla		P.O. Box 519, 7925 SW 20th St	Vero Beach	FL	32961-0519
JEM Farms		John	McKinstry		PO box 250	Loxahatchee	FL	33470
JET Farms		Shannon	Thompson		P.O. Box 1370	Loxahatchee	FL	33470
JT Boynton Farms		Wayne	Boynton		135 Bacom Point Rd	Pahokee	FL	33476
Kenedy Farms					1797 Bacon Point Rd	Pahokee	FL	33476
King Ranch		Paul	Grouse		P.O. Box 1210	Bell Glade	FL	33430
Lewis Friend Farms		Lewis	Friend		460 State Market Road	Pahokee	FL	33476
Lewis Friend Farms		Craig	Korbly		P.O. Box 119	Pahokee	FL	33476
Oasis Tree Farm					P.O. Box 677	Pahokee	FL	33476
Okeelanta Corporation		Matthew	Capone		P.O. Box 86	South Bay	FL	33493
Okeelanta Corporation	Flo-Sun Research Department	Raul	Perdomo		P.O. Box 86	South Bay	FL	33493
Osceola Farms		Carlos	Rionda		P.O. Box 679	Pahokee	FL	33476
Pacific Tomato Growers Ltd.		Ed	English		9500 Country Rd 858	Immokalee	FL	34142
Pro Farms		Paul	Orsenigo		P.O. Box 579	Pahokee	FL	33476
RC Hatton Farms		Paul	Allen		P.O. Box 220	Pahokee	FL	33476
Roth Farms		Rick	Roth		P.O. Box 1300	Belle Glade	FL	33430
Sci-Acra, Inc.		Joseph	Orsenigo		P.O. Box 1689	Belle Glade	FL	33430
Sem-Chi Rice Products		René	Gonzalez		P.O. Box 1097	Loxahatchee	FL	33470
SN Knight & Sons					P.O. Box 730	Belle Glade	FL	33430
South Florida Agricultural Council		Tom	Jones		P.O. Box 86	LaBelle	FL	33935
Southern Garden Groves Corporation					111 Ponce de Leon Ave	Clewiston	FL	33440
Stein Sugar Farms		Fritz	Stein		P.O. Box 2075	Belle Glade	FL	33430-7075
Sugar Cane Growers Corporation of Florida		David	Goodlett		330 Clematis St., Suite 270	West Palm Beach	FL	33401
Sugar Cane Growers Corporation of Florida		Barbara	Mediema		P.O. Box 666	Belle Glade	FL	33430-0666

Sugar Farms Cooperative	Modesto	Ulloa		P.O. Box 408	Loxahatchee	FL	33470
Twin H Farms	Kammy	Holt		3019 SR15	Belle Glade	FL	33430
US Sugar Corp. (USSC)	Judy	Sanchez	Director of Communications	111 Ponce de Leon Ave	Clewiston	FL	33440
W.E. Schelechter & Sons	Bill	Schelechter		P.O. Box 910	Belle Glade	FL	33430
1000 Friends of Florida	Joanne	Davis	Community Planner	1029 North Lakeside Drive	Lake Worth	FL	33460
1000 Friends of Florida	Doug	Coward		1833 Southeast Hideaway Circle	Port St. Lucie	FL	34952
Audobon of Florida	Eric	Draper		2507 Calloway Rd, Suite 103	Tallahassee	FL	32303
Audubon Society of the Everglades	Rosa	Durando		PO Box 16914	West Palm Beach	FL	33416
Broward County Sierra Club	Roderick	Tirrell		2101 North East 55th court	Fort Lauderdale	FL	33308-3111
Collier County Conservancy	John	Fitch		1450 Merrihue Dr	Naples	FL	33942
Defenders of Wildlife				1130 17th St NW	Washington	DC	20036
Ducks Unlimited				One Waterfowl Way	Memphis	TN	38120
Everglades Coordinating Council	Albert	Bryan		5120 SW 170 2nd Ave	Davie	FL	33331-1223
Everglades Foundation	Nathaniel	Reed	Director	P.O. Box 1213	Hobe Sound	FL	33475
Everglades Protection Society, Inc.	Barbra Jean	Powell	Secretary	22951 SW 190 Ave	Miami	FL	33170
Florida Audubon	Clay	Henderson	President	1331 Palmetto Ave, Suite 110	Winter Park	FL	32789
Florida Audubon Society	Jacquelyn	Cohen		444 Brickle Ave, Suite 850	Miami	FL	33131
Florida Audubon Society	Herbert	Kale, Ph.D.		460 Hwy 436	Cassleberry	FL	32707-4939
Florida Audubon Society	Charles	Lee		1101 Audubon Way	Maitland		32751
Florida Audubon Society	Jerry	Lorenz. Ph.D		Tavernier Science Center, 115 Indian Mound Trail	Tavernier	FL	33070
Florida Native Plant Society	Cynthia	Plockelman		311 Franklin Rd	West Palm Beach	FL	33405
Florida Sportsman Conservation Association	Brian	Jones		13918 61st Lane North	West Palm Beach	FL	33412
Florida Sportsman Conservation Association	Byron	Maharrey		329 Emerson Circle	Palm Springs	FL	33416
Florida Sportsman Conservation Association	Doug	Sharp		7407 Southern Blvd	West Palm Beach	FL	33413
Florida Sportsman Conservation Association	Bishop	Wright		P.O. Box 20051	West Palm Beach	FL	33146-0051
Florida Wildlife Federation	Manley	Fuller		P.O. Box 6870	Tallahassee	FL	32314
Friends of Lake Okeechobee	Carroll	Head		2252 SW 22nd Cir.	Okeechobee	FL	34974
Friends of the Everglades	John	Childe		606 Pines Rd	Palmyra	PA	17078
Friends of the Everglades	Juanita	Greene		700 and Biltmore Way, Suite 407	Miami	FL	33134
Friends of the Everglades	Joseph	Podgor		244-A Westward Drive	Miami Springs	FL	33166
Lake Region Audubon Society				115 Lameraux Rd	Winter Haven	FL	33884
Loxahatchee Group Sierra Club	John	Koch		4303 Barbridge Road	West Palm Beach	FL	33406-6411
Loxahatchee Group Sierra Club	Drew	Martin		500 Lake Ave. #102	Lake Worth	FL	33460
Loxahatchee Group Sierra Club	Elaine	Usherson		298 NW 11th St	Boca Raton	FL	33432
Arthur R. Marshall Foundation	John	Marshall		P.O. Box 2620	Palm Beach	FL	33480
National Audubon Society	Mark	Kraus		444 Brickle Ave, Suite 850	Miami	FL	33131

National Parks Conservation Association	Sara	Fain		450 N Park Rd	Hollywood	FL	33021	
National Wildlife Federation	Andrew	Schock		1330 W. Peachtree St, Ste 475	Atlanta	GA	30309	
Natural Resources Defense Council	Brad	Sewell		40 W. 20th St, 11th Floor	New York	NY	10011	
Ridge Audubon Society				P.O. Box 148	Babson Park	FL	33827	
Sierra Club	Kay	Gates		2700 SW 3rd AVe, Suite 2F	Miami	FL		33129
The Conservancy- CollierCounty	John	Fitch		1450Merrihue Drive	Naples	FL	33942	
The Everglades Foundation	Thomas	VanLent, Ph.D		18001 Old Cutler Rd., Suite 625	Palmetto Bay	FL	33157	
The Florida Biodiversity Project	Brian	Scherf		1120 NW 1st Ave	Fort Lauderdale	FL	33311	
The Nature Conservancy	Robert	Benedick		222 South Westemonte Dr, Ste 300	Altamonte Springs	FL	32714	
The Wilderness Society (Miami)				4203 Ponce de Leon Blvd.	Coral Gables	FL	33146	
Tropical Audubon Society	Karsten	Rist		5530 Sunset Drive	Miami	FL	33143	
Trust for Public Lands	Brenda	Marshall	Project Manager	7900 Red Rd, Suite 25	South Miami	FL	33143	
Airboat Association of Florida	Dave	Balman		P.O. Box 650611	Miami	FL	33165	
Caloosahatchee River Citizen's Assoc.				P.O. Box 1165	Fort Myers	FL	33902	
Caloosahatchee River Citizen's Assoc.				P.O. Box 2199	LaBelle	FL	33975	
Florida Cattlemen's Association	Joe	Pearce		P.O. Box 421929	Kissimmee	FL	34742-1929	
Marine Industries Association of Florida	William	Guy, Jr.		P.O. Box 430746	Miami	FL	33243	
Okeechobee Waterway Association				4968 SE Dixie Hwy	Stuart	FL	33499	
Pahokee Marina				190 Northlake Drive	Pahokee	FL	33476	
St. Lucie River Initiative	Max	Quackenbos		1778 NW Palmetto Terr.	Stuart	FL	34994-9423	
Trail Glades Bassmasters	Rick	Persson		10901 SW 106th Ave	Miami	FL	33176	
United Waterfowlers	David	Lithgow	Boardmember	9611 N. US HWY 1 #337	Sebastian	FL	32958	
Delta Waterfowl Foundation				P.O. Box 3128	Bismarck	ND		58502
Army Corps Of Engineers	Shawn	Komlos		3301 Gun Club Road	West Palm Beach	FL	33406	
Army Corps Of Engineers	Tori	White		1400 Centrepark Blvd., Ste 750	West Palm Beach	FL	33401	
Army Corps Of Engineers	Stuart	Mclean		701 San Marco Blvd.	Jacksonville	FL	32207	
Army Corps Of Engineers	Brooks	Moore		701 San Marco Blvd.	Jacksonville	FL	32207	
Army Corps Of Engineers	David	Hobbie		701 San Marco Blvd.	Jacksonville	FL	32207	
Army Corps Of Engineers	David	Bauman		701 San Marco Blvd.	Jacksonville	FL	32207	
Department of Agriculture	Christine	Coffin		1450 N. Crome Ave, Suite 102	Florida City	FL	33034	
Department of Agriculture	Diane	Conway		5200 US Hwy 441 N	Okeechobee	FL	34972	
Department of Agriculture	John	Folks		Room 171 C-28, 3128 Corner Blvd	Tallahassee	FL	32399-1650	
Department of Agriculture NRCS	Edward	Wright	State Conservationist	2614 NW 43rd St	Gainesville	FL	32606-6611	
Department Of Energy Office of Environmental Compliance			Director	1000 Independence Ave. Southwest, room 4g064	Washington	DC	20585	

Department of Housing and Urban Development				Regional Environmental Clearance Officer	75 Spring St. SW, Room 600-C	Atlanta	GA	30303-3388
Department Of Justice	Environmental & Natural Resources Div.	Neil	McAililey		99 NE 4th St	Miami	FL	33132-2111
Department of the Interior	FIU/SFERTF	Terrence	Salt	Senior Everglades Policy Adviser	11200 SW 8th St, OE Bldg, Room 148	Miami	FL	33199
DOI	Bureau of Indian Affairs			Superintendent	6075 Stirling Rd	Hollywood	FL	33024
DOI	US Fish and Wildlife Service			Regional Director	1875 Century Blvd.	Atlanta	FL	30345-3301
DOI	US Fish and Wildlife Service, Loxahatchee Wildlife Refuge	Rolf	Olsen	Refuge Manager	10216 Lee Rd	Boynton Beach	FL	33437-4796
DOI	US Fish And Wildlife, South Florida Ecological Services	Paul	Souza	Field Supervisor	1339 20th St	Vero Beach	FL	32960-3559
DOI	Geological Survey, Water Resources Division	Arturo	Torres	SFWMD Liaison	3110 SW 9th Ave	Fort Lauderdale	FL	33315
DOI	National Park Service, Everglades National Park	Dan	Kimball	Superintendent	40001 State Road 9336	Homestead	FL	33034-6733
DOI	Office of Env. Affairs	Jonathan	Deason	Director	1849 C St NW, MS2340	Washington	DC	20240
DOI	South FL. Ecosystem Rest. Task Force	Greg	May		11200 SW 8th St, FIU,SERC, OE Bldg, Rm 165	Miami		33199
Environmental Protection Agency	Region IV	Heinz	Mueller	Chief	61 Forsyth St, SW	Atlanta	GA	30303-3104
Environmental Protection Agency	Office of Federal Activities, NEPA Program Office	Anne	Norton Miller	Director	1200 Pennsylvania Ave. Northwest, 2251, Room 7209	Washington	DC	20460
Environmental Protection Agency		Veronica	Fasselt		400 N Congress Ave, Ste 120	West Palm Beach	FL	33401
Environmental Protection Agency	Office of Federal Activities, NEPA Compliance Division, EIS Filing Section	Robert	Hargrove	Director	Ariel Rios bldg, S Oval Lobby, Mail Code 2252-A, Room 7241,1200 Pennsylvania Ave. NW	Washington	DC	20460
Environmental Protection Agency	South Field Office	Richard	Harvey		400 N. Congress Ave, Suite 120	West Palm Beach	FL	33401
Federal Emergency Management Administration	Insurance & Mitigation Division	Gregg	Chappell		500 C St SW, room 714	Washington	DC	20472
Federal Emergency Management Administration	Region IV	Philip	May	Reg Director	1371 Peachtree St NE	Atlanta	GA	30341
Federal Emergency Management Administration	Region IV, Insurance & Mitigation Division	Todd	Davidson	Reg Director	3003 Chamblee-Tucker Road	Atlanta	GA	30341
Federal Highway Administration		Jim	John	Division Administrator	545 John Knox Rd, Ste 100	Tallahassee	FL	32303
House Of Representatives	District 22	Ron	Klein	Representative	625 N Flagler Drive	West Palm Beach	FL	33401

House Of Representatives	District 23	Alcee	Hastings	Representative	5725 Corporate Way, Suite 208	West Palm Beach	FL	33407
Department of Agriculture	Natural Resources Conservation Service, Soil Section	Deanna	Anderson	State Soil Scientist	2614 NW 43rd St	Gainesville	FL	32606-6611
NOAA	Habitat Conservation Division	Miles	Croon	Assistant Regional Administrator	263 13th Avenue South	St. Petersburg	FL	33701
NOAA	National Marine Fisheries Service, SE Regional Office, Protected Resources Division	David	Bernhart	Assistant Regional Administrator	9721 Executive Center Drive North/263 13th Ave S.	St. Petersburg	FL	33702-2449/33701
United States Senate	Senator	Mel	Martinez	Senator	800 Douglas Rd, Suite 148	Coral Gables	FL	33134
United States Senate	Senator	Bill	Nelson	Senator	500 Australian Ave, Suite 125	West Palm Beach, Florida	FL	33401
Department of Agriculture and Consumer Services		Charles	Bronson	Commissioner	3125 Conner Blvd., room 269	Tallahassee	FL	32399-1650
Department of Agriculture and Consumer Services		John	Folks		3128 Conner Blvd., Rm 171, C28	Tallahassee	FL	32399
Department of Agriculture and Consumer Services		Linda	McCarthy		3301 Gun Club Rd	West Palm Beach	FL	33406
Department of Environmental Protection		Mike	Sole	Secretary	3900 Commonwealth Blvd., MS 47	Tallahassee	FL	32399-3000
Department of Environmental Protection	Div. of Water Res. Mgmt & Env Planning	Dianne	Crigger		400 N. Congress Ave, Suite 200	West Palm Beach	FL	33401
Department of Environmental Protection	FL Coastal Mgmt Program	Sally	Mann	Director	3900 Commonwealth Blvd., MS47	Tallahassee	FL	32399-2400
Department of Environmental Protection	State Clearinghouse	Lauren	Milligan		3900 Commonwealth Blvd., MS47	Tallahassee	FL	32399
Department of Environmental Protection	FL St. Clearinghouse	James	Quinn	Program Administrator	3900 Commonwealth Blvd., MS 49	Tallahassee	FL	32399
Department of Environmental Protection	Wetlands Resource Mgmt.	Janet	Llewellyn	Director	2600 Blairstone Road	Tallahassee	FL	32399-3000
Department of State	Div of Hist. Resources, State Historic Preservation Office	Fred	Gaske		RA Grey Building, 500 S Bronough St, Room 402	Tallahassee	FL	32399-0250
Department of Environmental Protection		Greg	Knecht	Director of Ecosystem Projects	3900 Commonwealth Blvd., MS 45	Tallahassee	FL	32399
Department of Environmental Protection.	Division of Water Resource Management, Water Quality Standards & Special Projects Program	Shelly	Yaun		2600 Blair Stone Road, M. S., 3560	Tallahassee	FL	32399-3000
Department of Environmental Protection.		Ernie	Marks		2600 Blair Stone Road, M. S., 3560	Tallahassee	FL	32399-3000
Department of Transportation	Dist. 4, Planning & Env. Mgmt.	Amie	Goddeau		3400 West Commercial Blvd.	Fort Lauderdale	FL	33309-3421

Department Of Transportation	District 1, SW Area Office	Larry	Slayback		P.O. Box 1030	Fort Myers	FL	33902
Department Of Transportation	Env, Mgmt. Office	Robert	Crim		605 Suwannee St, MS 37	Tallahassee	FL	32399
Department Of Transportation	District 1	Elizabeth	Serdynski		P.O. Box 1030	Fort Myers	FL	33902
Fish & Wildlife Conservation Commission	Everglades Protection and Restoration	Joe	Walsh		255 154th Ave	Vero Beach	FL	32968-9041
Fish & Wildlife Conservation Commission	Director	Ken	Haddad		620 S. Meridian St.	Tallahassee	FL	32399-1600
House of Representatives	District 82	William	Snyder	Representative	2400 S. Federal Hwy, Suite 250	Stuart	FL	34994-4590
House of Representatives	District 76	Garrett	Richter	Representative	3301 East Tamiami Trail, Ste 203	Naples	FL	34112-4961
House of Representatives	District 77	Denise	Grimsley	Representative	205 S. Commerce Ave, Ste B	Sebring	FL	33870-3604
House of Representatives	District 78	Richard	Machek	Representative	5341 W. Atlantic Ave, Ste 3004	Delray Beach	FL	33484-8102
House of Representatives	District 84	Priscilla	Taylor	Representative	1 E. 11Th St, Suite 410	Riviera Beach	FL	33404-6921
House of Representatives	District 85	Shelley	Vana	Representative	1280 N. Congress Ave, Suite 100	West Palm Beach	FL	33409
House of Representatives	District 86	Maria Lorts	Sachs	Representative	203 NE 1st Ave	Delray Beach	FL	32399-1300
House of Representatives	District 88	Susan	Bucher	Representative	2240 Palm Beach Lakes Blvd., Suite 102	West Palm Beach	FL	33409
State Senate	District 27	Dave	Aronberg	Senator	400 Senate Office Building, 404 S. Monroe St, Room 404	Greenacres	FL	33463
State Senate	District 25	Jeffrey	Atwater		400 Senate Office Building, 404 S. Monroe St, Room 406	Tallahassee	FL	32399
State Senate	District 28	Ken	Pruitt	Senator	400 Senate Office Building, 404 S. Monroe St, Room 312	Tallahassee	FL	32399-1100
State Senate	District 30	Ted	Deutch		400 Senate Office Building, 404 S. Monroe St, Room 324	Tallahassee	FL	32399-1100
State Senate	District 39	Larcenia	Bullard		400 Senate Office Building, 404 S. Monroe St, Room 218	Miami	FL	33143
Broward County	Board of Commissioners	Pam	Brangaccio		115 S. Andrews Ave	Fort Lauderdale	FL	33301
Glades County		Wendell	Taylor	Administrator	500 Ave J.	Moore Haven	FL	33471
Glades County	Board of Commissioners	Robert	Geisler		500 Ave J.	Moore Haven	FL	33471
Glades County	Public Library	Pam	Brown		P.O. Box 505, Riverside Drive	Moore Haven	FL	33471
Hendry County	Hendry County Administration	Judi	Kennington-Korf	Assistant County Administrator	165 S. Lee St., Suite A	Labelle	FL	33975
Hendry County	Hendry County Administration	Wayne	O'neal	County Administrator	P.O. Box 1760	Labelle	FL	33935-1760
Hendry County	Public Library, Clewiston	John	Fraser		120 West Osceola Ave.	Clewiston	FL	33440
Martin County	Commission	Duncan	Ballantyne	Administrator	2401 SE Monterey Rd	Stuart	FL	34996

Martin County	Commission	Lee	Weberman	Chair	2401 SE Monterey Rd	Stuart	FL	34996
Martin County	Office of Water Quality	Paul	Millar	Manager	2401 SE Monterey Rd	Stuart	FL	34996
Palm Beach County	Board of Commissioners	Robert	Weisman	County Administrator	P.O. Box 1989, 301 N. Olive Ave	West Palm Beach	FL	33402-1989
Palm Beach County	Board of Commissioners, District 5	Burt	Aaronson	Commissioner	P.O. Box 1989, 301 N. Olive Ave	West Palm Beach	FL	33402-1989
Palm Beach County	Board of Commissioners, District 4	Mary	McCarty	Commissioner	P.O. Box 1989, 301 N. Olive Ave	West Palm Beach	FL	33402-1989
Palm Beach County	Board of Commissioners, District 6	Jess	Santamaria	Commissioner	P.O. Box 1989, 301 N. Olive Ave	West Palm Beach	FL	33402-1989
Palm Beach County	Board of Commissioners, District 1	Karen	Marcus	Commissioner	P.O. Box 1989, 301 N. Olive Ave	West Palm Beach	FL	33402-1989
Palm Beach County	Board of Commissioners, District 2	Jeff	Koons	Commissioner	P.O. Box 1989, 301 N. Olive Ave	West Palm Beach	FL	33402-1989
Palm Beach County	Board of Commissioners, District 3	Warren	Newell	Commissioner	P.O. Box 1989, 301 N. Olive Ave	West Palm Beach	FL	33402-1989
Palm Beach County	Board of Commissioners, District 7	Addie	Greene	Commissioner	P.O. Box 1989, 301 N. Olive Ave	West Palm Beach	FL	33402-1989
Palm Beach County	Main Library	Bob	Davidson		3650 Summit Blvd.	West Palm Beach	FL	33406
Palm Beach County	Engineering	George	Webb	Cpunty Engineer	2330 N Jog Road	West Palm Beach	FL	33411
Palm Beach County	Environmental Resources Management	Richard	Walesky	Director	2300 N Jog Road, 4th Floor	West Palm Beach	FL	33411
Palm Beach County	Legislative Delegation Office	Ed	Chase		301 N. Olive Ave, 1st floor	West Palm Beach	FL	33401
Palm Beach County	Parks And Recreation	Dennis	Eschelman		2700 6th Ave South	Lakeworth	FL	33461
Palm Beach County	Water Resources	Kenneth	Todd	Manager	P.O. Box 1989, 301 N. Olive Ave	West Palm Beach	FL	33402
Palm Beach County	Library System, Bell Glade Branch Public Library	Barbara	Oeffner		530 S. Main St.	Bell Glade	FL	33430
Palm Beach County	Library System, Southbay	Phyllis	Lilley	Branch Manager	375 SW 2nd Ave	South Bay	FL	33493
Belle Glade	City Clerk's Office	Don	Garrett	Mayor/Board of Commissioners Seat B	municipal complex, 110 SW Ave E	Bell Glade	FL	33430
Belle Glade	City Clerk's Office	William	Underwood	City Manager	Municipal Complex, 110 Southwest Ave. E.	Belle Glade	FL	33430
Belle Glade	Water Resources	Ken	Robinson	Director	2055 W. Canal St	Bell Glade	FL	33430
Belle Glade	City Clerk's Office	Mary	Kendall	Vice Mayor	Municipal Complex, 110 Southwest Ave. E.	Belle Glade	FL	33430
Belle Glade	Chamber Of Commerce	Brenda	Bunting	Executive Director	450 S. Main St.	Bell Glade	FL	33430

Belle Glade	City Clerk's Office	Gwendolyn	Asia-Williams	Commissioner, Seat E	110 Martin Luther King Boulevard W	Bell Glade	FL	33430
Belle Glade	City Clerk's Office	Ray	Sanchez, Ph.D.	Commissioner, Seat A	110 Martin Luther King Boulevard W	Bell Glade	FL	33430
Clewiston		Wendell	Johnson	City Manager	1150 W. Ventura Ave	Clewiston	FL	33440
Clewiston	City Commission	Mali	Chamness	Mayor	300 E. Sugarland Hwy	Clewiston	FL	33440
Pahokee	City Commission	Allie	Biggs	Commissioner	171 N. Lake Ave	Pahokee	FL	33476-1861
Pahokee	City Commission	Gary	McEntire	Commissioner	171 N. Lake Ave	Pahokee	FL	33476-1861
Pahokee	City Commission	Henry	Crawford	Commissioner	171 N. Lake Ave	Pahokee	FL	33476-1861
Pahokee		JP	Sasser	Mayor	171 N. Lake Ave	Pahokee	FL	33476-1861
Pahokee		Keith	Babb	Vice Mayor	171 N. Lake Ave	Pahokee	FL	33476-1861
Pahokee		Lillie	Latmore	City Manager	171 N. Lake Ave	Pahokee	FL	33476-1861
Pahokee	Chamber of Commerce				115 E. Main St.	Pahokee	FL	33476-1805
South Bay		Clarence	Anthony	Mayor	335 SW 2nd Ave	South Bay	FL	33493
South Bay		Esther	Berry	Vice Mayor	335 SW 2nd Ave	South Bay	FL	33493
South Bay	City Commission	Joe	Kyles	Commissioner	335 SW 2nd St	South Bay	FL	33493
South Bay	City Commission	Shirley	Walker-Turner	Commissioner	335 SW 2nd Ave	South Bay	FL	33493
South Bay		Tony	Smith	City Manager	335 SW 2nd Ave	South Bay	FL	33493
South Bay	City Commission	John	Wilson	Commissioner	335 SW 2nd Ave	South Bay	FL	33493
Southbay	Chamber of Commerce				335 SW 2nd Ave	South Bay	FL	33493
West Palm Beach		Ray	Liberti		200 2nd St	West Palm Beach	FL	33401
West Palm Beach	Public Utilities	Kenneth	Rearden		P.O. Box 3506	West Palm Beach	FL	33402-3506
Florida Inland Navigation District		Gail	Byrd		1314 Marcinski Ave	Jupiter	FL	33477-9498
Indian Trail Improvement District		Jay	Foy		13476 61st Street, North	West Palm Beach	FL	33412
Lake Worth Drainage District	Engineering	Patrick	Martin	Director	13081 Military Trail	Delray Beach	FL	33484-1105
Lake Worth Drainage District		Bill	Winters		13081 Military Trail	Delray Beach	FL	33484-1105
Southwest Florida Regional Planning Council		David	Burr		1926 Victoria Ave	Fort Myers	FL	33901
Treasure Coast Planning Council		Michael	Busha	Executive Director	301 East Ocean Blvd., Suite 300	Stuart	FL	34994
Everglades Agricultural Area	Protection District	John	Schelechter		P.O. Box 373, SR715	Belle Glade	FL	33430
Miccosukee Tribe of Indians of Florida		Joette	Lorion		7700 N Kendall Drive, Suite 303	Miami	FL	33216
Miccosukee Tribe of Indians of Florida		Billy	Cypress		PO Box 440021, Tamiami Station	Miami	FL	33144
Muscogee (Creek) Nation		Joyce	Bear		P.O. Box 580	Okmulgee	OK	74447
Poarch Band of Creek Indians		Robert	Thrower		8511 Jack Springs Road	Altmore	AL	36502
Seminole Nation of Oklahoma		Enosh Kelly	Haney	Principal Chief	P.O. Box 1498	Wewoka	OK	74884
Seminole Tribe of Florida	Water Resources	Craig	Tepper	Director	6073 Stirling Rd	Hollywood	FL	33024-2198
Seminole Tribe of Florida		Mitchell	Cypress		6073 Stirling Rd	Hollywood	FL	33024-2198
Seminole Tribe of Florida, AH-TAH-THI-KI Museum		Bill	Steele	THPO	HC61, Box 21-A	Clewiston	FL	33440
Broward County League Of Women Voters					202 SW 63rd Ave	Plantation	FL	33317
Florida League of United Latin American Citizens		Brent	Wilkes	National Executive Director	2000 L Street NW, Suite 610	Washington	DC	20036

Florida Alliance of Retired Americans		Tony	Fransetta	President	127731 W Forest Hill Blvd., Ste 211	Wellington	FL	33414
South Florida American Federation of Labor- Congress of Industrial Organizations					7910 NW 25th St, Suite 201	Miami	FL	33122
Economic Council of Palm Beach County		Karen	Woodson		1555 Palm Beach Lakes Blvd., Suite 950	West Palm Beach	FL	33401-2375
Florida International University	Dept. of Bio. Sciences			Dean	11200 SW 8th Street	Miami	FL	33199
Nova Southeastern University, Env & land use Law Center	Shepard Broad Law Center	Richard	Grosso	Executive Director and General Counsel	3305 College Ave.	Fort Lauderdale	FL	33314
SFERTF, c/o Florida International University		Greg	May		1200 SW 8th St, OE 148	Miami	FL	33199
St. Thomas University		Fred	Light		16401 NW 37th Ave	Miami Gardens	FL	33054
University of Florida		Richard	Raid		PO Box 111564	Gainsville	FL	32611
Barron Collier Companies, Government Affairs	Government Affairs	Tom	Jones	Director	2600 Golden Gate Parkway	Naples	FL	34105
Carney Environmental Consulting Services		Stephen	Carney	President	6435 SW 85th St.	Miami	FL	33143
E. F. Gaines Surveying Services, Inc.		Elizabeth	Gains		8481 Yorkshire Lane	Fort Myers	FL	33919
Environmental & Land-Use Law Center Inc.		Lisa	Interlandi	Regional Counsel	330 US Highway 1, Suite 3	Lake Park	FL	33403
EPJV		Zafar	Hyres		701 San Marco Blvd.	Jacksonville	FL	32207
Florida Power and Light Company					9700 SW 344th St	Goulds	FL	33170
Florida Power and Light Company	Environmental Services Department	Florette	Braun	Principal Environmental	700 University Blvd., P.O. Box 14000	Juno Beach	FL	33408
GCDC		Autrie	Moore-Williams		401 SW 2nd St	Belle Glade	FL	33430
		Virginia	Barnett		4241 SW 10th court	Miami	FL	33165
		Clayton	Diebel		113 20th St, route 4	Okeechobee	FL	34974
		Rosa	Durando		10308 heritage Farms Rd	Lake Worth	FL	33467
		Robin	Fail		1340 SW Ave C Pl	Belle Glade	FL	33430
		John	Geddie		8040 Bellamah Court Northeast	Albuquerque	NM	87110
		Wayne	Nelson		P.O. Box 16061	West Palm Beach	FL	33416
		Joseph	Padgor		244-A Westward Drive	Miami Springs	FL	33166
		Geraldine	Shelton		1340 Southwest Ave C. Place	Belle Glade	FL	33430
		John	Sugden		524 S. Andrews Ave, #102n	Fort Lauderdale	FL	33301
		Martha	Musgrove		2432 Edgewater Drive	West Palm Beach	FL	33406
		Ron	Smolla		12025 SE Laurel Lane	Hobe Sound	FL	33455
Landers & Parsons		Philip	Parsons	Vice President	1555 Palm Beach Lakes Blvd., Suite 1105	West Palm Beach	FL	33401
LBFH, Inc		Howard	Searcy		2029 Palm Beach Lakes Blvd., Suite 600	West Palm Beach	FL	33409
LGS, Inc		Leah	Schad		3634 North Flagler Drive	West Palm Beach	FL	33407
MacVicar, Federico & Lamb, Inc.		Thomas	MacVicar		4524 W. Gun Club Rd, Ste. 201	West Palm Beach	FL	33415
Pahokee Marine					190 Northlake Drive	Pahokee	FL	33476

APPENDIX G

AGENCY COORDINATION

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

REPLY TO
ATTENTION OF

July 5, 2007

Regulatory Division
Special Projects and Enforcement Branch

Mr. Mike Piccirilli
Chief of Federal Assistance
U.S. Fish and Wildlife Service
1875 Century Boulevard, Suite 240
Atlanta, Georgia 30345

Dear Mr. Piccirilli:

In accordance with regulations pertaining to the National Environmental Policy Act (Title 40 of the Code of Federal Regulations, part 1501.6), I am formally inviting your agency to become a cooperating agency for an Environmental Impact Statement (EIS) on the South Florida Water Management District's (SFWMD) proposed action to construct Stormwater Treatment Areas (STAs) on Compartments B and C of the Everglades Agricultural Area (EAA). The purpose of the project is to reduce nutrient loads of stormwater and runoff from the EAA and nutrient concentrations in water delivered from Lake Okeechobee prior to distribution into the Everglades Protection Area in order to meet legal requirements. The U.S. Army Corps of Engineers' (Corps) primary federal involvement associated with the project is the discharge of fill material in Waters of the United States. Pursuant to Section 404 of the Clean Water Act (33 U.S.C. 1344), the SFWMD must obtain a Department of the Army permit prior to construction and operation of the STAs.

Please note that cooperating agency status involves actions and responsibilities beyond that normally associated with a commenting or permitting agency. The Compartments B and C lands were originally purchased using funds appropriated to the Department of Interior (DOI) under the authority of the 1996 Farm Bill (Federal Agriculture Improvement and Reform Act of 1996, Public Law 104-127, 110 Stat. 1022). The DOI, Corps, Florida Department of Environmental Protection, and the SFWMD are parties to a Framework Agreement under which all interim uses of lands acquired with these funds must be consistent with the ultimate use of the property in a congressionally authorized federal project for Everglades restoration. As such, the SFWMD will need to obtain land use approval from DOI prior to construction of the STAs. As a cooperating agency, DOI could assist the Corps in the process to ensure the EIS fulfills the National Environmental Policy Act (NEPA) requirements associated with evaluating the land use change.

The formulation of the project, alternatives, and mitigation will be in accordance with the requirements of the NEPA (42 U.S.C. 4321 et seq.), Council for Environmental Quality (CEQ)

Regulations (40 C.F.R. Parts 1500-1508), and the NEPA Implementation Procedures for the Regulatory Program (Appendix B to 33 C.F.R. Part 325). The EIS will fully consider a range of environmental, economic, and social factors. As a cooperating agency, you must fully consider the views, needs, and benefits of competing interests.

Under your status as a commenting agency, you may recommend actions not proposed by the SFWMD. You may also impose requirements to the extent allowed under your legal authority as a permitting agency. Conflict with the lead agency may be resolved through mediation, placing a dissenting opinion in the EIS, withdrawing your cooperating agency status, or the Lead agency pursuing an EIS without you as a cooperating agency. For additional information see the "Rights and Responsibilities of Lead and Cooperating Agencies" (Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations, Council on Environmental Quality, 1981).

Please indicate whether you accept this invitation to become a cooperating agency (as described above) within 30 days of the date of this letter. If you have any questions, please contact Ms. Tori White by telephone at 561-472-8888 or by email at tori.white@saj02.usace.army.mil.

Sincerely,

David S. Hobbie
Chief, Regulatory Divison

United States Department of the Interior

FISH AND WILDLIFE SERVICE
1875 Century Boulevard
Atlanta, Georgia 30345

JUL 26 2007

IN REPLY/REFER TO:
FWS/R4MS/FA

Mr. David S. Hobbie
Chief, Regulatory Division
Jacksonville District Corps of Engineers
Special Projects and Enforcement Branch
P.O. Box 4970
Jacksonville, Florida 32232-0019

Dear Mr. Hobbie:

This is to acknowledge the District of the letter dated July 5, 2007, formally inviting the U.S. Fish and Wildlife Service (Service) to become a cooperating agency for an Environmental Impact Statement (EIS) on the South Florida Water Management District's (SFWMD) proposed action to construct Stormwater Treatment Areas (STAs) on Compartments B and C of the Everglades Agricultural Area (EAA). It is our understanding that the U.S. Army Corps of Engineers' (Corps) primary federal involvement associated with this project is the discharge of fill material in Waters of the United States, pursuant to Section 404 of the Clean Water Act (33 U.S. C. 1344).

On July 18, 2007, we met with Ms. Tori White of the Jacksonville District to discuss the Service's role as a cooperator on this project. It is our understanding the Corps has selected a contractor (Tetra Tech, Inc.) to prepare the EIS and that SFWMD will incur all cost associated with the preparation and publication of the document.

Due to the fact that lands within the project area were acquired with funds appropriated to the Department of Interior (DOI) under the authority of the 1996 Farm Bill (P.L. 104-127, 110 Stat. 1022) the Service agrees to participate as a cooperating agency on the EIS. We understand the EIS will fully consider a range of environmental, economic, and social factors and as a cooperating agency the Service will fully consider the views, needs, and benefits of competing interest. In order to meet our responsibilities as a cooperating agency, the Service agrees to: (1) to provide knowledgeable personnel after the close of the comment period to discuss comments relative to the Service's role in this project; (2) provide knowledgeable personnel at the public meeting following the release of the draft EIS to answer specific questions regarding the land exchange, interim changes in landuse and our trust resources; (3) to review and comment on chapters/sections of the NEPA document that are relevant to the Service's role in this project; and (4) any cost (e.g. labor/travel) relative to our participation in this project is the responsibility of the Service.

TAKE PRIDE® IN AMERICA

We look forward to working with Corps on this project. If you have any questions or comments, please do not hesitate to contact me at 404-679-4154 or Fernando Núñez-García of my staff at 404-679-7457.

Sincerely yours,

Michael L. Piccirilli
Chief - Federal Assistance

Enclosures

APPENDIX H

ALTERNATIVES MODELING REPORT

STA Phosphorus Modeling For the 2010 Planning Period: Alternative A

Work Order No. CN040902-WO03R2

Prepared for

US Army Corps of Engineers®

South Florida Water Management District

Prepared by

Gary Goforth, Inc.
10924 SW Hawkview Circle
Stuart, FL 34997
(772) 223-8593

Under Subcontract to

TETRA TECH EC, INC.
759 South Federal Highway, Suite 100
Stuart, FL 34994
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FINAL REPORT

December 23, 2007

December 23, 2007

Ms. Kelly Gracie
Project Manager
Tetra Tech EC, Inc.
1901 S. Congress Avenue
Ste. 270
Boynton Beach, FL 33426

U.S. Army Corps of Engineers
South Florida Water Management District
Tetra Tech Contract No. CN040902-WO03R2
STA Phosphorus Modeling for the 2010 Period: Alternative A

Dear Ms. Gracie:

I am pleased to submit this draft report titled "STA Phosphorus Modeling for the 2010 Planning Period: Alternative A". This document constitutes the final deliverable for Alternative A under Tetra Tech EC Purchase Order 1025202 dated October 19, 2007.

I gratefully acknowledge the valuable contributions of the staff of the South Florida Water Management District, and the technical review by yourself, staff of the District and of the U. S. Army Corps of Engineers, in the development of the information contained in this report.

Certification

I hereby certify, as a Professional Engineer in the State of Florida, that the information in this document was assembled under my direct personal charge. This report is not intended or represented to be suitable for reuse without specific verification or adaptation by the Engineer. This certification is made in accordance with the provisions of the Laws and Rules of the Florida Board of Professional Engineers under Chapter 61G15-29, Florida Administrative Code.

_____
Gary F. Goforth, P.E. Florida P.E. # 35525

Date: 12/23/07
Reproductions are not valid unless signed, dated and embossed with Engineer's seal

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1. Introduction

As part of the evaluation of alternatives for the Environmental Impact Statement (EIS) associated with the full build-out of Compartments B and C, the phosphorus removal performance of the Stormwater Treatment Areas (STAs) were projected using the DMSTA model (Walker and Kadlec 2005). Four alternatives were simulated for the EIS, and this report presents the results of the STA simulations for Alternative A: The No Action Alternative. Daily flow data from the South Florida Water Management Model (SFWMM) for this alternative were combined with phosphorus data to create the input time series for the DMSTA model, following the method utilized in the recently updated STA performance projections (Goforth 2007b). For STA-5 and STA-6, historic basin flow and phosphorus data were utilized in lieu of the SFWMM output. Additional details of the input data set and model setup are provided in Sections 2-9 of this report.

1.1. Scope of Work

This work constitutes Task 7 of CN040902-WO03.Ta18 - Preparation of an Environmental Impact Statement for Everglades Agricultural Area Conveyance and Regional Treatment Project Plus Compartments B and C - between the District and Tetra Tech EC, Inc. This work is being performed under Purchase Order No. 1025202, which was issued on October 19, 2007, between Tetra Tech EC, Inc., and Gary Goforth, Inc.

The scope of work for this Purchase Order consists of conducting DMSTA modeling for the four alternatives being evaluated for the Environmental Impact Statement associated with the full build-out of Compartments B and C. To expedite the preparation of the EIS, separate reports were generated for each alternative summarizing the phosphorus performance projections. This report presents the results of the simulation of Alternative A: The No Action Alternative; subsequent reports will be prepared for the other alternatives.

1.2. Regional Conditions for the 2010 Planning Period

This present analysis focuses on the regional conditions that are anticipated to be present in the 2010 time frame, without the full build-out of Compartments B and C. The anticipated status of the water resources projects within the basins tributary to the STAs (shown in **Figure 1-1**) is provided in the **Table 1-1**. These regional hydrologic conditions were simulated using the 2010A8 Base Simulation of the SFWMM. Appendix A contains a more complete summary of the key modeling assumptions used in this simulation throughout the South Florida area.

Figure 1-1: Overview of EAA And Surrounding Basins.

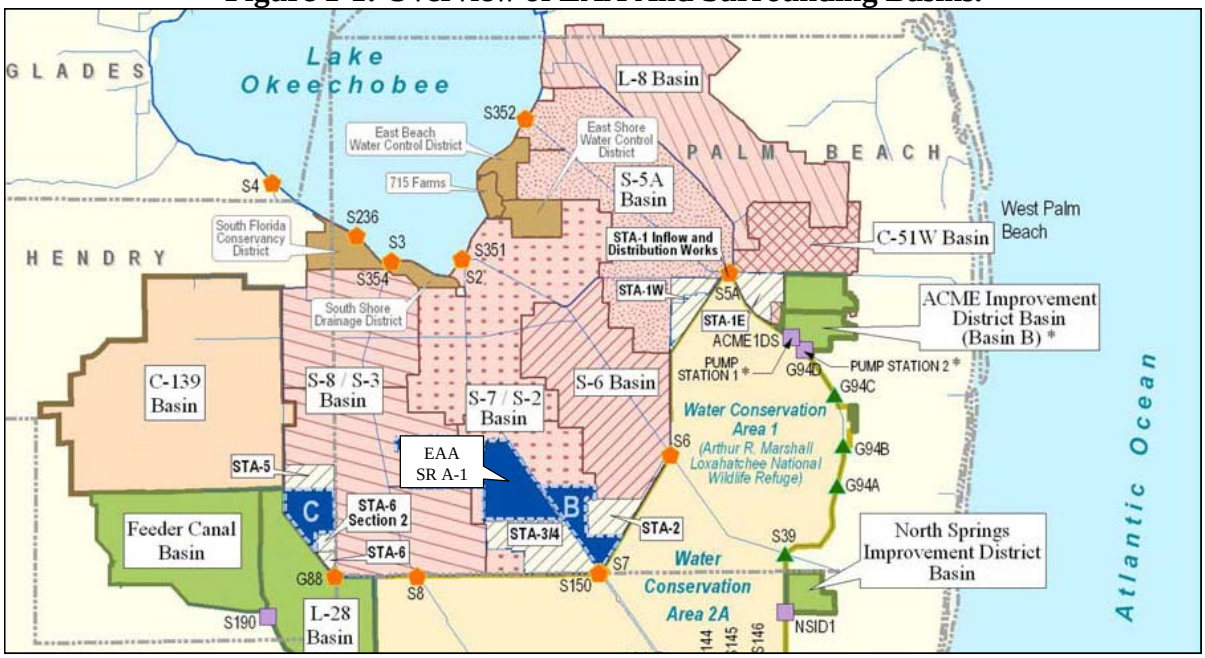


Table 1-1: Anticipated Status of Regional Water Resource Projects in the 2010 Period.

Project	Status During the 2010 Period
Original Everglades Construction Project	All 6 STAs are fully operational, including STA-6 Section 2. Approximately 20% of the S-5A Basin runoff diverted to the Hillsboro Canal through existing facilities. Ch. 298 District and 715 Farms diversions in place. No EAA runoff reduction adjustment necessary to account for Best Management Practices.
Compartment B	Cell 4 of STA-2 is fully operational, and is the only operational component of Compartment B.
Compartment C	Flow-way 3 of STA-5 is fully operational, and is the only operational component of Compartment C.
EAA Storage Reservoir A-1	16,000-acre reservoir operable with a 12-ft depth
Acme Basin B	Runoff directed away from WCA-1 and discharged to C-51W, and then to STA-1E
L-8 Reservoir	Partially completed: 870 acres, depth 44 ft. Facilities not completed for diversion away from S-5A/C-51W.
Everglades Agricultural Area Conveyance and Regional Treatment Project (ECART)	Not completed

1.3. Phosphorus Modeling

The phosphorus removal performance of the STAs, EAA Storage Reservoir and treatment areas of Compartments B and C were estimated using the July 5, 2007 release of the Dynamic Model for Stormwater Treatment Areas, Model Version 2 (DMSTA, 09/30/2005), developed for the U.S. Department of the Interior and the U.S. Army Corps of Engineers by W. Walker and R. Kadlec. Outflow phosphorus concentrations are calculated based on:

- daily input data, consisting of flow, phosphorus concentrations, rainfall evapotranspiration (ET), depth (optional) and releases (optional);
- mass and water balances calculated for each time step for each treatment cell or reservoir compartment,
- treatment area configuration, cell size, flow path width, vegetation type, estimates of hydraulic mixing, outflow hydraulics, seepage estimates;
- phosphorus removal rates that can be either user-defined or available within DMSTA based on calibration data sets extracted from numerous vegetation types, phosphorus characteristics and hydraulic regimes of many south Florida wetland treatment systems through early 2005.

DMSTA was used to predict annual and long-term average flow-weighted mean concentrations, with a 365-day averaging period. In addition, STA performance uncertainty analyses were conducted, using the 10%, mean and 90% values of the settling rates for the specific vegetation types. These projections are subject to the assumptions, constraints and limitations of DMSTA modeling and STA operations, including the following.

- DMSTA calibrations are based upon data from fully functional treatment cells with viable vegetation communities that have near optimal performance. The range of treatment characteristics for each vegetation type is summarized in **Table 1-2**.
- In addition to consideration of the range of calibration treatment characteristics, other important factors not yet incorporated into the model include calcium requirements, antecedent soils, and assumed intensive management, particularly for the enhanced vegetation types.
- DMSTA generates error/warning notices if simulated conditions exceed the range of the calibration characteristics presented in **Table 1-3**.
- The use of the DMSTA calibration vegetation types, e.g., SAV, assumes that the vegetation will be maintained in the long-term. This assumption may produce overly optimistic long-term performance projections for treatment areas subject to periodic disturbance such as hurricanes, droughts and other extreme conditions.
- DMSTA does not allow a treatment cell to dry out, and hence does not reproduce the vegetative responses and phosphorus dynamics (e.g., post-dry-out spikes) observed in treatment cells that periodically go dry. Hence the phosphorus removal performance simulated for large wetland systems with limited water availability, such as Compartment C, may be overly optimistic. Other methods should be used to estimate

the supplemental water required to either avoid dryout or to estimate the phosphorus performance for these large systems that experience periodic dryout.

- STA performance projections are subject to the complete set of DMSTA assumptions, which can be found at http://www.wwwalker.net/DMSTA/index.htm.
- Additional uncertainty exists in flow estimates and regional water management.

Table 1-2: Calibration Dataset Ranges (Draft, from www.wwwalker.net/dmsta/).

Variable	Units	EMERG		PEW		SAV		PSTA		RESERV	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Calib Period	days	641	4017	693	4017	693	1522	245	1062	1460	5843
Calib K	m/yr	12	23	27	49	46	64	18	34	1	8
Mean Depth	cm	35	76	38	66	62	87	13	52	90	304
Max Depth	cm	47	131	71	123	75	132	22	65	187	457
Freq Z < 10 cm	%	0%	9%	0%	13%	0%	0%	0%	38%	0%	0%
Hydraulic Load	cm/day	1.1	6.5	3.0	6.9	5.1	12.7	2.8	14.6	0.4	17.6
Residence Time	days	8	66	7	22	5	17	1	19	8	714
Velocity	cm/sec	0.04	0.45	0.16	0.48	0.30	0.64	0.01	1.12	0.05	1.32
Flow/Width	md/2	26	210	69	276	162	374	3	132	68	1135
Areal Load	mg/m2-yr	382	2908	222	1919	1649	5279	142	1447	212	11781
Storage	mg/m2	921	4299	171	1494	903	2959	96	911	200	4994
Inflow Conc	ppb	39	283	17	110	36	153	7	56	78	1144
FWM Outflow Conc	ppb	20	150	8	28	15	57	6	15	50	767
Outflow GeoMean	ppb	19	125	8	21	15	55	5	15	39	725
Marsh GeoMean	ppb	19	128	8	20	16	56	5	15	38	725

Table 1-3: Variable Ranges for Model Applications - Used to Trigger Warning Messages (Draft, from www.wwwalker.net/dmsta/).

Calibration	K (m/yr)	CV(K)	Depth (cm)		Q/W (m2/d)		Conc (ppb)		Freq Z < 10 cm (%)	
			Min	Max	Min	Max	Min	Max	Min	Max
EMERG_3	16.8	0.20	35	76	26	210	19.5	800	0%	9%
PEW_3	34.9	0.21	38	66	69	276	8.0	110	0%	13%
SAV_3	52.5	0.16	62	87	162	374	14.9	153	0%	0%
PSTA_3	23.6	0.22	13	60	3	132	5.9	56	0%	38%
RES_3	5.0	0.45	90	304	68	1135	50.3	1144	0%	0%

When evaluating DMSTA results, particular attention needs to be given to the simulated outflow concentration, in that DMSTA does not constrain the reported values to minimum levels observed in the calibration data sets reported in Table 1-2. In other words, the model may forecast outflow concentrations lower than have been observed in the field. Forecast error is inherent when using any simulation model. These errors result from limitations of the calibration datasets (measurement error, short duration, etc.) and other sources that are difficult to quantify. Based on information from the DMSTA website (http://www.wwwalker.net/DMSTA/index.htm) and Walker (personal communication), the DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. In addition, the following disclaimer is offered by the authors of DMSTA:

DMSTA2 is a modeling tool with a constrained range of applicability. It has been developed and calibrated to information specific to South Florida. It is intended for use in evaluating Everglades Protection Project by individuals with experience in hydrologic & water quality

modeling. It should not be exercised in any situation without careful examination of all features, assumptions and calibrations, as they relate to a given application and to the supporting research upon which the calibrations are based. When properly calibrated by the user, the hydraulics portion of DMSTA2 is thought to generate predictions that are adequate for the purpose of simulating phosphorus dynamics. The hydraulic simulations should not be relied upon for designing flood control measures, designing levees, for any other purposes in which life and/or property may be at risk. The user assumes all risks associated with using the model for designing treatment areas or any other purpose.

Proper use of DMSTA2 requires thorough understanding of calibration results & limitations & further documentation provided below. Sample input files are for demonstration purposes. None reflect actual designs. Atmospheric deposition, hydraulic, or seepage input values should not be interpreted as defaults or recommended values. While P cycling parameters are suggested for various situations and within well-defined calibration boundaries, users must decide which calibration is appropriate in any situation.

Additional information on the development, calibration and application of DMSTA can be found at: **www.wwwalker.net/dmsta.**

The general method used for development of the daily flow and phosphorus input data sets was described in *Updated STA Inflow Data Sets for the 2010 Period* (Goforth 2007b); STA-specific variations to this general method are described in Sections 2-9. Daily rainfall and ET for all the treatment areas except STA-5 and STA-6 were provided by the District as part of the SFWMM modeling. For STA-5 and STA-6, actual rainfall and ET were used based on local gauges. Treatment cell dimensions, hydraulic characteristics and vegetation types were consistent with values used in the 2005 EAA Regional Feasibility Study (ADA/Burns & McDonnell 2005), modified for consistency with updated information obtained from the on-going Compartments B and C design (Brown & Caldwell 2007, URS 2007). All STA enhancements described in the Everglades *Long-Term Plan* scheduled for completion by the end of 2010 are assumed to be completed (Burns & McDonnell 2003, as amended).

2. STA-1E

Working in concert with STA-1W, STA-1E will capture and treat runoff from the C-51 Basin, Acme Basin B, L-8 Basin, S-5A Basin and the East Beach Water Control District (EBWCD). A schematic of STA-1E is presented in **Figure 2-1**. The daily flow terms from the SFWMM simulation were utilized for the DMSTA modeling with the following modifications:

- ***For all alternatives***, 25% of the L-8 Basin runoff passing through S-5AE is assumed to be captured and treated in STA-1E, compared to the complete diversion of L-8 Basin runoff assumed in the SFWMM.
- ***For all alternatives,*** the SFWMM flow term for the transfer of water from the STA-1 Inflow Basin to STA-1E was modified to balance the phosphorus loading rate among STA-1E and STA-1W, yielding a PLR of approximately 2 $g/m^2/yr$ for both STAs, including re-directed flows from STA-1W that exceed the inflow capacity of 3,250 cfs.
- ***For all alternatives,*** runoff from the EBWCD was re-directed to STA-1E at the same percentage as the S-5A Basin runoff diversion to STA-1E. The estimate of runoff from the EBWCD and the remaining Ch. 298 Districts and Closter Farms was based on historic runoff volumes from these basins to the maximum extent practicable, as the SFWMM simulations do not well represent either the total discharges or the distribution of these discharges from these basins. Runoff volumes for the period May 1, 1994 through April 30, 2000 are available for direct use, while the runoff volumes for the remainder of the 35-year period (May 1, 1965 through April 30, 1994) were estimated by indirect methods. Consistent with the approach utilized in the *Updated STA Inflow Data Sets for the 2010 Period*, daily runoff volumes were estimated as a fixed percentage of the daily runoff from the adjacent primary basin of the EAA (Goforth 2007b). That fixed percentage was derived as the ratio of the overall runoff from each Ch. 298 District basin to the overall runoff from the adjacent EAA basin over the WY1995-2007 period. In recognition of the changes in EAA basin contributing area over the WY1995-2007 period due to conversion of agriculture lands to STAs, the EAA runoff was normalized to the effective basin areas reflected in the SFWMM simulation.

The long-term average annual inflow to STA-1E by source is summarized in **Table 2-1** for Alternative A. Although the long-term goal is to treat less inflow in STA-1E than shown in Table 2-1, it is recognized that during the interim period before ECART and the L-8 Basin projects are complete, STA-1E inflows will be higher than the long-term goals. With complete diversion of the L-8 Basin runoff and without implementation of ECART, the long-term average annual inflows to STA-1E will be lower than presented in Table 2-1. It should also be noted that significantly higher phosphorus loads to STA-1E are estimated in the present analysis than in the 2005 EAA Regional Feasibility Study (ADA/Burns & McDonnell 2006), due principally to higher phosphorus concentrations during the updated period of record, observed following the 2004 hurricanes. A longer period of record will be

utilized in the 2009 update of the STA data sets, and it is likely that lower concentrations will be applied to future STA-1E inflows at that time.

Figure 2-1: Schematic of STA-1E (Not to Scale).

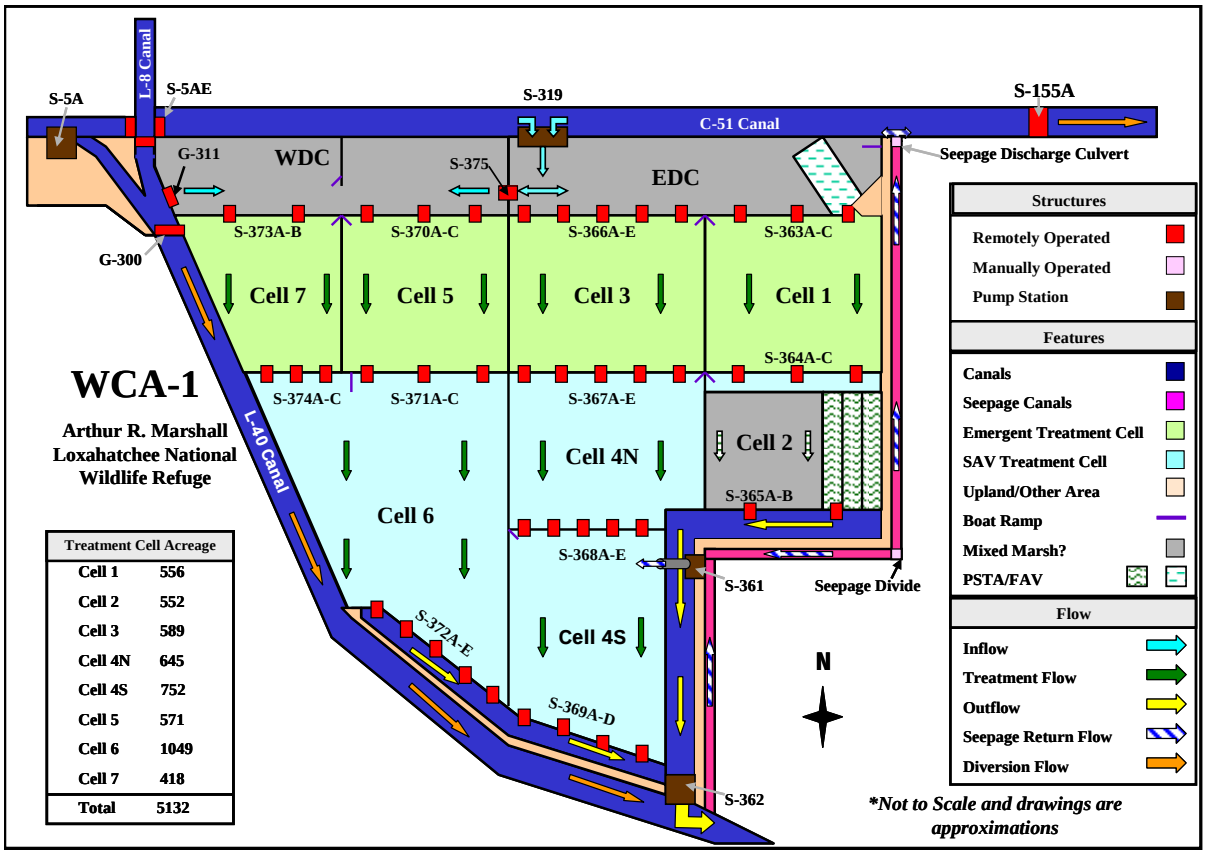


Table 2-1: Summary of Long-term Average Annual Inflow to STA-1E.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
C-51W Basin	131,035	31,734	196
Acme Basin B	35,054	4,913	114
L-8 Basin	8,515	1,012	96
S-5A Basin	18,231	3,796	356
EBWCD	977	564	468
Total	**193,812**	**42,021**	**176**

Prior to construction, the existing ground elevation at STA-1E exhibited a slope from the northeast to the southwest of more than 7 feet. When constructed by the U. S. Army Corps of Engineers, the majority of the treatment cells were leveled to minimize hydraulic short-circuiting and areas of deep depths. However, the East and West Distribution Cells were not leveled and still retain the relatively steep slope that existed prior to the STA construction. As a result, the cells are characterized by areas of high ground without wetland vegetation,

areas of deep ponds, and an irregular inundation/dry out cycle. Unlike the Buffer Cell of the prototype STA (the Everglades Nutrient Removal Project), phosphorus removal within the East and West Distribution Cells is not anticipated to be reliable. Hence, these cells are not considered as part of the effective treatment area of STA-1E, and were modeled with an effective settling rate of 0.01 m/yr.

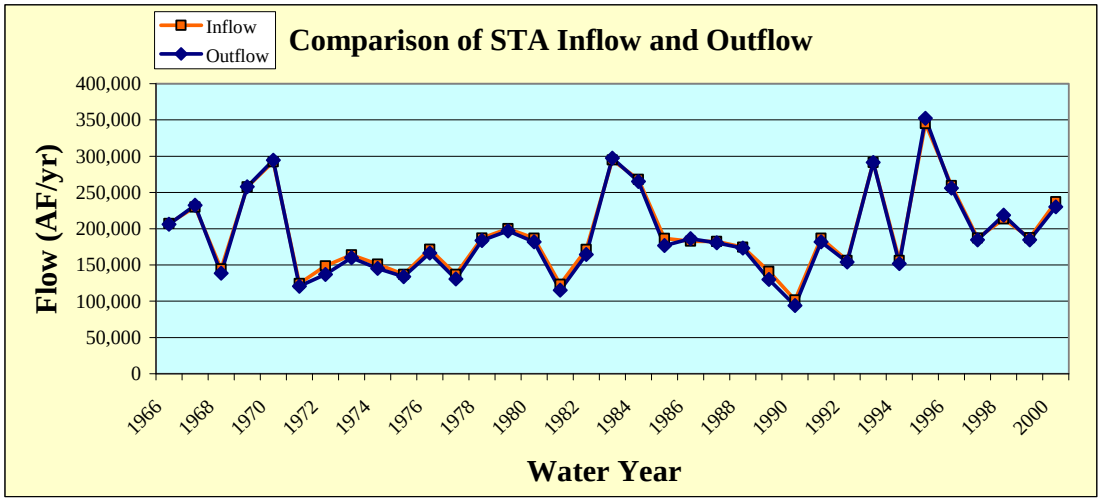
A summary of STA-1E phosphorus performance for Alternative A is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix B. A long-term flow-weighted mean outflow concentration range of 20-35 ppb was forecast, however this includes years when DMSTA forecast levels that fell below the calibration range of 15 ppb for an SAV system, and hence may be optimistic. DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix B. For Cells 2, 4S and 4S, the mean depths were slightly lower than the SAV calibration range. Also for Cell 2, the mean flow/width was slightly lower than the range in the SAV calibration data sets. For all alternatives, a portion of the L-8 Basin runoff was simulated as being diverted to the eastern C-51 Basin.

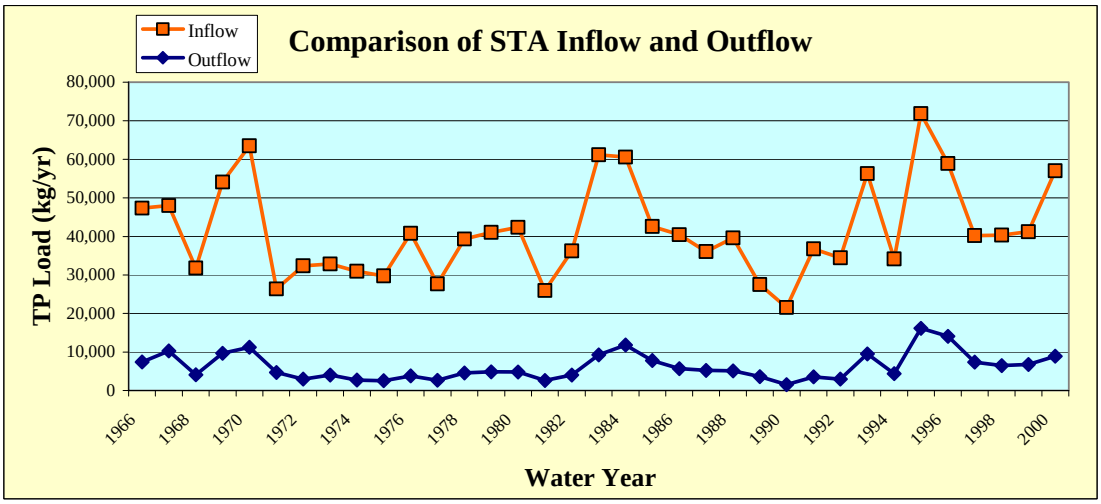
Table 2-2: Summary of DMSTA Results for STA-1E.

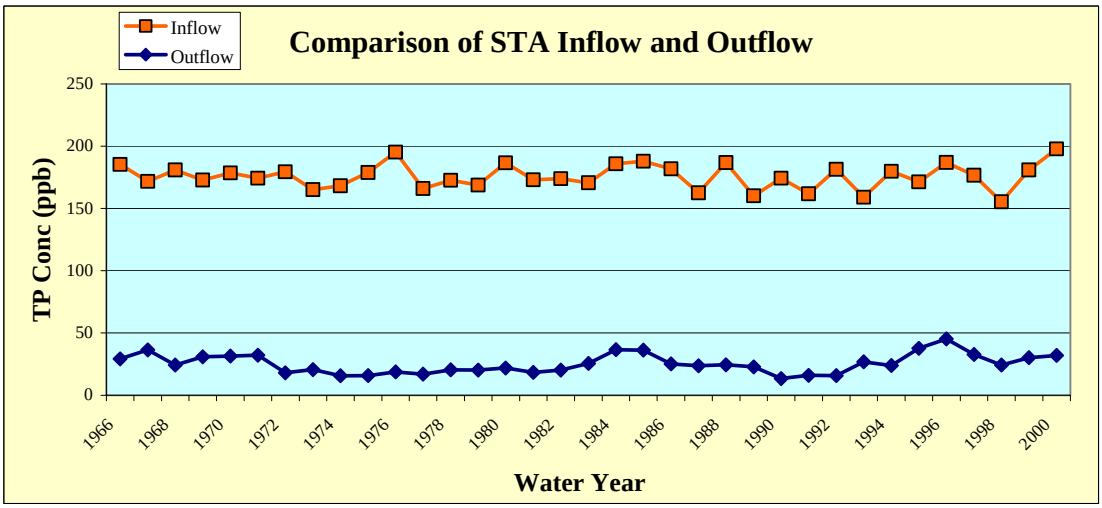
Parameter	Unit	STA-1E
Effective Treatment Area	acres	5,132
Average Annual Inflow		
Volume	AF/yr	193,812
TP Load	kg/yr	42,021
TP Concentration	ppb	176
Average Annual Outflow		
Volume	AF/yr	190,600
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	20.0 (10)
Mean Estimate of Settling Rate	ppb	26.8 (1)
Lower Conf. Limit for Settling Rate	ppb	35.3
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	17.9
Mean Estimate of Settling Rate	ppb	24.2
Lower Conf. Limit for Settling Rate	ppb	32.4
TP Load (Using Mean TP Conc.)	kg/yr	6,299
Diversion Volumes and Loads		
Volume	AF/yr	25,545
TP Load	kg/yr	3,037
TP Concentration	ppb	96

Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.
2. Outflow values highlighted in yellow had one or more years of the 35 years simulated below the low end of the calibration data set (enumerated by the number in parentheses).
3. Diversions related to STA-1E are directed to eastern C-51.

Figure 2-2: Comparison of Inflows and Outflows for STA-1E.







3. STA-1W

Working in concert with STA-1E, STA-1W will capture and treat runoff from the S-5A Basin, East Beach Water Control District (EBWCD), L-8 Basin and a portion of C-51 Basin, Acme Basin B when re-directed from STA-1E. A schematic of STA-1W is presented in **Figure 3-1**. The daily flow terms from the SFWMM simulation were utilized for the DMSTA modeling with the following modifications:

- ***For all alternatives,*** the SFWMM flow term for the transfer of water from the STA-1 Inflow Basin to STA-1E was modified to balance the phosphorus loading rate among STA-1E and STA-1W, yielding a PLR of approximately 2 $g/m^2/yr$ for both STAs, including re-directed flows from STA-1W that exceed the inflow capacity of 3,250 cfs.
- ***For all alternatives,*** the estimate of runoff from the EBWCD and the remaining Ch. 298 Districts and Closter Farms was based on historic runoff volumes from these basins to the maximum extent practicable, as the SFWMM simulations do not well represent either the total discharges or the distribution of these discharges from these basins. Runoff volumes for the period May 1, 1994 through April 30, 2000 are available for direct use, while the runoff volumes for the remainder of the 35-year period (May 1, 1965 through April 30, 1994) were estimated by indirect methods. Consistent with the approach utilized in the *Updated STA Inflow Data Sets for the 2010 Period*, daily runoff volumes were estimated as a fixed percentage of the daily runoff from the adjacent primary basin of the EAA (Goforth 2007b). That fixed percentage was derived as the ratio of the overall runoff from each Ch. 298 District basin to the overall runoff from the adjacent EAA basin over the WY1995-2007 period. In recognition of the changes in EAA basin contributing area over the WY1995-2007 period due to conversion of agriculture lands to STAs, the EAA runoff was normalized to the effective basin areas reflected in the SFWMM simulation.
- ***For all alternatives,*** a small amount of S-5A Basin Runoff was simulated in SFWMM as being diverted untreated to WCA-1 (4,544 AF/yr; 912 kg/yr and 163 ppb). For the purpose of estimating phosphorus removal performance, these diversions were simulated by DMSTA as being captured in STA-1W. Actual diversion may occur based on the daily hydraulic and treatment capacity of the treatment areas.

The long-term average annual inflow to STA-1W by source is summarized in **Table 3-1**. Although the long-term goal is to treat less inflow in STA-1W than shown in **Table 3-1**, it is recognized that during the interim period before ECART and the L-8 Basin projects are complete, STA-1W inflows will be higher than the long-term goals.

Figure 3-1: Schematic of STA-1W (Not to Scale).

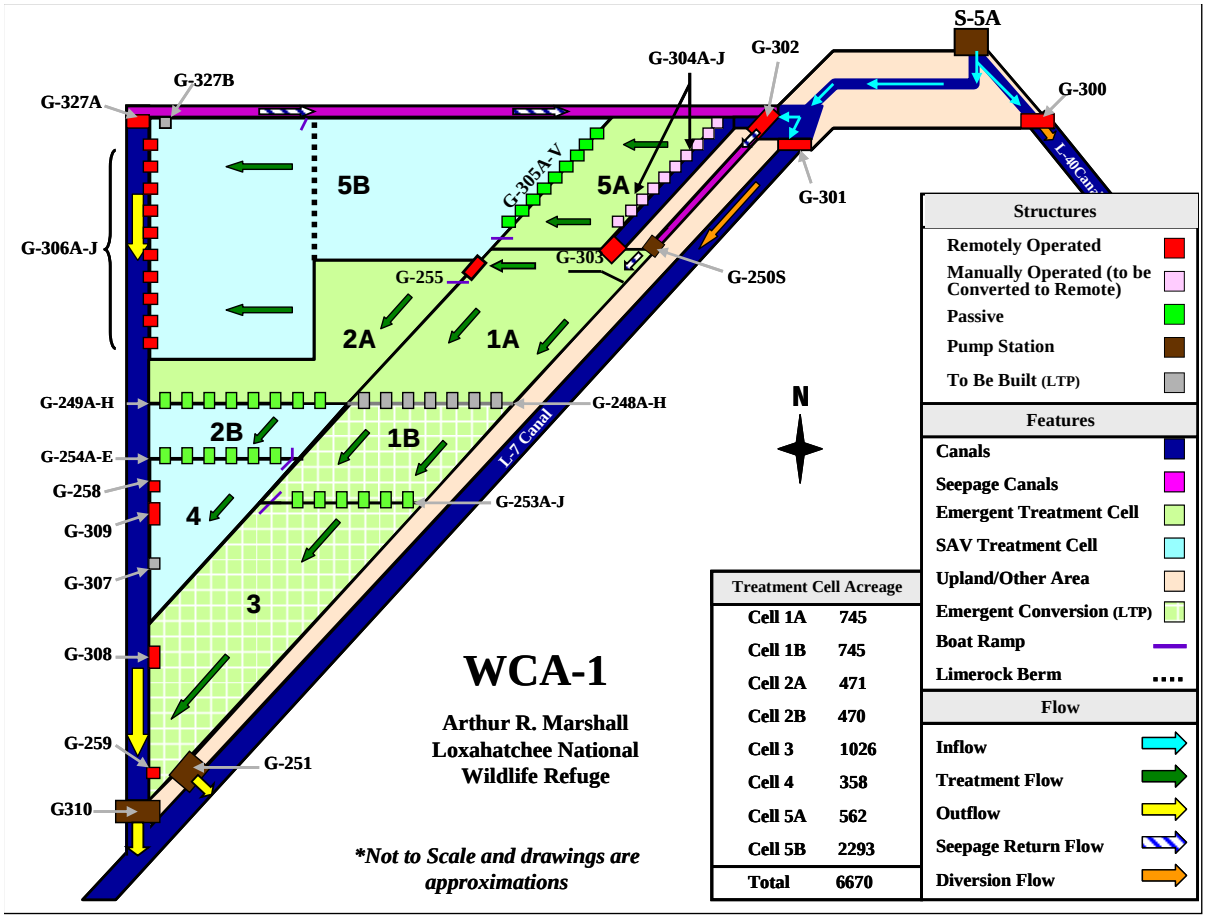


Table 3-1: Summary of Long-term Average Annual Inflow to STA-1W.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
S-5A Basin	228,653	45,852	163
EBWCD	15,122	8,724	468
Total	**243,799**	**54,580**	**181**

A summary of STA-1W phosphorus performance for Alternative A is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix B. A long-term flow-weighted mean outflow concentration range of 21-35 ppb was forecast, however this includes years when DMSTA forecast levels that fell below the calibration range of 15 ppb for an SAV system, and hence may be optimistic. DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix B. For Cells 2B, 4 and 5B the mean depths and flow/width were slightly below the range of the SAV calibration data sets. For Cell 1A, the flow/width was about 30% above the range of the emergent calibration data sets.

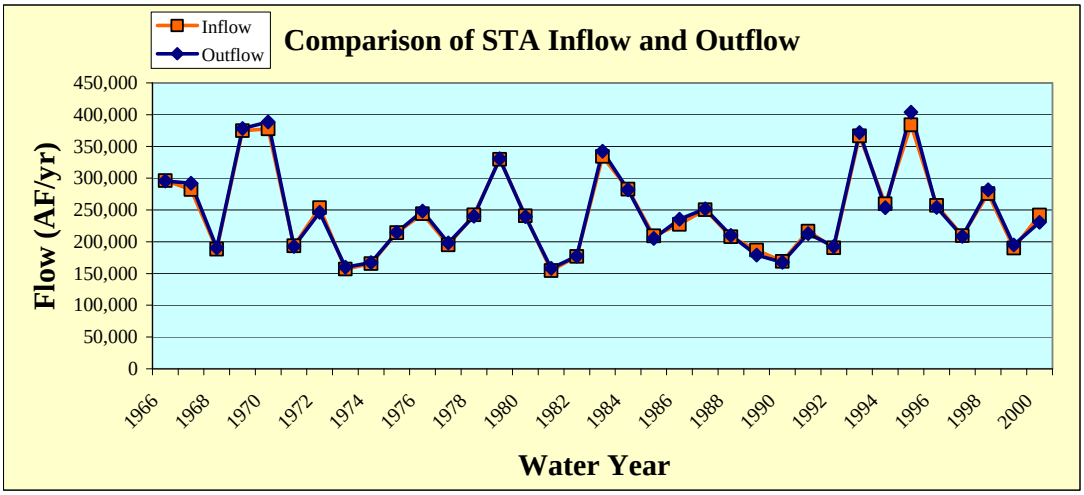
Table 3-2: Summary of DMSTA Results for STA-1W.

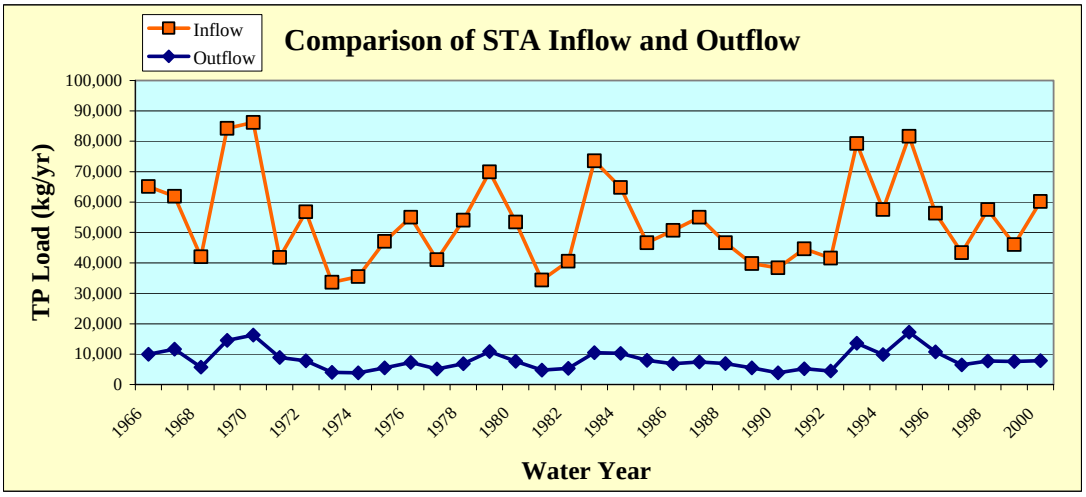
Parameter	Unit	STA-1W
Effective Treatment Area	acres	6,670
Average Annual Inflow		
Volume	AF/yr	243,799
TP Load	kg/yr	54,580
TP Concentration	ppb	181
Average Annual Outflow		
Volume	AF/yr	245,536
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	21.3 (4)
Mean Estimate of Settling Rate	ppb	27.3
Lower Conf. Limit for Settling Rate	ppb	34.9
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	20.2
Mean Estimate of Settling Rate	ppb	26.0
Lower Conf. Limit for Settling Rate	ppb	33.3
TP Load (Using Mean TP Conc.)	kg/yr	8,281
Diversion Volumes and Loads		
Volume	AF/yr	0
TP Load	kg/yr	0
TP Concentration	ppb	-

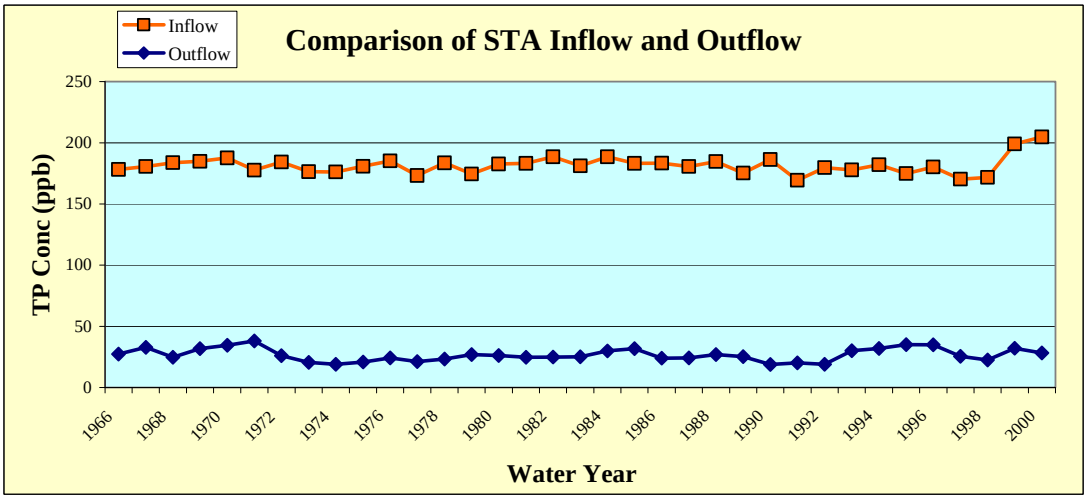
Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.

2. Outflow values highlighted in yellow had one or more years of the 35 years simulated below the low end of the calibration data set (enumerated by the number in parentheses).

Figure 3-2: Comparison of Inflows and Outflows for STA-1W.







4. STA-2

A schematic of STA-2 is presented in **Figure 4-1**. The daily flow terms from the SFWMM simulation were utilized for the DMSTA modeling with the following modifications:

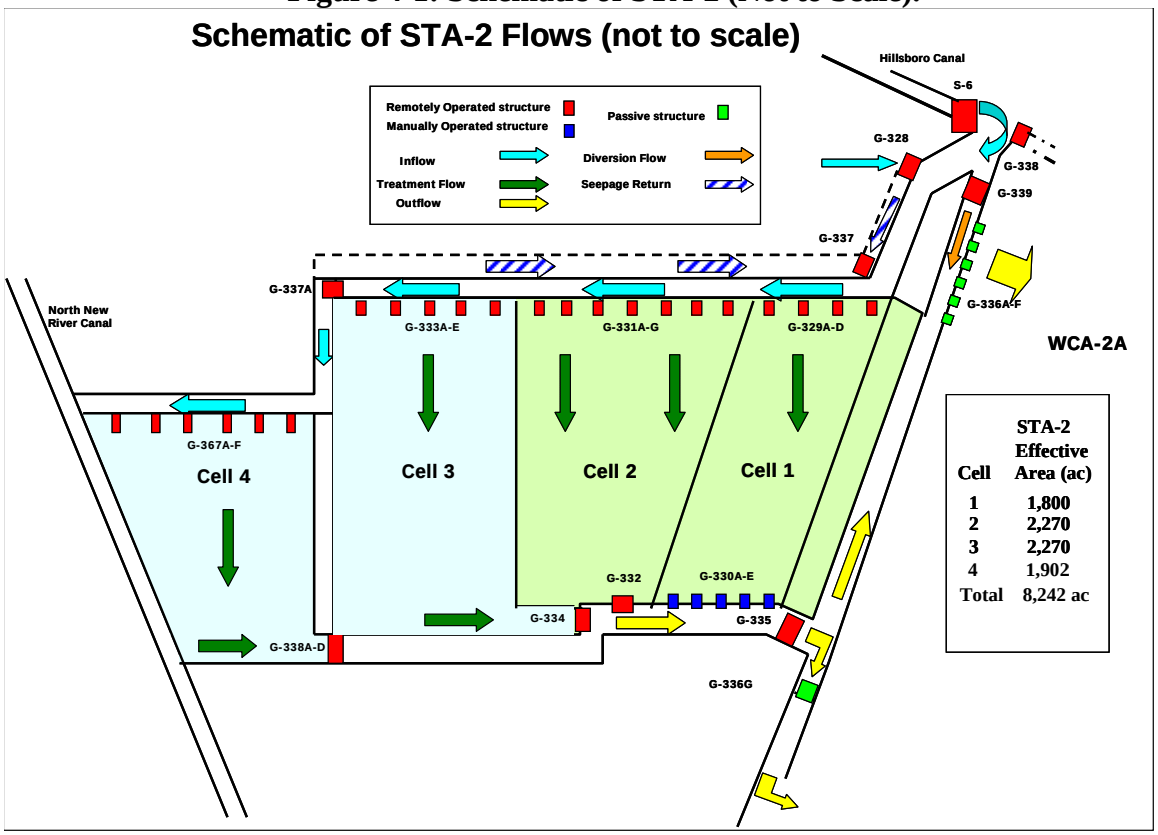
- ***For all alternatives,*** an additional inflow to the STA-2 Supply Canal equal to 38 cfs was added to the runoff inflow to represent the seepage from the adjacent WCA-2A into the adjacent Supply Canal for STA-2, which extends approximately 18,500 feet from the S-6 pump station to the northeast corner of Cell 1. A phosphorus concentration of 15 ppb was used to estimate the phosphorus contribution of this seepage.
- ***For all alternatives,*** the estimate of runoff from the ESWCD and Closter Farms was based on historic runoff volumes from these basins to the maximum extent practicable, as the SFWMM simulations do not well represent either the total discharges or the distribution of these discharges from these basins. Runoff volumes for the period May 1, 1994 through April 30, 2000 are available for direct use, while the runoff volumes for the remainder of the 35-year period (May 1, 1965 through April 30, 1994) were estimated by indirect methods. Consistent with the approach utilized in the *Updated STA Inflow Data Sets for the 2010 Period*, daily runoff volumes were estimated as a fixed percentage of the daily runoff from the adjacent primary basin of the EAA (Goforth 2007b). That fixed percentage was derived as the ratio of the overall runoff from each Ch. 298 District basin to the overall runoff from the adjacent EAA basin over the WY1995-2007 period. In recognition of the changes in EAA basin contributing area over the WY1995-2007 period due to conversion of agriculture lands to STAs, the EAA runoff was normalized to the effective basin areas reflected in the SFWMM simulation.

The long-term average annual inflow to STA-2 by source is summarized in **Table 4-1**. Although the long-term goal is to treat less inflow in STA-2 than shown in **Table 4-1**, it is recognized that during the interim period before the full Build-out of Compartment B, STA-2 inflows will be higher than the long-term goals.

Table 4-1: Long-term Average Annual Inflow to STA-2.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
WCA-2A Seepage	27,530	509	15
S-5A Basin	62,839	12,629	163
ESWCD & 715 Farms	31,993	5,215	132
S-6/S-2 Basin	187,373	24,435	106
Inflow Prior to Re-direction	309,734	42,788	112
Re-direct to Compartment B	0	0	-
Net Inflow	**309,734**	**42,788**	**112**

Figure 4-1: Schematic of STA-2 (Not to Scale).



A summary of STA-2 phosphorus performance for Alternative A is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix B. A long-term flow-weighted mean outflow concentration range of 17-26 ppb was forecast, however this includes years when DMSTA forecast levels that fell below the calibration range of 15 ppb for an SAV system, and hence may be optimistic. DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix B. For Cells 1 and 2, the long-term average inflow concentration was <2% above the range of the prior existing wetland (PEW) calibration data sets. For Cells 3 and 4 the mean depth and flow/width were slightly below the range of the SAV calibration data sets. For Cell 3, the long-term average outflow concentration was below the calibration range of 15 ppb for an SAV system, and this was set to 15 ppb in calculating the composite STA outflow concentration.

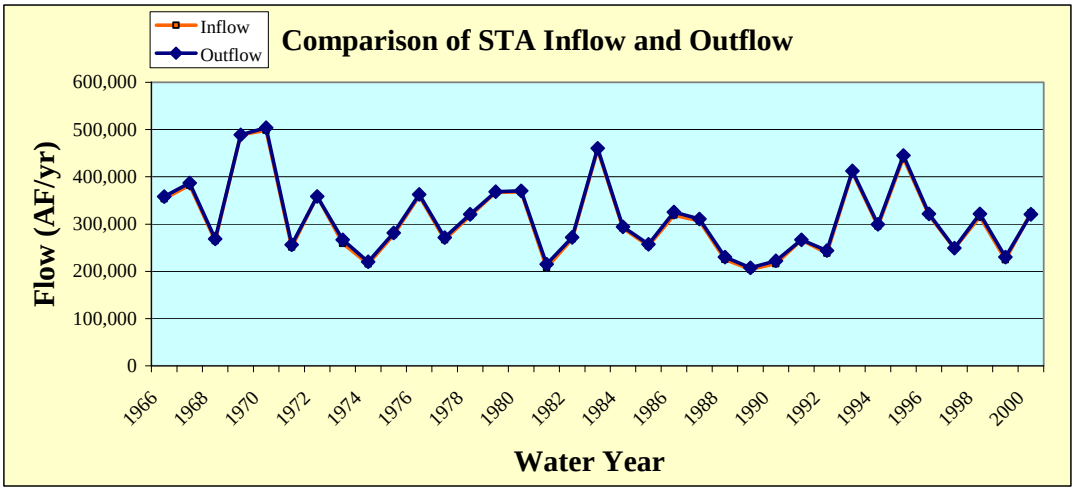
Table 4-2: Summary of DMSTA Results for STA-2.

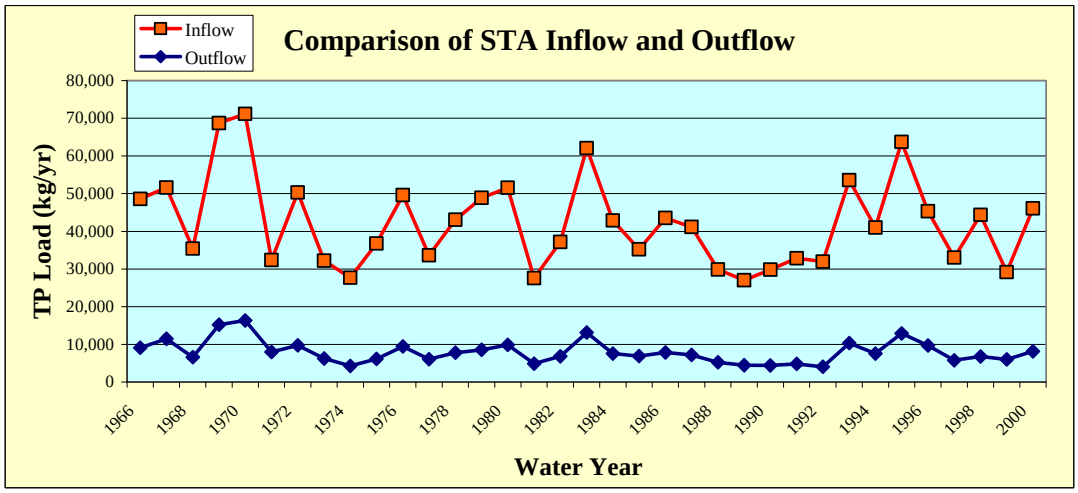
Parameter	Unit	STA-2
Effective Treatment Area	acres	8,240
Average Annual Inflow		
Volume	AF/yr	309,734
TP Load	kg/yr	42,788
TP Concentration	ppb	112
Average Annual Outflow		
Volume	AF/yr	313,628
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	16.7 (1)
Mean Estimate of Settling Rate	ppb	20.9
Lower Conf. Limit for Settling Rate	ppb	26.1
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	15.9
Mean Estimate of Settling Rate	ppb	20.0
Lower Conf. Limit for Settling Rate	ppb	25.1
TP Load (Using Mean TP Conc.)	kg/yr	8,083
Diversion Volumes and Loads		
Volume	AF/yr	0
TP Load	kg/yr	0
TP Concentration	ppb	-

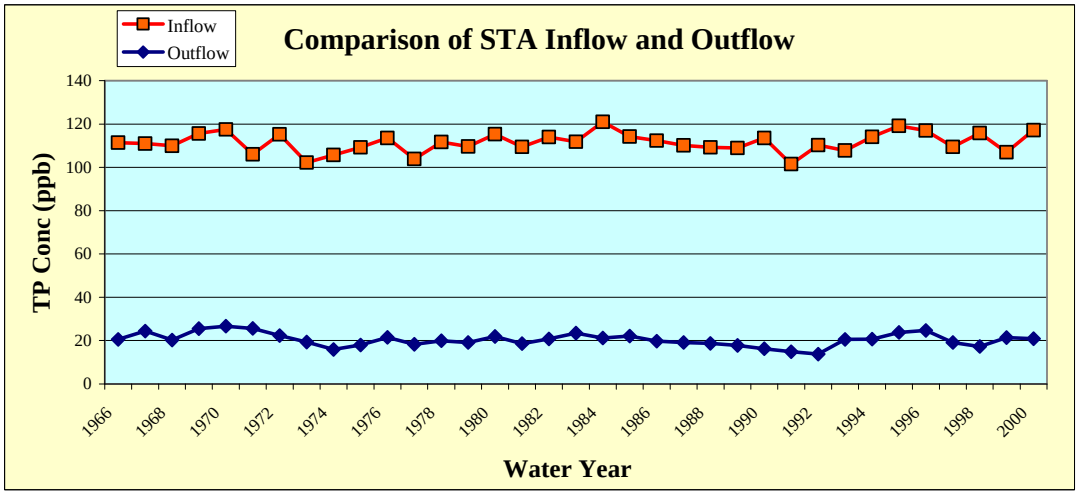
Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.

2. Outflow values highlighted in yellow had one or more years of the 35 years simulated below the low end of the calibration data set (enumerated by the number in parentheses).

Figure 4-2: Comparison of Inflows and Outflows for STA-2.







5. Compartment B

For Alternative A, Cell 4 of STA-2 is the only treatment area constructed in Compartment B, and modeling results for STA-2 are presented in Part 4 above.

6. EAA Storage Reservoir A-1

The network feature of DMSTA was used to model the combined EAA Storage Reservoir A-1 (EAASR A-1) and STA-3/4 system. This simulation generated a daily time series of flow and phosphorus levels from the reservoir back to the EAA for irrigation releases and to STA-3/4 for subsequent treatment. Upon review of the outflow time series to STA-3/4, it was observed that DMSTA was simulating releases during the dry season when the SFWMM results indicated no releases from the reservoir to STA-3/4. Further, the phosphorus concentrations associated with these dry season releases were quite high. For the purpose of the STA-3/4 inflow, the DMSTA-generated time series was replaced by the daily flows from the SFWMM results and the phosphorus concentrations from DMSTA. Although this won't resolve the high concentrations during the dry seasons, it will reduce the frequency of their occurrence. This new time series was then used in combination with basin runoff flows for an independent DMSTA simulation of STA-3/4 that allowed an uncertainty analysis of the STA performance, using the 10%, mean and 90% values of the effective settling rates for the specific vegetation types within STA-3/4.

For all alternatives, several assumptions were incorporated in the DMSTA modeling of the EAASR A-1:

- The SFWMM models the EAASR as two reservoir compartments, EARSN and EARSS. These were simulated in DMSTA as a single reservoir cell.
- Many reservoir characteristics were identical to those evaluated during the Basis of Design Report for the EAASR A-1 (Black and Veatch 2006):
  - The effective treatment area of the EAASR A-1 is 15,200 acres
  - The minimum depth for releases is 15.2 cm
  - The outflow weir depth for bypass is 12.5 ft
  - Seepage characteristics
- Other reservoir characteristics include:
  - The average flow width is 4.5 miles which is the average of the east-west width at the north end of EAASR and the width at the south end
  - The mean settling rate for the reservoir calibration data sets (5 m/yr) was used to simulate phosphorus removal in the reservoir.
- Daily rainfall and evapotranspiration from the SFWMM scenario were used in the DMSTA simulation.
- Reservoir depths from the SFWMM scenario were used in the DMSTA simulation. The depth time series provides an appropriate range of depths in the reservoir, based on model assumptions of footprint and volume, but is not intended as a true estimate

of reservoir depth. Reservoir depth time series are not recommended for calculations outside the 2x2, however, the depth time series can be used as a reference for feasibility-level work such as the present analysis.

- The daily flow time series from the SFWMM simulation quantifying the flow from the EAASR to STA-3/4 (WCS4S and EVBLSS) were used as outflow time series within the DMSTA simulation of the reservoir.

Using the recent phosphorus concentration of Lake Okeechobee releases as 100 ppb, the long-term average annual inflow to the EAASR A-1 by source is summarized in **Table 6-1**.

Table 6-1: Summary of Long-term Average Annual Inflow to EAASR A-1.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
S-7/S-2 Basin	121,084	14,280	96
S-8/S-3 Basin	100,062	10,290	83
Lake Okee.	318,145	39,224	150
Total	**539,290**	**63,794**	**96**

A summary of EAASR A-1 phosphorus performance for Alternative A is presented in the table and figures below. For WY1991, the simulated flow-weighted mean outflow concentration slightly exceeded the inflow concentration, although the outflow loads were only 10% of the inflow loads. A copy of the DMSTA output is presented in Appendix B. No warning or error messages were generated during the DMSTA simulation for the EAASR A-1. However, the minimum simulated depth was 1 cm, indicating that DMSTA numerically prevented dry-out by reducing the rates of ET, seepage, etc. In reality the reservoir would have dried out and phosphorus levels may temporarily increase upon rewetting; depending on how much time passes between rewetting and discharge to the STA, the impact of this temporary increase in phosphorus levels could vary, however, the long-term concentration shown in Table 6-2 may be optimistic.

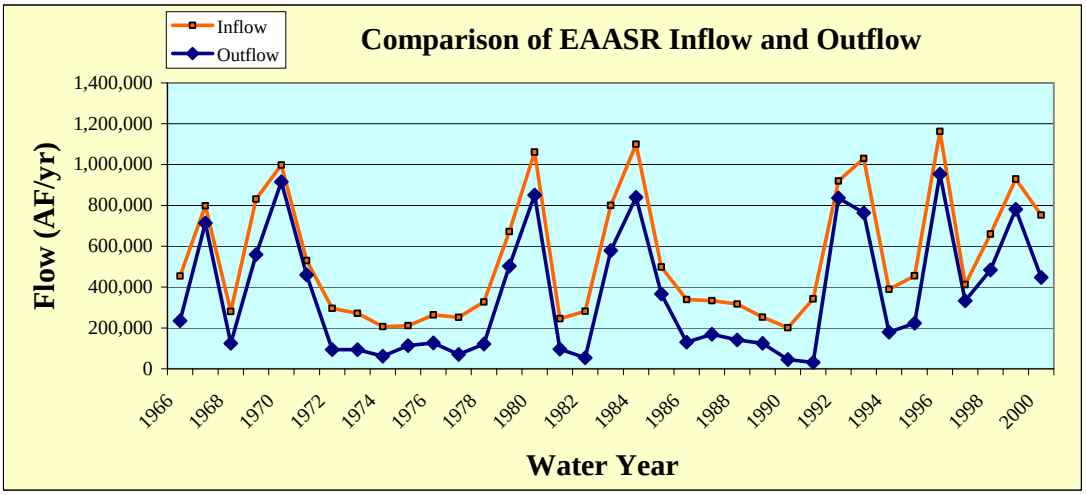
Table 6-2: Summary of DMSTA Results for EAASR A-1 (Lake TP Conc. of 100 ppb).

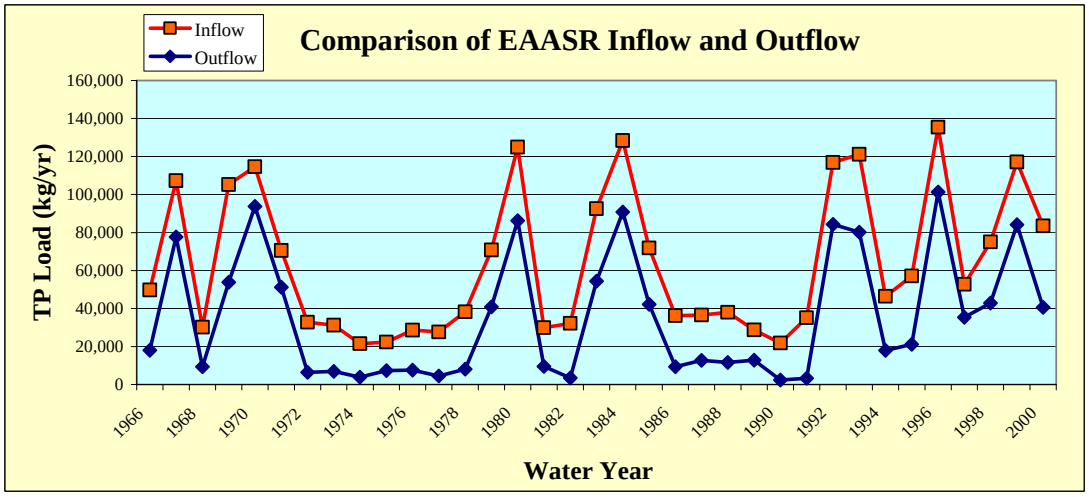
Parameter	Unit	EAASR A-1 Note 2
Effective Treatment Area	acres	15,200
Average Annual Inflow		
Volume	AF/yr	539,290
TP Load	kg/yr	63,794
TP Concentration	ppb	96
Average Annual Outflow		
Volume	AF/yr	360,658
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	-
Mean Estimate of Settling Rate	ppb	79.4
Lower Conf. Limit for Settling Rate	ppb	-
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	-
Mean Estimate of Settling Rate	ppb	94.9
Lower Conf. Limit for Settling Rate	ppb	-
TP Load (Using Mean TP Conc.)	kg/yr	35,322
Diversion Volumes and Loads		
Volume	AF/yr	0
TP Load	kg/yr	0
TP Concentration	ppb	-

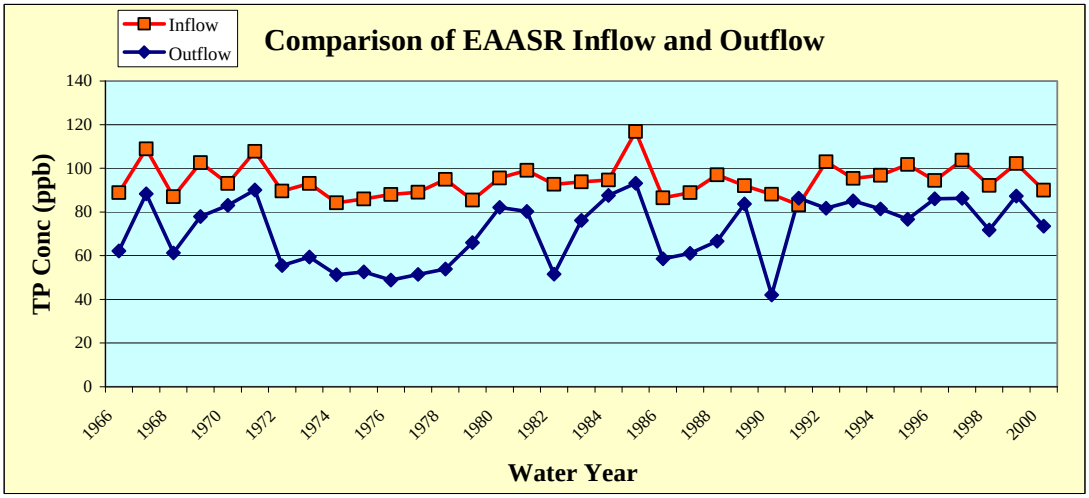
Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.

2. Shown are outflows to STA-3/4 after adjustment (see text); total outflows, including irrigation releases, were 513,664 AF/yr and 48,417 kg/yr at 76 ppb.

Figure 6-1: Comparison of Inflows and Outflows for EAASR A-1 (Lake TP Concentration of 100 ppb).







6.1. Sensitivity Analysis: Lake Okeechobee TP Concentration of 150 ppb

As an analysis of the sensitivity of the EAA reservoir and STA-3/4 performance to the phosphorus concentration of Lake Okeechobee releases, this section describes the performance of EAASR A-1 if the phosphorus concentration of Lake releases is 150 ppb at the inflow to the reservoir. With this assumption, the long-term average annual inflow to the EAASR A-1 by source is summarized in **Table 6-3**.

Table 6-3: Summary of Long-term Average Annual Inflow to EAASR.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
S-7/S-2 Basin	121,084	14,280	96
S-8/S-3 Basin	100,062	10,290	83
Lake Okee.	318,145	58,843	150
Total	**539,290**	**83,412**	**125**

A summary of EAASR A-1 phosphorus performance for Alternative A is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix B. **The net effect of assuming a Lake Okeechobee phosphorus concentration of 150 ppb appears to be about 27 ppb at the outflow of the reservoir to STA-3/4, resulting in a long-term average additional 11.7 metric tons/yr of phosphorus to STA-3/4.**

No warning or error messages were generated during the DMSTA simulation for the EAASR A-1. However, the minimum simulated depth was 1 cm, indicating that DMSTA numerically prevented dry-out by reducing the rates of ET, seepage, etc. In reality the reservoir would have dried out and phosphorus levels would likely increase upon rewetting; thus the long-term concentration shown in Table 6-4 may be optimistic.

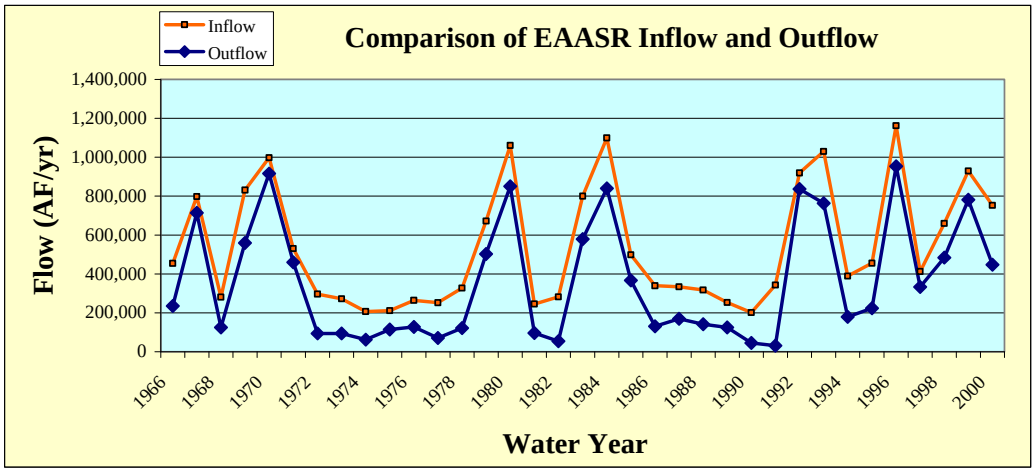
Table 6-4: Summary of DMSTA Results for EAASR A-1 (Lake TP Conc. of 150 ppb).

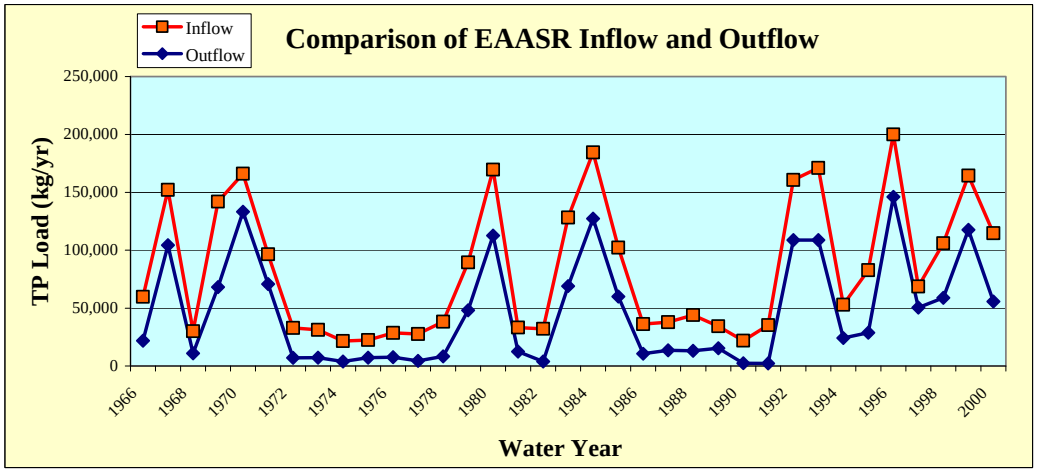
Parameter	Unit	EAASR A-1 Note 2
Effective Treatment Area	acres	15,200
Average Annual Inflow		
Volume	AF/yr	539,290
TP Load	kg/yr	83,412
TP Concentration	ppb	125
Average Annual Outflow		
Volume	AF/yr	360,658
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	-
Mean Estimate of Settling Rate	ppb	106.0
Lower Conf. Limit for Settling Rate	ppb	-
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	.-
Mean Estimate of Settling Rate	ppb	113.5
Lower Conf. Limit for Settling Rate	ppb	-
TP Load (Using Mean TP Conc.)	kg/yr	47,009
Diversion Volumes and Loads		
Volume	AF/yr	0
TP Load	kg/yr	0
TP Concentration	ppb	-

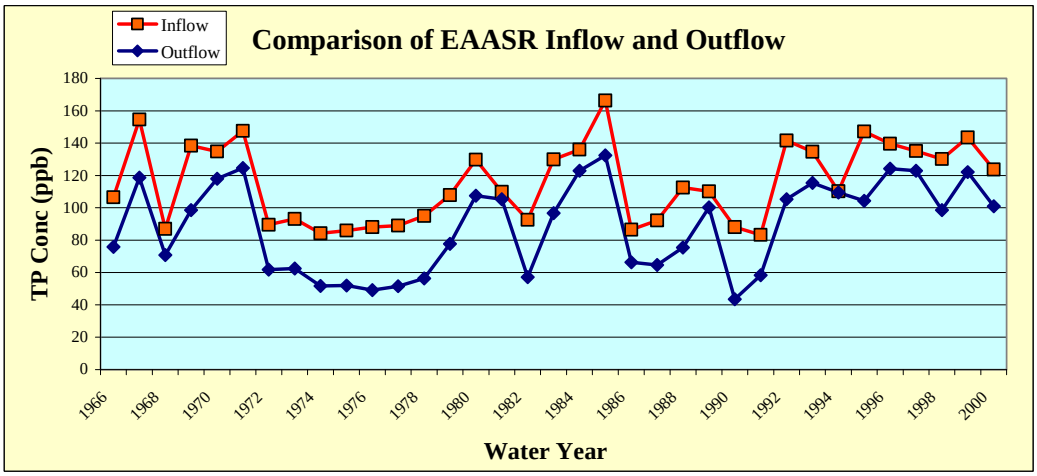
Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.

2. Shown are outflows to STA-3/4 after adjustment (see text); total outflows, including irrigation releases, were 514,633 AF/yr and 63,738 kg/yr at 100 ppb.

Figure 6-2: Comparison of Inflows and Outflows for EAASR A-1 (Lake TP Concentration of 150 ppb).



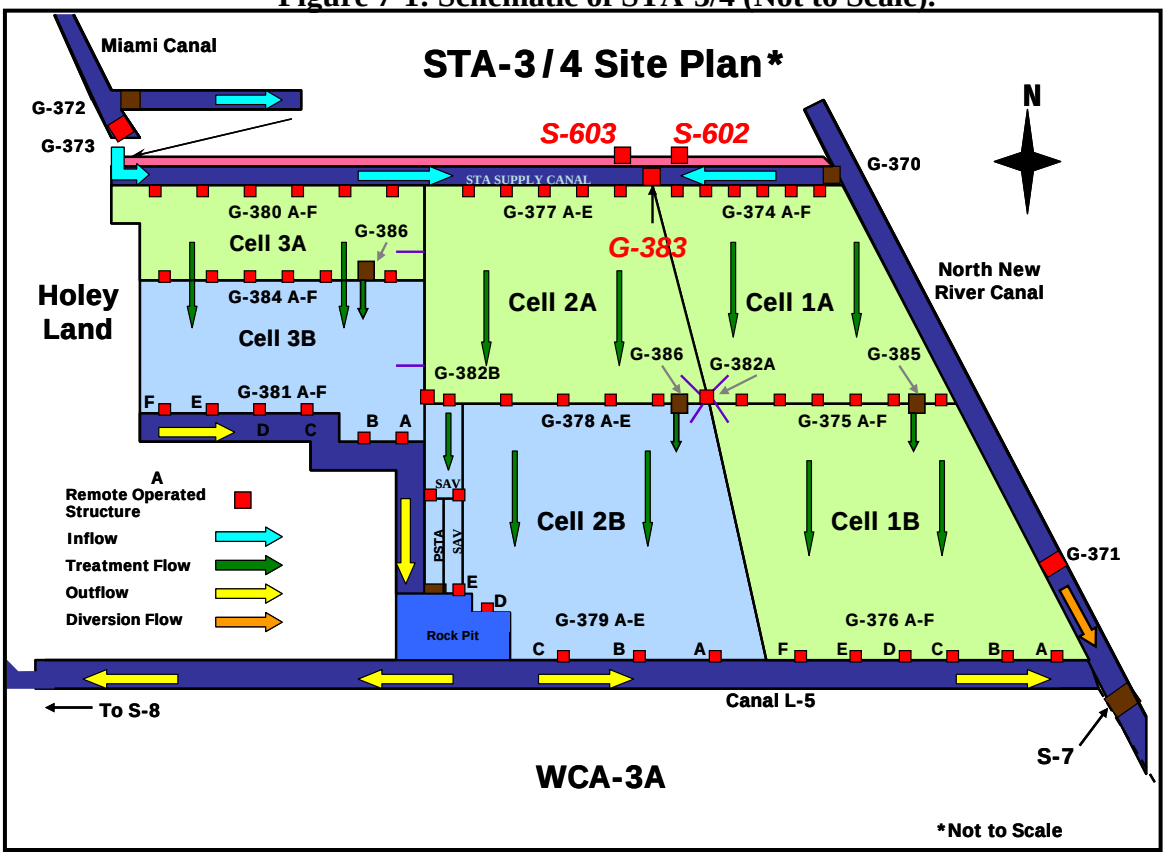




7. STA-3/4

A schematic of STA-3/4 is presented in **Figure 7-1**, showing the two proposed structures (S-602 and S-603) that will allow transfer of water from the EAA Storage Reservoir to the STA.

Figure 7-1: Schematic of STA-3/4 (Not to Scale).



The simulated inflows to STA-3/4 are summarized in **Table 7-1**. The daily flow terms from the SFWMM simulation were utilized for the DMSTA modeling with the following modifications:

- ***For all alternatives,*** the estimate of runoff from the South Shore Drainage District and the South Florida Conservancy District was based on historic runoff volumes from these basins to the maximum extent practicable, as the SFWMM simulations do not well represent either the total discharges or the distribution of these discharges from these basins. Runoff volumes for the period May 1, 1994 through April 30, 2000 are available for direct use, while the runoff volumes for the remainder of the 35-year period (May 1, 1965 through April 30, 1994) were estimated by indirect methods. Consistent with the approach utilized in the *Updated STA Inflow Data Sets for the 2010 Period*, daily runoff volumes were estimated as a fixed percentage of the daily runoff from the adjacent primary basin of the EAA (Goforth 2007b). That fixed

percentage was derived as the ratio of the overall runoff from each Ch. 298 District basin to the overall runoff from the adjacent EAA basin over the WY1995-2007 period. In recognition of the changes in EAA basin contributing area over the WY1995-2007 period due to conversion of agriculture lands to STAs, the EAA runoff was normalized to the effective basin areas reflected in the SFWMM simulation.

- ***For all alternatives,*** a small amount of Miami Canal Runoff was simulated in SFWMM as being diverted untreated to the Water Conservation Area 3A. For the purpose of estimating phosphorus removal performance, these diversions were simulated by DMSTA as being captured in STA-3/4. Actual diversion may occur based on the daily hydraulic and treatment capacity of the treatment areas.

A summary of STA-3/4 phosphorus performance for Alternative A is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix B. A long-term flow-weighted mean outflow concentration range of 18-26 ppb was forecast, however this includes years when DMSTA forecast levels that fell below the calibration range of 15 ppb for an SAV system, and hence may be optimistic. DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix B. For Cells 1A and 2A, the mean flow/width was about 25% above the range of the emergent calibration data sets. For Cell 3B, the mean flow/width was about 25% below the range of the SAV calibration data sets. For the three SAV cells, the simulated mean depths were slightly below the range of the SAV calibration data sets, although the simulated minimum depths were above 30 cm. Diversion around the STA was simulated to provide water supply to downstream users, including the Big Cypress Basin Seminole Indian Reservation.

Table 7-1: Summary of Long-term Average Annual Inflow to STA-3/4 (Lake TP Conc of 100 ppb).

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
S-7/S-2 Basin	126,028	14,713	95
S-8/S-3 Basin	134,787	13,626	82
C-139 Basin	13,176	3,402	209
SSDD	10,539	1,324	102
SFCD	24,110	3,363	113
EAA SR	360,658	35,322	79
Total	**672,549**	**71,638**	**86**

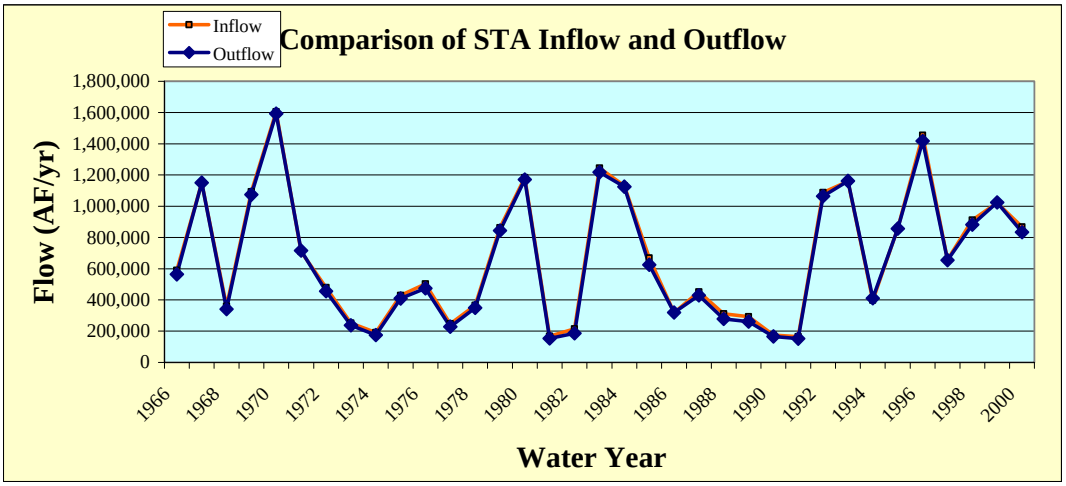
Totals are less than the sum of the components due to daily net negative values within the basin.

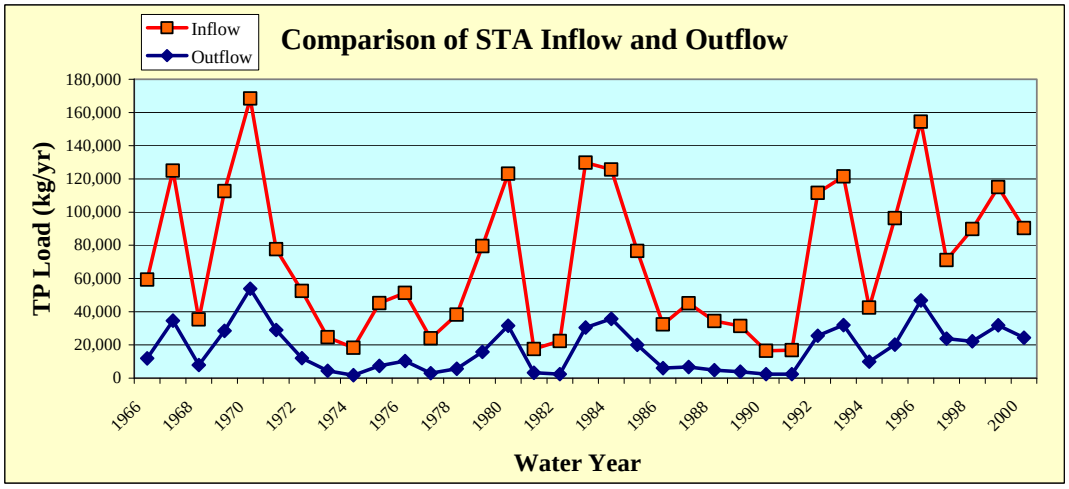
Table 7-2: Summary of DMSTA Results for STA-3/4 (Lake TP Conc. of 100 ppb).

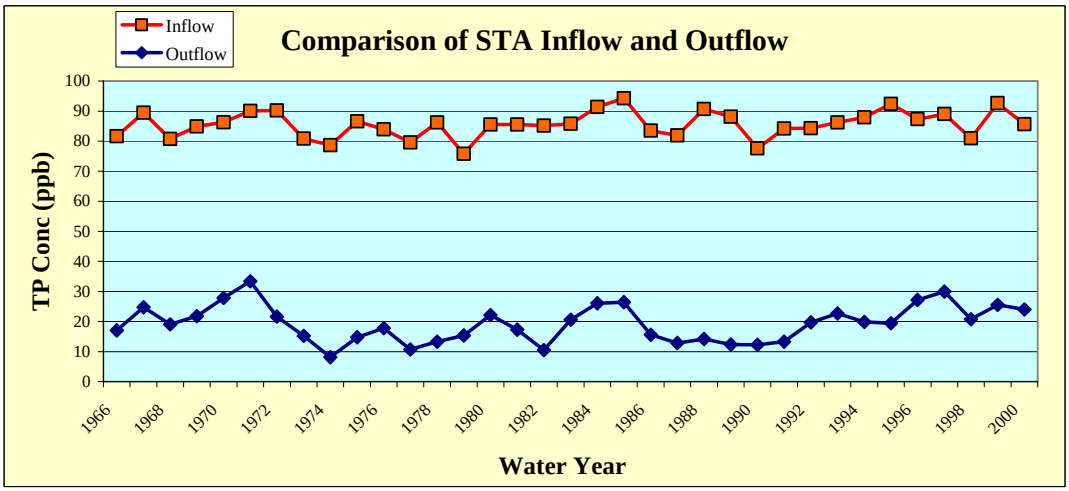
Parameter	Unit	STA-3/4
Effective Treatment Area	acres	16,543
Average Annual Inflow		
Volume	AF/yr	672,549
TP Load	kg/yr	71,638
TP Concentration	ppb	86
Average Annual Outflow		
Volume	AF/yr	656,972
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	18.1 (16)
Mean Estimate of Settling Rate	ppb	21.9 (10)
Lower Conf. Limit for Settling Rate	ppb	26.3 (6)
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	15.1
Mean Estimate of Settling Rate	ppb	18.3
Lower Conf. Limit for Settling Rate	ppb	22.1
TP Load (Using Mean TP Conc.)	kg/yr	17,727
Diversion Volumes and Loads		
Volume	AF/yr	86,039
TP Load	kg/yr	10,820
TP Concentration	ppb	102

Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.
2. Outflow values highlighted in yellow had one or more years of the 35 years simulated below the low end of the calibration data set (enumerated by the number in parentheses). The lowest sustainable STA outflow phosphorus concentration is 19 ppb (STA-3/4), with a standard deviation of 5 ppb.
3. Diversion consists primarily of water supply deliveries.

Figure 7-2: Comparison of Inflows and Outflows for STA-3/4 (Lake TP Concentration of 100 ppb).







Note: TP concentrations below 15 ppb have not been sustained.

7.1. Sensitivity Analysis: Lake Okeechobee TP Concentration of 150 ppb

As an analysis of the sensitivity of STA performance to the phosphorus concentration of Lake Okeechobee releases, this section describes the performance of STA-3/4 if the phosphorus concentration of Lake releases is 150 ppb at the inflow to the EAASR. With this assumption, the inflows to STA-3/4 are summarized in **Table 7-3**.

Table 7-3: Summary of Long-term Average Annual Inflow to STA-3/4 (Lake TP Conc of 150 ppb).

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
S-7/S-2 Basin	126,028	14,713	95
S-8/S-3 Basin	134,787	13,626	82
C-139 Basin	13,176	3,402	209
SSDD	10,539	1,324	102
SFCD	24,110	3,363	113
EAA SR	360,658	47,009	106
Total	**672,549**	**82,860**	**100**

A summary of STA-3/4 phosphorus performance for Alternative A is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix B. A long-term flow-weighted mean outflow concentration range of 20-30 ppb was forecast, however this includes years when DMSTA forecast levels that fell below the calibration range of 15 ppb for an SAV system, and hence may be optimistic. These results compare to a simulated range of 18-26 ppb with a concentrations of Lake releases averaging 100 ppb. **The net effect of assuming a Lake Okeechobee phosphorus concentration of 150 ppb appears to be about 3 ppb at the outflow of STA-3/4, resulting in a long-term average annual increase of 2.5 metric tons of phosphorus to the Everglades compared to an average Lake release concentration of 100 ppb.** In addition to the STA discharge, it is estimated that an additional 4.7 metric tons per year of phosphorus will enter the Everglades in Lake Okeechobee deliveries for downstream water supply, including the Big Cypress Basin Seminole Indian Reservation.

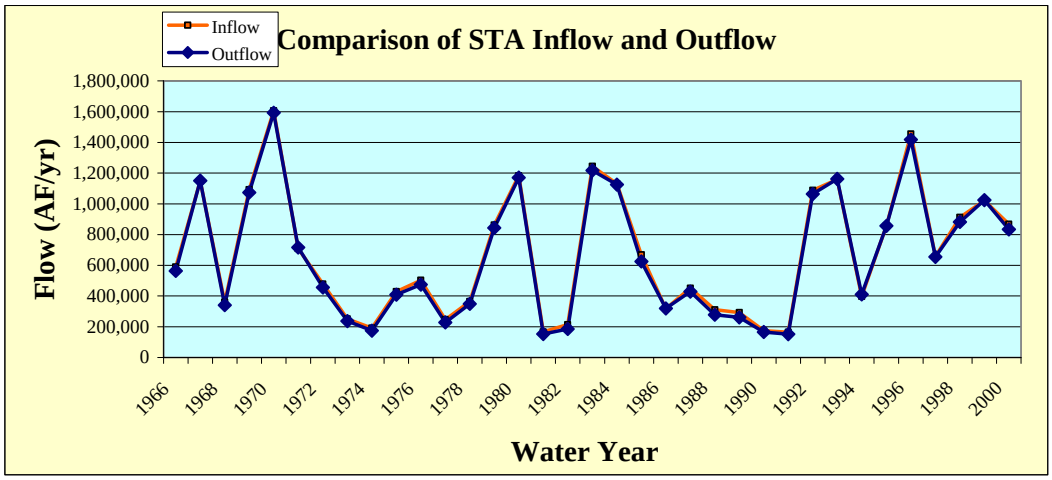
DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix B. For Cells 1A and 2A, the mean flow/width was about 25% above the range of the emergent calibration data sets. For Cell 3B, the mean flow/width was about 25% below the range of the SAV calibration data sets. For the three SAV cells, the simulated mean depths were slightly below the range of the SAV calibration data sets, although the simulated minimum depths were above 30 cm. Diversion around the STA was simulated to provide water supply to downstream users, including the Big Cypress Basin Seminole Indian Reservation.

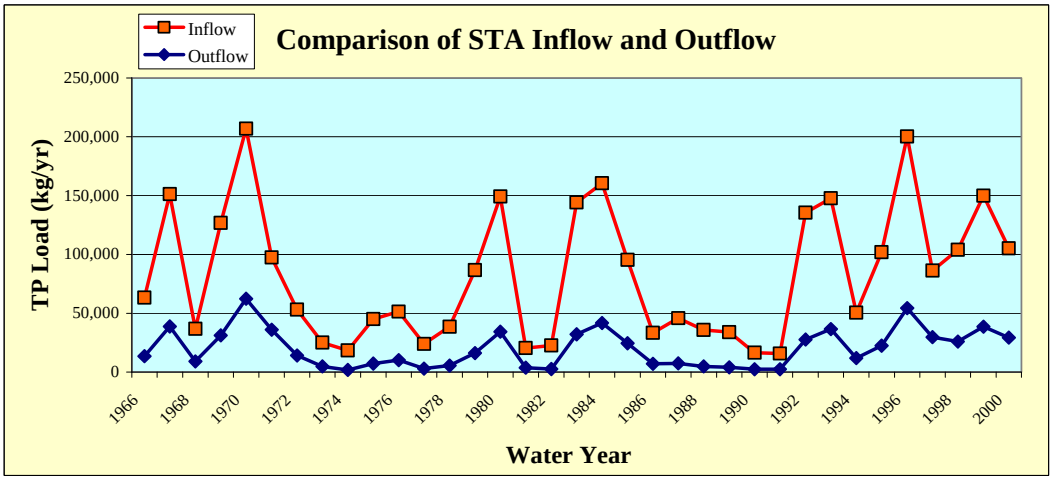
Table 7-4: Summary of DMSTA Results for STA-3/4 (Lake Conc. of 150 ppb).

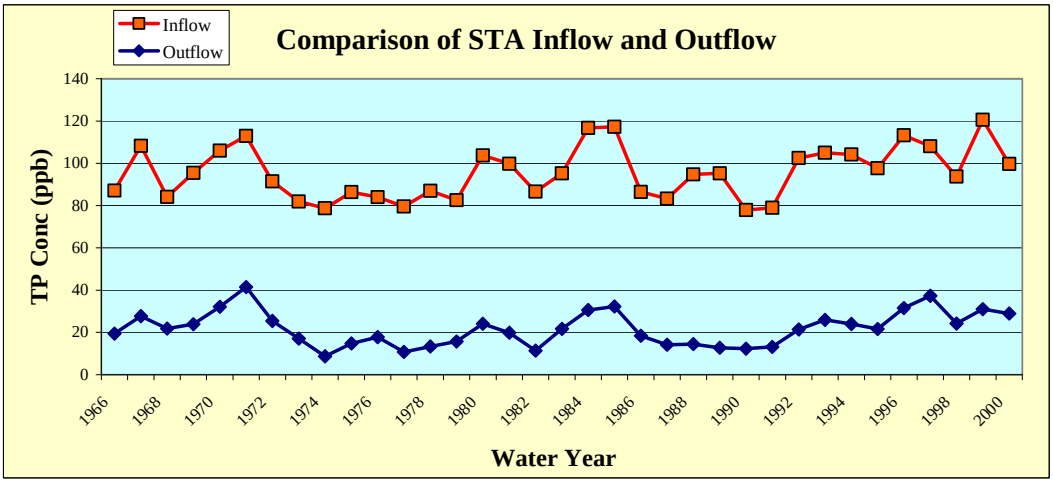
Parameter	Unit	STA-3/4
Effective Treatment Area	acres	16,543
Average Annual Inflow		
Volume	AF/yr	672,549
TP Load	kg/yr	82,860
TP Concentration	ppb	100
Average Annual Outflow		
Volume	AF/yr	656,972
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	20.4 (14)
Mean Estimate of Settling Rate	ppb	25.0 (10)
Lower Conf. Limit for Settling Rate	ppb	30.3 (5)
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	16.6
Mean Estimate of Settling Rate	ppb	20.3
Lower Conf. Limit for Settling Rate	ppb	24.9
TP Load (Using Mean TP Conc.)	kg/yr	20,219
Diversion Volumes and Loads		
Volume	AF/yr	86,039
TP Load	kg/yr	15,535
TP Concentration	ppb	146

Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.
2. Outflow values highlighted in yellow had one or more years of the 35 years simulated below the low end of the calibration data set (enumerated by the number in parentheses). The lowest sustainable STA outflow phosphorus concentration is 19 ppb (STA-3/4), with a standard deviation of 5 ppb.
3. Diversion consists primarily of water supply deliveries.

Figure 7-3: Comparison of Inflows and Outflows for STA-3/4 (Lake TP Concentration of 150 ppb).







Note: TP concentrations below 15 ppb have not been sustained.

8. STA-5

Inflow data sets for STA-5 and STA-6 utilized the historic flows and phosphorus loads for the WY1995-2007 period. For the purpose of developing the STA-5 inflow data set, STA-5 was assumed to be comprised of the existing 3 flow-ways of STA-5, but not the 4th and 5th flow-ways of Compartment C (see **Figure 8-1**; URS 2007). A summary of inflows to STA-5 is presented in **Table 8-1**. A maximum total flow-through capacity of 1,100 cfs is estimated for the 3 flow-ways of STA-5 results from reliance on the S-8 pump station; hence, daily flows in excess of this flow was considered to be diverted untreated to WCA-3A.

At this time, it is extremely difficult to forecast the phosphorus removal performance of STA-5. Since the first full water year of operation (2001), the annual inflow concentrations have ranged from 165 ppb to 299 ppb, with a 7-yr average of 235 ppb (Pietro et al. 2007). The phosphorus loading rate has been considerably higher than the other STAs, ranging from 0.94 $g/m^2/yr$ to 4.01 $g/m^2/yr$ with a 7-yr average of 2.1 $g/m^2/yr$. The long-term outflow concentration has ranged from 82-192 ppb, with a 7-yr average of 105 ppb. These characteristics are more similar to the DMSTA emergent vegetation calibration data set than to the SAV data set, which may be related to different soil type than in the EAA STAs (more mineral content) and less calcium in the inflow waters than the EAA STAs. In consideration of the anticipated reduced phosphorus loading rate when the additional treatment cells within Compartment C begin operation, the 2005 Study estimated the performance of STA-5 using the average performance of two DMSTA simulations:

1. Assuming the phosphorus removal downstream cell in each flow-way performs similar to the emergent calibration data set; and
2. Assuming the phosphorus removal downstream cell in each flow-way performs similar to the SAV calibration data set.

For comparison purposes, a similar set of simulations were conducted during the present analysis, ***however, until such time that the STA-5 performance improves, and until performance data for the newly constructed Flow-way 3 is available, the forecast performance will be based on assuming the phosphorus removal of the downstream cell in each flow-way performs similar to the emergent calibration data set.***

Figure 8-1: Preliminary Layout of Compartment C Build-out; Subject to Revision (modified from URS 2007).

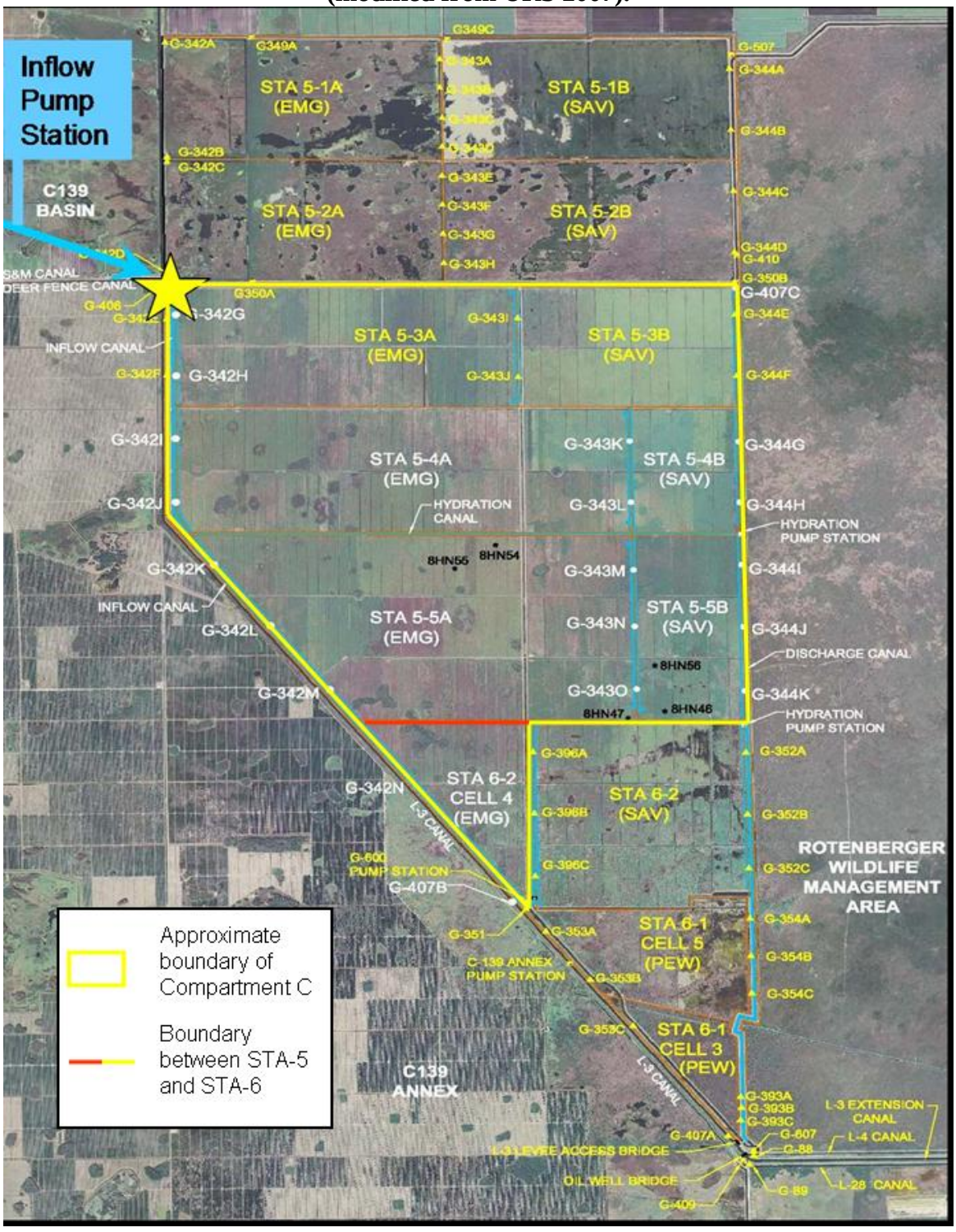


Table 8-1: Summary of Long-term Average Annual Inflow to STA-5, Including Flow-way 3.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
C-139 Basin	167,284	46,768	227

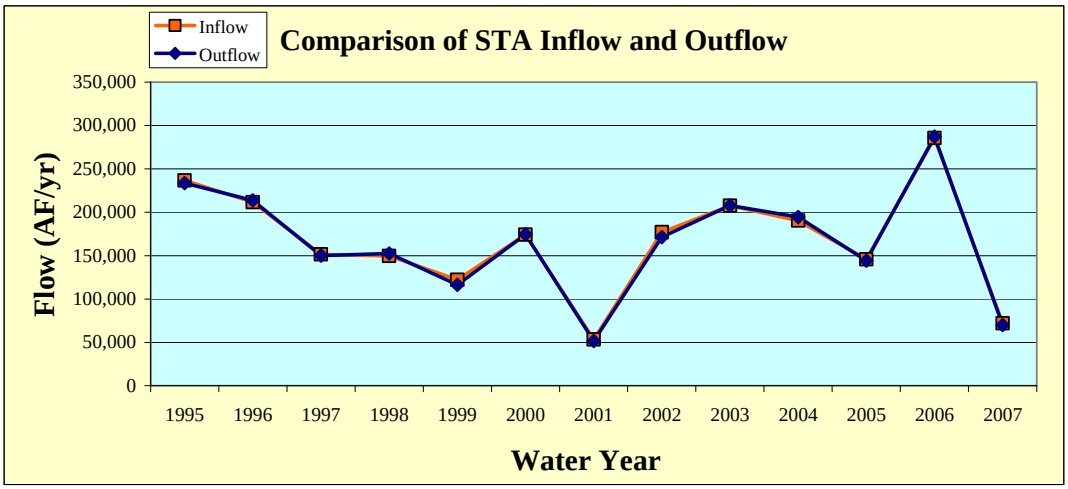
A summary of STA-5 phosphorus performance for Alternative A is presented in the tables and figures below. Copies of the DMSTA output are presented in Appendix B. For the emergent vegetation scenario, a long-term flow-weighted mean outflow concentration range of 54-93 ppb was forecast, however this includes six of the thirteen years when DMSTA forecast levels that fell below the calibration range of 20 ppb for an emergent system; hence this range may be optimistic, particularly in light of STA-5 performance history. DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix B. For the emergent vegetation scenario no warnings messages were generated. However, DMSTA forecast 7% of the time the depth in the upstream cells was less than 10 cm, indicating the potential for insufficient water availability to maintain the minimum desirable water depth of 15 cm. For the SAV scenario, ***presented only for comparison and not as a forecast of STA-5 performance***, six messages were generated, identifying that mean depths, flow/widths and outflow phosphorus concentrations were below the range of the SAV calibration data sets. In addition, DMSTA forecast 7% of the time the depth in the upstream cells was less than 10 cm, indicating the potential for insufficient water availability to maintain the minimum desirable water depth of 15 cm.

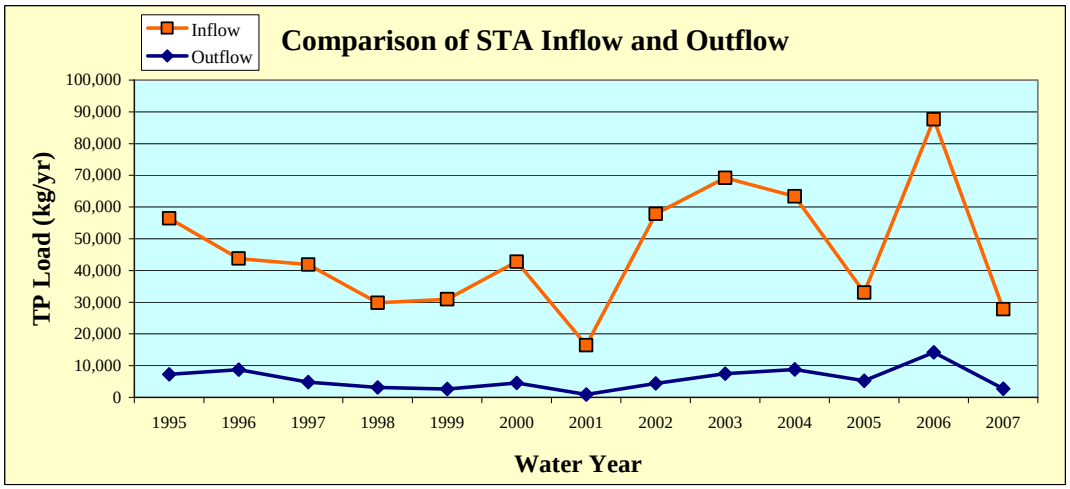
Table 8-2: Summary of DMSTA Results for STA-5, Including Flow-way 3.

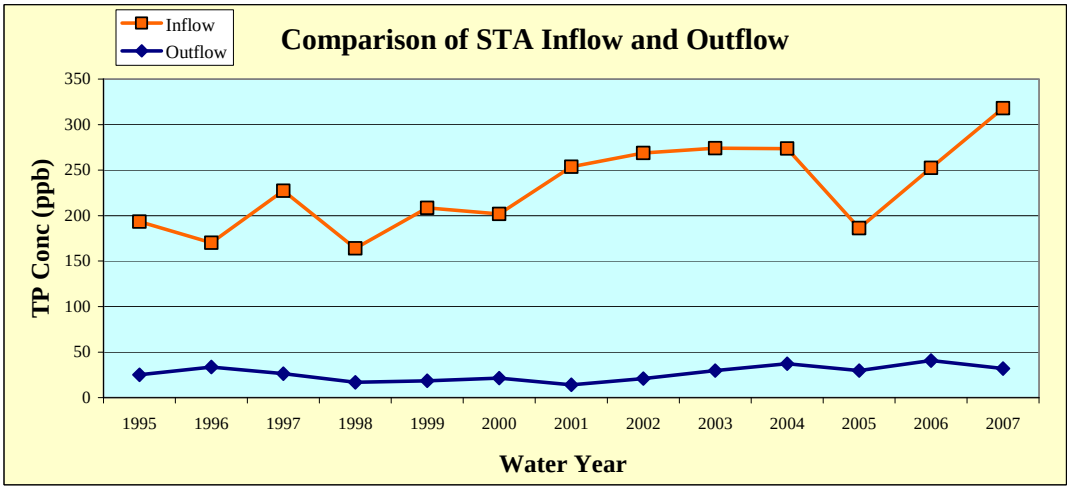
Parameter	Unit	STA-5 - Emergent	STA-5 - SAV
Effective Treatment Area	acres	6,095	6,095
Average Annual Inflow			
Volume	AF/yr	167,284	167,284
TP Load	kg/yr	46,768	46,768
TP Concentration	ppb	227	227
Average Annual Outflow			
Volume	AF/yr	166,604	166,604
Flow-weighted Mean TP Concentration			
Upper Conf. Limit for Settling Rate	ppb	54.2	20.8 (7)
Mean Estimate of Settling Rate	ppb	73.1	28.4 (3)
Lower Conf. Limit for Settling Rate	ppb	93.3	38.6 (1)
Geometric Mean TP Concentration			
Upper Conf. Limit for Settling Rate	ppb	50.5	18.7
Mean Estimate of Settling Rate	ppb	68.7	25.5
Lower Conf. Limit for Settling Rate	ppb	88.4	34.9
TP Load (Using Mean TP Conc.)	kg/yr	15,028	5,836
Diversion Volumes and Loads			
Volume	AF/yr	2,779	2,779
TP Load	kg/yr	1,188	1,188
TP Concentration	ppb	347	347

Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value.
There is associated uncertainty in these predictions and actual performance will vary.
2. Outflow values highlighted in yellow had one or more years of the 13 years simulated below the low end of the calibration data set (enumerated by the number in parentheses).
3. Results for SAV in the downstream cells are presented for comparison only; the emergent vegetation scenario is currently used as a forecast for STA-5

Figure 8-2: Comparison of Inflows and Outflows for STA-5 With Emergent Vegetation in All Cells, Including Flow-way 3.

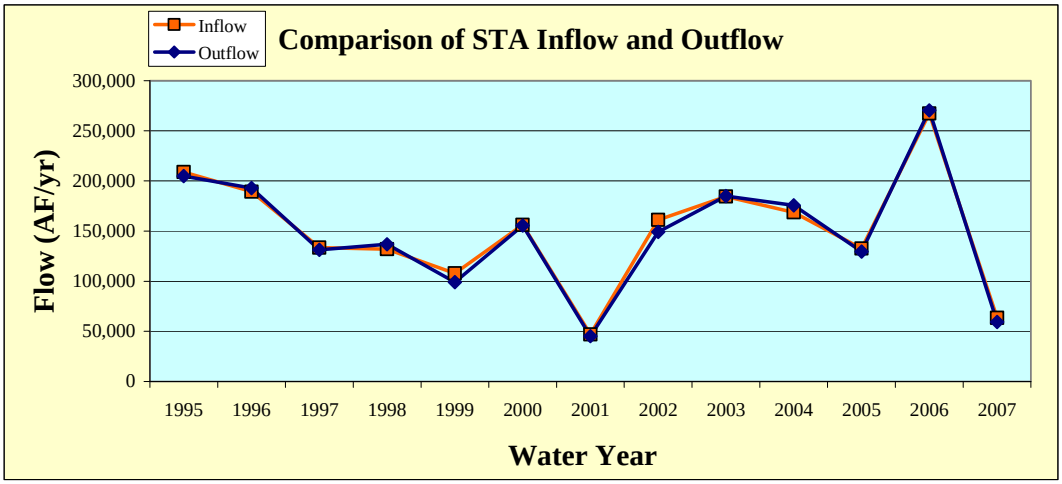


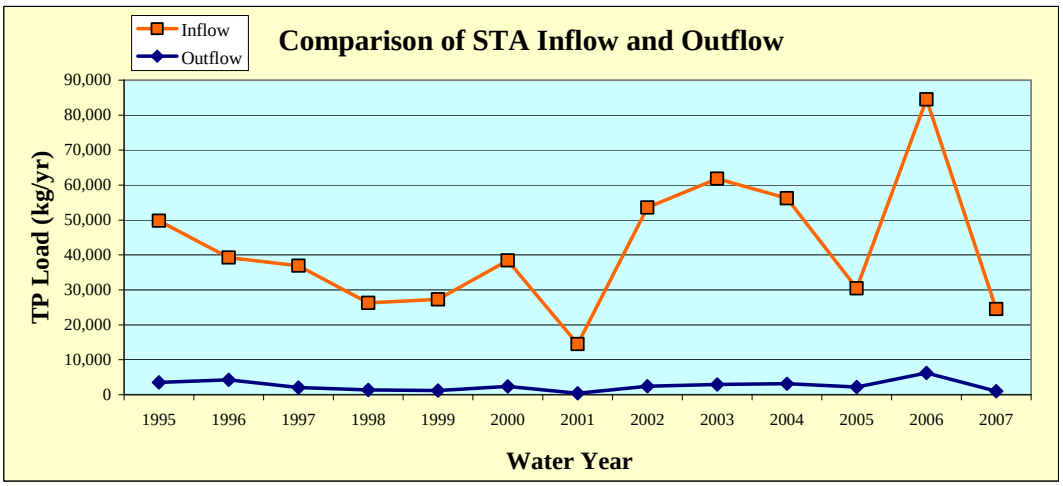


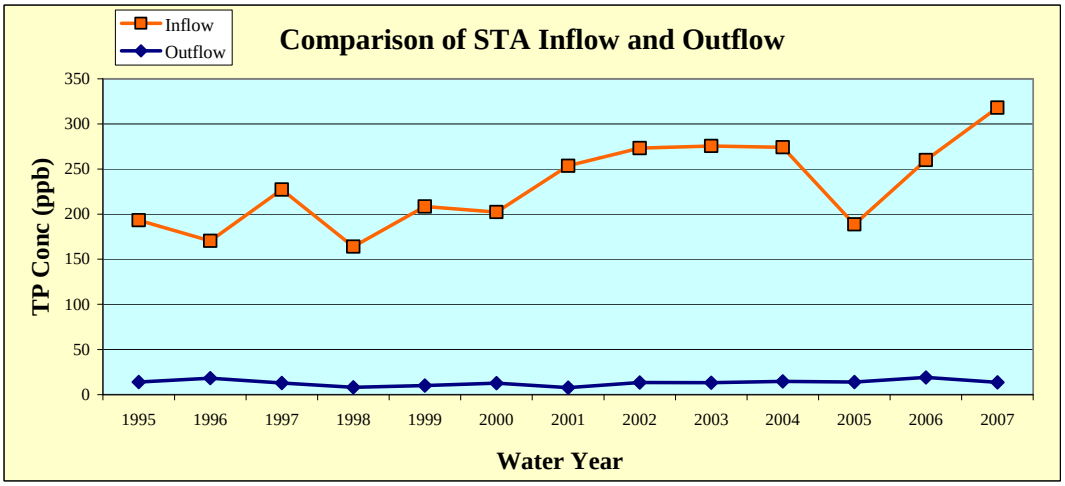


Note: TP concentrations below 15 ppb have not been sustained.

Figure 8-3: Summary of DMSTA Results for STA-5 With SAV in Downstream Cells.







Note: TP concentrations below 15 ppb have not been sustained.

9. STA-6

For the No Action Alternative, the performance of the existing STA-6 treatment cells (cells 3, 5 and Section 2) was simulated. Inflows were simulated as consisting of runoff from the 6,395-acre portion of Compartment C south of the 3rd flow-way of STA-5 and runoff from the 17,845-acre C-139 Annex.

- **Compartment C runoff.** Historic flow and phosphorus data for runoff from the entire 10,395-acre Compartment C are available for the 10-yr period May 1, 1997 through April 30, 2007. For the purpose of simulating a consistent 13-yr period for all the alternatives, data for the period May 1, 1994 to April 30, 1997 were estimated as the monthly average of flows and phosphorus loads for the available 10-yr period of record. The resulting 13-yr flow and phosphorus data set was then reduced by the factor (6395/10395) to reflect the reduced tributary area.
- **C-139 Annex runoff.** Historic flow and phosphorus data for runoff from the C-139 Annex are available for the 11.5-yr period December 1, 1995 through April 30, 2007. For the purpose of simulating a consistent 13-yr period for all the alternatives, data for the period May 1, 1994 to December 30, 1995 were estimated as the monthly average of flows and phosphorus loads for the available 11.5-yr period of record.

A summary of the long-term average inflows to STA-6 is presented in **Table 9-1.**

Table 9-1: Summary of Long-term Average Annual Inflow to STA-6.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
Comp. C	28,108	2,712	78
C-139 Annex	41,480	4,987	97
Total	**69,588**	**7,699**	**90**

A summary of STA-6 phosphorus performance for Alternative A is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix B. DMSTA forecast a best case scenario long-term flow-weighted mean phosphorus concentration below the minimum of the calibration data sets for the vegetation in the treatment cells, and that forecast was replaced in Table 9-2 by 13 ppb[1]. The adjusted outflow phosphorus levels in Table 9-2 may still portray optimistic results in that the best performing STA (STA-3/4) is presently averaging about 19 ppb, with a 5 ppb standard deviation on annual values. DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix B. Five messages were generated, identifying that flow/widths were below the range of the calibration data sets in each of the three treatment cells. In addition, for STA-6 Section 2, the mean depth and outflow phosphorus concentration were below the range of the SAV calibration data set.

[1] For STA-6, two flow-ways have SAV in the downstream cell which has a minimum calibration concentration of 15 ppb, and one has Prior Existing Wetlands (PEW) which has a minimum calibration concentration of 15 ppb. The flow-weighted minimum concentration for the three flow-ways is 13 ppb.

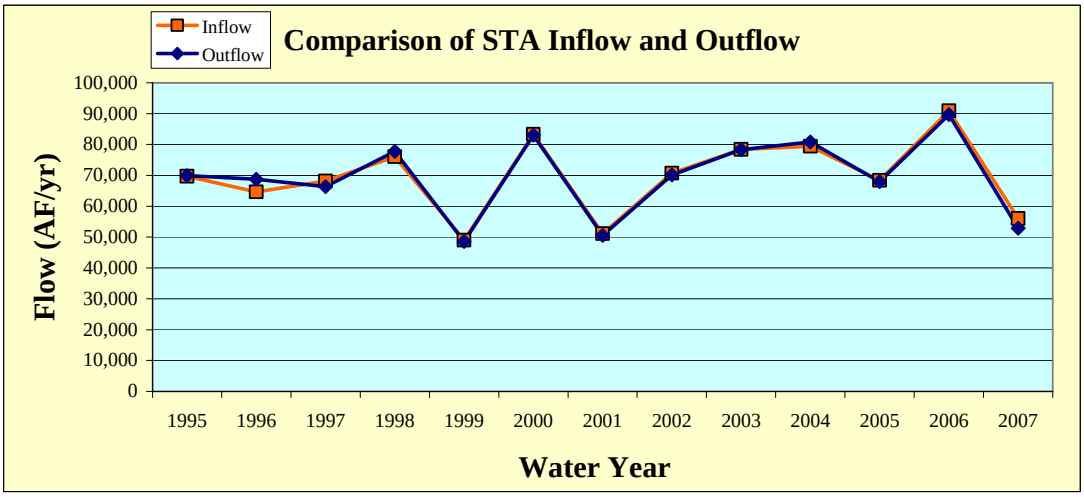
Table 9-2: Summary of DMSTA Results for STA-6, Including Comp. C Build-out.

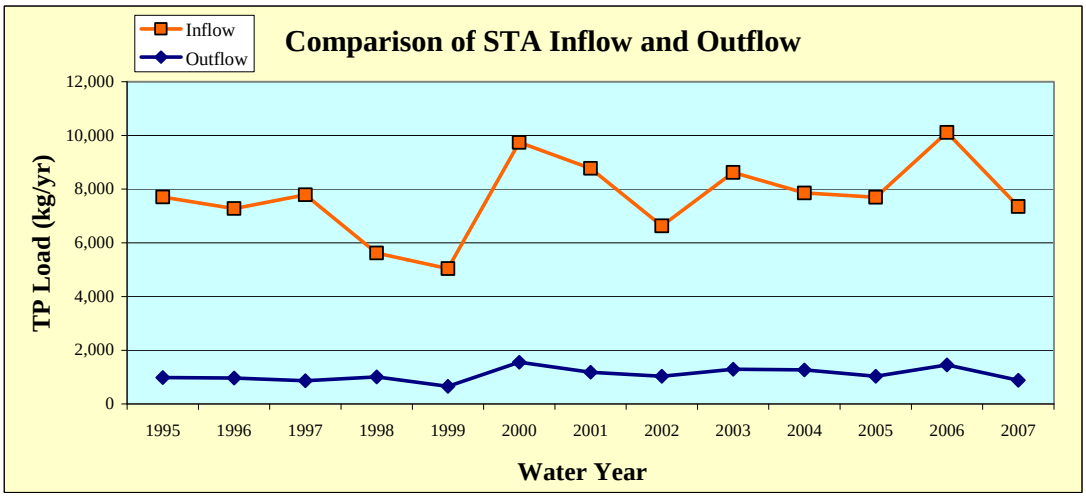
Parameter	Unit	STA-6
Effective Treatment Area	acres	2,284
Average Annual Inflow		
Volume	AF/yr	69,588
TP Load	kg/yr	7,699
TP Concentration	ppb	90
Average Annual Outflow		
Volume	AF/yr	69,507
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	13.0 (11)
Mean Estimate of Settling Rate	ppb	13.0 (7)
Lower Conf. Limit for Settling Rate	ppb	16.0
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	13.0
Mean Estimate of Settling Rate	ppb	13.0
Lower Conf. Limit for Settling Rate	ppb	15.9
TP Load (Using Mean TP Conc.)	kg/yr	1,115
Diversion Volumes and Loads		
Volume	AF/yr	0
TP Load	kg/yr	0
TP Concentration	ppb	-

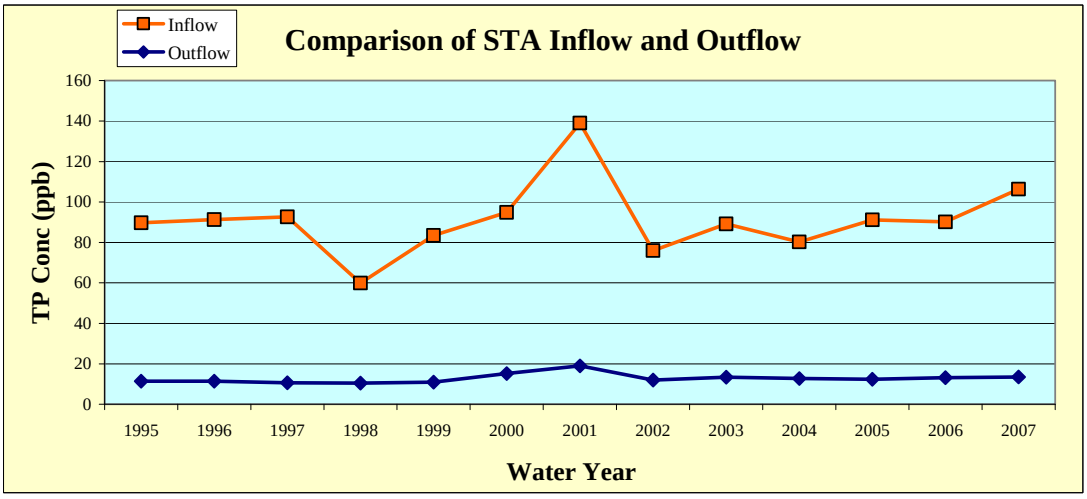
Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.

2. Outflow values highlighted in yellow had one or more years of the 13 years simulated below the low end of the calibration data set (enumerated by the number in parentheses). The lowest sustainable STA outflow phosphorus concentration is 19 ppb (STA-3/4), with a standard deviation of 5 ppb.

Figure 9-1: Comparison of Inflows and Outflows for STA-6.







Note: TP concentrations below 15 ppb have not been sustained.

10. Summary

A summary of the simulated phosphorus removal performance in the STAs, the EAASR A-1 and the existing treatment areas in Compartments B and C is presented in **Table 10-1** below[2]. For STA-6, DMSTA forecast a best case scenario long-term flow-weighted mean phosphorus concentration below the minimum of the calibration data sets for the vegetation in the treatment cells, and that forecast was replaced in Table 10-1 by 13 ppb[3]. The adjusted outflow phosphorus levels in Table 10-1 may still portray optimistic results in that the best performing STA (STA-3/4) is presently averaging about 19 ppb, with a 5 ppb standard deviation on annual values. Simulated long-term average annual flow-weighted mean outflow concentrations from the individual STAs ranged from 13-93 ppb. On a cumulative basis, the simulated long-term average annual concentration ranged from 22-35 ppb. In consideration of the forecast error of ±23%, this suggests a potential long-term range of 18-114 ppb for the cumulative long-term average annual outflow concentration.

The estimated allocation of discharges to the Water Conservation Areas is summarized in **Table 10-2**.

Phosphorus Concentrations for Lake Okeechobee Releases. Table 10-1 presents DMSTA modeling results for the EAASR A-1 and STA-3/4 using an average phosphorus concentration for Lake Okeechobee releases of 100 ppb, which corresponds to recent levels. An alternative simulation was conducted assuming an average phosphorus concentration for Lake Okeechobee releases of 150 ppb. While this assumed 50% increase in concentration increased the simulated phosphorus load to the EAASR A-1 by a long-term average of 20 metric tons/yr, the simulated net increase to STA-3/4 was just over 12 metric tons/yr. The 8 metric ton/yr balance either accumulated in the reservoir storage or was discharged to the EAA to satisfy irrigation demand. DMSTA simulated an increase in the long-term STA-3/4 outflow concentration as about 3 ppb, resulting in a predicted long-term average annual increase of about 2.2 metric tons/yr of phosphorus to the Everglades compared to the simulations that used an average Lake release concentration of 100 ppb. In addition to the STA discharge, it is estimated that an additional 4.7 metric tons per year of phosphorus will enter the Everglades in Lake Okeechobee deliveries for downstream water supply, including the Big Cypress Basin Seminole Indian Reservation.

[2] These simulated forecasts of STA performance are made for the comparison of alternatives and not for the development of effluent limits. Effluent limits are determined through the State of Florida's issuance of permits for these facilities.

[3] For STA-6, two flow-ways have SAV in the downstream cell which has a minimum calibration concentration of 15 ppb, and one has Prior Existing Wetlands (PEW) which has a minimum calibration concentration of 15 ppb. The flow-weighted minimum concentration for the three flow-ways is 13 ppb.

Table 10-1: Summary of DMSTA Modeling Results.

Parameter	Unit	STA-1E	STA-1W	STA-2	Comp. B North	Comp. B South	Comp. B Combined	EAASR A-1 Note 3	STA-3/4	STA-5 - Emergent	STA-6	All
Effective Treatment Area	acres	5,132	6,670	8,240	N/A	N/A	N/A	15,200	16,543	6,095	2,284	44,964
Average Annual Inflow												
Volume	AF/yr	193,812	243,799	309,734	N/A	N/A	N/A	539,290	672,549	167,284	69,588	1,656,766
TP Load	kg/yr	42,021	54,580	42,788	N/A	N/A	N/A	63,794	71,638	46,768	7,699	265,494
TP Concentration	ppb	176	181	112	N/A	N/A	N/A	96	86	227	90	130
Phosphorus Loading Rate	$g/m^2/yr$	2.0	2.0	1.3	N/A	N/A	N/A	1.0	1.1	1.9	0.8	1.5
Average Annual Outflow												
Volume	AF/yr	190,600	245,536	313,628	N/A	N/A	N/A	360,658	656,972	166,604	69,507	1,642,847
Flow-weighted Mean TP Concentration												
Upper Conf. Limit for Settling Rate	ppb	20.0 (10)	21.3 (4)	16.7 (1)	N/A	N/A	N/A	-	18.1 (16)	54.2	13.0 (11)	21.9
Mean Estimate of Settling Rate	ppb	26.8 (1)	27.3	20.9	N/A	N/A	N/A	79.4	21.9 (10)	73.1	13.0 (7)	27.9
Lower Conf. Limit for Settling Rate	ppb	35.3	34.9	26.1	N/A	N/A	N/A	-	26.3 (6)	93.3	16.0	34.8
Upper Conf. Limit for Settling Rate	ppb	17.9	20.2	15.9	N/A	N/A	N/A	-	15.1	50.5	13.0	-
Mean Estimate of Settling Rate	ppb	24.2	26.0	20.0	N/A	N/A	N/A	94.9	18.3	68.7	13.0	-
Lower Conf. Limit for Settling Rate	ppb	32.4	33.3	25.1	N/A	N/A	N/A	-	22.1	88.4	15.9	-
TP Load (Using Mean TP Conc.)	kg/yr	6,299	8,281	8,083	N/A	N/A	N/A	35,322	17,727	15,028	1,115	56,533
Receiving Water	WCA	1	1	2A	2A	2A	2A	EAA/STA-3/4	2A & 3A	Rot. & 3A	3A	
Diversion Volumes and Loads (See Note 4)												
Volume	AF/yr	25,545	0	0				0	86,039	2,779	0	114,363
TP Load	kg/yr	3,037	0	0				0	10,820	1,188	0	15,045
TP Concentration	ppb	96	-	-				-	102	347	-	107

Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value.
There is associated uncertainty in these predictions and actual performance will vary.
2. Outflow values highlighted in yellow had one or more years below the low end of the calibration data set (enumerated by the number in parentheses).
For all areas except STA-5 and STA-6, a total of 35 water years (WY66-00) were simulated; for STA-5 and STA-6 a total of 13 water years (WY95-07) were simulated.
The lowest sustainable STA outflow phosphorus concentration is 19 ppb (STA-3/4), with a standard deviation of 5 ppb.
3. Outflows shown from EAASR are outflows to STA-3/4; total outflows, including irrigation releases, were 513,664 AF/yr and 48,417 kg/yr at 76 ppb.
4. Diversion around STA-1E is directed to C-51E. Diversion around STA-3/4 is primarily for downstream water supply users. While the SFWMM simulated small diversion volumes of EAA runoff, for the purpose of estimating phosphorus removal performance, these were simulated by DMSTA as being captured in the STAs.
Diversions may occur based on the daily hydraulic and treatment capacity of the treatment areas. Diversion around STA-5 is from C-139 Basin to WCA-3A.

Table 10-2: Estimate of Discharge Allocation to Receiving Waters.

Parameter	Unit	WCA-1	WCA-2A	WCA-3A	Other	Total
Volume	**AF/yr**	435,948	462,761	749,466	113,291	1,761,466
TP Load (at mean settling rate)	**kg/yr**	14,521	12,107	34,315	11,172	72,115
TP Concentration	**ppb**	27	21	37	80	33

"Other" includes discharges to C-51 East and Rotenberger, assumed to receive 50% of STA-5 discharges.

11. References

ADA Engineering, Inc. and Burns and McDonnell Engineering Inc. 2005. Everglades Agricultural Area Regional Feasibility Study, prepared for SFWMD. October 2005.

Black and Veatch 2006. EAA Storage Reservoir A1 Basis of Design Report. Prepared for the South Florida Water Management District. January 2006.

Brown and Caldwell 2007. Compartment B Build-out Basis of Design Report, prepared for the South Florida Water Management District. July 2007.

Brown and Caldwell 2007. Compartment B Build-out Preliminary Design Report Stormwater Treatment Area, prepared for the South Florida Water Management District. Oct. 2007.

Burns & McDonnell, 2003. Final Report, Everglades Protection Area Tributary Basins, Long-Term Plan for Achieving Water Quality Goals; prepared for the South Florida Water Management District, October 2003.

Goforth G. 2007a. Updated Flow and Phosphorus Data Sets for the ECP Basins Covering the Period May 1, 1994 – April 30, 2007. Prepared for the U.S. Army Corps of Engineers and South Florida Water Management District. August 2007.

Goforth G. 2007b. Updated STA Inflow Data Sets for the 2010 Period. Prepared for the U.S. Army Corps of Engineers and South Florida Water Management District. October 2007.

Pietro, K., R. Bearzotti, M. Chimney, G. Germain and N. Iricanin. 2007. Draft – STA Performance, Compliance and Optimization; Chapter 5 in the SFER. August 2007.

URS Corporation 2007. Graphic presented at 8/23/07 Long-Term Plan Quarterly Meeting.

Walker, W. and R. Kadlec 2005. Dynamic Model for Stormwater Treatment Areas, prepared for the U. S. Department of Interior and the U. S. Army Corps of Engineers.

Appendix A. 2010A8 Base Simulation Model Assumptions

Feature	2010A8 Base Assumptions
Regional Input Data	
Climate	• The climatic period of record is from 1965 to 2000. • Rainfall estimates have been revised and updated for 1965-2000. • Revised evapotranspiration methods have been used for 1965-2000.
Topography	Updated November 2001 and September 2003 using latest available information (in NGVD 29 datum). Nov 2001 update (Documented in November 2001 SFWMD memorandum from M. Hinton to K. Tarboton) includes: • USGS High Accuracy Elevation data from helicopter surveys collected 1999-2000 for Everglades National Park and Water Conservation Area (WCA) 3 south of Alligator Alley • USGS Lidar data (May 1999) for WCA-3A north of Alligator Alley • Lindahl, Browning, Ferrari & Helstrom 1999 survey for Rotenberger Wildlife Management Area. • Stormwater Treatment Area surveys from 1990s • Aerometric Corp. 1986 survey of the 8-1/2 square mile area • Includes estimate of Everglades Agricultural Area subsidence • Other data as in SFWMM v3.7 • FWC survey 1992 for the Holey Land Wildlife Management Area. September 2003 update includes: • Reverting to FWC 1992 survey data for Rotenberger Wildlife Management Area. • DHI gridded data from Kimley –Horn contracted survey of EAA, 2002-2003. Regridded to 2x2 scale for EAA outside of STAs and WMAs.
Sea Level	• Sea level data from six long-term NOAA stations were used to generate a historic record to use as sea level boundary conditions for the 1965 to 2000 evaluation period.
Land Use	• The land use coverage is intermediate between 2000B2 and 2050B2
Natural Area Land Cover (Vegetation)	Vegetation classes and their spatial distribution in the natural areas comes from the following data: • Walsh 1995 aerial photography in Everglades National Park

Feature	2010A8 Base Assumptions
	• Rutchey 1995 classification in WCA-3B, WCA-3A north of Alligator Alley and the Miami Canal, WCA-2A & 2B • Richardson 1990 data for Loxahatchee National Wildlife Refuge • FLUCCS 1995 for Big Cypress National Preserve, Holey Land & Rotenberger Wildlife Management Areas & WCA-3A south of Alligator Alley and Miami Canal. (Documented in August 2003 SFWMD memorandum from J. Barnes and K. Tarboton to J. Obeysekera).
Lake Okeechobee Service Area	
LOSA Basins	• Southern Indian Prairie Basin, S-4, North Lake Shore and Northeast Lake Shore demands and runoff based on AFSIRS (Agricultural Field-Scale Irrigation Requirement Simulation) modeling using 2010 LU projections.
Lake Okeechobee	• Lake Okeechobee Regulation Schedule WSE according to WSE decision trees, with pulse releases in Zone D modeled as Level III pulse in upper third of the zone, Level II pulse in middle third of the zone, and Level I pulse in the lower third of the zone, when the decision tree calls for regulatory releases to the estuaries in that zone. • WSE thresholds derived from the Class Limit Adjustment (CLA) WSE modification: Increase the frequency of Pulse Releases in Zone D of WSE. • Modified WSE thresholds for zone D1 to improve utilization of EAA reservoir. • Lake Okeechobee Supply Side Management guidelines are used to implement Lake Okeechobee Service Area water restriction cutbacks as per rule 40E-21 and 40E-22. The Lake Okeechobee service area water shortage triggering line is the line starting at 13.0 ft on October 1 and ending at 10.5 ft on May 31, with additional breakpoints defined in between. • Emergency flood control backpumping to Lake Okeechobee from the Everglades Agricultural Area. • Kissimmee River Restoration and Headwaters Revitalization Project are complete. • Lake Okeechobee environmental releases to supplement reservoir deliveries to Caloosahatchee and St. Lucie Estuaries. • Environmental deliveries to WCA-3A according to Rainfall Driven Operations as means of operating the EAA Reservoirs. • Lake Okeechobee BMP makeup water deliveries to WCAs are not made. • Adaptive protocols are included. • Flood control releases South through STA-3/4 and WCAs are not performed in this simulation.
Acceler8 Projects	Acceler8 Projects On Line by 2010 – See A8 Website. • C44 Reservoirs: 9315 acres, depth 5 .ft.

Feature	2010A8 Base Assumptions

	• C43 Reservoirs: 11000 acres, depth 15 ft.
	• EAA Reservoirs- A-1 Reservoir
	A-1 Reservoir simulated as two interconnected compartments.
	Compartment 1: irrigation, 9600 acres, depth 12 ft.
	Compartment 2: environment 6400 acres, depth 12 ft.
	• WPA's
	  • Site 1 Impoundment: 1660 acres; depth 8 ft.
	  • C-9 Impoundment: 1739 acres; depth 4 ft.
	  • C-11 Impoundment: 1730 acres; depth 4 ft.
	  • Acme Basin B discharge to C51W and then to STA1E
	  • WCA-3A/3B Seepage Management Area

Caloosahatchee River Basin	• Caloosahatchee River Basin irrigation demands and runoff were estimated using the AFSIRS method based on projected 2010 land use. • Public water supply daily intake from the river is included in the analysis. • C43 reservoir supplements basin irrigation needs and estuarine environmental needs.
St. Lucie Canal Basin	• St. Lucie Canal Basin demands estimated using the AFSIRS method based on projected 2010 land use. • Basin demands include the Florida Power & Light reservoir at Indiantown. • C44 reservoir supplements basin irrigation needs and estuarine environmental needs.
Seminole Brighton Reservation	• Brighton reservation demands were estimated using AFSIRS method based on existing planted acreage in a manner consistent with that applied to other basins not in the distributed mesh of the SFWMM. • The 2 in 10 demand set forth in the Seminole Compact Work plan equals 2,262 MGM (million gallons/month). AFSIRS modeled 2 in 10 demands equaled 2,383 MGM. • While estimated demands, and therefore deliveries, for every month of simulation do not equate to monthly entitlement quantities as per Table 7, Agreement 41-21 (Nov. 1992), tribal rights to these quantities are preserved. • Lake Okeechobee low stage management applies to this agreement.
Seminole Big Cypress Reservation	• Big Cypress Reservation irrigation demands and runoff were estimated using the AFSIRS method based on existing planted acreage in a manner consistent with that applied to other basins not in the distributed mesh of the SFWMM. • The 2 in 10 demand set forth in the Seminole Compact Work Plan equals 2,606 MGM. AFSIRS modeled 2 in 10 demands equaled 2,659 MGM.

Feature	2010A8 Base Assumptions
	• While estimated demands, and therefore deliveries, for every month of simulation do not equate to monthly entitlement quantities as per the District's Final Order and Tribe's Resolution establishing the Big Cypress Reservation entitlement, tribal rights to these quantities are preserved. • Lake Okeechobee low stage management applies to this agreement.
Seminole Hollywood Reservation	• Hollywood Reservation demands are set forth under VI. C of the Tribal Rights Compact. • Tribal sources of water supply include various bulk sale agreements with municipal service suppliers.
Everglades Agricultural Area	• Everglades Agricultural Area irrigation demands are simulated using climatic data for the 36 year period of record and a soil moisture accounting algorithm, with parameters calibrated to match historical regional supplemental deliveries from Lake Okeechobee. • SFWMM EAA runoff and irrigation demand response to rainfall was calibrated for 1984-95 and verified for 1979-1983/1996-2000. No runoff reduction adjustment was necessary to account for Best Management Practices (BMPs). • Minimum elevation at which farmers can pump water out of the major canals for supplemental irrigation is 8.0 ft. • EAA Reservoirs A1 16,000 acres o Compartment 1: 9600 acres o Compartment 2: 6400 acres • Rain Driven Operation applied to operate the EAA reservoirs for the Everglades Restoration Project
Everglades Construction Project Stormwater Treatment Areas	• STA-1E: 5132 acres total treatment area • STA-1W: 6670 acres total treatment area • STA-2 : 6430 acres total treatment area • STA 2-Cell 4: 1902 acres total treatment area • STA-3/4: 16543 acres total treatment area • STA-5: 6095 acres total treatment • STA-6: 2257 acres total treatment • Operation of STAs assumes maintenance of a 6" minimum depth.
Holey Land Wildlife WMA	• As per Memorandum of Agreement between the FWC and the District.

Feature	2010A8 Base Assumptions
Rotenberger Wildlife WMA	• Interim Operational Schedule as defined in the Operation Plan for Rotenberger (SFWMD Jan 2002).
Water Conservation Areas	
Water Conservation Area 1 (ARM Loxahatchee National Wildlife Refuge)	• Current C&SF Regulation Schedule. Includes regulatory releases to tide through LEC canals. • No net outflow to maintain minimum stages in the LEC Service Area canals (salinity control), if water levels are less than minimum operating criteria of 14 ft. The bottom floor of the schedule (Zone C) is the area below 14 ft. Any water supply releases below the floor will be matched by an equivalent volume of inflow from Lake Okeechobee.
Water Conservation Area 2 A&B	• Current C&SF regulation schedule. Includes regulatory releases to tide through LEC canals. • No net outflow to maintain minimum stages in the LEC Service Area canals (salinity control), if water levels in WCA-2A are less than minimum operating criteria of 10.5 ft. Any water supply releases below the floor will be matched by an equivalent volume of inflow from Lake Okeechobee.
Water Conservation Area 3 A&B	• Rainfall driven operational criteria for determining timing of deliveries to and discharges from WCA-3A and WCA-3B. • No net outflow to maintain minimum stages in the LEC Service Area canals (salinity control), if water levels are less than minimum operating criteria of 7.5 ft in WCA-3A. Any water supply releases below the floor will be matched by an equivalent volume of inflow from Lake Okeechobee. • Structural and operational modifications for L-67 canal conveyance and S-355 structures as in the federally authorized Modified Water Deliver Project. •
Lower East Coast Service Areas	
Public Water Supply and Irrigation	• 2010 projections based upon permitted allocation to utilities by 2005, with 2010 well field distribution and inclusion of utility ASR. • Irrigation demands are based upon existing land use (updated through 2010) and calculated using AFSIRS, reduced to account for landscape and golf course areas irrigated using reuse water and landscape areas irrigated using public water supply.

Feature	2010A8 Base Assumptions
Other Natural Areas	• For the Northwest Fork of the Loxahatchee River, the District operates the G-92 structure and associated structures to provide approximately 50 cfs over Lainhart Dam to the Northwest Fork, when sufficient water is available in C-18 Canal. • Flows to Pond Apple Slough through S-13A are adjusted in the model to approximate measured flows at the structure. • Flows to Biscayne Bay are simulated through Snake Creek, North Bay, the Miami River, Central Bay and South Bay.
Coastal Basin Canal Facilities and Operations	• C-4 Flood Mitigation Project • C-11 Water Quality Treatment Critical Project (S-381 and S-9A) • Releases from WCA-3A to ENP and the South Dade Conveyance System (SDCS) will follow the Interim Operational Plan (2002 IOP EIS): o Decreased S-12 flood control discharges & increased flood control discharges to SDCS o Structures S-343A, S-343B, S-344 and S-12A are closed Nov. 1 to July 15 o Structure S-12B is closed Jan. 1 to July 15. o Structure S-12C is closed Feb. 1 to July 15. South Dade Conveyance System operations will follow IOP for protection of the Cape Sable
Lower East Coast	• C-4 Impoundment – 843.5 acres
Upper East Coast Operational CERP	• L-8 Reservoir: 870 acres, depth 44 ft.
Western Basins and Big Cypress National Preserve	
Western Basins	• Estimated and updated historical inflows from western basins at two locations: G-136 and G-406. The G-406 location represents potential inflow from the C-139 Basin into STA 5. Data for the period 1978 - 2000 is the same as the data used for the C-139 Basin Rule development. (Documented in June 2002 SFWMD memorandum from L. Cadavid and L. Brion to J. Obeysekera).
Big Cypress National Preserve	• Tamiami Trail culverts are not modeled in SFWMM due to the coarse (2x2 mile) model resolution.
Everglades National Park and Florida Bay	

Feature	2010A8 Base Assumptions
Everglades National Park & Lower East Coast	• Water deliveries to Everglades National Park are based upon Everglades Rain-driven operations. (WCA3A, 3B, ENP) • L29 constraint set to 9.2' per Tamiami Trail GRR Nov 2001 • 8.5 SMA as per the federally authorized Alternative 6D of the 8.5 SMA project. • Northern C111 project (2002 IOP EIS) • Southern C111 project modeled per C-111 Project 1994 GRR • IOP (partial implementation): o South Dade Structures modeled per 2002 IOP EIS o S12 and S343's operation under IOP schedules 2002 IOP EIS
Region-wide Water Management and Related Operations	
Water Shortage Rules	• The existing condition reflects the existing water shortage policies in 2005 as reflected in South Florida Water Management District Chapters 40E-21 and 40E-22, FAC

Appendix B. DMSTA Output

STA-1E

DMSTA2- Inputs & Outputs Project: STA 1E EIS Model Release: 07/05/07 Current Date: 11/5/2007

Input Variable	Units	Value
Design Case Name	-	All EIS AltA
Input Series Name		TS_All_EIS_AltA
Starting Date for Simulation	-	05/01/65
Ending Date for Simulation	-	04/30/00
Starting Date for Output	-	05/01/65
Integration Steps Per Day	-	4
Number of Iterations	-	0
Output Averaging Interval	days	365
Inflow Conc Scale Factor	-	1
Rainfall P Conc	ppb	10
Atmospheric P Load (Dry)	mg/m2-yr	20

Case Description: All cells

East Distribution Cell modeled as two cells in parallel; minimal treatment in EDC (K=0.01 m/yr)

West Distribution Cell modeled as two cells in parallel; minimal treatment in WDC (K=0.01 m/yr)

Simulation Type: Uncertainty Analysis

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	26.8	35.3	20.0
GM Outflow C (ppb)	24.2	32.4	17.9
Load Reduction %	85%	80%	89%
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	3	0.0%
Warning/Error Messages	4	

Cell Number -->	1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	EDCE	1	2	EDCW	3	4N	4S	WDCW	7	WDCE	5	6
Vegetation Type	none	EMG_3	SAV_3	none	EMG_3	SAV_3	SAV_3	none	EMG_3	none	EMG_3	SAV_3
Inflow Fraction	0.215903431			0.386989363				0.167819		0.229288		
Downstream Cell Number	2	3		5	6	7		9	12	11.00	12.00	
Surface Area km2	0.95	2.25	2.23	0.95	2.38	2.61	3.04	1.17	1.69	1.17	2.31	4.25
Mean Width of Flow Path km	0.66	1.55	1.55	0.66	1.55	1.55	1.55	0.75	1.61	0.75	1.18	0.75
Number of Tanks in Series -	0.5	3.0	3.0	0.5	3.0	3.0	3.0	0.5	3.0	0.5	3.0	3.0
Minimum Depth for Releases cm												
Release 1 Series Name												
Release 2 Series Name												
Outflow Series Name												
Depth Series Name												
Outflow Control Depth cm	38.1	38.1	38.1	91.44	38.1	38.1	38.1	99.06	38.1	38.1	38.1	38.1
Outflow Weir Depth cm												
Outflow Coefficient - Exponent -	4	4	4	4	4	4	4	4	4	4	4	4
Outflow Coefficient - Intercept -	1	1	1	1	1	1	1	1	1	1	1	1
Bypass Depth cm												
Maximum Inflow hm3/day												
Maximum Outflow hm3/day												
Inflow Seepage Rate (cm/d) / cm									0.0054			0.0057
Inflow Seepage Control Elev cm									69			94
Inflow Seepage Conc ppb									20			20
Outflow Seepage Rate (cm/d) / cm	0.0095	0.0042	0.0042	0.0095			0.0054	0.01		0.01		
Outflow Seepage Control Elev cm	-137	-137	-99	-87			-38	-15		-76		
Max Outflow Seepage Conc ppb	20	20	20	20			20	20		20		
Seepage Recycle to Cell Number -	1	1	1	4			7					
Seepage Recycle Fraction -	1	1	1	1			1					
Seepage Discharge Fraction -												
Initial Water Column Conc ppb	30	30	30	30	30	30	30	30	30	30	30	30
Initial P Storage Per Unit Area mg/m2	500	500	500	500	500	500	500	500	500	500	500	500
Initial Water Column Depth cm	50	50	50	50	50	50	50	50	50	50	50	50
C0 = Conc at 0 g/m2 P Storage ppb	3	3	3	3	3	3	3	3	3	3	3	3
C1 = Conc at 1 g/m2 P storage ppb	22	22	22	22	22	22	22	22	22	22	22	22
C2 = Conc at Half-Max Uptake ppb	300	300	300	300	300	300	300	300	300	300	300	300
K = Net Settling Rate at Steady State m/yr	0.0	16.8	52.5	0.0	16.8	52.5	52.5	0.0	16.8	0.0	16.8	52.5
Z1 = Saturated Uptake Depth cm	40	40	40	40	40	40	40	40	40	40	40	40
Z2 = Lower Penalty Depth cm	100	100	100	100	100	100	100	100	100	100	100	100
Z3 = Upper Penalty Depth cm	200	200	200	200	200	200	200	200	200	200	200	200

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	17.17	17.89	18.60	19.00	19.71	20.43	21.14	21.54	22.26	22.66	23.34	24.06	24.06
Run Date	-	11/05/07	11/05/07	11/05/07	11/05/07	11/05/07	11/05/07	11/05/07	11/05/07	11/05/07	11/05/07	11/05/07	11/05/07	11/05/07
Starting Date for Simulation	-	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65
Starting Date for Output	-	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65
Ending Date	-	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00
Output Duration	days	12784	12784	12784	12784	12784	12784	12784	12784	12784	12784	12784	12784	12784
Cell Label		EDCE	1	2	EDCW	3	4N	4S	WDCW	7	WDCE	5	6	Total
Downstream Cell Label		1	2	Outflow	3	4N	4S	Outflow	7	6	5	6	Outflow	-
Network Simulation Name	-	none	none	none	none	none	none	none	none	none	none	none	none	none
Simulation Type	-	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta
Surface Area	km2	0.95	2.25	2.23	0.95	2.38	2.61	3.04	1.17	1.69	1.17	2.31	4.25	25.02
Mean Rainfall	cm/yr	142.94	142.94	142.94	142.94	142.94	142.94	142.94	142.94	142.94	142.94	142.94	142.94	142.9
Mean ET	cm/yr	128.87	128.87	128.50	128.87	128.87	128.87	128.87	128.87	128.87	128.58	128.66	128.87	128.8
Cell Inflow Volume	hm3/yr	51.6	63.4	57.2	92.6	92.7	93.0	93.4	40.1	35.5	54.8	49.3	86.1	239.2
Cell Inflow Load	kg/yr	9078.0	8698.0	5399.7	16271.5	15523.1	12054.9	5173.2	7056.2	6255.6	9640.7	8704.4	9560.3	42046
Cell Inflow Conc	ppb	176	137	94	176	167	130	55	176	176	176	176	111	175.8
Treated Outflow Volume	hm3/yr	63.4	57.2	52.4	92.7	93.0	93.4	93.8	35.5	36.5	49.3	49.6	89.1	235.3
Treated Outflow Load	kg/yr	8698.0	5399.7	1560.8	15523.1	12054.9	5173.2	2089.4	6255.6	3999.7	8704.4	5560.6	2649	6299
Treated FWM Outflow Conc	ppb	137	94	30	167	130	55	22	176	110	176	112	30	26.8
Upper Confidence Limit	ppb	137.2	102.9	38.1	167.4	137.3	67.5	30.0	176.3	121.4	176.5	124.0	39.1	35.3
Lower Confidence Limit	ppb	137.1	84.8	22.8	167.4	120.3	44.0	16.4	176.3	96.5	176.5	98.5	22.2	20.0
Total Outflow Volume + Bypass	hm3/yr	63.4	57.2	52.4	92.7	93.0	93.4	93.8	35.5	36.5	49.3	49.6	89.1	235.3
Total Outflow Load + Bypass	kg/yr	8698.0	5399.7	1560.8	15523.1	12054.9	5173.2	2089.4	6255.6	3999.7	8704.4	5560.6	2648.9	6299.2
Total FWM Outflow Conc	ppb	137.2	94.5	29.8	167.4	129.6	55.4	22.3	176.3	109.7	176.5	112.0	29.7	26.8
Bypass Load	kg/yr	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Bypass Load	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.0
Maximum Inflow	hm3/d	0.25	0.29	0.27	0.45	0.45	0.46	0.46	0.20	0.18	0.27	0.25	0.45	1.17
Maximum Outflow	hm3/d	0.29	0.27	0.26	0.45	0.46	0.46	0.47	0.18	0.19	0.25	0.26	0.46	1.19
Surface Load Reduction	kg/yr	7745	3298	3839	868	3468	6882	3188	801	2256	936	3144	6911	35747
Load Trapped in Sediments	kg/yr	0	2693	3660	0	3548	6970	3142	0	2328	0	3222	7104	32667
Overall Load Reduction	%	4%	38%	71%	5%	22%	57%	60%	11%	36%	10%	36%	72%	85%
Lower Confidence Limit	%	0.0	0.3	0.7	0.0	0.2	0.5	0.6	0.1	0.3	0.1	0.3	0.7	80%
Upper Confidence Limit	%	0.0	0.4	0.8	0.0	0.3	0.6	0.6	0.1	0.4	0.1	0.4	0.8	89%
Daily Geometric Mean	ppb	102.6	88.6	24.0	141.7	122.8	46.9	16.6	166.7	102.9	163.2	109.2	22.2	#N/A
Outflow Geo Mean - Composites	ppb	135.1	91.9	27.3	166.4	127.0	51.4	20.1	175.6	106.4	176.0	109.0	26.8	24.2
Upper Confidence Limit	ppb	135.1	100.6	35.3	166.4	135.1	63.6	27.4	175.6	118.5	176.0	121.4	35.8	32.4
Lower Confidence Limit	ppb	135.0	82.0	20.6	166.4	117.3	40.1	14.6	175.6	92.8	176.0	95.0	19.8	17.9
Frequency Outflow Conc > 10 ppb	%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Frequency Outflow Conc > 20 ppb	%	100%	100%	81%	100%	100%	100%	53%	100%	100%	100%	100%	83%	97%
Frequency Outflow Conc > 50 ppb	%	100%	100%	0%	100%	100%	53%	0%	100%	100%	100%	100%	0%	75%
Freq Outflow Volume > 10 ppb	%	100%	100%	100%	100%	100%	100%	96%	100%	100%	100%	100%	100%	100%
95th Percentile Outflow Conc	ppb	153.41	109.58	40.38	181.51	146.53	75.42	31.10	192.89	125.78	192.39	127.85	41.06	37
Mean Biomass P Storage	mg/m2	737	3764	1648	939	4677	2684	1040	1003	4329	813	4385	1687	2471
Storage Increase / Net Removal	%	2065%	0%	0%	2687%	0%	0%	0%	2891%	0%	2804%	0%	0%	0%
Net Storage Turnover Rate	1/yr	0.0	11.1	34.8	0.0	11.1	34.8	34.7	0.0	11.1	0.0	11.1	34.7	18.5
Unit Area P Load	mg/m2-yr	9546	3864	2416	17110	6510	4616	1699	6031	3697	8240	3765	2251	1681
Unit Area P Removal	mg/m2-yr	0	1197	1638	0	1488	2669	1032	0	1376	0	1394	1673	1306
Mean Water Load	cm/d	14.9	7.7	7.0	26.7	10.6	9.8	8.4	9.4	5.7	12.8	5.8	5.6	2.6
Max Water Load	cm/d	26.5	12.8	12.2	47.4	19.0	17.5	15.2	16.7	10.9	22.8	10.9	10.5	4.7
Mean Depth	cm	68	53	51	94	59	59	58	98	47	58	53	68	61
Minimum Depth	cm	59.9	46.5	43.2	92.8	50.5	50.1	49.7	84.6	42.1	43.1	41.7	57.1	52
Maximum Depth	cm	76.2	60.1	59.5	98.0	67.9	68.1	69.0	100.7	54.3	69.5	62.6	82.1	71
Frequency Depth < 10 cm	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.0%
Flow/Width	m2/day	214	112	101	384	164	164	165	147	60	200	114	314	178.9
HRT Days	days	4.6	6.9	7.3	3.5	5.5	6.0	7.0	10.5	8.2	4.5	9.1	12.3	23.4
Mean Velocity	cm/sec	0.37	0.24	0.23	0.47	0.32	0.32	0.33	0.17	0.15	0.40	0.25	0.53	0.33
Seepage Outflow / Total Outflow	%	0%	0%	0%	0%	0%	0%	0%	12%	0%	10%	0%	0%	4%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
95th Percentile Outflow Volume	hm3/d	0.2	0.2	0.2	0.4	0.4	0.4	0.4	0.2	0.2	0.2	0.2	0.4	1.0
95th Percentile Outflow Load	kg/d	35.6	23.9	8.3	64.2	53.2	26.8	11.5	26.6	18.5	36.6	25.4	14.6	34.4
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Range Check - Mean Depth	-			0.82			0.94	0.94						3
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-			0.62										1
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-													0
Water Balance Error	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%
Mass Balance Error	%	0.00%	0.01%	0.01%	0.00%	0.01%	0.01%	0.01%	0.00%	0.01%	0.00%	0.01%	0.01%	0.02%
Warning or Error Messages		Cell# 3 Depth out of calib. range for SAV_3: 51 vs. 62 - 87 cm												4
		Cell# 3 Flow/Width out of calib. range for SAV_3: 101 vs. 162 - 374 m2/day												
		Cell# 6 Depth out of calib. range for SAV_3: 59 vs. 62 - 87 cm												
		Cell# 7 Depth out of calib. range for SAV_3: 58 vs. 62 - 87 cm												

STA-1W

DMSTA2- Inputs & Outputs — **Project: STA 1W EIS** — Model Release: 07/05/07 — Current Date: 11/5/2007

Input Variable	Units	Value
Design Case Name	-	EIS AltA
Input Series Name	-	TS_EIS_AltA
Starting Date for Simulation	-	05/01/65
Ending Date for Simulation	-	04/30/00
Starting Date for Output	-	05/01/65
Integration Steps Per Day	-	4
Number of Iterations	-	0
Output Averaging Interval	days	365
Inflow Conc Scale Factor	-	1
Rainfall P Conc	ppb	10
Atmospheric P Load (Dry)	mg/m2-yr	20

Case Description:
STA-1W with Long Term Plan Enhancements
Include all S-5A Basin and EBWCD Runoff
Balanced loading rate among STA-1E and STA-1W

Simulation Type: Uncertainty Analysis

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	27.3	34.9	21.3
GM Outflow C (ppb)	26.0	33.3	20.2
Load Reduction %	85%	81%	88%
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	-0.2%	0.4%
Iterations & Convergence	3	0.1%
Warning/Error Messages	7	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	1A	1B	3	2A	2B	4	5A	5B				
Vegetation Type	-->	EMG_3	SAV_3	SAV_3	EMG_3	SAV_3	SAV_3	EMG_3	SAV_3				
Inflow Fraction	-	0.377211394			0.194752624			0.428036					
Downstream Cell Number	-	2	3		5	6		8					
Surface Area	km2	3.02	3.02	4.15	1.91	1.90	1.45	2.28	9.28				
Mean Width of Flow Path	km	1.10	1.10	1.10	2.40	2.00	1.30	1.78	2.34				
Number of Tanks in Series	-	2.0	2.0	2.0	2.0	2.0	2.0	2.0	3.0				
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	38.1	38.1	38.1	38.1	38.1	38.1	38.1	38.1				
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4	4	4	4	4	4				
Outflow Coefficient - Intercept	-	1	1	1	1	1	1	1	1				
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm	0.0035	0.0018	0.0023									
Inflow Seepage Control Elev	cm	172	172	185									
Inflow Seepage Conc	ppb	20	20	20									
Outflow Seepage Rate	(cm/d) / cm			0.0014	0.0016	0.0016	0.0021	0.0156	0.0049				
Outflow Seepage Control Elev	cm			-60	-46	-46	-46	-46	-46				
Max Outflow Seepage Conc	ppb			20	20	20	20	20	20				
Seepage Recycle to Cell Number	-							1	1				
Seepage Recycle Fraction	-							0.91	0.8				
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	30	30	30	30	30	30	30	30				
Initial P Storage Per Unit Area	mg/m2	500	500	500	500	500	500	500	500				
Initial Water Column Depth	cm	200	200	200	200	200	200	200	200				
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3	3	3	3	3	3				
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22	22	22	22	22	22				
C2 = Conc at Half-Max Uptake	ppb	300	300	300	300	300	300	300	300				
K = Net Settling Rate at Steady State	m/yr	16.8	52.5	52.5	16.8	52.5	52.5	16.8	52.5				
Z1 = Saturated Uptake Depth	cm	40	40	40	40	40	40	40	40				
Z2 = Lower Penalty Depth	cm	100	100	100	100	100	100	100	100				
Z3 = Upper Penalty Depth	cm	200	200	200	200	200	200	200	200				

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	10.40	10.94	11.51	12.06	12.60	13.14	13.71	14.43					14.43
Run Date	-	11/05/07	11/05/07	11/05/07	11/05/07	11/05/07	11/05/07	11/05/07	11/05/07					11/05/07
Starting Date for Simulation	-	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65					05/01/65
Starting Date for Output	-	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65					05/01/65
Ending Date	-	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00					04/30/00
Output Duration	days	12784	12784	12784	12784	12784	12784	12784	12784					12784
Cell Label		1A	1B	3	2A	2B	4	5A	5B					Total
Downstream Cell Label		1B	3	Outflow	2B	4	Outflow	5B	Outflow					-
Network Simulation Name	-	none	none	none	none	none	none	none	none					none
Simulation Type	-	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta					Uncerta
Surface Area	km2	3.02	3.02	4.15	1.91	1.90	1.45	2.28	9.28					27.00
Mean Rainfall	cm/yr	134.86	134.86	134.86	134.86	134.86	134.86	134.86	134.86					134.9
Mean ET	cm/yr	130.02	130.02	130.02	129.91	129.83	129.69	123.15	127.38					128.5
Cell Inflow Volume	hm3/yr	113.5	140.3	142.5	58.6	57.7	56.8	128.8	117.4					300.9
Cell Inflow Load	kg/yr	20603.4	17206.1	9181.1	10637.5	7734.6	3205.6	23379.5	16322.6					54620
Cell Inflow Conc	ppb	181	123	64	181	134	56	181	139					181.5
Treated Outflow Volume	hm3/yr	140.3	142.5	144.0	57.7	56.8	55.8	117.4	103.1					302.9
Treated Outflow Load	kg/yr	17206.1	9181.1	4125.4	7734.6	3205.6	1661.7	16322.6	2494.1					8281
Treated FWM Outflow Conc	ppb	123	64	29	134	56	30	139	24					27.3
Upper Confidence Limit	ppb	128.6	74.9	36.9	143.2	68.5	38.6	145.3	30.0					34.9
Lower Confidence Limit	ppb	115.4	53.9	21.9	123.3	45.4	22.9	131.9	19.6					21.3
Total Outflow Volume + Bypass	hm3/yr	140.3	142.5	144.0	57.7	56.8	55.8	117.4	103.1					302.9
Total Outflow Load + Bypass	kg/yr	17206.1	9181.1	4125.4	7734.6	3205.6	1661.7	16322.6	2494.1					8281.1
Total FWM Outflow Conc	ppb	122.6	64.4	28.6	134.1	56.5	29.8	139.0	24.2					27.3
Bypass Load	kg/yr	0	0	0	0	0	0	0	0					0.0
Bypass Load	%	0%	0%	0%	0%	0%	0%	0%	0%					0.0
Maximum Inflow	hm3/d	0.49	0.58	0.59	0.25	0.25	0.26	0.56	0.53					1.30
Maximum Outflow	hm3/d	0.58	0.59	0.61	0.25	0.26	0.26	0.53	0.50					1.36
Surface Load Reduction	kg/yr	3838	8025	5056	2903	4529	1544	7057	13829					46339
Load Trapped in Sediments	kg/yr	4017	8165	5191	2769	4496	1551	2896	12710					41795
Overall Load Reduction	%	16%	47%	55%	27%	59%	48%	30%	85%					85%
Lower Confidence Limit	%	0.1	0.4	0.5	0.2	0.5	0.4	0.3	0.8					81%
Upper Confidence Limit	%	0.2	0.5	0.6	0.3	0.6	0.5	0.3	0.9					88%
Daily Geometric Mean	ppb	109.8	54.8	22.4	140.2	50.5	23.0	158.5	19.6					#N/A
Outflow Geo Mean - Composites	ppb	121.0	62.1	27.3	132.0	53.8	28.1	136.1	22.9					26.0
Upper Confidence Limit	ppb	127.1	72.8	35.3	141.5	65.7	36.6	142.7	28.5					33.3
Lower Confidence Limit	ppb	113.5	51.6	20.8	121.0	42.9	21.6	128.8	18.5					20.2
Frequency Outflow Conc > 10 ppb	%	100%	100%	100%	100%	100%	100%	100%	100%					100%
Frequency Outflow Conc > 20 ppb	%	100%	100%	94%	100%	100%	94%	100%	75%					100%
Frequency Outflow Conc > 50 ppb	%	100%	92%	0%	100%	69%	0%	100%	0%					92%
Freq Outflow Volume > 10 ppb	%	100%	100%	100%	100%	100%	100%	100%	99%					100%
95th Percentile Outflow Conc	ppb	132.88	78.01	37.11	144.95	69.47	38.15	153.80	31.30					35
Mean Biomass P Storage	mg/m2	4187	2713	1250	4555	2360	1068	3988	1364					2313
Storage Increase / Net Removal	%	0%	0%	0%	0%	0%	0%	0%	0%					0%
Net Storage Turnover Rate	1/yr	11.1	34.9	35.0	11.2	35.0	35.1	11.2	35.1					23.4
Unit Area P Load	mg/m2-yr	6831	5705	2210	5578	4065	2212	10275	1758					2023
Unit Area P Removal	mg/m2-yr	1332	2707	1250	1452	2363	1070	1273	1369					1548
Mean Water Load	cm/d	10.3	12.7	9.4	8.4	8.3	10.7	15.5	3.5					3.1
Max Water Load	cm/d	16.2	19.3	14.3	13.2	13.4	17.7	24.4	5.7					4.8
Mean Depth	cm	67	69	70	44	45	48	46	46					55
Minimum Depth	cm	59.6	60.9	61.8	37.1	37.3	37.3	33.1	28.6					43
Maximum Depth	cm	77.1	78.7	80.1	51.3	53.6	59.1	61.1	60.1					66
Frequency Depth < 10 cm	%	0%	0%	0%	0%	0%	0%	0%	0%					0.0%
Flow/Width	m2/day	283	349	355	67	79	120	198	137					205.8
HRT Days	days	6.5	5.4	7.5	5.2	5.4	4.5	3.0	13.2					17.9
Mean Velocity	cm/sec	0.49	0.59	0.59	0.18	0.20	0.29	0.49	0.35					0.41
Seepage Outflow / Total Outflow	%	0%	0%	2%	2%	2%	2%	1%	3%					3%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					0.0
95th Percentile Outflow Volume	hm3/d	0.6	0.6	0.6	0.2	0.2	0.2	0.5	0.5					1.3
95th Percentile Outflow Load	kg/d	74.3	43.1	20.1	34.7	15.9	8.5	75.9	13.1					41.7
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A					#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A					#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A					#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A					#N/A
Range Check - Mean Depth	-					0.72	0.77		0.74					3
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-	1.35				0.49	0.74		0.85					4
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-													0
Water Balance Error	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%					0.00%
Mass Balance Error	%	0.01%	0.01%	0.01%	0.01%	0.02%	0.01%	-0.41%	-0.01%					-0.16%
Warning or Error Messages		Cell# 1 Flow/Width out of calib. range for EMG_3: 283 vs. 26 - 210 m2/day						Cell# 6 Flow/Width out of calib. range for SAV_3: 120 vs. 162 - 374 m2/day						7
		Cell# 5 Depth out of calib. range for SAV_3: 45 vs. 62 - 87 cm						Cell# 8 Depth out of calib. range for SAV_3: 46 vs. 62 - 87 cm						
		Cell# 5 Flow/Width out of calib. range for SAV_3: 79 vs. 162 - 374 m2/day						Cell# 8 Flow/Width out of calib. range for SAV_3: 137 vs. 162 - 374 m2/day						
		Cell# 6 Depth out of calib. range for SAV_3: 48 vs. 62 - 87 cm												

STA-2

DMSTA2- Inputs & Outputs — **Project: STA 2 EIS** — Model Release: 07/05/07 — Current Date: 11/5/2007

Input Variable	Units	Value
Design Case Name	-	EIS AltA
Input Series Name	-	TS_EIS_AltA
Starting Date for Simulation	-	05/01/65
Ending Date for Simulation	-	04/30/00
Starting Date for Output	-	05/01/65
Integration Steps Per Day	-	4
Number of Iterations	-	0
Output Averaging Interval	days	365
Inflow Conc Scale Factor	-	1
Rainfall P Conc	ppb	10
Atmospheric P Load (Dry)	mg/m2-yr	20

Case Description: Analysis for WY 1966-2000; Inflow time series includes allowance of 38 cfs (27,500 ac-ft/yr) seepage from WCA-2A to Supply Canal; Includes Cell 4

Simulation Type: Uncertainty Analysis

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	20.9	26.1	16.7
GM Outflow C (ppb)	20.0	25.1	15.9
Load Reduction %	81%	76%	85%
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.1%
Iterations & Convergence	2	0.7%
Warning/Error Messages	7	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	1	2	3	4								
Vegetation Type	-->	PEW_3	PEW_3	SAV_3	SAV_3								
Inflow Fraction	-	0.218222771	0.275476273	0.275476273	0.230824682								
Downstream Cell Number	-												
Surface Area	km2	7.28	9.19	9.19	7.70								
Mean Width of Flow Path	km	1.58	2.00	2.00	2.50								
Number of Tanks in Series	-	3.0	3.0	6.0	3.0								
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	52.73	29.26	29.87	42.7								
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4	4								
Outflow Coefficient - Intercept	-	1	1	1	1								
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm	0.008			0.0064								
Inflow Seepage Control Elev	cm	76			60								
Inflow Seepage Conc	ppb	20			75								
Outflow Seepage Rate	(cm/d) / cm	0.004	0.006	0.00337									
Outflow Seepage Control Elev	cm	-61	-61	-30									
Max Outflow Seepage Conc	ppb	20	20	20									
Seepage Recycle to Cell Number	-	1	2	3									
Seepage Recycle Fraction	-	1	1	1									
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	30	30	30	30								
Initial P Storage Per Unit Area	mg/m2	500	500	500	500								
Initial Water Column Depth	cm	200	200	200	200								
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3	3								
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22	22								
C2 = Conc at Half-Max Uptake	ppb	300	300	300	300								
K = Net Settling Rate at Steady State	m/yr	34.9	34.9	52.5	52.5								
Z1 = Saturated Uptake Depth	cm	40	40	40	40								
Z2 = Lower Penalty Depth	cm	100	100	100	100								
Z3 = Upper Penalty Depth	cm	200	200	200	200								

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	4.63	5.34	6.51	7.23									7.23
Run Date	-	11/05/07	11/05/07	11/05/07	11/05/07									11/05/07
Starting Date for Simulation	-	05/01/65	05/01/65	05/01/65	05/01/65									05/01/65
Starting Date for Output	-	05/01/65	05/01/65	05/01/65	05/01/65									05/01/65
Ending Date	-	04/30/00	04/30/00	04/30/00	04/30/00									04/30/00
Output Duration	days	12784	12784	12784	12784									12784
Cell Label		1	2	3	4									Total
Downstream Cell Label		Outflow	Outflow	Outflow	Outflow									-
Network Simulation Name	-	none	none	none	none									none
Simulation Type	-	Uncerta	Uncerta	Uncerta	Uncerta									Uncerta
Surface Area	km2	7.28	9.19	9.19	7.70									33.36
Mean Rainfall	cm/yr	129.37	129.37	129.37	129.37									129.4
Mean ET	cm/yr	130.68	130.68	130.68	130.68									130.7
Cell Inflow Volume	hm3/yr	83.4	105.3	105.3	88.3									382.3
Cell Inflow Load	kg/yr	9344.3	11795.8	11795.8	9883.9									42820
Cell Inflow Conc	ppb	112	112	112	112									112.0
Treated Outflow Volume	hm3/yr	86.8	105.2	105.2	89.9	105.2	387.2							387.2
Treated Outflow Load	kg/yr	2247.1	2725.4	1494.1	1616.7	1578.1	8167.2							8083
Treated FWM Outflow Conc	ppb	26	26	14	18	15	21.1							20.9
Upper Confidence Limit	ppb	32.8	32.8	17.5	21.7									26.1
Lower Confidence Limit	ppb	20.2	20.2	11.8	15.1	15.0	17.3							16.7
Total Outflow Volume + Bypass	hm3/yr	86.8	105.2	105.2	89.9									387.2
Total Outflow Load + Bypass	kg/yr	2247.1	2725.4	1494.1	1616.7									8083.2
Total FWM Outflow Conc	ppb	25.9	25.9	14.2	18.0									20.9
Bypass Load	kg/yr	0	0	0	0									0.0
Bypass Load	%	0%	0%	0%	0%									0.0
Maximum Inflow	hm3/d	0.37	0.46	0.46	0.39									1.68
Maximum Outflow	hm3/d	0.38	0.47	0.47	0.39									1.70
Surface Load Reduction	kg/yr	7349	9527	10462	8267									34737
Load Trapped in Sediments	kg/yr	7188	8978	10471	8653									35291
Overall Load Reduction	%	76%	77%	87%	84%									81%
Lower Confidence Limit	%	0.7	0.7	0.8	0.8									76%
Upper Confidence Limit	%	0.8	0.8	0.9	0.9									85%
Daily Geometric Mean	ppb	19.8	19.9	8.7	11.8									#N/A
Outflow Geo Mean - Composites	ppb	24.9	24.9	13.4	17.1									20.0
Upper Confidence Limit	ppb	31.8	31.7	16.7	20.7									25.1
Lower Confidence Limit	ppb	19.3	19.3	11.1	14.3									15.9
Frequency Outflow Conc > 10 ppb	%	100%	100%	92%	100%									100%
Frequency Outflow Conc > 20 ppb	%	89%	92%	0%	19%									92%
Frequency Outflow Conc > 50 ppb	%	0%	0%	0%	0%									53%
Freq Outflow Volume > 10 ppb	%	100%	100%	68%	91%									99%
95th Percentile Outflow Conc	ppb	31.34	31.35	17.57	21.74									26
Mean Biomass P Storage	mg/m2	1485	1470	1139	1124									1302
Storage Increase / Net Removal	%	0%	0%	0%	0%									0%
Net Storage Turnover Rate	1/yr	23.3	23.3	35.0	35.0									28.4
Unit Area P Load	mg/m2-yr	1284	1284	1284	1284									1284
Unit Area P Removal	mg/m2-yr	987	977	1139	1124									1058
Mean Water Load	cm/d	3.1	3.1	3.1	3.1									3.1
Max Water Load	cm/d	5.0	5.0	5.0	5.0									5.0
Mean Depth	cm	61	55	55	52									56
Minimum Depth	cm	57.5	47.9	47.9	48.5									50
Maximum Depth	cm	66.2	64.2	64.2	58.5									63
Frequency Depth < 10 cm	%	0%	0%	0%	0%									0.0%
Flow/Width	m2/day	145	144	144	97									133.3
HRT Days	days	19.4	17.6	17.6	16.7									17.8
Mean Velocity	cm/sec	0.28	0.30	0.30	0.21									0.28
Seepage Outflow / Total Outflow	%	0%	0%	0%	0%									0%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00									0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00									0.0
95th Percentile Outflow Volume	hm3/d	0.3	0.4	0.4	0.4									1.6
95th Percentile Outflow Load	kg/d	10.2	12.6	7.4	7.7									37.9
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A	#N/A									#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A	#N/A									#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A	#N/A									#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A	#N/A									#N/A
Range Check - Mean Depth	-			0.89	0.85									2
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-			0.89	0.60									2
Range Check - Inflow Conc	-	1.02	1.02											2
Range Check - Outflow Conc	-			0.96										1
Water Balance Error	%	0.00%	0.00%	0.00%	0.00%									0.00%
Mass Balance Error	%	0.02%	0.02%	0.10%	0.02%									0.04%
Warning or Error Messages		Cell# 1 Inflow Conc out of calib. range for PEW_3: 112 vs. 8 - 110 ppb Cell# 2 Inflow Conc out of calib. range for PEW_3: 112 vs. 8 - 110 ppb Cell# 3 Depth out of calib. range for SAV_3: 55 vs. 62 - 87 cm Cell# 3 Flow/Width out of calib. range for SAV_3: 144 vs. 162 - 374 m2/day						Cell# 3 Outflow Conc out of calib. range for SAV_3: 14 vs. 15 - 153 ppb Cell# 4 Depth out of calib. range for SAV_3: 52 vs. 62 - 87 cm Cell# 4 Flow/Width out of calib. range for SAV_3: 97 vs. 162 - 374 m2/day						7

EAASR With Lake Okeechobee TP=100 ppb

DMSTA2- Inputs & Outputs Project: PROJECT_EAASR_STA34_NETWORK_EIS_ALTA Model Release: 07/05/07 Current Date: 11/5/2007

Input Variable	Units	Value
Design Case Name	-	A1
Input Series Name		TS_A1
Starting Date for Simulation	-	01/01/65
Ending Date for Simulation	-	04/30/00
Starting Date for Output	-	05/01/65
Integration Steps Per Day	-	4
Number of Iterations	-	0
Output Averaging Interval	days	1
Inflow Conc Scale Factor	-	1
Rainfall P Conc	ppb	10
Atmospheric P Load (Dry)	mg/m2-yr	20
Cell Number -->		1
Cell Label	-	1
Vegetation Type	-->	none
Inflow Fraction	-	1
Downstream Cell Number	-	
Surface Area	km2	61.54
Mean Width of Flow Pa	km	6.70
Number of Tanks in Series	-	1.0
Minimum Depth for Releases	cm	15
Release 1 Series Name		IRRIG
Release 2 Series Name		
Outflow Series Name		TO_STA
Depth Series Name		A1_DEPTH
Outflow Control Depth	cm	
Outflow Weir Depth	cm	
Outflow Coefficient - Exponent	-	1.5
Outflow Coefficient - Intercept	-	8
Bypass Depth	cm	
Maximum Inflow	hm3/day	
Maximum Outflow	hm3/day	9.05233
Inflow Seepage Rate	(cm/d) / cm	
Inflow Seepage Control Elev	cm	
Inflow Seepage Conc	ppb	
Outflow Seepage Rate	(cm/d) / cm	0.00081
Outflow Seepage Control Elev	cm	6
Max Outflow Seepage Conc	ppb	100
Seepage Recycle to Cell Number	-	1
Seepage Recycle Fraction	-	0.75
Seepage Discharge Fraction	-	
Initial Water Column Conc	ppb	105
Initial P Storage Per Unit Area	mg/m2	525
Initial Water Column Depth	cm	150
C0 = Conc at 0 g/m2 P Storage	ppb	3
C1 = Conc at 1 g/m2 P storage	ppb	150
C2 = Conc at Half-Max Uptake	ppb	
K = Net Settling Rate at Steady State	m/yr	5.0
Z1 = Saturated Uptake Depth	cm	40
Z2 = Lower Penalty Depth	cm	100
Z3 = Upper Penalty Depth	cm	400

Case Description:

Compartment A-1
15,200 acres (from A8)
Inflow volumes, outflow volumes, and depths from SFWMM simulation
Reservoir settling rate = 5.0 m/yr
Lake Okeechobee deliveries at 100 ppb

Simulation Type:

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	84.3	#N/A	#N/A
GM Outflow C (ppb)	94.9	#N/A	#N/A
Load Reduction %	18%	#N/A	#N/A
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	2	0.4%
Warning/Error Messages	0	

Output Variables	Units	1	Overall
Execution Time	sec/yr	1.67	1.67
Run Date	-	11/05/07	11/05/07
Starting Date for Simulation	-	01/01/65	01/01/65
Starting Date for Output	-	05/01/65	05/01/65
Ending Date	-	04/30/00	04/30/00
Output Duration	days	12784	12784
Cell Label		1	Total
Downstream Cell Label		Outflow	-
Network Simulation Name	-	EAASR_NET	EAASR_NET
Simulation Type	-	Base	Base
Surface Area	km2	61.54	61.54
Mean Rainfall	cm/yr	130.73	130.7
Mean ET	cm/yr	125.30	125.3
Cell Inflow Volume	hm3/yr	666.6	666.6
Cell Inflow Load	kg/yr	63931.8	63932
Cell Inflow Conc	ppb	96	95.9
Treated Outflow Volume	hm3/yr	469.5	469.5
Treated Outflow Load	kg/yr	39559.8	39560
Treated FWM Outflow Conc	ppb	84	84.3
Upper Confidence Limit	ppb	#N/A	#N/A
Lower Confidence Limit	ppb	#N/A	#N/A
Total Outflow Volume + Bypass	hm3/yr	658.2	658.2
Total Outflow Load + Bypass	kg/yr	52655.2	52655.2
Total FWM Outflow Conc	ppb	80.0	80.0
Bypass Load	kg/yr	0	0.0
Bypass Load	%	0%	0.0
Maximum Inflow	hm3/d	14.75	14.75
Maximum Outflow	hm3/d	10.15	10.15
Surface Load Reduction	kg/yr	26160	24372
Load Trapped in Sediments	kg/yr	12267	12267
Overall Load Reduction	%	18%	18%
Lower Confidence Limit	%	#N/A	#N/A
Upper Confidence Limit	%	#N/A	#N/A
Daily Geometric Mean	ppb	68.1	#N/A
Outflow Geo Mean - Composites	ppb	94.9	94.9
Upper Confidence Limit	ppb	#N/A	#N/A
Lower Confidence Limit	ppb	#N/A	#N/A
Frequency Outflow Conc > 10 ppb	%	100%	100%
Frequency Outflow Conc > 20 ppb	%	100%	100%
Frequency Outflow Conc > 50 ppb	%	93%	100%
Freq Outflow Volume > 10 ppb	%	71%	71%
95th Percentile Outflow Conc	ppb	772.49	772
Mean Biomass P Storage	mg/m2	405	405
Storage Increase / Net Removal	%	2%	2%
Net Storage Turnover Rate	1/yr	17.2	17.2
Unit Area P Load	mg/m2-yr	1039	1039
Unit Area P Removal	mg/m2-yr	199	199
Mean Water Load	cm/d	3.0	3.0
Max Water Load	cm/d	24.0	24.0
Mean Depth	cm	193	193
Minimum Depth	cm	1.0	1
Maximum Depth	cm	388.0	388
Frequency Depth < 10 cm	%	12%	12.1%
Flow/Width	m2/day	272	272.4
HRT Days	days	65.1	65.1
Mean Velocity	cm/sec	0.16	0.16
Seepage Outflow / Total Outflow	%	1%	2%
Release 1 Outflow Volume	hm3/yr	188.73	188.7
Release 2 Outflow Volume	hm3/yr	0.00	0.0
95th Percentile Outflow Volume	hm3/d	9.1	9.1
95th Percentile Outflow Load	kg/d	726.4	726.4
Simulated / Specified Mean Depth	%	99%	1.0
Release 1 Demand Met	%	90%	0.9
Release 2 Demand Met	%	#N/A	#N/A
Outflow Demand Met	%	105%	1.1
Range Check - Mean Depth	-		0
Range Check - Freq Depth < 10 cm	-		0
Range Check - Flow/Width	-		0
Range Check - Inflow Conc	-		0
Range Check - Outflow Conc	-		0
Water Balance Error	%	0.00%	0.00%
Mass Balance Error	%	0.01%	0.01%
Warning or Error Messages			0

EAASR With Lake Okeechobee TP=150 ppb

DMSTA2- Inputs & Outputs Project: PROJECT_EAASR_STA34_NETWORK_EIS_ALTA Model Release: 07/05/07 Current Date: 11/9/2007

Case Description:

Compartment A-1
15,200 acres (from A8)
Inflow volumes, outflow volumes, and depths from SFWMM simulation
Reservoir settling rate = 5.0 m/yr
Lake inflow = 150 ppb

Simulation Type:

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	111.6	#N/A	#N/A
GM Outflow C (ppb)	113.5	#N/A	#N/A
Load Reduction %	18%	#N/A	#N/A
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	2	0.7%
Warning/Error Messages	0	

Input Variable	Units	1	2	3	4	5	6	7	8	9	10	11	12
Cell Number -->		1											
Cell Label	-	1											
Vegetation Type	-->	none											
Inflow Fraction	-	1											
Downstream Cell Number	-												
Surface Area	km2	61.54											
Mean Width of Flow Pt	km	6.70											
Number of Tanks in Series	-	1.0											
Minimum Depth for Releases	cm	15											
Release 1 Series Name		IRRIG											
Release 2 Series Name													
Outflow Series Name		TO_STA											
Depth Series Name		A1_DEPTH											
Outflow Control Depth	cm												
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	1.5											
Outflow Coefficient - Intercept	-	8											
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day	9.05233											
Inflow Seepage Rate	(cm/d) / cm												
Inflow Seepage Control Elev	cm												
Inflow Seepage Conc	ppb												
Outflow Seepage Rate	(cm/d) / cm	0.00081											
Outflow Seepage Control Elev	cm	6											
Max Outflow Seepage Conc	ppb	100											
Seepage Recycle to Cell Number	-	1											
Seepage Recycle Fraction	-	0.75											
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	105											
Initial P Storage Per Unit Area	mg/m2	525											
Initial Water Column Depth	cm	150											
C0 = Conc at 0 g/m2 P Storage	ppb	3											
C1 = Conc at 1 g/m2 P storage	ppb	150											
C2 = Conc at Half-Max Uptake	ppb												
K = Net Settling Rate at Steady State	m/yr	5.0											
Z1 = Saturated Uptake Depth	cm	40											
Z2 = Lower Penalty Depth	cm	100											
Z3 = Upper Penalty Depth	cm	400											

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	1.64												1.64
Run Date	-	11/09/07												11/09/07
Starting Date for Simulation	-	01/01/65												01/01/65
Starting Date for Output	-	05/01/65												05/01/65
Ending Date	-	04/30/00												04/30/00
Output Duration	days	12784												12784
Cell Label		1												Total
Downstream Cell Label		Outflow												-
Network Simulation Name	-	AASR_NET 150												EAASR_NET 1
Simulation Type	-	Base												Base
Surface Area	km2	61.54												61.54
Mean Rainfall	cm/yr	130.73												130.7
Mean ET	cm/yr	125.39												125.4
Cell Inflow Volume	hm3/yr	665.7												665.7
Cell Inflow Load	kg/yr	83473.7												83474
Cell Inflow Conc	ppb	125												125.4
Treated Outflow Volume	hm3/yr	466.9												466.9
Treated Outflow Load	kg/yr	52103.8												52104
Treated FWM Outflow Conc	ppb	112												111.6
Upper Confidence Limit	ppb	#N/A												#N/A
Lower Confidence Limit	ppb	#N/A												#N/A
Total Outflow Volume + Bypass	hm3/yr	656.8												656.8
Total Outflow Load + Bypass	kg/yr	68833.1												68833.1
Total FWM Outflow Conc	ppb	104.8												104.8
Bypass Load	kg/yr	0												0.0
Bypass Load	%	0%												0.0
Maximum Inflow	hm3/d	14.75												14.75
Maximum Outflow	hm3/d	10.15												10.15
Surface Load Reduction	kg/yr	33483												31370
Load Trapped in Sediments	kg/yr	15048												15048
Overall Load Reduction	%	18%												18%
Lower Confidence Limit	%	#N/A												#N/A
Upper Confidence Limit	%	#N/A												#N/A
Daily Geometric Mean	ppb	81.6												#N/A
Outflow Geo Mean - Composites	ppb	113.5												113.5
Upper Confidence Limit	ppb	#N/A												#N/A
Lower Confidence Limit	ppb	#N/A												#N/A
Frequency Outflow Conc > 10 ppb	%	100%												100%
Frequency Outflow Conc > 20 ppb	%	100%												100%
Frequency Outflow Conc > 50 ppb	%	93%												100%
Freq Outflow Volume > 10 ppb	%	71%												71%
95th Percentile Outflow Conc	ppb	811.25												811
Mean Biomass P Storage	mg/m2	508												508
Storage Increase / Net Removal	%	3%												3%
Net Storage Turnover Rate	1/yr	16.8												16.8
Unit Area P Load	mg/m2-yr	1356												1356
Unit Area P Removal	mg/m2-yr	245												245
Mean Water Load	cm/d	3.0												3.0
Max Water Load	cm/d	24.0												24.0
Mean Depth	cm	196												196
Minimum Depth	cm	1.0												1
Maximum Depth	cm	387.1												387
Frequency Depth < 10 cm	%	12%												12.0%
Flow/Width	m2/day	272												272.0
HRT Days	days	66.1												66.1
Mean Velocity	cm/sec	0.16												0.16
Seepage Outflow / Total Outflow	%	1%												2%
Release 1 Outflow Volume	hm3/yr	189.93												189.9
Release 2 Outflow Volume	hm3/yr	0.00												0.0
95th Percentile Outflow Volume	hm3/d	9.1												9.1
95th Percentile Outflow Load	kg/d	998.5												998.5
Simulated / Specified Mean Depth	%	100%												1.0
Release 1 Demand Met	%	90%												0.9
Release 2 Demand Met	%	#N/A												#N/A
Outflow Demand Met	%	105%												1.0
Range Check - Mean Depth	-													0
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-													0
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-													0
Water Balance Error	%	0.00%												0.00%
Mass Balance Error	%	0.01%												0.01%
Warning or Error Messages														0

STA-3/4 With Lake Okeechobee TP=100 ppb

DMSTA2- Inputs & Outputs Project: PROJECT_EAASR_STA34_NETWORK_EIS_ALTA Model Release: 07/05/07 Current Date: 11/5/2007

Input Variable	Units	Value	Case Description:
Design Case Name	-	STA34 ind	STA-3/4 stand alone
Input Series Name		TS_STA34_ind	Inflows distributed uniformly based on area
Starting Date for Simulation	-	01/01/65	Lake Okeechobee deliveries at 100 ppb
Ending Date for Simulation	-	04/30/00	PSTA Demo in Cell 2B modeled as SAV_3
Starting Date for Output	-	05/01/65	Used EAASR inflows from network simulation to run uncertainty analysis
Integration Steps Per Day	-	4	
Number of Iterations	-	0	
Output Averaging Interval	days	365	
Inflow Conc Scale Factor	-	1	
Rainfall P Conc	ppb	10	
Atmospheric P Load (Dry)	mg/m2-yr	20	

Simulation Type: Uncertainty Analysis

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	21.9	26.3	18.1
GM Outflow C (ppb)	18.3	22.1	15.1
Load Reduction %	75%	70%	80%
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	2	0.3%
Warning/Error Messages	6	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	1A	1B	2A	2B	3A	3B						
Vegetation Type	-->	EMG_3	SAV_3	EMG_3	SAV_3	EMG_3	SAV_3						
Inflow Fraction	-	0.394547543		0.328598199		0.276854							
Downstream Cell Number	-	2		4		6							
Surface Area	km2	12.30	14.12	10.29	11.72	8.72	9.83						
Mean Width of Flow Path	km	3.42	4.50	2.89	4.02	4.88	4.88						
Number of Tanks in Series	-	3.0	3.0	3.0	3.0	3.0	3.0						
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	38.1	38.1	38.1	38.1	38.1	38.1						
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4	4	4	4						
Outflow Coefficient - Intercept	-	1	1	1	1	1	1						
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm												
Inflow Seepage Control Elev	cm												
Inflow Seepage Conc	ppb												
Outflow Seepage Rate	(cm/d) / cm	0.0058	0.0029	0.0014		0.0038							
Outflow Seepage Control Elev	cm	16	40	-67		-64							
Max Outflow Seepage Conc	ppb	20	20	20	20	20	20						
Seepage Recycle to Cell Number	-	1		3		5							
Seepage Recycle Fraction	-	0.5	0.5	0.5	0.5	0.5	0.5						
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	52	12	55	15	55	15						
Initial P Storage Per Unit Area	mg/m2	2400	615	2400	615	2400	615						
Initial Water Column Depth	cm	60	60	60	60	60	60						
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3	3	3	3						
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22	22	22	22						
C2 = Conc at Half-Max Uptake	ppb	300	300	300	300	300	300						
K = Net Settling Rate at Steady State	m/yr	16.8	52.5	16.8	52.5	16.8	52.5						
Z1 = Saturated Uptake Depth	cm	40	40	40	40	40	40						
Z2 = Lower Penalty Depth	cm	100	100	100	100	100	100						
Z3 = Upper Penalty Depth	cm	200	200	200	200	200	200						

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	5.58	6.31	7.02	7.73	8.43	9.14							9.14
Run Date	-	11/05/07	11/05/07	11/05/07	11/05/07	11/05/07	11/05/07							11/05/07
Starting Date for Simulation	-	01/01/65	01/01/65	01/01/65	01/01/65	01/01/65	01/01/65							01/01/65
Starting Date for Output	-	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65							05/01/65
Ending Date	-	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00							04/30/00
Output Duration	days	12784	12784	12784	12784	12784	12784							12784
Cell Label		1A	1B	2A	2B	3A	3B							Total
Downstream Cell Label		1B	Outflow	2B	Outflow	3B	Outflow							-
Network Simulation Name	-	none	none	none	none	none	none							none
Simulation Type	-	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta							Uncerta
Surface Area	km2	12.30	14.12	10.29	11.72	8.72	9.83							66.98
Mean Rainfall	cm/yr	129.99	129.99	129.99	129.99	129.99	129.99							130.0
Mean ET	cm/yr	134.40	134.15	134.40	134.11	133.38	133.87							134.1
Cell Inflow Volume	hm3/yr	327.6	321.5	272.8	269.0	229.8	222.8							830.2
Cell Inflow Load	kg/yr	28285.1	18960.6	23557.2	15874.8	19847.7	12996.8							71690
Cell Inflow Conc	ppb	86	59	86	59	86	58							86.4
Treated Outflow Volume	hm3/yr	321.5	319.5	269.0	268.5	222.8	222.4							810.4
Treated Outflow Load	kg/yr	18960.6	6945.9	15874.8	5886.6	12996.8	4894.5							17727
Treated FWM Outflow Conc	ppb	59	22	59	22	58	22							21.9
Upper Confidence Limit	ppb	63.7	26.2	63.7	26.4	62.8	26.3							26.3
Lower Confidence Limit	ppb	53.7	17.9	53.7	18.1	53.4	18.3							18.1
Total Outflow Volume + Bypass	hm3/yr	321.5	319.5	269.0	268.5	222.8	222.4							810.4
Total Outflow Load + Bypass	kg/yr	18960.6	6945.9	15874.8	5886.6	12996.8	4894.5							17727.0
Total FWM Outflow Conc	ppb	59.0	21.7	59.0	21.9	58.3	22.0							21.9
Bypass Load	kg/yr	0	0	0	0	0	0							0.0
Bypass Load	%	0%	0%	0%	0%	0%	0%							0.0
Maximum Inflow	hm3/d	2.14	2.12	1.78	1.77	1.50	1.48							5.42
Maximum Outflow	hm3/d	2.12	2.12	1.77	1.78	1.48	1.49							5.38
Surface Load Reduction	kg/yr	9435	12040	7748	9988	6987	8102							53963
Load Trapped in Sediments	kg/yr	9082	12301	7569	10270	6069	8339							53629
Overall Load Reduction	%	33%	63%	33%	63%	35%	62%							75%
Lower Confidence Limit	%	0.3	0.6	0.3	0.6	0.3	0.6							70%
Upper Confidence Limit	%	0.4	0.7	0.4	0.7	0.4	0.7							80%
Daily Geometric Mean	ppb	51.2	13.2	51.7	13.3	52.4	13.3							#N/A
Outflow Geo Mean - Composites	ppb	54.4	18.1	54.4	18.2	53.7	18.6							18.3
Upper Confidence Limit	ppb	59.7	21.9	59.7	22.1	58.7	22.3							22.1
Lower Confidence Limit	ppb	48.6	14.9	48.6	15.0	48.3	15.5							15.1
Frequency Outflow Conc > 10 ppb	%	100%	97%	100%	97%	100%	97%							97%
Frequency Outflow Conc > 20 ppb	%	100%	42%	100%	42%	100%	47%							72%
Frequency Outflow Conc > 50 ppb	%	67%	0%	67%	0%	67%	0%							42%
Freq Outflow Volume > 10 ppb	%	100%	93%	100%	93%	100%	93%							93%
95th Percentile Outflow Conc	ppb	68.42	28.34	68.59	28.52	68.42	28.07							28
Mean Biomass P Storage	mg/m2	2326	883	2318	888	2197	860							1537
Storage Increase / Net Removal	%	1%	1%	1%	1%	1%	1%							1%
Net Storage Turnover Rate	1/yr	11.1	34.5	11.1	34.5	11.1	34.5							18.2
Unit Area P Load	mg/m2-yr	2299	1343	2289	1355	2277	1323							1070
Unit Area P Removal	mg/m2-yr	738	871	735	876	696	849							801
Mean Water Load	cm/d	7.3	6.2	7.3	6.3	7.2	6.2							3.4
Max Water Load	cm/d	17.4	15.0	17.3	15.1	17.2	15.1							8.1
Mean Depth	cm	58	56	58	55	48	50							55
Minimum Depth	cm	42.2	40.9	41.9	40.2	34.9	36.7							40
Maximum Depth	cm	82.9	79.4	82.8	78.2	68.8	70.9							78
Frequency Depth < 10 cm	%	0%	0%	0%	0%	0%	0%							0.0%
Flow/Width	m2/day	262	196	259	183	129	125							196.4
HRT Days	days	8.0	9.0	8.0	8.8	6.7	8.1							16.2
Mean Velocity	cm/sec	0.52	0.40	0.52	0.38	0.31	0.29							0.41
Seepage Outflow / Total Outflow	%	2%	0%	1%	0%	3%	0%							2%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00							0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00							0.0
95th Percentile Outflow Volume	hm3/d	1.7	1.7	1.4	1.4	1.2	1.2							4.3
95th Percentile Outflow Load	kg/d	106.3	42.0	89.1	35.6	73.1	29.3							106.8
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Range Check - Mean Depth	-		0.91		0.89		0.81							3
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-	1.25		1.23			0.77							3
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-													0
Water Balance Error	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%							0.00%
Mass Balance Error	%	0.02%	0.02%	0.02%	0.02%	-0.04%	0.02%							0.02%
Warning or Error Messages		Cell# 1 Flow/Width out of calib. range for EMG_3: 262 vs. 26 - 210 m2/day					Cell# 4 Depth out of calib. range for SAV_3: 55 vs. 62 - 87 cm							6
		Cell# 2 Depth out of calib. range for SAV_3: 56 vs. 62 - 87 cm					Cell# 6 Depth out of calib. range for SAV_3: 50 vs. 62 - 87 cm							
		Cell# 3 Flow/Width out of calib. range for EMG_3: 259 vs. 26 - 210 m2/day					Cell# 6 Flow/Width out of calib. range for SAV_3: 125 vs. 162 - 374 m2/day							

STA-3/4 With Lake Okeechobee TP=150 ppb

DMSTA2- Inputs & Outputs **Project: PROJECT_EAASR_STA34_NETWORK_EIS_ALTA** Model Release: 07/05/07 Current Date: 11/9/2007

Input Variable	Units	Value	Case Description:
Design Case Name	-	STA34 ind 150	STA-3/4 stand alone
Input Series Name	-	TS_STA34_ind_1	Inflows distributed uniformly based on area
Starting Date for Simulation	-	01/01/65	Lake Okeechobee deliveries at 150 ppb
Ending Date for Simulation	-	04/30/00	PSTA Demo in Cell 2B modeled as SAV_3
Starting Date for Output	-	05/01/65	Used EAASR inflows from network simulation to run uncertainty analysis
Integration Steps Per Day	-	4	
Number of Iterations	-	0	
Output Averaging Interval	days	365	
Inflow Conc Scale Factor	-	1	
Rainfall P Conc	ppb	10	
Atmospheric P Load (Dry)	mg/m2-yr	20	

Simulation Type: Uncertainty Analysis

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	25.0	30.3	20.4
GM Outflow C (ppb)	20.3	24.9	16.6
Load Reduction %	76%	71%	80%
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	2	0.8%
Warning/Error Messages	6	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	1A	1B	2A	2B	3A	3B						
Vegetation Type	-->	EMG_3	SAV_3	EMG_3	SAV_3	EMG_3	SAV_3						
Inflow Fraction	-	0.394547543		0.328598199		0.276854							
Downstream Cell Number	-	2		4		6							
Surface Area	km2	12.30	14.12	10.29	11.72	8.72	9.83						
Mean Width of Flow Path	km	3.42	4.50	2.89	4.02	4.88	4.88						
Number of Tanks in Series	-	3.0	3.0	3.0	3.0	3.0	3.0						
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	38.1	38.1	38.1	38.1	38.1	38.1						
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4	4	4	4						
Outflow Coefficient - Intercept	-	1	1	1	1	1	1						
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm												
Inflow Seepage Control Elev	cm												
Inflow Seepage Conc	ppb												
Outflow Seepage Rate	(cm/d) / cm	0.0058	0.0029	0.0014		0.0038							
Outflow Seepage Control Elev	cm	16	40	-67		-64							
Max Outflow Seepage Conc	ppb	20	20	20	20	20	20						
Seepage Recycle to Cell Number	-	1		3		5							
Seepage Recycle Fraction	-	0.5	0.5	0.5	0.5	0.5	0.5						
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	52	12	55	15	55	15						
Initial P Storage Per Unit Area	mg/m2	2400	615	2400	615	2400	615						
Initial Water Column Depth	cm	60	60	60	60	60	60						
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3	3	3	3						
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22	22	22	22						
C2 = Conc at Half-Max Uptake	ppb	300	300	300	300	300	300						
K = Net Settling Rate at Steady State	m/yr	16.8	52.5	16.8	52.5	16.8	52.5						
Z1 = Saturated Uptake Depth	cm	40	40	40	40	40	40						
Z2 = Lower Penalty Depth	cm	100	100	100	100	100	100						
Z3 = Upper Penalty Depth	cm	200	200	200	200	200	200						

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	5.69	6.40	7.13	7.84	8.58	9.28							9.28
Run Date	-	11/09/07	11/09/07	11/09/07	11/09/07	11/09/07	11/09/07							11/09/07
Starting Date for Simulation	-	01/01/65	01/01/65	01/01/65	01/01/65	01/01/65	01/01/65							01/01/65
Starting Date for Output	-	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65							05/01/65
Ending Date	-	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00							04/30/00
Output Duration	days	12784	12784	12784	12784	12784	12784							12784
Cell Label		1A	1B	2A	2B	3A	3B							Total
Downstream Cell Label		1B	Outflow	2B	Outflow	3B	Outflow							-
Network Simulation Name	-	none	none	none	none	none	none							none
Simulation Type	-	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta							Uncerta
Surface Area	km2	12.30	14.12	10.29	11.72	8.72	9.83							66.98
Mean Rainfall	cm/yr	129.99	129.99	129.99	129.99	129.99	129.99							130.0
Mean ET	cm/yr	134.40	134.15	134.40	134.11	133.38	133.87							134.1
Cell Inflow Volume	hm3/yr	327.6	321.5	272.8	269.0	229.8	222.8							830.2
Cell Inflow Load	kg/yr	32899.6	22241.2	27400.4	18619.2	23085.7	15204.2							83386
Cell Inflow Conc	ppb	100	69	100	69	100	68							100.4
Treated Outflow Volume	hm3/yr	321.5	319.5	269.0	268.5	222.8	222.4							810.4
Treated Outflow Load	kg/yr	22241.2	7929.4	18619.2	6722.2	15204.2	5567.4							20219
Treated FWM Outflow Conc	ppb	69	25	69	25	68	25							25.0
Upper Confidence Limit	ppb	74.7	30.2	74.7	30.4	73.4	30.2							30.3
Lower Confidence Limit	ppb	63.1	20.2	63.1	20.4	62.4	20.5							20.4
Total Outflow Volume + Bypass	hm3/yr	321.5	319.5	269.0	268.5	222.8	222.4							810.4
Total Outflow Load + Bypass	kg/yr	22241.2	7929.4	18619.2	6722.2	15204.2	5567.4							20219.0
Total FWM Outflow Conc	ppb	69.2	24.8	69.2	25.0	68.3	25.0							25.0
Bypass Load	kg/yr	0	0	0	0	0	0							0.0
Bypass Load	%	0%	0%	0%	0%	0%	0%							0.0
Maximum Inflow	hm3/d	2.14	2.12	1.78	1.77	1.50	1.48							5.42
Maximum Outflow	hm3/d	2.12	2.12	1.77	1.78	1.48	1.49							5.38
Surface Load Reduction	kg/yr	10769	14338	8847	11897	8017	9637							63167
Load Trapped in Sediments	kg/yr	10280	14555	8559	12153	6846	9852							62244
Overall Load Reduction	%	32%	64%	32%	64%	34%	63%							76%
Lower Confidence Limit	%	0.3	0.6	0.3	0.6	0.3	0.6							71%
Upper Confidence Limit	%	0.4	0.7	0.4	0.7	0.4	0.7							80%
Daily Geometric Mean	ppb	59.5	15.0	60.0	15.2	60.5	15.1							#N/A
Outflow Geo Mean - Composites	ppb	62.2	20.1	62.2	20.3	61.0	20.6							20.3
Upper Confidence Limit	ppb	68.3	24.7	68.3	24.9	66.7	25.1							24.9
Lower Confidence Limit	ppb	55.5	16.4	55.5	16.5	54.8	17.0							16.6
Frequency Outflow Conc > 10 ppb	%	100%	97%	100%	97%	100%	97%							97%
Frequency Outflow Conc > 20 ppb	%	100%	56%	100%	56%	100%	58%							72%
Frequency Outflow Conc > 50 ppb	%	78%	0%	78%	0%	72%	0%							56%
Freq Outflow Volume > 10 ppb	%	100%	94%	100%	94%	100%	94%							94%
95th Percentile Outflow Conc	ppb	86.81	33.50	87.06	33.69	87.19	33.53							33
Mean Biomass P Storage	mg/m2	2637	1046	2626	1053	2483	1019							1765
Storage Increase / Net Removal	%	1%	1%	1%	1%	1%	1%							1%
Net Storage Turnover Rate	1/yr	11.1	34.5	11.1	34.5	11.1	34.5							18.4
Unit Area P Load	mg/m2-yr	2674	1575	2662	1589	2648	1547							1245
Unit Area P Removal	mg/m2-yr	836	1031	832	1037	785	1003							929
Mean Water Load	cm/d	7.3	6.2	7.3	6.3	7.2	6.2							3.4
Max Water Load	cm/d	17.4	15.0	17.3	15.1	17.2	15.1							8.1
Mean Depth	cm	58	56	58	55	48	50							55
Minimum Depth	cm	42.2	40.9	41.9	40.2	34.9	36.7							40
Maximum Depth	cm	82.9	79.4	82.8	78.2	68.8	70.9							78
Frequency Depth < 10 cm	%	0%	0%	0%	0%	0%	0%							0.0%
Flow/Width	m2/day	262	196	259	183	129	125							196.4
HRT Days	days	8.0	9.0	8.0	8.8	6.7	8.1							16.2
Mean Velocity	cm/sec	0.52	0.40	0.52	0.38	0.31	0.29							0.41
Seepage Outflow / Total Outflow	%	2%	0%	1%	0%	3%	0%							2%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00							0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00							0.0
95th Percentile Outflow Volume	hm3/d	1.7	1.7	1.4	1.4	1.2	1.2							4.3
95th Percentile Outflow Load	kg/d	130.8	49.1	109.7	41.7	89.9	34.1							124.9
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Range Check - Mean Depth	-		0.91		0.89		0.81							3
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-	1.25		1.23			0.77							3
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-													0
Water Balance Error	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%							0.00%
Mass Balance Error	%	0.02%	0.02%	0.02%	0.02%	-0.04%	0.02%							0.02%
Warning or Error Messages		Cell# 1 Flow/Width out of calib. range for EMG_3: 262 vs. 26 - 210 m2/day					Cell# 4 Depth out of calib. range for SAV_3: 55 vs. 62 - 87 cm							6
		Cell# 2 Depth out of calib. range for SAV_3: 56 vs. 62 - 87 cm					Cell# 6 Depth out of calib. range for SAV_3: 50 vs. 62 - 87 cm							
		Cell# 3 Flow/Width out of calib. range for EMG_3: 259 vs. 26 - 210 m2/day					Cell# 6 Flow/Width out of calib. range for SAV_3: 125 vs. 162 - 374 m2/day							

STA-5 With Emergent Vegetation in All Cells

DMSTA2- Inputs & Outputs **Project: STA 5 EIS** Model Release: 07/05/07 Current Date: 11/5/2007

Input Variable	Units	Value	Case Description:
Design Case Name	-	EIS AltA EMG	STA-5 Expanded to Include Flow-ways 1-3
Input Series Name		TS_EIS_AltA	Downstream cells considered as EMG_3; Inflows are C-139 Basin
Starting Date for Simulation	-	05/01/94	
Ending Date for Simulation	-	04/30/07	
Starting Date for Output	-	05/01/94	
Integration Steps Per Day	-	4	Simulation Type: Uncertainty Analysis
Number of Iterations	-	0	Output Variable / Mean / Lower CL / Upper CL
Output Averaging Interval	days	365	FWM Outflow C (ppb) 73.1 93.3 54.2
Inflow Conc Scale Factor	-	1	GM Outflow C (ppb) 68.7 88.4 50.5
Rainfall P Conc	ppb	10	Load Reduction % 68% 59% 76%
Atmospheric P Load (Dry)	mg/m2-yr	20	Bypass Load (%) 0.0%

Diagnostics

H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	3	0.0%
Warning/Error Messages	0	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	1A	1B	2A	2B	3A	3B						
Vegetation Type	-->	EMG_3	EMG_3	EMG_3	EMG_3	EMG_3	EMG_3						
Inflow Fraction	-	0.337161608		0.337161608		0.325677							
Downstream Cell Number	-	2		4		6							
Surface Area	km2	3.38	4.94	3.38	4.94	4.31	3.72						
Mean Width of Flow Path	km	1.56	1.56	1.56	1.56	1.56	1.56						
Number of Tanks in Series	-	3.0	3.0	3.0	3.0	3.0	3.0						
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	38.1	60.96	38.1	60.96	38.1	60.96						
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4	4	4	4						
Outflow Coefficient - Intercept	-	1	1	1	1	1	1						
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm												
Inflow Seepage Control Elev	cm												
Inflow Seepage Conc	ppb												
Outflow Seepage Rate	(cm/d) / cm	0.0075	0.0075										
Outflow Seepage Control Elev	cm	-46	-38										
Max Outflow Seepage Conc	ppb	20	20										
Seepage Recycle to Cell Number	-	1	2										
Seepage Recycle Fraction	-	1	1										
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	30	30	30	30	30	30						
Initial P Storage Per Unit Area	mg/m2	500	500	500	500	500	500						
Initial Water Column Depth	cm	200	200	200	200	200	200						
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3	3	3	3						
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22	22	22	22						
C2 = Conc at Half-Max Uptake	ppb	300	300	300	300	300	300						
K = Net Settling Rate at Steady State	m/yr	16.8	16.8	16.8	16.8	16.8	16.8						
Z1 = Saturated Uptake Depth	cm	40	40	40	40	40	40						
Z2 = Lower Penalty Depth	cm	100	100	100	100	100	100						
Z3 = Upper Penalty Depth	cm	200	200	200	200	200	200						

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	12.85	13.69	14.54	15.39	16.23	17.08							17.08
Run Date	-	11/05/07	11/05/07	11/05/07	11/05/07	11/05/07	11/05/07							11/05/07
Starting Date for Simulation	-	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94							05/01/94
Starting Date for Output	-	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94							05/01/94
Ending Date	-	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07							04/30/07
Output Duration	days	4748	4748	4748	4748	4748	4748							4748
Cell Label		1A	1B	2A	2B	3A	3B							Total
Downstream Cell Label		1B	Outflow	2B	Outflow	3B	Outflow							-
Network Simulation Name	-	none	none	none	none	none	none							none
Simulation Type	-	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta							Uncerta
Surface Area	km2	3.38	4.94	3.38	4.94	4.31	3.72							24.68
Mean Rainfall	cm/yr	127.21	127.21	127.21	127.21	127.21	127.21							127.2
Mean ET	cm/yr	131.29	131.30	131.26	131.30	131.26	131.30							131.3
Cell Inflow Volume	hm3/yr	69.6	69.5	69.6	69.5	67.3	67.1							206.5
Cell Inflow Load	kg/yr	15781.3	9429.9	15781.3	10533.3	15243.7	8907.9							46806
Cell Inflow Conc	ppb	227	136	227	152	227	133							226.7
Treated Outflow Volume	hm3/yr	69.5	69.3	69.5	69.3	67.1	66.9							205.5
Treated Outflow Load	kg/yr	9429.9	4448.7	10533.3	5386.2	8907.9	5193.0							15028
Treated FWM Outflow Conc	ppb	136	64	152	78	133	78							73.1
Upper Confidence Limit	ppb	148.4	80.5	166.5	99.8	150.4	99.8							93.3
Lower Confidence Limit	ppb	121.4	48.8	134.5	57.1	113.5	56.8							54.2
Total Outflow Volume + Bypass	hm3/yr	69.5	69.3	69.5	69.3	67.1	66.9							205.5
Total Outflow Load + Bypass	kg/yr	9429.9	4448.7	10533.3	5386.2	8907.9	5193.0							15027.9
Total FWM Outflow Conc	ppb	135.7	64.2	151.6	77.7	132.8	77.6							73.1
Bypass Load	kg/yr	0	0	0	0	0	0							0.0
Bypass Load	%	0%	0%	0%	0%	0%	0%							0.0
Maximum Inflow	hm3/d	0.33	0.33	0.33	0.33	0.31	0.32							0.97
Maximum Outflow	hm3/d	0.33	0.33	0.33	0.33	0.32	0.32							0.97
Surface Load Reduction	kg/yr	6531	5252	5248	5147	6336	3715							31778
Load Trapped in Sediments	kg/yr	4911	4424	5365	5308	6481	3836							30325
Overall Load Reduction	%	40%	53%	33%	49%	42%	42%							68%
Lower Confidence Limit	%	0.3	0.5	0.3	0.4	0.3	0.3							59%
Upper Confidence Limit	%	0.5	0.6	0.4	0.6	0.5	0.5							76%
Daily Geometric Mean	ppb	137.7	59.0	158.6	71.7	139.8	71.4							#N/A
Outflow Geo Mean - Composites	ppb	129.1	60.6	143.9	72.9	125.4	72.7							68.7
Upper Confidence Limit	ppb	142.4	76.6	159.6	94.5	143.4	94.3							88.4
Lower Confidence Limit	ppb	114.3	45.6	126.2	53.1	106.0	52.7							50.5
Frequency Outflow Conc > 10 ppb	%	100%	100%	100%	100%	100%	100%							100%
Frequency Outflow Conc > 20 ppb	%	100%	100%	100%	100%	100%	100%							100%
Frequency Outflow Conc > 50 ppb	%	100%	69%	100%	92%	100%	92%							100%
Freq Outflow Volume > 10 ppb	%	100%	100%	100%	100%	100%	100%							100%
95th Percentile Outflow Conc	ppb	176.55	81.47	190.83	95.79	164.19	95.57							91
Mean Biomass P Storage	mg/m2	4455	2820	4913	3383	4655	3245							3828
Storage Increase / Net Removal	%	0%	0%	0%	0%	0%	0%							0%
Net Storage Turnover Rate	1/yr	4.2	4.1	4.2	4.1	4.2	4.1							4.2
Unit Area P Load	mg/m2-yr	4668	1909	4668	2133	3535	2392							1897
Unit Area P Removal	mg/m2-yr	1453	896	1587	1075	1503	1030							1229
Mean Water Load	cm/d	5.6	3.9	5.6	3.9	4.3	4.9							2.3
Max Water Load	cm/d	9.6	6.6	9.6	6.6	7.3	8.5							3.9
Mean Depth	cm	48	59	47	59	47	59							54
Minimum Depth	cm	1.6	24.4	1.4	24.1	1.4	24.1							14
Maximum Depth	cm	59.2	67.5	59.2	67.4	58.8	67.1							64
Frequency Depth < 10 cm	%	7%	0%	7%	0%	7%	0%							3.2%
Flow/Width	m2/day	122	122	122	122	118	118							120.7
HRT Days	days	8.4	15.4	8.4	15.4	11.0	12.0							23.5
Mean Velocity	cm/sec	0.30	0.24	0.30	0.24	0.29	0.23							0.26
Seepage Outflow / Total Outflow	%	0%	0%	0%	0%	0%	0%							0%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00							0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00							0.0
95th Percentile Outflow Volume	hm3/d	0.3	0.3	0.3	0.3	0.3	0.3							0.9
95th Percentile Outflow Load	kg/d	46.5	21.1	50.2	25.5	41.7	24.9							70.7
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Range Check - Mean Depth	-													0
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-													0
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-													0
Water Balance Error	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%							0.00%
Mass Balance Error	%	0.00%	0.00%	-0.04%	0.00%	-0.03%	0.00%							-0.02%
Warning or Error Messages														0

STA-5 With SAV in the Downstream Cells

DMSTA2- Inputs & Outputs — **Project: STA 5 EIS** — Model Release: 07/05/07 — Current Date: 11/5/2007

Input Variable	Units	Value	Case Description:
Design Case Name	-	EIS AltA SAV	STA-5 Expanded to Include Flow-ways 1-3
Input Series Name		TS_EIS_AltA	Downstream cells considered as SAV_3; Inflows are C-139 Basin
Starting Date for Simulation	-	05/01/94	
Ending Date for Simulation	-	04/30/07	
Starting Date for Output	-	05/01/94	
Integration Steps Per Day	-	4	
Number of Iterations	-	0	
Output Averaging Interval	days	365	
Inflow Conc Scale Factor	-	1	
Rainfall P Conc	ppb	10	
Atmospheric P Load (Dry)	mg/m2-yr	20	

Simulation Type: Uncertainty Analysis

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	28.4	38.6	20.8
GM Outflow C (ppb)	25.5	34.9	18.7
Load Reduction %	88%	83%	91%
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	3	0.0%
Warning/Error Messages	6	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	1A	1B	2A	2B	3A	3B						
Vegetation Type	-->	EMG_3	SAV_3	EMG_3	SAV_3	EMG_3	SAV_3						
Inflow Fraction	-	0.337161608		0.337161608		0.325677							
Downstream Cell Number	-	2		4		6							
Surface Area	km2	3.38	4.94	3.38	4.94	4.31	3.72						
Mean Width of Flow Path	km	1.56	1.56	1.56	1.56	1.56	1.56						
Number of Tanks in Series	-	3.0	3.0	3.0	3.0	3.0	3.0						
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	38.1	60.96	38.1	60.96	38.1	60.96						
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4	4	4	4						
Outflow Coefficient - Intercept	-	1	1	1	1	1	1						
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm												
Inflow Seepage Control Elev	cm												
Inflow Seepage Conc	ppb												
Outflow Seepage Rate	(cm/d) / cm	0.0075	0.0075										
Outflow Seepage Control Elev	cm	-46	-38										
Max Outflow Seepage Conc	ppb	20	20										
Seepage Recycle to Cell Number	-	1	2										
Seepage Recycle Fraction	-	1	1										
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	30	30	30	30	30	30						
Initial P Storage Per Unit Area	mg/m2	500	500	500	500	500	500						
Initial Water Column Depth	cm	200	200	200	200	200	200						
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3	3	3	3						
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22	22	22	22						
C2 = Conc at Half-Max Uptake	ppb	300	300	300	300	300	300						
K = Net Settling Rate at Steady State	m/yr	16.8	52.5	16.8	52.5	16.8	52.5						
Z1 = Saturated Uptake Depth	cm	40	40	40	40	40	40						
Z2 = Lower Penalty Depth	cm	100	100	100	100	100	100						
Z3 = Upper Penalty Depth	cm	200	200	200	200	200	200						

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	12.62	13.39	14.23	15.08	15.92	16.77							16.77
Run Date	-	11/05/07	11/05/07	11/05/07	11/05/07	11/05/07	11/05/07							11/05/07
Starting Date for Simulation	-	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94							05/01/94
Starting Date for Output	-	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94							05/01/94
Ending Date	-	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07							04/30/07
Output Duration	days	4748	4748	4748	4748	4748	4748							4748
Cell Label		1A	1B	2A	2B	3A	3B							Total
Downstream Cell Label		1B	Outflow	2B	Outflow	3B	Outflow							-
Network Simulation Name	-	none	none	none	none	none	none							none
Simulation Type	-	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta							Uncerta
Surface Area	km2	3.38	4.94	3.38	4.94	4.31	3.72							24.68
Mean Rainfall	cm/yr	127.21	127.21	127.21	127.21	127.21	127.21							127.2
Mean ET	cm/yr	131.29	131.30	131.26	131.30	131.26	131.30							131.3
Cell Inflow Volume	hm3/yr	69.6	69.5	69.6	69.5	67.3	67.1							206.5
Cell Inflow Load	kg/yr	15781.3	9429.9	15781.3	10533.3	15243.7	8907.9							46806
Cell Inflow Conc	ppb	227	136	227	152	227	133							226.7
Treated Outflow Volume	hm3/yr	69.5	69.3	69.5	69.3	67.1	66.9							205.5
Treated Outflow Load	kg/yr	9429.9	1741.5	10533.3	1933.9	8907.9	2168.0							5843
Treated FWM Outflow Conc	ppb	136	25	152	28	133	32							28.4
Upper Confidence Limit	ppb	148.4	33.3	166.5	38.0	150.4	44.6							38.6
Lower Confidence Limit	ppb	121.4	18.9	134.5	20.4	113.5	23.2							20.8
Total Outflow Volume + Bypass	hm3/yr	69.5	69.3	69.5	69.3	67.1	66.9							205.5
Total Outflow Load + Bypass	kg/yr	9429.9	1741.5	10533.3	1933.9	8907.9	2168.0							5843.4
Total FWM Outflow Conc	ppb	135.7	25.1	151.6	27.9	132.8	32.4							28.4
Bypass Load	kg/yr	0	0	0	0	0	0							0.0
Bypass Load	%	0%	0%	0%	0%	0%	0%							0.0
Maximum Inflow	hm3/d	0.33	0.33	0.33	0.33	0.31	0.32							0.97
Maximum Outflow	hm3/d	0.33	0.33	0.33	0.33	0.32	0.32							0.97
Surface Load Reduction	kg/yr	6531	7943	5248	8599	6336	6740							40963
Load Trapped in Sediments	kg/yr	4911	7579	5365	8761	6481	6861							39958
Overall Load Reduction	%	40%	82%	33%	82%	42%	76%							88%
Lower Confidence Limit	%	0.3	0.8	0.3	0.8	0.3	0.7							83%
Upper Confidence Limit	%	0.5	0.8	0.4	0.8	0.5	0.8							91%
Daily Geometric Mean	ppb	137.7	18.3	158.6	20.1	139.8	23.9							#N/A
Outflow Geo Mean - Composites	ppb	129.1	22.8	143.9	25.0	125.4	28.9							25.5
Upper Confidence Limit	ppb	142.4	30.4	159.6	34.3	143.4	40.0							34.9
Lower Confidence Limit	ppb	114.3	17.1	126.2	18.3	106.0	20.6							18.7
Frequency Outflow Conc > 10 ppb	%	100%	100%	100%	100%	100%	100%							100%
Frequency Outflow Conc > 20 ppb	%	100%	69%	100%	77%	100%	85%							92%
Frequency Outflow Conc > 50 ppb	%	100%	0%	100%	0%	100%	0%							77%
Freq Outflow Volume > 10 ppb	%	100%	98%	100%	99%	100%	100%							99%
95th Percentile Outflow Conc	ppb	176.55	34.70	190.83	37.82	164.19	44.02							39
Mean Biomass P Storage	mg/m2	4455	1512	4913	1748	4655	1816							3023
Storage Increase / Net Removal	%	0%	0%	0%	0%	0%	0%							0%
Net Storage Turnover Rate	1/yr	4.2	13.2	4.2	13.2	4.2	13.2							7.0
Unit Area P Load	mg/m2-yr	4668	1909	4668	2133	3535	2392							1897
Unit Area P Removal	mg/m2-yr	1453	1534	1587	1774	1503	1842							1619
Mean Water Load	cm/d	5.6	3.9	5.6	3.9	4.3	4.9							2.3
Max Water Load	cm/d	9.6	6.6	9.6	6.6	7.3	8.5							3.9
Mean Depth	cm	48	59	47	59	47	59							54
Minimum Depth	cm	1.6	24.4	1.4	24.1	1.4	24.1							14
Maximum Depth	cm	59.2	67.5	59.2	67.4	58.8	67.1							64
Frequency Depth < 10 cm	%	7%	0%	7%	0%	7%	0%							3.2%
Flow/Width	m2/day	122	122	122	122	118	118							120.7
HRT Days	days	8.4	15.4	8.4	15.4	11.0	12.0							23.5
Mean Velocity	cm/sec	0.30	0.24	0.30	0.24	0.29	0.23							0.26
Seepage Outflow / Total Outflow	%	0%	0%	0%	0%	0%	0%							0%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00							0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00							0.0
95th Percentile Outflow Volume	hm3/d	0.3	0.3	0.3	0.3	0.3	0.3							0.9
95th Percentile Outflow Load	kg/d	46.5	9.0	50.2	9.9	41.7	11.3							29.8
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Range Check - Mean Depth	-		0.96		0.96		0.95							3
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-		0.75		0.75		0.73							3
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-													0
Water Balance Error	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%							0.00%
Mass Balance Error	%	0.00%	0.00%	-0.04%	0.00%	-0.03%	0.00%							-0.02%
Warning or Error Messages		Cell# 2 Depth out of calib. range for SAV_3: 59 vs. 62 - 87 cm Cell# 2 Flow/Width out of calib. range for SAV_3: 122 vs. 162 - 374 m2/day Cell# 4 Depth out of calib. range for SAV_3: 59 vs. 62 - 87 cm					Cell# 4 Flow/Width out of calib. range for SAV_3: 122 vs. 162 - 374 m2/day Cell# 6 Depth out of calib. range for SAV_3: 59 vs. 62 - 87 cm Cell# 6 Flow/Width out of calib. range for SAV_3: 118 vs. 162 - 374 m2/day						6

STA-6

DMSTA2- Inputs & Outputs **Project: STA 6 EIS** Model Release: 07/05/07 Current Date: 11/9/2007

Input Variable	Units	Value	Case Description:
Design Case Name	-	EIS AltA	STA-6 Section 1 and Section 2
Input Series Name	-	TS_EIS_AltA	Inflows are a mixture of Comp C and C-139 Annex (USSO)
Starting Date for Simulation	-	05/01/94	WY95-07 simulation (13 years)
Ending Date for Simulation	-	04/30/07	
Starting Date for Output	-	05/01/94	
Integration Steps Per Day	-	4	Simulation Type: Uncertainty Analysis
Number of Iterations	-	0	Output Variable / Mean / Lower CL / Upper CL
Output Averaging Interval	days	365	FWM Outflow C (ppb) 12.7 16.0 10.3
Inflow Conc Scale Factor	-	1	GM Outflow C (ppb) 12.6 15.9 10.2
Rainfall P Conc	ppb	10	Load Reduction % 86% 82% 89%
Atmospheric P Load (Dry)	mg/m2-yr	20	Bypass Load (%) 0.0%

Diagnostics

H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	3	0.0%
Warning/Error Messages	5	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	3	5	4									
Vegetation Type	-->	PEW_3	PEW_3	SAV_3									
Inflow Fraction	-	0.107267951	0.285464098	0.607267951									
Downstream Cell Number	-												
Surface Area	km2	0.99	2.64	5.62									
Mean Width of Flow Path	km	0.61	1.31	2.39									
Number of Tanks in Series	-	3.0	3.0	3.0									
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	28.3464	35.3568	48.8									
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4									
Outflow Coefficient - Intercept	-	1	1	1									
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm												
Inflow Seepage Control Elev	cm												
Inflow Seepage Conc	ppb												
Outflow Seepage Rate	(cm/d) / cm												
Outflow Seepage Control Elev	cm												
Max Outflow Seepage Conc	ppb												
Seepage Recycle to Cell Number	-												
Seepage Recycle Fraction	-												
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	30	30	30									
Initial P Storage Per Unit Area	mg/m2	500	500	500									
Initial Water Column Depth	cm	200	200	200									
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3									
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22									
C2 = Conc at Half-Max Uptake	ppb	300	300	300									
K = Net Settling Rate at Steady State	m/yr	34.9	34.9	52.5									
Z1 = Saturated Uptake Depth	cm	40	40	40									
Z2 = Lower Penalty Depth	cm	100	100	100									
Z3 = Upper Penalty Depth	cm	200	200	200									

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	7.15	8.08	8.92										8.92
Run Date	-	11/09/07	11/09/07	11/09/07										11/09/07
Starting Date for Simulation	-	05/01/94	05/01/94	05/01/94										05/01/94
Starting Date for Output	-	05/01/94	05/01/94	05/01/94										05/01/94
Ending Date	-	04/30/07	04/30/07	04/30/07										04/30/07
Output Duration	days	4748	4748	4748										4748
Cell Label		3	5	4										Total
Downstream Cell Label		Outflow	Outflow	Outflow										-
Network Simulation Name	-	none	none	none										none
Simulation Type	-	Uncerta	Uncerta	Uncerta										Uncerta
Surface Area	km2	0.99	2.64	5.62										9.25
Mean Rainfall	cm/yr	129.55	129.55	129.55										129.5
Mean ET	cm/yr	130.68	130.68	130.68										130.7
Cell Inflow Volume	hm3/yr	9.2	24.5	52.2										85.9
Cell Inflow Load	kg/yr	826.5	2199.4	4678.9										7705
Cell Inflow Conc	ppb	90	90	90										89.7
Treated Outflow Volume	hm3/yr	9.2	24.5	52.1										85.8
Treated Outflow Load	kg/yr	147.0	387.0	556.4										1090
Treated FWM Outflow Conc	ppb	16	16	11										12.7
Upper Confidence Limit	ppb	21.0	20.8	12.8										16.0
Lower Confidence Limit	ppb	12.2	12.1	9.1										10.3
Total Outflow Volume + Bypass	hm3/yr	9.2	24.5	52.1										85.8
Total Outflow Load + Bypass	kg/yr	147.0	387.0	556.4										1090.4
Total FWM Outflow Conc	ppb	16.0	15.8	10.7										12.7
Bypass Load	kg/yr	0	0	0										0.0
Bypass Load	%	0%	0%	0%										0.0
Maximum Inflow	hm3/d	0.03	0.09	0.19										0.31
Maximum Outflow	hm3/d	0.03	0.09	0.18										0.30
Surface Load Reduction	kg/yr	679	1812	4122										6614
Load Trapped in Sediments	kg/yr	712	1899	4307										6919
Overall Load Reduction	%	82%	82%	88%										86%
Lower Confidence Limit	%	0.8	0.8	0.9										82%
Upper Confidence Limit	%	0.9	0.9	0.9										89%
Daily Geometric Mean	ppb	15.0	13.7	7.5										#N/A
Outflow Geo Mean - Composites	ppb	15.9	15.7	10.6										12.6
Upper Confidence Limit	ppb	21.0	20.7	12.7										15.9
Lower Confidence Limit	ppb	12.1	12.0	9.0										10.2
Frequency Outflow Conc > 10 ppb	%	100%	100%	54%										100%
Frequency Outflow Conc > 20 ppb	%	8%	8%	0%										15%
Frequency Outflow Conc > 50 ppb	%	0%	0%	0%										0%
Freq Outflow Volume > 10 ppb	%	100%	99%	44%										75%
95th Percentile Outflow Conc	ppb	19.76	19.60	14.78										17
Mean Biomass P Storage	mg/m2	1079	1082	764										888
Storage Increase / Net Removal	%	0%	0%	0%										0%
Net Storage Turnover Rate	1/yr	8.6	8.6	13.1										10.9
Unit Area P Load	mg/m2-yr	833	833	833										833
Unit Area P Removal	mg/m2-yr	718	719	767										748
Mean Water Load	cm/d	2.5	2.5	2.5										2.5
Max Water Load	cm/d	3.3	3.3	3.3										3.3
Mean Depth	cm	40	43	51										47
Minimum Depth	cm	12.7	19.3	32.8										27
Maximum Depth	cm	45.6	48.2	54.0										51
Frequency Depth < 10 cm	%	0%	0%	0%										0.0%
Flow/Width	m2/day	41	51	60										55.4
HRT Days	days	15.7	17.1	19.9										18.6
Mean Velocity	cm/sec	0.12	0.14	0.14										0.13
Seepage Outflow / Total Outflow	%	0%	0%	0%										0%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00										0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00										0.0
95th Percentile Outflow Volume	hm3/d	0.0	0.1	0.2										0.3
95th Percentile Outflow Load	kg/d	0.5	1.4	2.1										4.1
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A										#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A										#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A										#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A										#N/A
Range Check - Mean Depth	-			0.82										1
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-	0.60	0.74	0.37										3
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-			0.72										1
Water Balance Error	%	0.00%	0.00%	0.00%										0.00%
Mass Balance Error	%	0.00%	0.00%	0.00%										0.00%
Warning or Error Messages		Cell# 1 Flow/Width out of calib. range for PEW_3: 41 vs. 69 - 276 m2/day							Cell# 3 Flow/Width out of calib. range for SAV_3: 60 vs. 162 - 374 m2/day					5
		Cell# 2 Flow/Width out of calib. range for PEW_3: 51 vs. 69 - 276 m2/day							Cell# 3 Outflow Conc out of calib. range for SAV_3: 11 vs. 15 - 153 ppb					
		Cell# 3 Depth out of calib. range for SAV_3: 51 vs. 62 - 87 cm												

STA Phosphorus Modeling For the 2010 Planning Period: Alternative B

Work Order No. CN040902-WO03R2

Prepared for

US Army Corps of Engineers®

South Florida Water Management District

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FINAL REPORT

December 23, 2007

December 23, 2007

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U.S. Army Corps of Engineers
South Florida Water Management District
Tetra Tech Contract No. CN040902-WO03R2
STA Phosphorus Modeling for the 2010 Period: Alternative B

Dear Ms. Gracie:

I am pleased to submit this final report titled "STA Phosphorus Modeling for the 2010 Planning Period: Alternative B". This document constitutes the final deliverable for Alternative B under Tetra Tech EC Purchase Order 1025202 dated October 19, 2007.

I gratefully acknowledge the valuable contributions of the staff of the South Florida Water Management District, and the technical review by yourself, staff of the District and of the U. S. Army Corps of Engineers, in the development of the information contained in this report.

Certification

I hereby certify, as a Professional Engineer in the State of Florida, that the information in this document was assembled under my direct personal charge. This report is not intended or represented to be suitable for reuse without specific verification or adaptation by the Engineer. This certification is made in accordance with the provisions of the Laws and Rules of the Florida Board of Professional Engineers under Chapter 61G15-29, Florida Administrative Code.

_____
Gary F. Goforth, P.E. Florida P.E. # 35525

Date: 11/23/07
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1. Introduction

As part of the evaluation of alternatives for the Environmental Impact Statement (EIS) associated with the full build-out of Compartments B and C, the phosphorus removal performance of the Stormwater Treatment Areas (STAs) were projected using the DMSTA model (Walker and Kadlec 2005). Four alternatives were simulated for the EIS, and this report presents the results of the STA simulations for Alternative B. Daily flow data from the South Florida Water Management Model (SFWMM) for this alternative were combined with phosphorus data to create the input time series for the DMSTA model, following the method utilized in the recently updated STA performance projections (Goforth 2007b). For STA-5 and STA-6, historic basin flow and phosphorus data were utilized in lieu of the SFWMM output. Additional details of the input data set and model setup are provided in Sections 2-9 of this report.

1.1. Scope of Work

This work constitutes Task 7 of CN040902-WO03.Ta18 - Preparation of an Environmental Impact Statement for Everglades Agricultural Area Conveyance and Regional Treatment Project Plus Compartments B and C - between the District and Tetra Tech EC, Inc. This work is being performed under Purchase Order No. 1025202, which was issued on October 19, 2007, between Tetra Tech EC, Inc., and Gary Goforth, Inc.

The scope of work for this Purchase Order consists of conducting DMSTA modeling for the four alternatives being evaluated for the Environmental Impact Statement associated with the full build-out of Compartments B and C. To expedite the preparation of the EIS, separate reports were generated for each alternative summarizing the phosphorus performance projections. This report presents the results of the simulation of Alternative B; subsequent reports will be prepared for the other alternatives.

1.2. Regional Conditions for the 2010 Planning Period

This present analysis focuses on the regional conditions that are anticipated to be present in the 2010 time frame, including the full build-out of Compartments B and C. The anticipated status of the water resources projects within the basins tributary to the STAs (shown in **Figure 1-1**) is provided in the **Table 1-1**. These regional hydrologic conditions were simulated using the 2010A8 STA2B Simulation of the SFWMM. Appendix A contains a more complete summary of the key modeling assumptions used in this simulation throughout the South Florida area (to be provided by the District modeling staff).

Figure 1-1: Overview of EAA And Surrounding Basins.

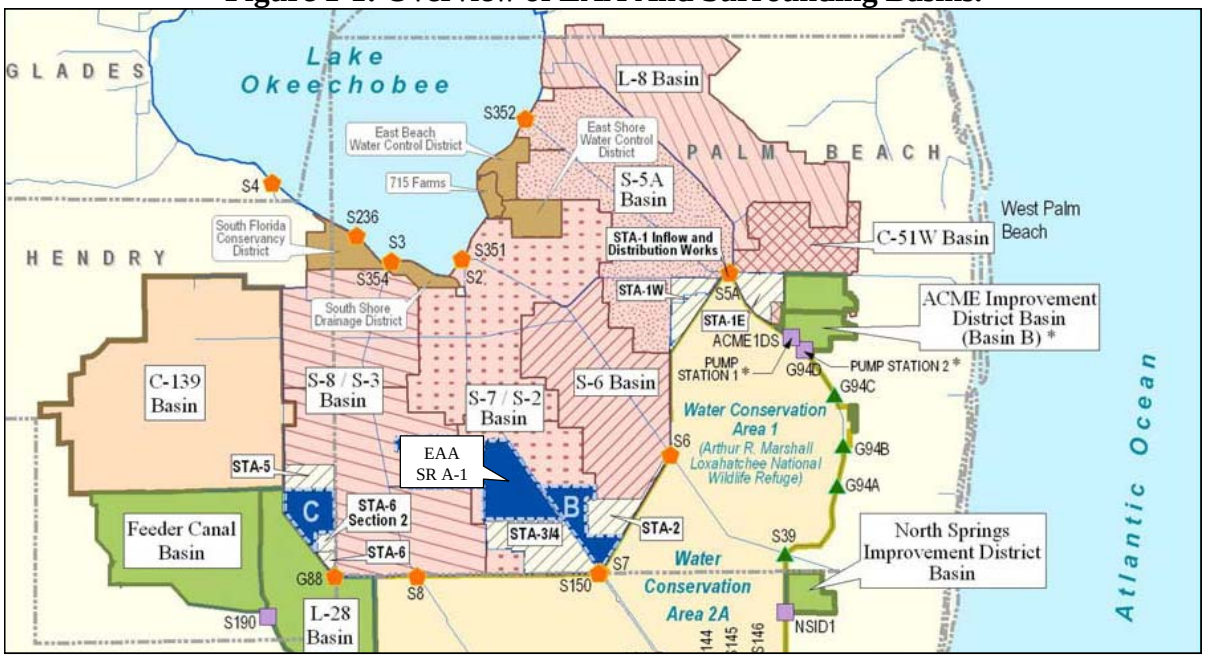


Table 1-1: Anticipated Status of Regional Water Resource Projects in the 2010 Period.

Project	Status During the 2010 Period
Original Everglades Construction Project	All 6 STAs are fully operational, including STA-6 Section 2. Approximately 20% of the S-5A Basin runoff diverted to the Hillsboro Canal through existing facilities. Ch. 298 District and 715 Farms diversions in place. No EAA runoff reduction adjustment necessary to account for Best Management Practices.
Compartment B	The full area of Compartment B is operational as effective treatment area.
Compartment C	The full area of Compartment C is operational as effective treatment area.
EAA Storage Reservoir A-1	16,000-acre reservoir operable with a 12-ft depth
Acme Basin B	Runoff directed away from WCA-1 and discharged to C-51W, and then to STA-1E
L-8 Reservoir	Partially completed: 870 acres, depth 44 ft. Facilities not completed for diversion away from S-5A/C-51W.
Everglades Agricultural Area Conveyance and Regional Treatment Project (ECART)	Not completed

1.3. Phosphorus Modeling

The phosphorus removal performance of the STAs, EAA Storage Reservoir and treatment areas of Compartments B and C were estimated using the July 5, 2007 release of the Dynamic Model for Stormwater Treatment Areas, Model Version 2 (DMSTA, 09/30/2005), developed for the U.S. Department of the Interior and the U.S. Army Corps of Engineers by W. Walker and R. Kadlec. Outflow phosphorus concentrations are calculated based on:

- daily input data, consisting of flow, phosphorus concentrations, rainfall evapotranspiration (ET), depth (optional) and releases (optional);
- mass and water balances calculated for each time step for each treatment cell or reservoir compartment,
- treatment area configuration, cell size, flow path width, vegetation type, estimates of hydraulic mixing, outflow hydraulics, seepage estimates;
- phosphorus removal rates that can be either user-defined or available within DMSTA based on calibration data sets extracted from numerous vegetation types, phosphorus characteristics and hydraulic regimes of many south Florida wetland treatment systems through early 2005.

DMSTA was used to predict annual and long-term average flow-weighted mean concentrations, with a 365-day averaging period. In addition, STA performance uncertainty analyses were conducted, using the 10%, mean and 90% values of the settling rates for the specific vegetation types. These projections are subject to the assumptions, constraints and limitations of DMSTA modeling and STA operations, including the following.

- DMSTA calibrations are based upon data from fully functional treatment cells with viable vegetation communities that have near optimal performance. The range of treatment characteristics for each vegetation type is summarized in **Table 1-2**.
- In addition to consideration of the range of calibration treatment characteristics, other important factors not yet incorporated into the model include calcium requirements, antecedent soils, and assumed intensive management, particularly for the enhanced vegetation types.
- DMSTA generates error/warning notices if simulated conditions exceed the range of the calibration characteristics presented in **Table 1-3**.
- The use of the DMSTA calibration vegetation types, e.g., SAV, assumes that the vegetation will be maintained in the long-term. This assumption may produce overly optimistic long-term performance projections for treatment areas subject to periodic disturbance such as hurricanes, droughts and other extreme conditions.
- DMSTA does not allow a treatment cell to dry out, and hence does not reproduce the vegetative responses and phosphorus dynamics (e.g., post-dry-out spikes) observed in treatment cells that periodically go dry. Hence the phosphorus removal performance simulated for large wetland systems with limited water availability, such as Compartment C, may be overly optimistic. Other methods should be used to estimate

the supplemental water required to either avoid dryout or to estimate the phosphorus performance for these large systems that experience periodic dryout.

- STA performance projections are subject to the complete set of DMSTA assumptions, which can be found at http://www.wwwalker.net/DMSTA/index.htm.
- Additional uncertainty exists in flow estimates and regional water management.

Table 1-2: Calibration Dataset Ranges (Draft, from www.wwwalker.net/dmsta/).

Variable	Units	EMERG		PEW		SAV		PSTA		RESERV	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Calib Period	days	641	4017	693	4017	693	1522	245	1062	1460	5843
Calib K	m/yr	12	23	27	49	46	64	18	34	1	8
Mean Depth	cm	35	76	38	66	62	87	13	52	90	304
Max Depth	cm	47	131	71	123	75	132	22	65	187	457
Freq Z < 10 cm	%	0%	9%	0%	13%	0%	0%	0%	38%	0%	0%
Hydraulic Load	cm/day	1.1	6.5	3.0	6.9	5.1	12.7	2.8	14.6	0.4	17.6
Residence Time	days	8	66	7	22	5	17	1	19	8	714
Velocity	cm/sec	0.04	0.45	0.16	0.48	0.30	0.64	0.01	1.12	0.05	1.32
Flow/Width	md/2	26	210	69	276	162	374	3	132	68	1135
Areal Load	mg/m2-yr	382	2908	222	1919	1649	5279	142	1447	212	11781
Storage	mg/m2	921	4299	171	1494	903	2959	96	911	200	4994
Inflow Conc	ppb	39	283	17	110	36	153	7	56	78	1144
FWM Outflow Conc	ppb	20	150	8	28	15	57	6	15	50	767
Outflow GeoMean	ppb	19	125	8	21	15	55	5	15	39	725
Marsh GeoMean	ppb	19	128	8	20	16	56	5	15	38	725

Table 1-3: Variable Ranges for Model Applications - Used to Trigger Warning Messages (Draft, from www.wwwalker.net/dmsta/).

Calibration	K (m/yr)	CV(K)	Depth (cm)		Q/W (m2/d)		Conc (ppb)		Freq Z < 10 cm (%)	
			Min	Max	Min	Max	Min	Max	Min	Max
EMERG_3	16.8	0.20	35	76	26	210	19.5	800	0%	9%
PEW_3	34.9	0.21	38	66	69	276	8.0	110	0%	13%
SAV_3	52.5	0.16	62	87	162	374	14.9	153	0%	0%
PSTA_3	23.6	0.22	13	60	3	132	5.9	56	0%	38%
RES_3	5.0	0.45	90	304	68	1135	50.3	1144	0%	0%

When evaluating DMSTA results, particular attention needs to be given to the simulated outflow concentration, in that DMSTA does not constrain the reported values to minimum levels observed in the calibration data sets reported in Table 1-2. In other words, the model may forecast outflow concentrations lower than have been observed in the field. Forecast error is inherent when using any simulation model. These errors result from limitations of the calibration datasets (measurement error, short duration, etc.) and other sources that are difficult to quantify. Based on information from the DMSTA website (http://www.wwwalker.net/DMSTA/index.htm) and Walker (personal communication), the DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. In addition, the following disclaimer is offered by the authors of DMSTA:

DMSTA2 is a modeling tool with a constrained range of applicability. It has been developed and calibrated to information specific to South Florida. It is intended for use in evaluating Everglades Protection Project by individuals with experience in hydrologic & water quality

modeling. It should not be exercised in any situation without careful examination of all features, assumptions and calibrations, as they relate to a given application and to the supporting research upon which the calibrations are based. When properly calibrated by the user, the hydraulics portion of DMSTA2 is thought to generate predictions that are adequate for the purpose of simulating phosphorus dynamics. The hydraulic simulations should not be relied upon for designing flood control measures, designing levees, for any other purposes in which life and/or property may be at risk. The user assumes all risks associated with using the model for designing treatment areas or any other purpose.

Proper use of DMSTA2 requires thorough understanding of calibration results & limitations & further documentation provided below. Sample input files are for demonstration purposes. None reflect actual designs. Atmospheric deposition, hydraulic, or seepage input values should not be interpreted as defaults or recommended values. While P cycling parameters are suggested for various situations and within well-defined calibration boundaries, users must decide which calibration is appropriate in any situation.

Additional information on the development, calibration and application of DMSTA can be found at: **www.wwwalker.net/dmsta.**

The general method used for development of the daily flow and phosphorus input data sets was described in *Updated STA Inflow Data Sets for the 2010 Period* (Goforth 2007b); STA-specific variations to this general method are described in Sections 2-9. Daily rainfall and ET for all the treatment areas except STA-5 and STA-6 were provided by the District as part of the SFWMM modeling. For STA-5 and STA-6, actual rainfall and ET were used based on local gauges. Treatment cell dimensions, hydraulic characteristics and vegetation types were consistent with values used in the 2005 EAA Regional Feasibility Study (ADA/Burns & McDonnell 2005), modified for consistency with updated information obtained from the on-going Compartments B and C design (Brown & Caldwell 2007, URS 2007). All STA enhancements described in the Everglades *Long-Term Plan* scheduled for completion by the end of 2010 are assumed to be completed (Burns & McDonnell 2003, as amended).

2. STA-1E

Working in concert with STA-1W, STA-1E will capture and treat runoff from the C-51 Basin, Acme Basin B, L-8 Basin, S-5A Basin and the East Beach Water Control District (EBWCD). A schematic of STA-1E is presented in **Figure 2-1**. The daily flow terms from the SFWMM simulation were utilized for the DMSTA modeling with the following modifications:

- ***For all alternatives***, 25% of the L-8 Basin runoff passing through S-5AE is assumed to be captured and treated in STA-1E, compared to the complete diversion of L-8 Basin runoff assumed in the SFWMM.
- ***For all alternatives,*** the SFWMM flow term for the transfer of water from the STA-1 Inflow Basin to STA-1E was modified to balance the phosphorus loading rate among STA-1E and STA-1W, yielding a PLR of approximately 2 $g/m^2/yr$ for both STAs, including re-directed flows from STA-1W that exceed the inflow capacity of 3,250 cfs.
- ***For all alternatives,*** runoff from the EBWCD was re-directed to STA-1E at the same percentage as the S-5A Basin runoff diversion to STA-1E. The estimate of runoff from the EBWCD and the remaining Ch. 298 Districts and Closter Farms was based on historic runoff volumes from these basins to the maximum extent practicable, as the SFWMM simulations do not well represent either the total discharges or the distribution of these discharges from these basins. Runoff volumes for the period May 1, 1994 through April 30, 2000 are available for direct use, while the runoff volumes for the remainder of the 35-year period (May 1, 1965 through April 30, 1994) were estimated by indirect methods. Consistent with the approach utilized in the *Updated STA Inflow Data Sets for the 2010 Period*, daily runoff volumes were estimated as a fixed percentage of the daily runoff from the adjacent primary basin of the EAA (Goforth 2007b). That fixed percentage was derived as the ratio of the overall runoff from each Ch. 298 District basin to the overall runoff from the adjacent EAA basin over the WY1995-2007 period. In recognition of the changes in EAA basin contributing area over the WY1995-2007 period due to conversion of agriculture lands to STAs, the EAA runoff was normalized to the effective basin areas reflected in the SFWMM simulation.

The long-term average annual inflow to STA-1E by source is summarized in **Table 2-1** for Alternative B. Although the long-term goal is to treat less inflow in STA-1E than shown in Table 2-1, it is recognized that during the interim period before ECART and the L-8 Basin projects are complete, STA-1E inflows will be higher than the long-term goals. With complete diversion of the L-8 Basin runoff and without implementation of ECART, the long-term average annual inflows to STA-1E will be lower than presented in Table 2-1. It should also be noted that significantly higher phosphorus loads to STA-1E are estimated in the present analysis than in the 2005 EAA Regional Feasibility Study (ADA/Burns & McDonnell 2006), due principally to higher phosphorus concentrations during the updated period of record, observed following the 2004 hurricanes. A longer period of record will be

utilized in the 2009 update of the STA data sets, and it is likely that lower concentrations will be applied to future STA-1E inflows at that time.

Figure 2-1: Schematic of STA-1E (Not to Scale).

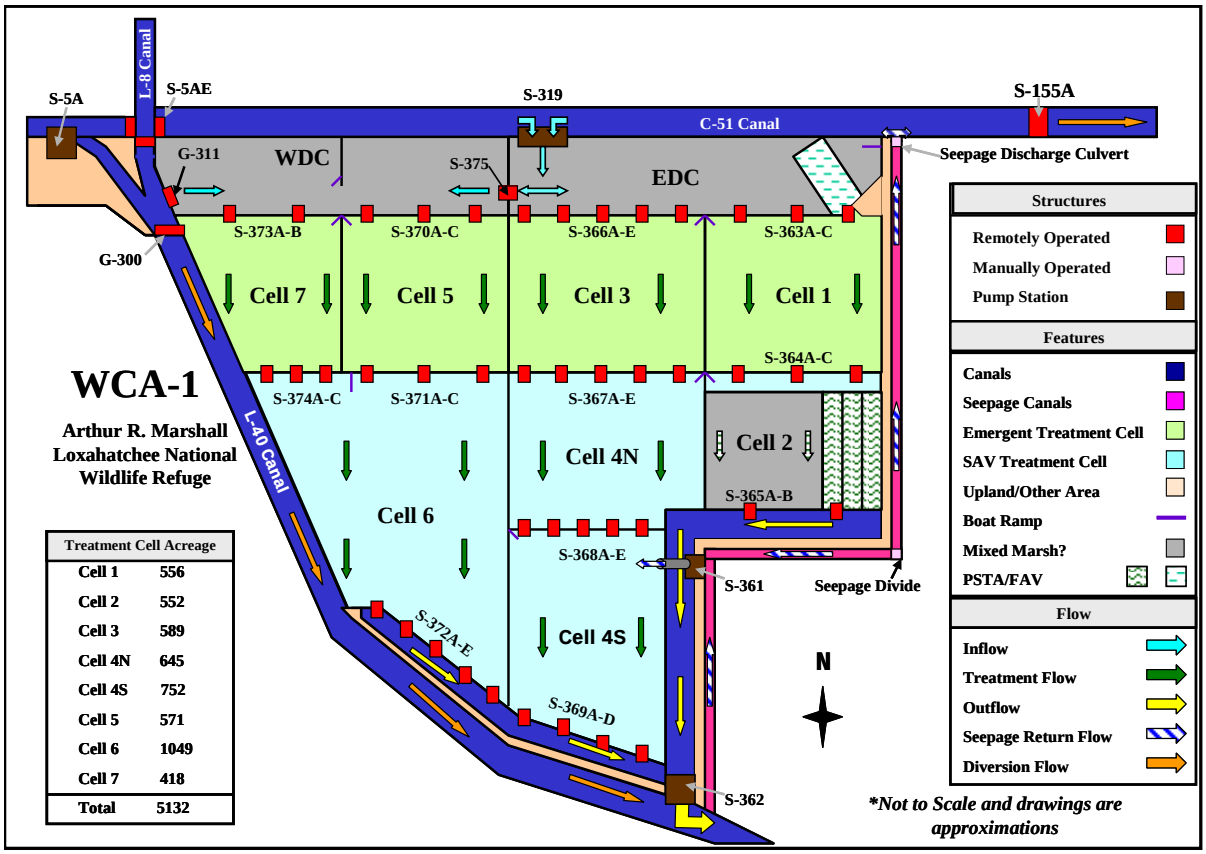


Table 2-1: Summary of Long-term Average Annual Inflow to STA-1E.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
C-51W Basin	131,039	31,737	196
Acme Basin B	35,052	4,913	114
L-8 Basin	8,124	964	96
S-5A Basin	18,134	3,776	356
EBWCD	982	567	468
Total	**193,332**	**41,959**	**176**

Prior to construction, the existing ground elevation at STA-1E exhibited a slope from the northeast to the southwest of more than 7 feet. When constructed by the U. S. Army Corps of Engineers, the majority of the treatment cells were leveled to minimize hydraulic short-circuiting and areas of deep depths. However, the East and West Distribution Cells were not leveled and still retain the relatively steep slope that existed prior to the STA construction. As a result, the cells are characterized by areas of high ground without wetland vegetation,

areas of deep ponds, and an irregular inundation/dry out cycle. Unlike the Buffer Cell of the prototype STA (the Everglades Nutrient Removal Project), phosphorus removal within the East and West Distribution Cells is not anticipated to be reliable. Hence, these cells are not considered as part of the effective treatment area of STA-1E, and were modeled with an effective settling rate of 0.01 m/yr.

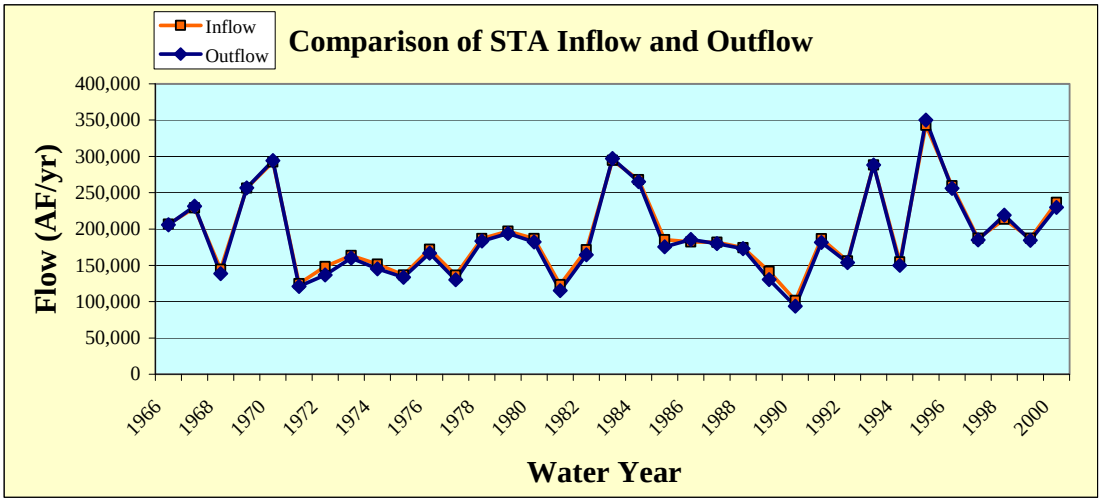
A summary of STA-1E phosphorus performance for Alternative B is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix B. A long-term flow-weighted mean outflow concentration range of 20-35 ppb was forecast, however this includes years when DMSTA forecast levels that fell below the calibration range of 15 ppb for an SAV system, and hence may be optimistic. DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix B. For Cells 2, 4S and 4S, the mean depths were slightly lower than the SAV calibration range. Also for Cell 2, the mean flow/width was slightly lower than the range in the SAV calibration data sets. For all alternatives, a portion of the L-8 Basin runoff was simulated as being diverted to the eastern C-51 Basin.

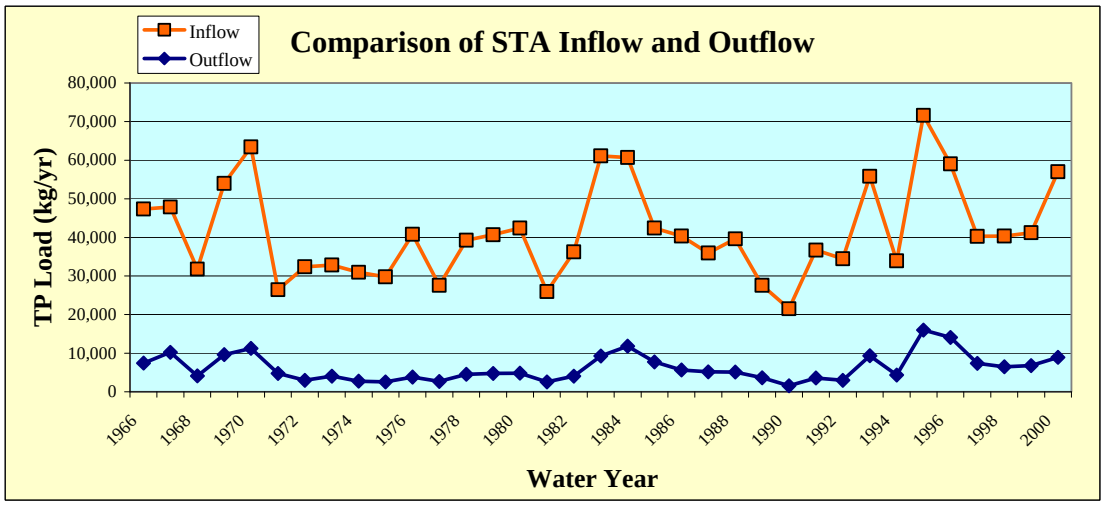
Table 2-2: Summary of DMSTA Results for STA-1E.

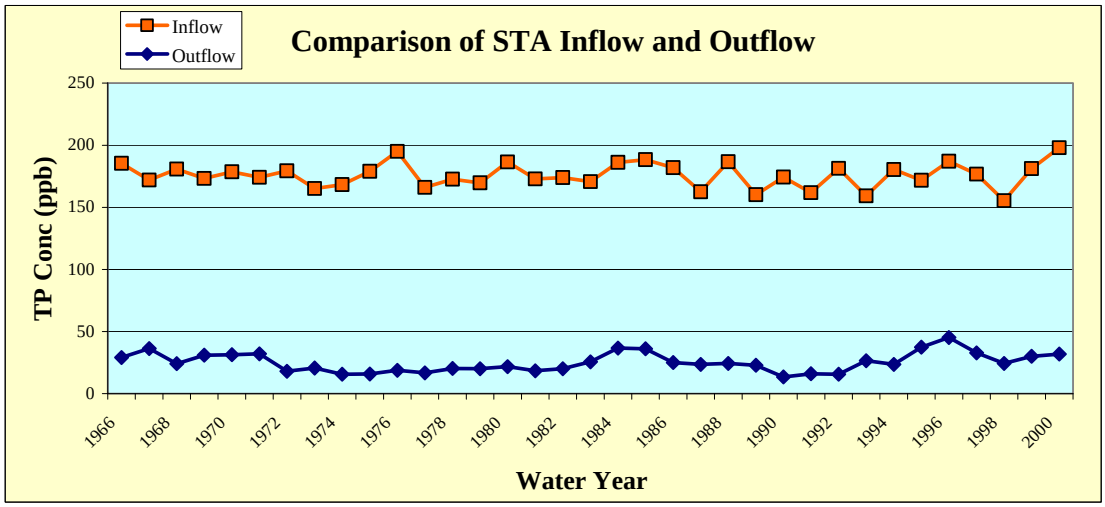
Parameter	Unit	STA-1E
Effective Treatment Area	acres	5,132
Average Annual Inflow		
Volume	AF/yr	193,332
TP Load	kg/yr	41,959
TP Concentration	ppb	176
Average Annual Outflow		
Volume	AF/yr	190,293
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	20.0 (10)
Mean Estimate of Settling Rate	ppb	26.7 (1)
Lower Conf. Limit for Settling Rate	ppb	35.2
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	17.9
Mean Estimate of Settling Rate	ppb	24.2
Lower Conf. Limit for Settling Rate	ppb	32.3
TP Load (Using Mean TP Conc.)	kg/yr	6,269
Diversion Volumes and Loads		
Volume	AF/yr	24,373
TP Load	kg/yr	2,892
TP Concentration	ppb	96

Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.
2. Outflow values highlighted in yellow had one or more years of the 35 years simulated below the low end of the calibration data set (enumerated by the number in parentheses).
3. Diversions related to STA-1E are directed to eastern C-51.

Figure 2-2: Comparison of Inflows and Outflows for STA-1E.







3. STA-1W

Working in concert with STA-1E, STA-1W will capture and treat runoff from the S-5A Basin, East Beach Water Control District (EBWCD), L-8 Basin and a portion of C-51 Basin, Acme Basin B when re-directed from STA-1E. A schematic of STA-1W is presented in **Figure 3-1**. The daily flow terms from the SFWMM simulation were utilized for the DMSTA modeling with the following modifications:

- ***For all alternatives,*** the SFWMM flow term for the transfer of water from the STA-1 Inflow Basin to STA-1E was modified to balance the phosphorus loading rate among STA-1E and STA-1W, yielding a PLR of approximately 2 $g/m^2/yr$ for both STAs, including re-directed flows from STA-1W that exceed the inflow capacity of 3,250 cfs.
- ***For all alternatives,*** the estimate of runoff from the EBWCD and the remaining Ch. 298 Districts and Closter Farms was based on historic runoff volumes from these basins to the maximum extent practicable, as the SFWMM simulations do not well represent either the total discharges or the distribution of these discharges from these basins. Runoff volumes for the period May 1, 1994 through April 30, 2000 are available for direct use, while the runoff volumes for the remainder of the 35-year period (May 1, 1965 through April 30, 1994) were estimated by indirect methods. Consistent with the approach utilized in the *Updated STA Inflow Data Sets for the 2010 Period*, daily runoff volumes were estimated as a fixed percentage of the daily runoff from the adjacent primary basin of the EAA (Goforth 2007b). That fixed percentage was derived as the ratio of the overall runoff from each Ch. 298 District basin to the overall runoff from the adjacent EAA basin over the WY1995-2007 period. In recognition of the changes in EAA basin contributing area over the WY1995-2007 period due to conversion of agriculture lands to STAs, the EAA runoff was normalized to the effective basin areas reflected in the SFWMM simulation.
- ***For all alternatives,*** a small amount of S-5A Basin Runoff was simulated in SFWMM as being diverted untreated to WCA-1 (4,544 AF/yr; 912 kg/yr and 163 ppb). For the purpose of estimating phosphorus removal performance, these diversions were simulated by DMSTA as being captured in STA-1W. Actual diversion may occur based on the daily hydraulic and treatment capacity of the treatment areas.

The long-term average annual inflow to STA-1W by source is summarized in **Table 3-1**. Although the long-term goal is to treat less inflow in STA-1W than shown in **Table 3-1**, it is recognized that during the interim period before ECART and the L-8 Basin projects are complete, STA-1W inflows will be higher than the long-term goals.

Figure 3-1: Schematic of STA-1W (Not to Scale).

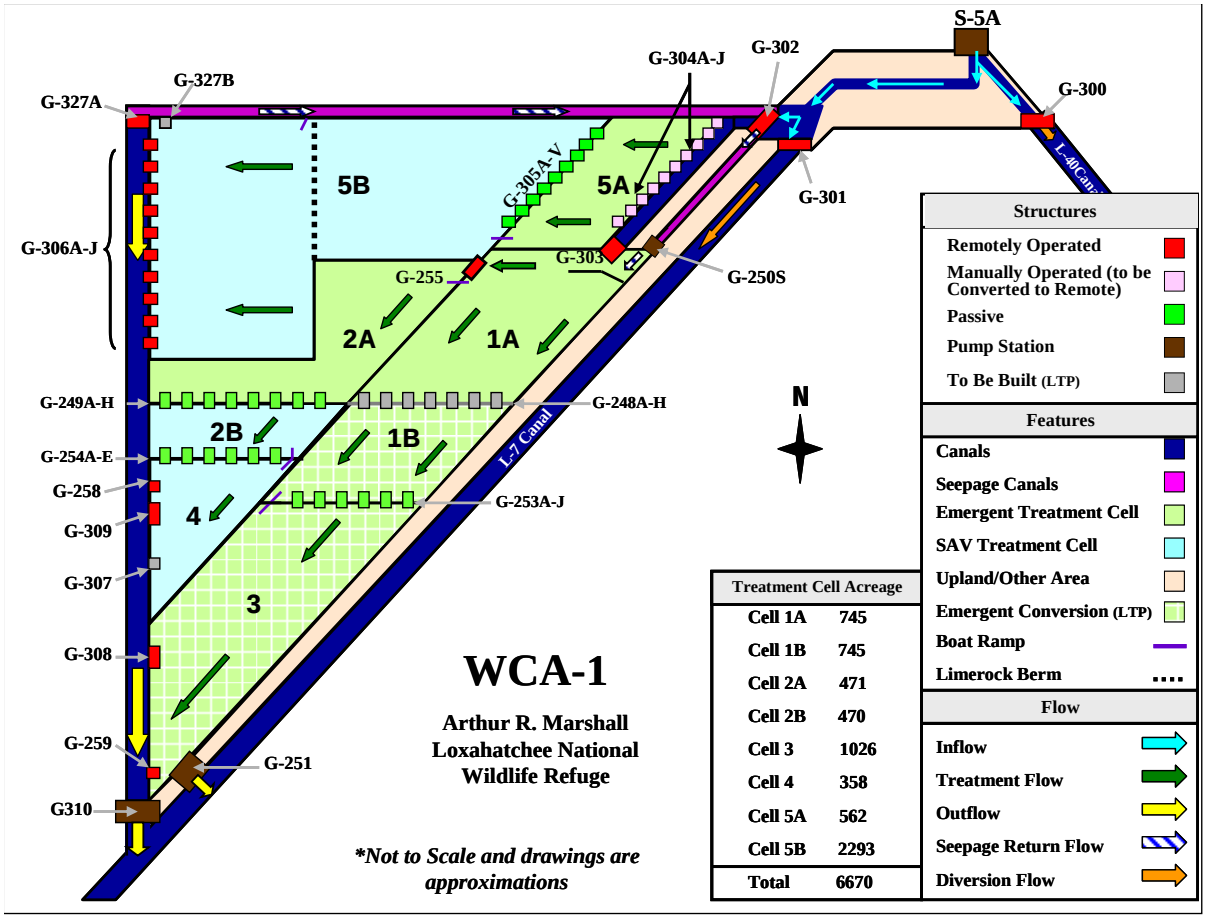


Table 3-1: Summary of Long-term Average Annual Inflow to STA-1W.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
S-5A Basin	228,433	45,809	163
EBWCD	15,117	8,721	468
Total	**243,570**	**54,533**	**182**

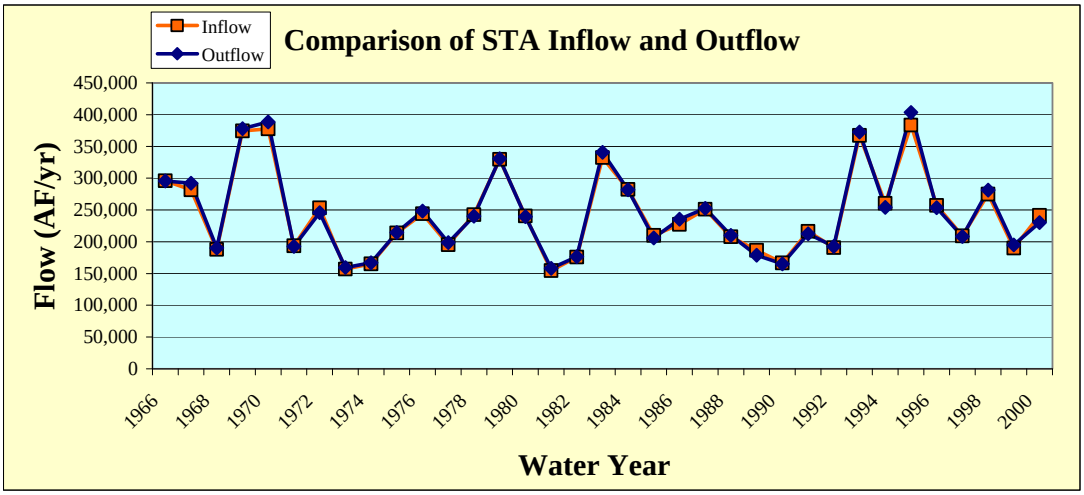
A summary of STA-1W phosphorus performance for Alternative B is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix B. A long-term flow-weighted mean outflow concentration range of 21-35 ppb was forecast, however this includes years when DMSTA forecast levels that fell below the calibration range of 15 ppb for an SAV system, and hence may be optimistic. DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix B. For Cells 2B, 4 and 5B the mean depths and flow/width were slightly below the range of the SAV calibration data sets. For Cell 1A, the flow/width was about 30% above the range of the emergent calibration data sets.

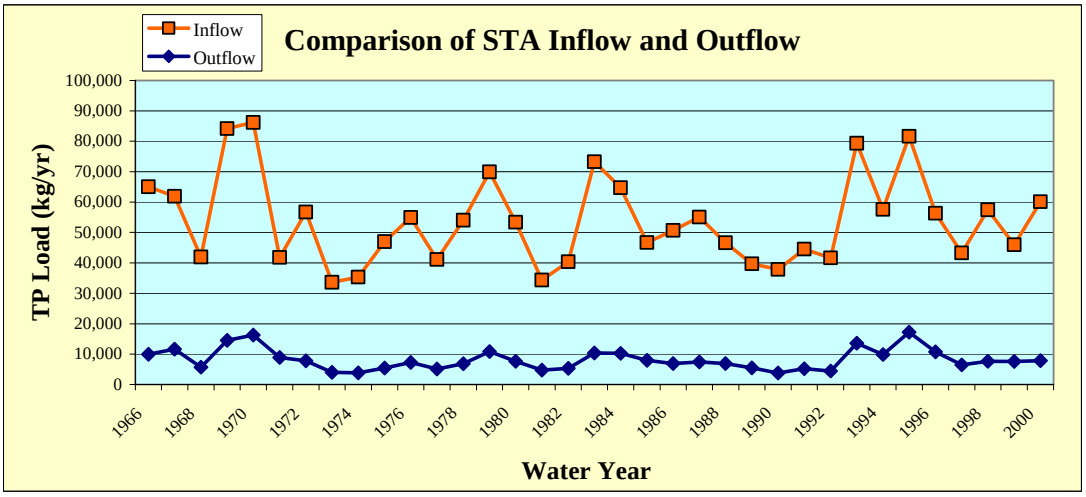
Table 3-2: Summary of DMSTA Results for STA-1W.

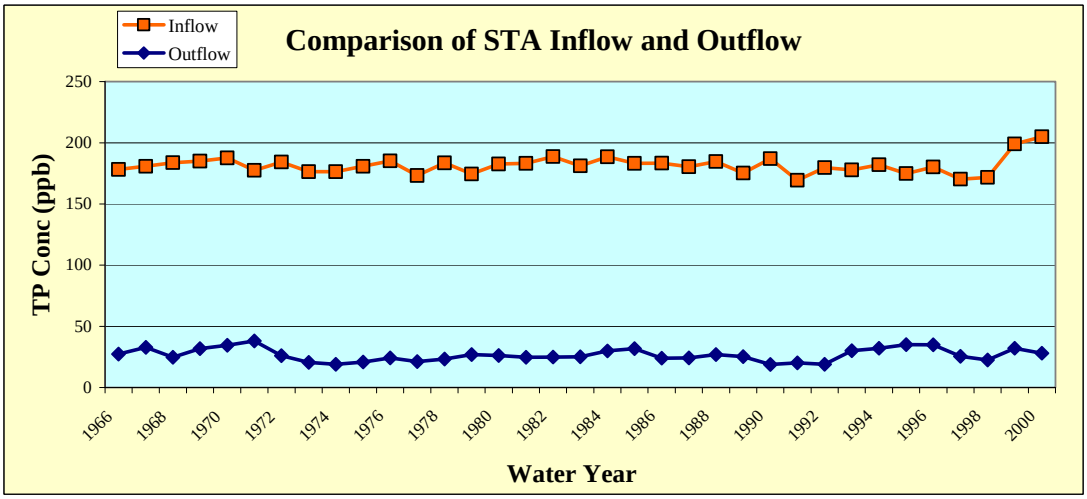
Parameter	Unit	STA-1W
Effective Treatment Area	acres	6,670
Average Annual Inflow		
Volume	AF/yr	243,570
TP Load	kg/yr	54,533
TP Concentration	ppb	182
Average Annual Outflow		
Volume	AF/yr	245,336
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	21.3 (4)
Mean Estimate of Settling Rate	ppb	27.3
Lower Conf. Limit for Settling Rate	ppb	34.8
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	20.2
Mean Estimate of Settling Rate	ppb	26.0
Lower Conf. Limit for Settling Rate	ppb	33.3
TP Load (Using Mean TP Conc.)	kg/yr	8,270
Diversion Volumes and Loads		
Volume	AF/yr	0
TP Load	kg/yr	0
TP Concentration	ppb	-

Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.
2. Outflow values highlighted in yellow had one or more years of the 35 years simulated below the low end of the calibration data set (enumerated by the number in parentheses).

Figure 3-2: Comparison of Inflows and Outflows for STA-1W.







4. STA-2

A schematic of STA-2 is presented in **Figure 4-1**. The daily flow terms from the SFWMM simulation were utilized for the DMSTA modeling with the following modifications:

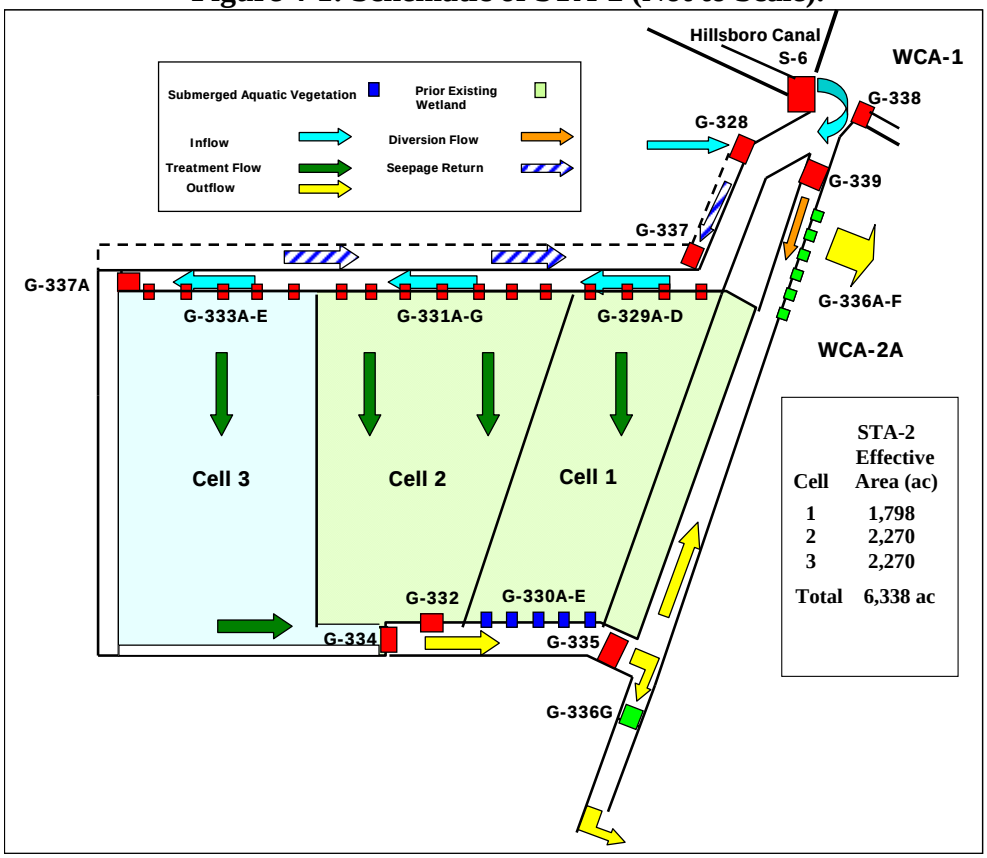
- ***For all alternatives,*** an additional inflow to the STA-2 Supply Canal equal to 38 cfs was added to the runoff inflow to represent the seepage from the adjacent WCA-2A into the adjacent Supply Canal for STA-2, which extends approximately 18,500 feet from the S-6 pump station to the northeast corner of Cell 1. A phosphorus concentration of 15 ppb was used to estimate the phosphorus contribution of this seepage.
- ***For all alternatives,*** the estimate of runoff from the ESWCD and Closter Farms was based on historic runoff volumes from these basins to the maximum extent practicable, as the SFWMM simulations do not well represent either the total discharges or the distribution of these discharges from these basins. Runoff volumes for the period May 1, 1994 through April 30, 2000 are available for direct use, while the runoff volumes for the remainder of the 35-year period (May 1, 1965 through April 30, 1994) were estimated by indirect methods. Consistent with the approach utilized in the *Updated STA Inflow Data Sets for the 2010 Period*, daily runoff volumes were estimated as a fixed percentage of the daily runoff from the adjacent primary basin of the EAA (Goforth 2007b). That fixed percentage was derived as the ratio of the overall runoff from each Ch. 298 District basin to the overall runoff from the adjacent EAA basin over the WY1995-2007 period. In recognition of the changes in EAA basin contributing area over the WY1995-2007 period due to conversion of agriculture lands to STAs, the EAA runoff was normalized to the effective basin areas reflected in the SFWMM simulation.

The long-term average annual inflow to STA-2 by source is summarized in **Table 4-1**. Although the long-term goal is to treat less inflow in STA-2 than shown in **Table 4-1**, it is recognized that during the interim period before ECART is implemented, STA-2 inflows will be higher than the long-term goals.

Table 4-1: Long-term Average Annual Inflow to STA-2.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
WCA-2A Seepage	27,530	509	15
S-5A Basin	62,759	12,613	163
ESWCD & 715 Farms	31,993	5,215	132
S-6/S-2 Basin	180,568	23,532	106
Inflow Prior to Re-direction	302,850	41,870	112
Re-direct to Compartment B	116,754	16,989	118
Net Inflow	**186,096**	**24,881**	**108**

Figure 4-1: Schematic of STA-2 (Not to Scale).



A summary of STA-2 phosphorus performance for Alternative B is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix B. A long-term flow-weighted mean outflow concentration range of 14-22 ppb was forecast, however this includes years when DMSTA forecast levels that fell below the calibration range of 11 ppb[1] for a combined SAV/prior existing wetland system, and hence may be optimistic. DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix B. For Cell 3 the mean depth and flow/width were slightly below the range of the SAV calibration data sets. For Cell 3, the long-term average outflow concentration was below the calibration range of 15 ppb for an SAV system, and this was set to 15 ppb in calculating the composite STA outflow concentration.

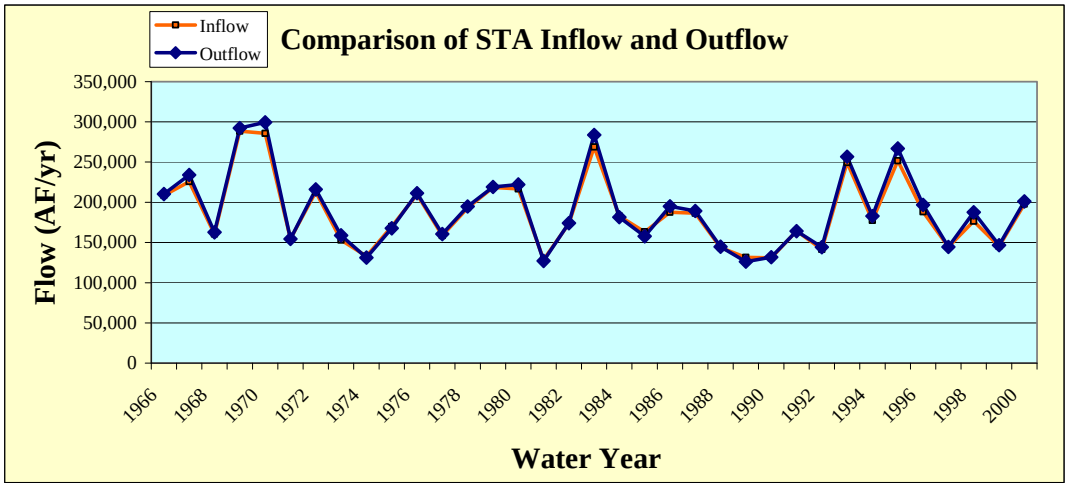
[1] For STA-2, two flow-ways have SAV in the downstream cell which has a minimum calibration concentration of 15 ppb, and two have Prior Existing Wetlands (PEW) which has a minimum calibration concentration of 8 ppb. The flow-weighted minimum concentration for the three flow-ways is 11 ppb.

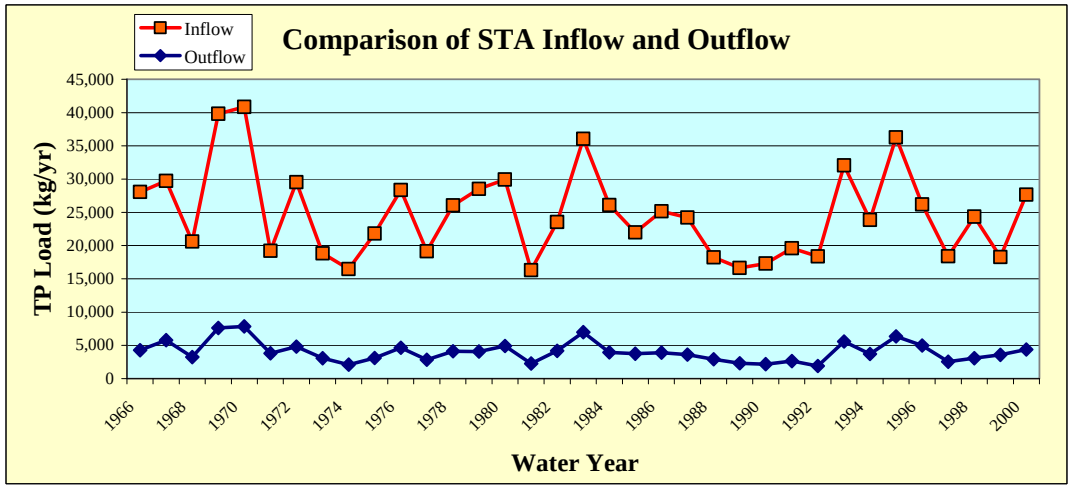
Table 4-2: Summary of DMSTA Results for STA-2.

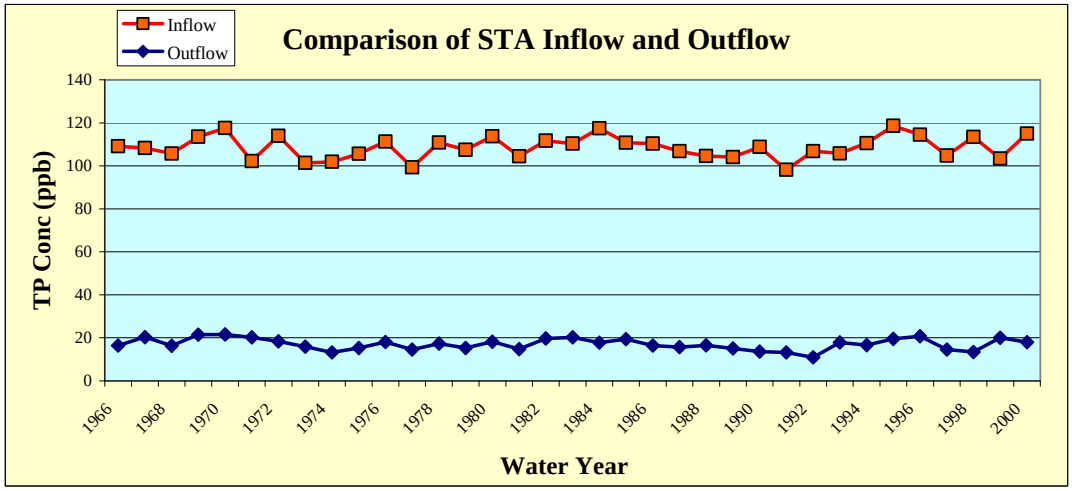
Parameter	Unit	STA-2
Effective Treatment Area	acres	6,338
Average Annual Inflow		
Volume	AF/yr	186,096
TP Load	kg/yr	24,881
TP Concentration	ppb	108
Average Annual Outflow		
Volume	AF/yr	189,582
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	14.2 (4)
Mean Estimate of Settling Rate	ppb	17.5 (1)
Lower Conf. Limit for Settling Rate	ppb	21.8
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	13.5
Mean Estimate of Settling Rate	ppb	16.7
Lower Conf. Limit for Settling Rate	ppb	21.0
TP Load (Using Mean TP Conc.)	kg/yr	4,084
Diversion Volumes and Loads		
Volume	AF/yr	0
TP Load	kg/yr	0
TP Concentration	ppb	-

Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.
2. Outflow values highlighted in yellow had one or more years of the 35 years simulated below the low end of the calibration data set (enumerated by the number in parentheses).

Figure 4-2: Comparison of Inflows and Outflows for STA-2.





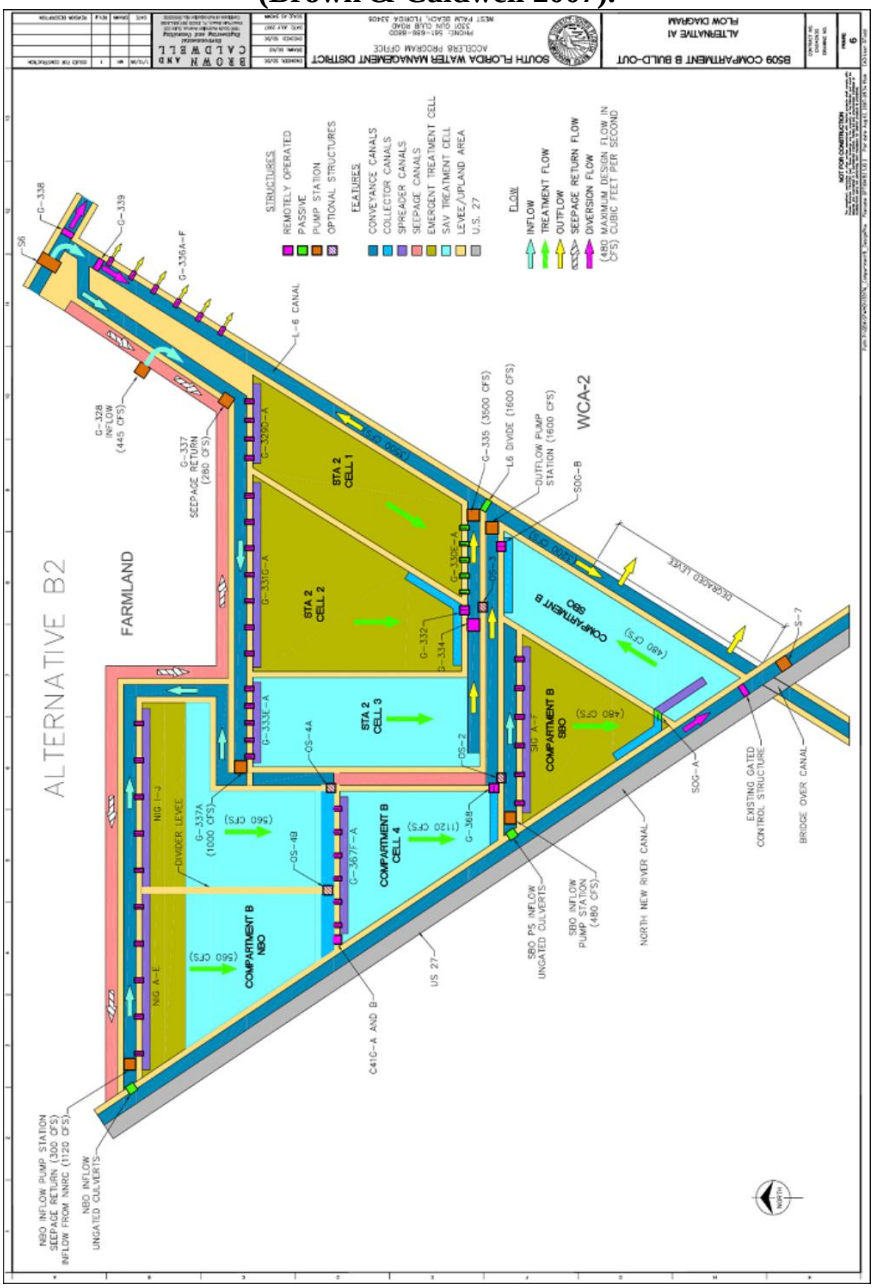


Note: TP concentrations below 15 ppb have not been sustained.

5. Compartment B

A preliminary schematic of the Compartment B Build-out is presented in **Figure 5-1** (Brown & Caldwell 2007).

Figure 5-1: Preliminary Schematic of Compartment B Build-out, Subject to Revision (Brown & Caldwell 2007).



Compartment B will consist of two independent treatment areas (Brown and Caldwell 2007). The North Build-out will consist of three cells, with the initial cells containing approximately 3,922 acres of effective treatment area followed by the existing Cell 4 of STA-2. While the Build-out is still under preliminary design, the present configuration includes a north-south interior levee that will divide the upper area into two parallel cells. Inflows will come from the North New River Canal and inflows re-directed from STA-2, and will be limited to a total of 1,120 cfs. After passing through the North Build-out, treated discharges will be conveyed to a new 1,600-cfs outflow pump station located directly south of the STA-2 outflow pump station G-335 (Brown and Caldwell 2007). The South Build-out will consist of two cells in series, with the initial cell containing approximately 1,477 acres of effective treatment area followed by an additional 1,319 acres. Inflows will come from the North New River Canal and will be limited to 480 cfs. Treated discharges will be conveyed to the new 1,600-cfs outflow pump station located directly south of the STA-2 outflow pump station G-335 (Brown and Caldwell 2007).

For the purpose of phosphorus removal performance modeling, Compartment B was simulated as two distinct treatment areas. The daily flow terms from the SFWMM simulation were utilized for the DMSTA modeling with the following distribution among the North Build-out and South Build-out:

- ***For all alternatives,*** all inflows re-directed from STA-2 were captured and treated in the North Build-out. The South Build-out received the initial 480 cfs of all inflows from the North New River Canal, and the North Build-out received the balance of North New River inflows.

The resulting long-term average annual inflow to Compartment B by source is summarized in **Table 5-1**, showing the inflows before and after the re-direction.

Table 5-1: Long-term Average Annual Inflow to Compartment B.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
S-7/S-2 Basin	131,515	15,383	95
Re-direction from STA-2			
WCA-2A Seepage	10,613	196	15
S-6/S-2 Basin	69,612	9,480	110
S-5 Basin	24,195	5,336	179
ESWCD & 715 Farms	12,334	2,010	132
Total	**248,269**	**32,408**	**106**

A summary of Compartment B phosphorus performance for Alternative B is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix B. DMSTA forecast long-term average annual phosphorus concentrations below the minimum of the calibration data sets for SAV (15 ppb), and those forecasts were replaced in Table 5-2 by 15 ppb. The adjusted outflow phosphorus levels in Table 5-2 may still portray optimistic results in that the best performing STA (STA-3/4) is presently averaging about 19 ppb, with a

5 ppb standard deviation on annual values. DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix B. For the North and South Build-out cells, the mean depth and flow/width were slightly below the range of the SAV calibration data sets.

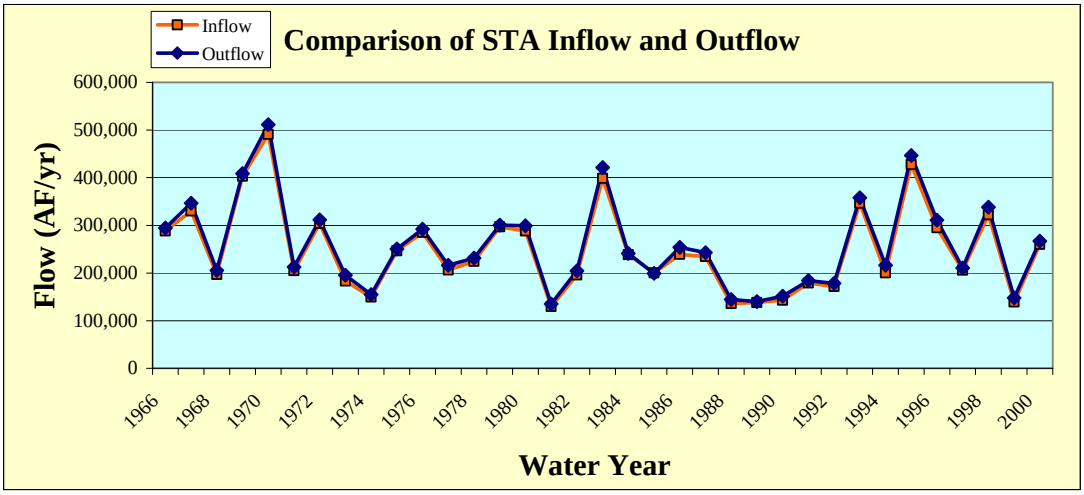
Table 5-2: DMSTA Results for Compartment B.

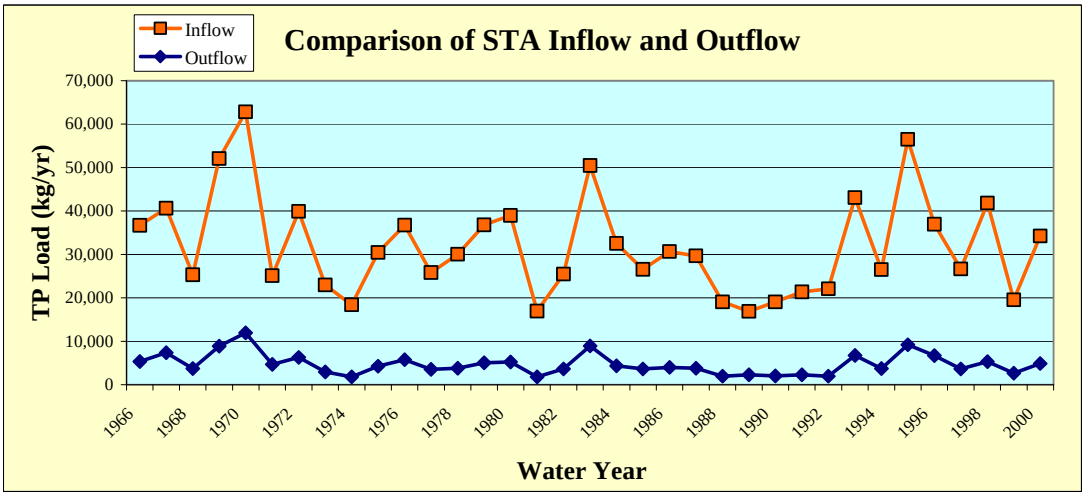
Parameter	Unit	Comp. B North	Comp. B South	Comp. B Combined
Effective Treatment Area	acres	5,824	2,796	8,620
Average Annual Inflow				
Volume	AF/yr	185,765	62,504	248,269
TP Load	kg/yr	25,096	7,276	32,372
TP Concentration	ppb	110	94	106
Average Annual Outflow				
Volume	AF/yr	190,843	67,001	257,844
Flow-weighted Mean TP Concentration				
Upper Conf. Limit for Settling Rate	ppb	15.0 (30)	15.0 (35)	15.0 (30)
Mean Estimate of Settling Rate	ppb	15.7 (17)	15.0 (31)	15.7 (17)
Lower Conf. Limit for Settling Rate	ppb	19.1 (6)	15.8 (18)	19.1 (6)
Geometric Mean TP Concentration				
Upper Conf. Limit for Settling Rate	ppb	15.0	15.0	15.0
Mean Estimate of Settling Rate	ppb	15.0	15.0	15.5
Lower Conf. Limit for Settling Rate	ppb	17.8	15.0	17.1
TP Load (Using Mean TP Conc.)	kg/yr	3,704	1,240	4,944
Diversion Volumes and Loads				
Volume	AF/yr	0	0	0
TP Load	kg/yr	0	0	0
TP Concentration	ppb	-	-	-

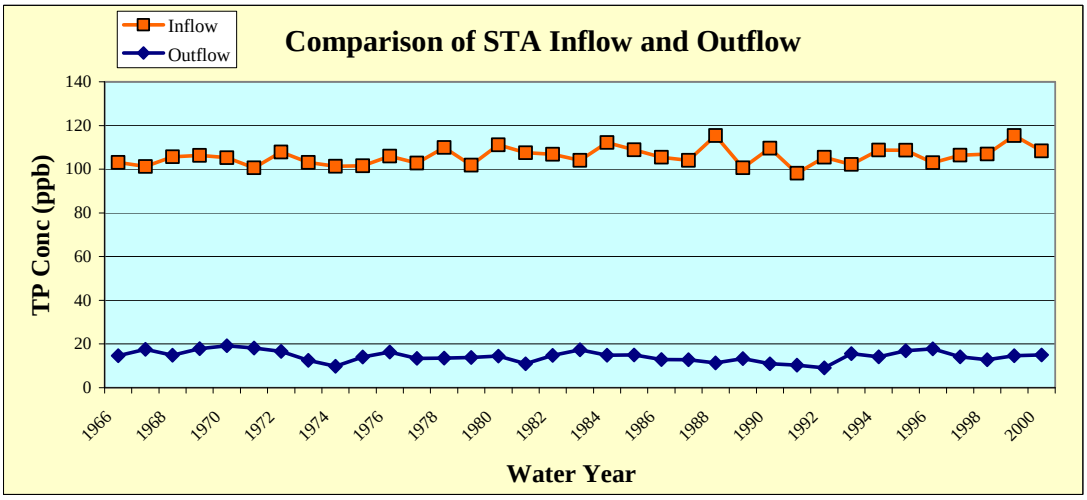
Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.

2. Outflow values highlighted in yellow had one or more years of the 35 year simulated below the low end of the calibration data set (enumerated by the number in parentheses). The lowest sustainable STA outflow phosphorus concentration is 19 ppb (STA-3/4), with a standard deviation of 5 ppb.

Figure 5-2: Comparison of Inflows and Outflows for Compartment B.







Note: TP concentrations below 15 ppb have not been sustained.

6. EAA Storage Reservoir A-1

The network feature of DMSTA was used to model the combined EAA Storage Reservoir A-1 (EAASR A-1) and STA-3/4 system. This simulation generated a daily time series of flow and phosphorus levels from the reservoir back to the EAA for irrigation releases and to STA-3/4 for subsequent treatment. Upon review of the outflow time series to STA-3/4, it was observed that DMSTA was simulating releases during the dry season when the SFWMM results indicated no releases from the reservoir to STA-3/4. Further, the phosphorus concentrations associated with these dry season releases were quite high. For the purpose of the STA-3/4 inflow, the DMSTA-generated time series was replaced by the daily flows from the SFWMM results and the phosphorus concentrations from DMSTA. Although this won't resolve the high concentrations during the dry seasons, it will reduce the frequency of their occurrence. This new time series was then used in combination with basin runoff flows for an independent DMSTA simulation of STA-3/4 that allowed an uncertainty analysis of the STA performance, using the 10%, mean and 90% values of the effective settling rates for the specific vegetation types within STA-3/4.

For all alternatives, several assumptions were incorporated in the DMSTA modeling of the EAASR A-1:

- The SFWMM models the EAASR as two reservoir compartments, EARSN and EARSS. These were simulated in DMSTA as a single reservoir cell.
- Many reservoir characteristics were identical to those evaluated during the Basis of Design Report for the EAASR A-1 (Black and Veatch 2006):
  - The effective treatment area of the EAASR A-1 is 15,200 acres
  - The minimum depth for releases is 15.2 cm
  - The outflow weir depth for bypass is 12.5 ft
  - Seepage characteristics
- Other reservoir characteristics include:
  - The average flow width is 4.5 miles which is the average of the east-west width at the north end of EAASR and the width at the south end
  - The mean settling rate for the reservoir calibration data sets (5 m/yr) was used to simulate phosphorus removal in the reservoir.
- Daily rainfall and evapotranspiration from the SFWMM scenario were used in the DMSTA simulation.
- Reservoir depths from the SFWMM scenario were used in the DMSTA simulation. The depth time series provides an appropriate range of depths in the reservoir, based on model assumptions of footprint and volume, but is not intended as a true estimate of reservoir depth. Reservoir depth time series are not recommended for calculations outside the 2x2, however, the depth time series can be used as a reference for feasibility-level work such as the present analysis.

- The daily flow time series from the SFWMM simulation quantifying the flow from the EAASR to STA-3/4 (WCS4S and EVBLSS) were used as outflow time series within the DMSTA simulation of the reservoir.

Using the recent phosphorus concentration of Lake Okeechobee releases as 100 ppb, the long-term average annual inflow to the EAASR A-1 by source is summarized in **Table 6-1**.

Table 6-1: Summary of Long-term Average Annual Inflow to EAASR A-1.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
S-7/S-2 Basin	84,612	9,881	95
S-8/S-3 Basin	109,116	11,195	83
Lake Okee.	378,190	46,419	100
Total	**571,919**	**67,496**	**96**

A summary of EAASR A-1 phosphorus performance for Alternative B is presented in the table and figures below. For WY1982, the simulated flow-weighted mean outflow concentration exceeded the inflow concentration, although the outflow loads were only 6% of the inflow loads. A copy of the DMSTA output is presented in Appendix B. No warning or error messages were generated during the DMSTA simulation for the EAASR A-1. However, the minimum simulated depth was 1 cm, indicating that DMSTA numerically prevented dry-out by reducing the rates of ET, seepage, etc. In reality the reservoir would have dried out and phosphorus levels may temporarily increase upon rewetting; depending on how much time passes between rewetting and discharge to the STA, the impact of this temporary increase in phosphorus levels could vary, however, the long-term concentration shown in Table 6-2 may be optimistic.

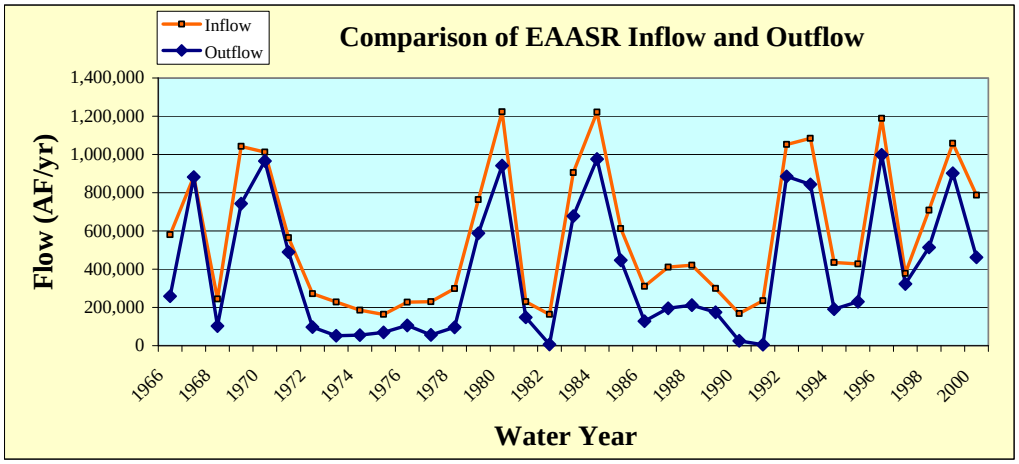
Table 6-2: Summary of DMSTA Results for EAASR A-1 (Lake TP Conc. of 100 ppb).

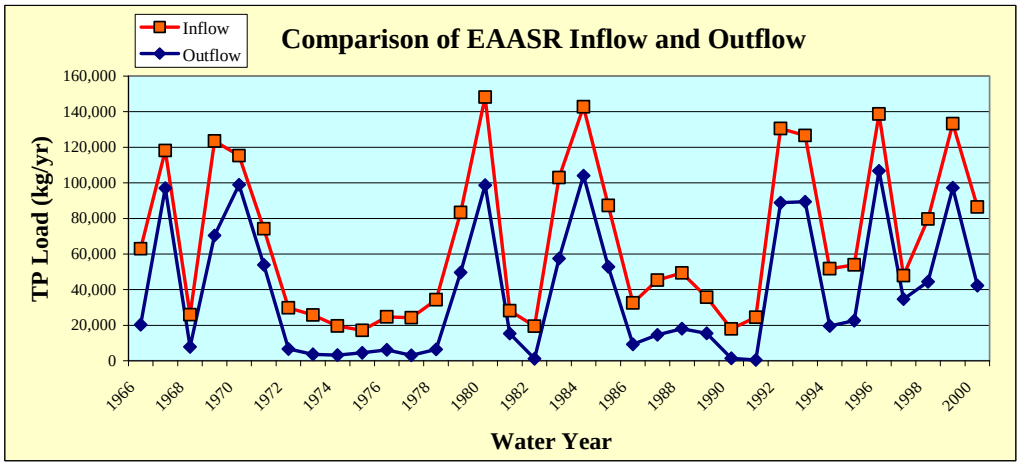
Parameter	Unit	EAASR A-1 Note 2
Effective Treatment Area	acres	15,200
Average Annual Inflow		
Volume	AF/yr	571,919
TP Load	kg/yr	67,496
TP Concentration	ppb	96
Average Annual Outflow		
Volume	AF/yr	395,639
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	-
Mean Estimate of Settling Rate	ppb	80.0
Lower Conf. Limit for Settling Rate	ppb	-
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	-
Mean Estimate of Settling Rate	ppb	94.2
Lower Conf. Limit for Settling Rate	ppb	-
TP Load (Using Mean TP Conc.)	kg/yr	39,054
Diversion Volumes and Loads		
Volume	AF/yr	0
TP Load	kg/yr	0
TP Concentration	ppb	-

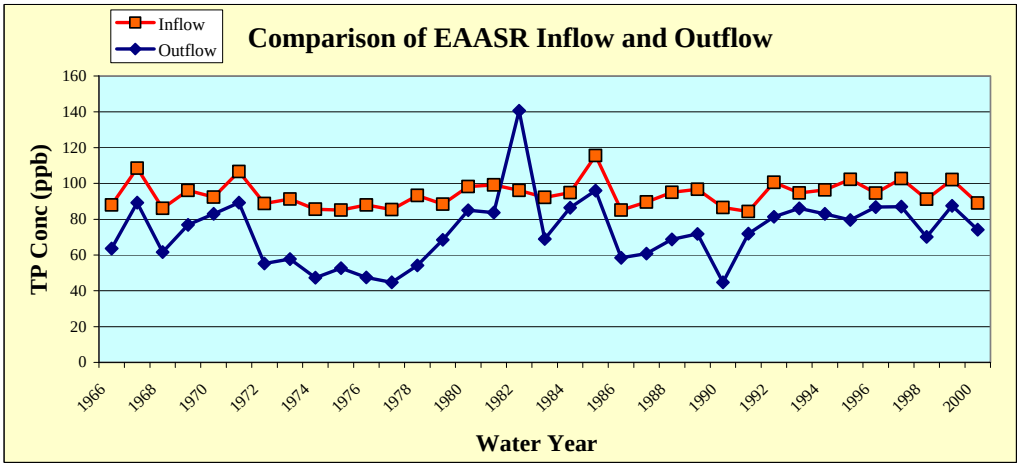
Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.

2. Shown are outflows to STA-3/4 after adjustment (see text); total outflows, including irrigation releases, were 546,691 AF/yr and 52,201 kg/yr at 77 ppb.

Figure 6-1: Comparison of Inflows and Outflows for EAASR A-1 (Lake TP Concentration of 100 ppb).







6.1. Sensitivity Analysis: Lake Okeechobee TP Concentration of 150 ppb

As an analysis of the sensitivity of the EAA reservoir and STA-3/4 performance to the phosphorus concentration of Lake Okeechobee releases, this section describes the performance of EAASR A-1 if the phosphorus concentration of Lake releases is 150 ppb at the inflow to the reservoir. With this assumption, the long-term average annual inflow to the EAASR A-1 by source is summarized in **Table 6-3**.

Table 6-3: Summary of Long-term Average Annual Inflow to EAASR.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
S-7/S-2 Basin	84,612	9,881	95
S-8/S-3 Basin	109,116	11,195	83
Lake Okee.	378,190	69,636	149
Total	**571,919**	**90,713**	**129**

A summary of EAASR A-1 phosphorus performance for Alternative B is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix B. **The net effect of assuming a Lake Okeechobee phosphorus concentration of 150 ppb appears to be about 32 ppb at the outflow of the reservoir to STA-3/4, resulting in a long-term average additional 15.6 metric tons/yr of phosphorus to STA-3/4.**

Inspection of Figure 6-2 reveals an anomaly in WY1989, in that the simulated outflow load and concentrations are significantly higher than the corresponding inflow values. An examination of the daily DMSTA output reveals that during a 5-day period in May 1988, the simulated outflow concentrations averaged 1,862 ppb, resulting in an estimated outflow load of 89,946 kg; this 5-day total accounted for 84% of the entire outflow load for WY89. This 5-day total accounts for 2.57 metric tons/yr or 16% of the 35-yr average increase compared to the scenario simulated with Lake inflows of 100 ppb.

No warning or error messages were generated during the DMSTA simulation for the EAASR A-1. However, the minimum simulated depth was 1 cm, indicating that DMSTA numerically prevented dry-out by reducing the rates of ET, seepage, etc. In reality the reservoir would have dried out and phosphorus levels would likely increase upon rewetting; thus the long-term concentration shown in Table 6-4 may be optimistic.

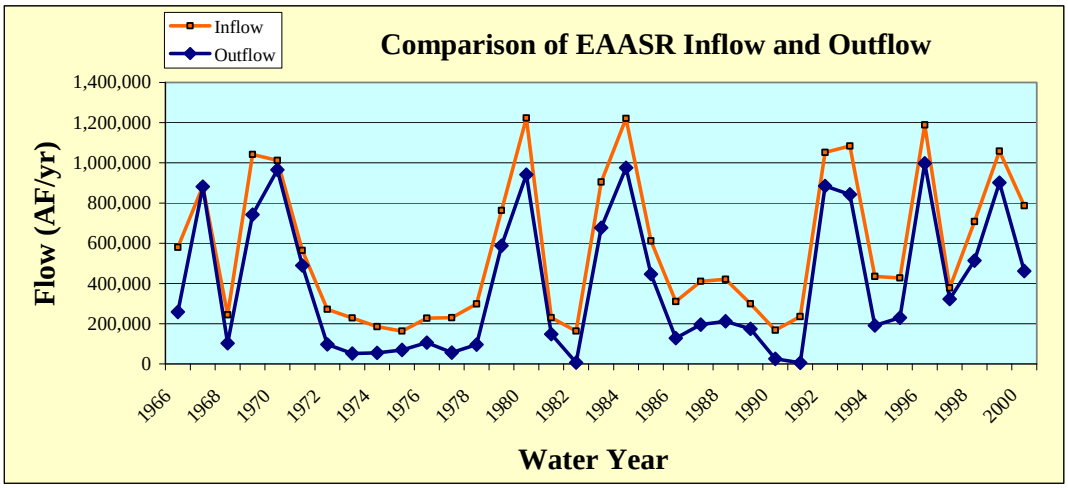
Table 6-4: Summary of DMSTA Results for EAASR A-1 (Lake TP Conc. of 150 ppb).

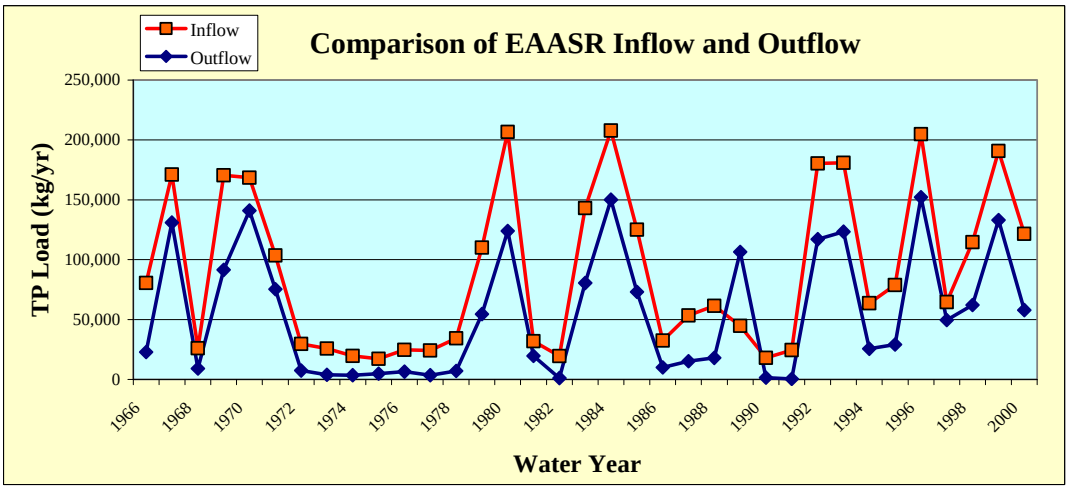
Parameter	Unit	EAASR A-1 Note 2
Effective Treatment Area	acres	15,200
Average Annual Inflow		
Volume	AF/yr	571,919
TP Load	kg/yr	90,713
TP Concentration	ppb	129
Average Annual Outflow		
Volume	AF/yr	395,639
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	-
Mean Estimate of Settling Rate	ppb	112.0
Lower Conf. Limit for Settling Rate	ppb	-
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	.-
Mean Estimate of Settling Rate	ppb	118.6
Lower Conf. Limit for Settling Rate	ppb	-
TP Load (Using Mean TP Conc.)	kg/yr	54,648
Diversion Volumes and Loads		
Volume	AF/yr	0
TP Load	kg/yr	0
TP Concentration	ppb	-

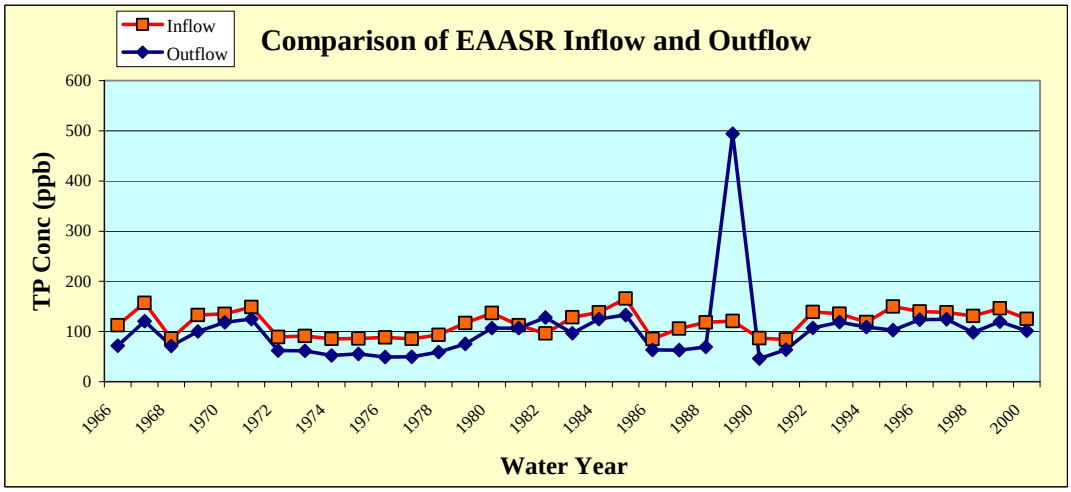
Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.

2. Shown are outflows to STA-3/4 after adjustment (see text); total outflows, including irrigation releases, were 546,691 AF/yr and 71,814 kg/yr at 106 ppb.

Figure 6-2: Comparison of Inflows and Outflows for EAASR A-1 (Lake TP Concentration of 150 ppb).



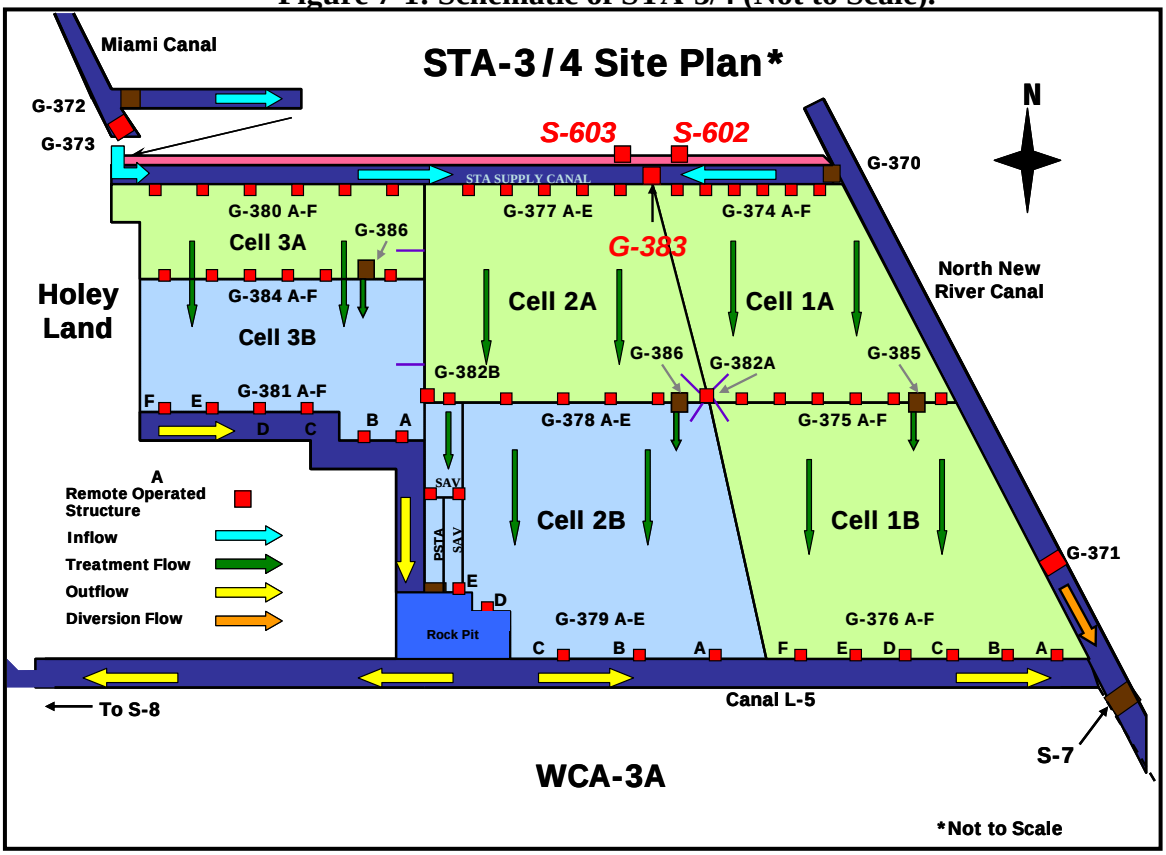




7. STA-3/4

A schematic of STA-3/4 is presented in **Figure 7-1B**, showing the two proposed structures (S-602 and S-603) that will allow transfer of water from the EAA Storage Reservoir to the STA.

Figure 7-1: Schematic of STA-3/4 (Not to Scale).



The simulated inflows to STA-3/4 are summarized in **Table 7-1**. The daily flow terms from the SFWMM simulation were utilized for the DMSTA modeling with the following modifications:

- ***For all alternatives,*** the estimate of runoff from the South Shore Drainage District and the South Florida Conservancy District was based on historic runoff volumes from these basins to the maximum extent practicable, as the SFWMM simulations do not well represent either the total discharges or the distribution of these discharges from these basins. Runoff volumes for the period May 1, 1994 through April 30, 2000 are available for direct use, while the runoff volumes for the remainder of the 35-year period (May 1, 1965 through April 30, 1994) were estimated by indirect methods. Consistent with the approach utilized in the *Updated STA Inflow Data Sets for the 2010 Period*, daily runoff volumes were estimated as a fixed percentage of the

daily runoff from the adjacent primary basin of the EAA (Goforth 2007b). That fixed percentage was derived as the ratio of the overall runoff from each Ch. 298 District basin to the overall runoff from the adjacent EAA basin over the WY1995-2007 period. In recognition of the changes in EAA basin contributing area over the WY1995-2007 period due to conversion of agriculture lands to STAs, the EAA runoff was normalized to the effective basin areas reflected in the SFWMM simulation.

- ***For all alternatives,*** a small amount of Miami Canal Runoff was simulated in SFWMM as being diverted untreated to the Water Conservation Area 3A. For the purpose of estimating phosphorus removal performance, these diversions were simulated by DMSTA as being captured in STA-3/4. Actual diversion may occur based on the daily hydraulic and treatment capacity of the treatment areas.

A summary of STA-3/4 phosphorus performance for Alternative B is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix B. A long-term flow-weighted mean outflow concentration range of 18-26 ppb was forecast, however this includes years when DMSTA forecast levels that fell below the calibration range of 15 ppb for an SAV system, and hence may be optimistic. DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix B. For Cells 1A and 2A, the mean flow/width was about 25% above the range of the emergent calibration data sets. For Cell 3B, the mean flow/width was about 25% below the range of the SAV calibration data sets. For the three SAV cells, the simulated mean depths were slightly below the range of the SAV calibration data sets, although the simulated minimum depths were above 30 cm. Diversion around the STA was simulated to provide water supply to downstream users, including the Big Cypress Basin Seminole Indian Reservation.

Table 7-1: Summary of Long-term Average Annual Inflow to STA-3/4 (Lake TP Conc of 100 ppb).

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
S-7/S-2 Basin	41,937	5,074	98
S-8/S-3 Basin	120,881	12,226	82
C-139 Basin	13,211	3,408	209
SSDD	10,539	1,324	102
SFCD	24,110	3,363	113
EAA SR	395,639	39,054	80
Total	**610,797**	**64,343**	**85**

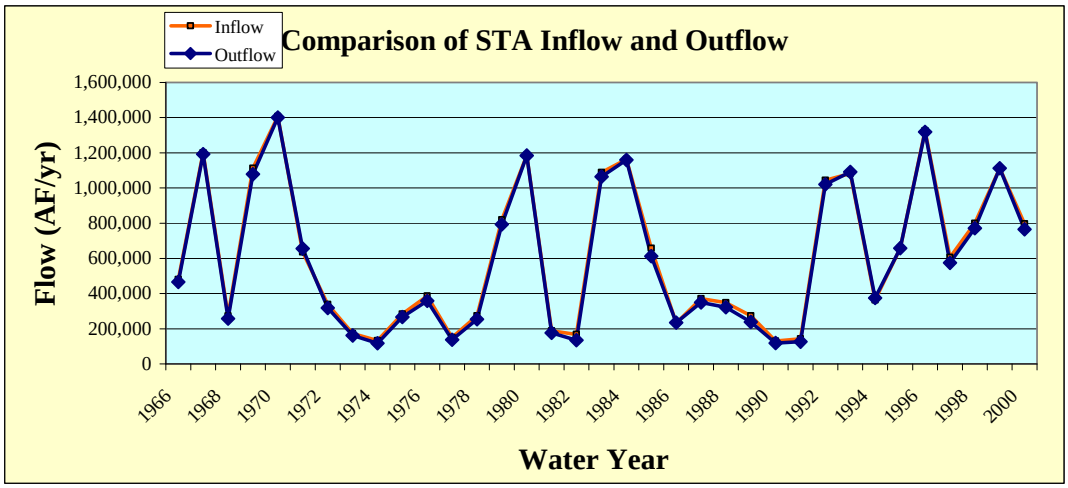
Totals are less than the sum of the components due to daily net negative values within the basin.

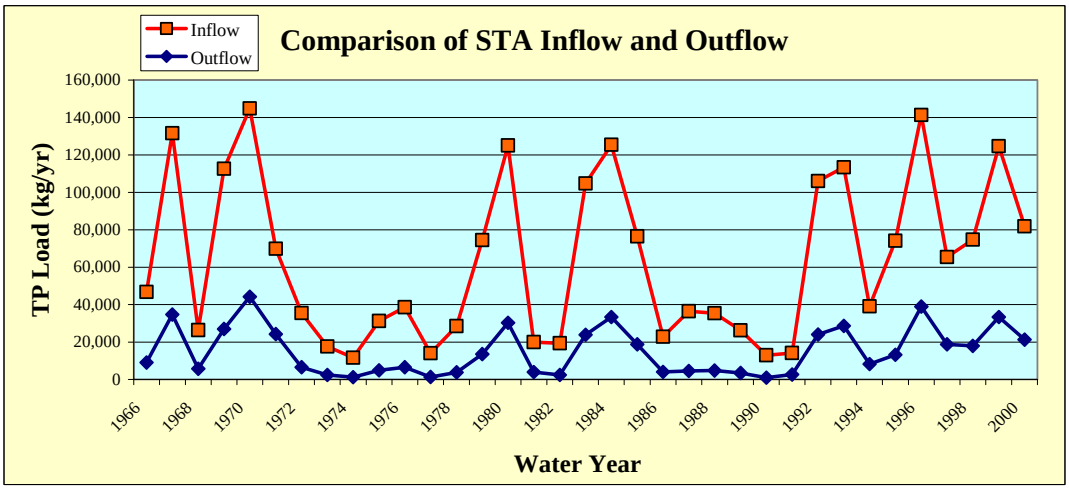
Table 7-2: Summary of DMSTA Results for STA-3/4 (Lake TP Conc. of 100 ppb).

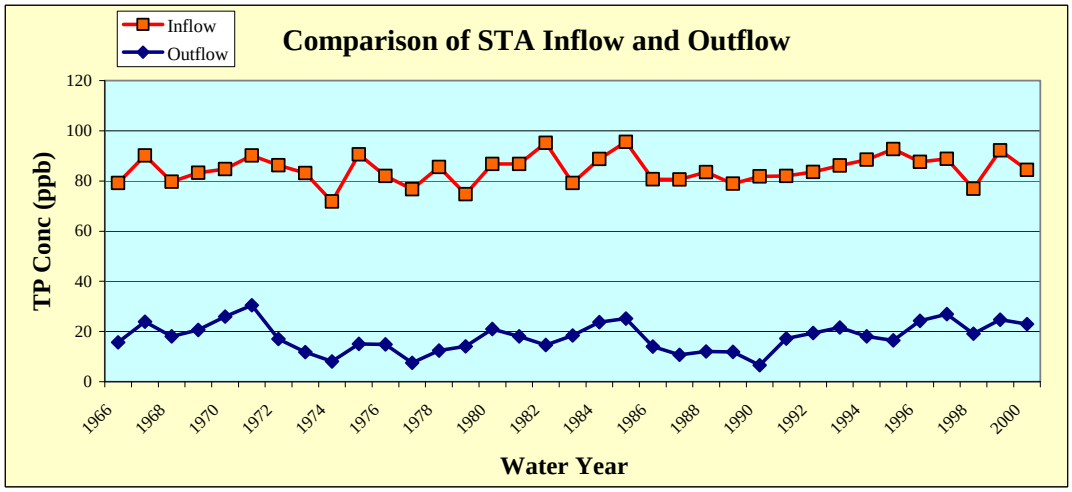
Parameter	Unit	STA-3/4
Effective Treatment Area	acres	16,543
Average Annual Inflow		
Volume	AF/yr	610,797
TP Load	kg/yr	64,343
TP Concentration	ppb	85
Average Annual Outflow		
Volume	AF/yr	595,822
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	17.1 (19)
Mean Estimate of Settling Rate	ppb	20.6 (12)
Lower Conf. Limit for Settling Rate	ppb	24.7 (7)
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	15.0
Mean Estimate of Settling Rate	ppb	16.8
Lower Conf. Limit for Settling Rate	ppb	20.2
TP Load (Using Mean TP Conc.)	kg/yr	15,120
Diversion Volumes and Loads		
Volume	AF/yr	82,358
TP Load	kg/yr	10,300
TP Concentration	ppb	101

Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.
2. Outflow values highlighted in yellow had one or more years of the 35 years simulated below the low end of the calibration data set (enumerated by the number in parentheses). The lowest sustainable STA outflow phosphorus concentration is 19 ppb (STA-3/4), with a standard deviation of 5 ppb.
3. Diversion is primarily for downstream water supply users.

Figure 7-2: Comparison of Inflows and Outflows for STA-3/4 (Lake TP Concentration of 100 ppb).







Note: TP concentrations below 15 ppb have not been sustained.

7.1. Sensitivity Analysis: Lake Okeechobee TP Concentration of 150 ppb

As an analysis of the sensitivity of STA performance to the phosphorus concentration of Lake Okeechobee releases, this section describes the performance of STA-3/4 if the phosphorus concentration of Lake releases is 150 ppb at the inflow to the EAASR. With this assumption, the inflows to STA-3/4 are summarized in **Table 7-3**. With the assumed higher concentration in the Lake releases, the estimated total annual average inflow to STA-3/4 increased approximately 21 ppb, or about 15.6 metric tons/yr.

Table 7-3: Summary of Long-term Average Annual Inflow to STA-3/4 (Lake TP Conc of 150 ppb).

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
S-7/S-2 Basin	41,937	5,074	98
S-8/S-3 Basin	120,881	12,226	82
C-139 Basin	13,211	3,408	209
SSDD	10,539	1,324	102
SFCD	24,110	3,363	113
EAA SR	395,639	54,648	112
Total	**610,797**	**79,937**	**106**

A summary of STA-3/4 phosphorus performance for Alternative B is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix B. A long-term flow-weighted mean outflow concentration range of 20-30 ppb was forecast, however this includes years when DMSTA forecast levels that fell below the calibration range of 15 ppb for an SAV system, and hence may be optimistic. These results compare to a simulated range of 17-25 ppb with a concentrations of Lake releases averaging 100 ppb. **The net effect of assuming a Lake Okeechobee phosphorus concentration of 150 ppb appears to be about 4 ppb at the outflow of STA-3/4, resulting in a long-term average annual increase of 2.9 metric tons of phosphorus to the Everglades compared to an average Lake release concentration of 100 ppb.** In addition to the STA discharge, it is estimated that an additional 4.75 metric tons per year of phosphorus will enter the Everglades in Lake Okeechobee deliveries for downstream water supply, including the Big Cypress Basin Seminole Indian Reservation.

Mirroring the anomalous outflow phosphorus levels of the EAA Storage Reservoir discussed in Section 6.1 above, STA-3/4 inflow and outflow for WY89 increased dramatically. Unlike the EAASR result, the outflow concentration remained significantly lower than the simulated inflow concentration, with approximately 89% load reduction. Excluding WY89 values reduces the simulated long-term average STA-3/4 outflow concentration from 24.6 ppb to 24.3 ppb for this scenario (using the mean estimate of the apparent settling rate), as shown in Table 7.2. Because of this minor influence on the overall phosphorous levels to the EPA, no further review of WY89 DMSTA results is felt warranted.

DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix B. For Cells 1A and 2A, the mean flow/width was about 25% above the range of the emergent calibration data sets. For Cell 3B, the mean flow/width was about 25% below the range of the SAV calibration data sets. For the three SAV cells, the simulated mean depths were slightly below the range of the SAV calibration data sets, although the simulated minimum depths were above 30 cm. Diversion around the STA was simulated to provide water supply to downstream users, including the Big Cypress Basin Seminole Indian Reservation.

Table 7-4: Summary of DMSTA Results for STA-3/4 (Lake Conc. of 150 ppb).

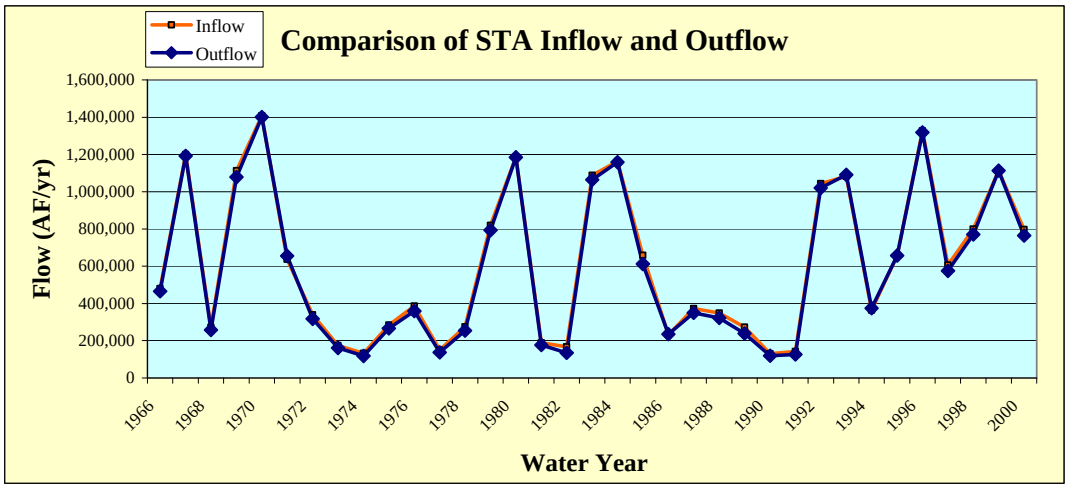
Parameter	Unit	STA-3/4
Effective Treatment Area	acres	16,543
Average Annual Inflow		
Volume	AF/yr	610,797
TP Load	kg/yr	79,937
TP Concentration	ppb	106
Average Annual Outflow		
Volume	AF/yr	595,822
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	20.1 (14)
Mean Estimate of Settling Rate	ppb	24.6 (10)
Lower Conf. Limit for Settling Rate	ppb	29.9 (4)
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	16.3
Mean Estimate of Settling Rate	ppb	19.9
Lower Conf. Limit for Settling Rate	ppb	24.4
TP Load (Using Mean TP Conc.)	kg/yr	18,065
Diversion Volumes and Loads		
Volume	AF/yr	82,358
TP Load	kg/yr	15,052
TP Concentration	ppb	148

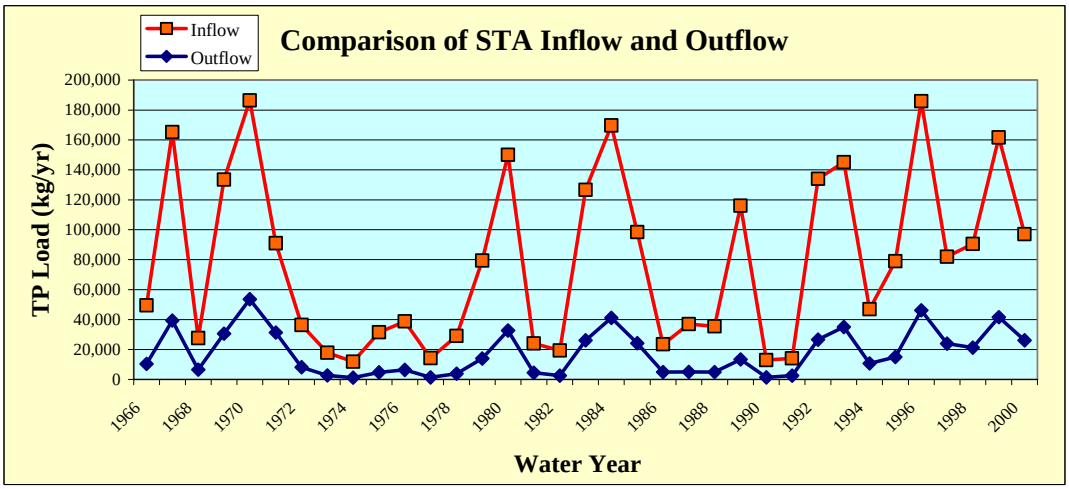
Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.
2. Outflow values highlighted in yellow had one or more years of the 35 years simulated below the low end of the calibration data set (enumerated by the number in parentheses). The lowest sustainable STA outflow phosphorus concentration is 19 ppb (STA-3/4), with a standard deviation of 5 ppb.
3. Diversion is primarily for downstream water supply users.

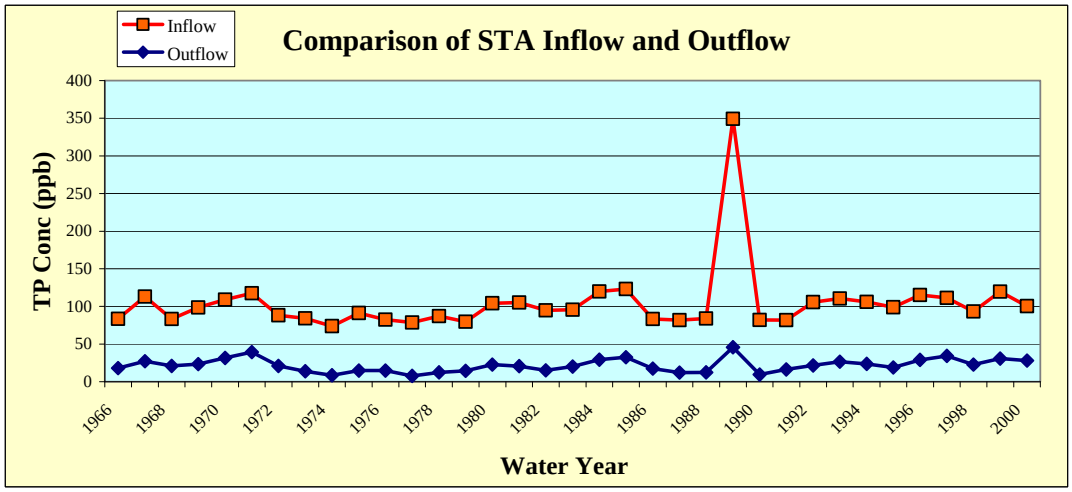
Table 7-5: Influence of Excluding Anomalous WY89 Values.

Water Year	STA Inflow			STA Outflow		
	Flow	TP Load	TP Conc	Flow	TP Load	TP Conc
	AF/yr	kg/yr	ppb	AF/yr	kg/yr	ppb
35-yr Average	610,797	79,937	106	595,822	18,065	24.6
34-yr average	620,728	78,843	103	606,314	18,204	24.3
Excluding WY89						

Figure 7-3: Comparison of Inflows and Outflows for STA-3/4 (Lake TP Concentration of 150 ppb).







Note: TP concentrations below 15 ppb have not been sustained.

8. STA-5

Inflow data sets for STA-5 and STA-6 utilized the historic flows and phosphorus loads for the WY1995-2007 period. For the purpose of developing the STA-5 inflow data set, STA-5 was assumed to be comprised of the existing 3 flow-ways of STA-5, along with the 4th and 5th flow-ways of Compartment C that are soon to be constructed (see **Figure 8-1**; URS 2007). The combined C-139 Basin and C-139 Annex runoff will likely be distributed to STA-5 and STA-6 in an attempt to balance the phosphorus loading rate among the flow-ways of the STAs (see **Table 8-1**). A summary of inflows to STA-5 is presented in **Table 8-2**.

Table 8-1: Estimate of Inflow Distribution to Balance the PLR to STA-5 and STA-6.

Flow-way	Area	TP inflow	Flow at PLR	Load	PLR
STA-5 1	2,055	229	28,177	7,945	0.96
STA-5 2	2,055	229	28,177	7,945	0.96
STA-5 3	1,985	229	27,217	7,674	0.96
STA-5 4	2,176	229	29,836	8,413	0.96
STA-5 5	2,669	229	36,595	10,319	0.96
STA-6 3	1,857	178	32,692	7,180	0.96
STA-6 5	652	97	20,970	2,521	0.96
STA-6 2	245	97	7,880	947	0.96
Total	13,694	203	211,544	52,944	0.96

At this time, it is extremely difficult to forecast the phosphorus removal performance of STA-5. Since the first full water year of operation (2001), the annual inflow concentrations have ranged from 165 ppb to 299 ppb, with a 7-yr average of 235 ppb (Pietro et al. 2007). The phosphorus loading rate has been considerably higher than the other STAs, ranging from 0.94 g/m^2/yr to 4.01 g/m^2/yr with a 7-yr average of 2.1 g/m^2/yr. The long-term outflow concentration has ranged from 82-192 ppb, with a 7-yr average of 105 ppb. These characteristics are more similar to the DMSTA emergent vegetation calibration data set than to the SAV data set, which may be related to different soil type than in the EAA STAs (more mineral content) and less calcium in the inflow waters than the EAA STAs. In consideration of the anticipated reduced phosphorus loading rate when the additional treatment cells within Compartment C begin operation, the 2005 Study estimated the performance of STA-5 using the average performance of two DMSTA simulations:

1. Assuming the phosphorus removal downstream cell in each flow-way performs similar to the emergent calibration data set; and
2. Assuming the phosphorus removal downstream cell in each flow-way performs similar to the SAV calibration data set.

For comparison purposes, a similar set of simulations were conducted during the present analysis, ***however, until such time that the STA-5 performance improves, and until performance data for the newly constructed Flow-way 3 is available, the forecast performance will be based on assuming the phosphorus removal of the downstream cell in each flow-way performs similar to the emergent calibration data set.***

Figure 8-1: Preliminary Layout of Compartment C Build-out; Subject to Revision (modified from URS 2007).

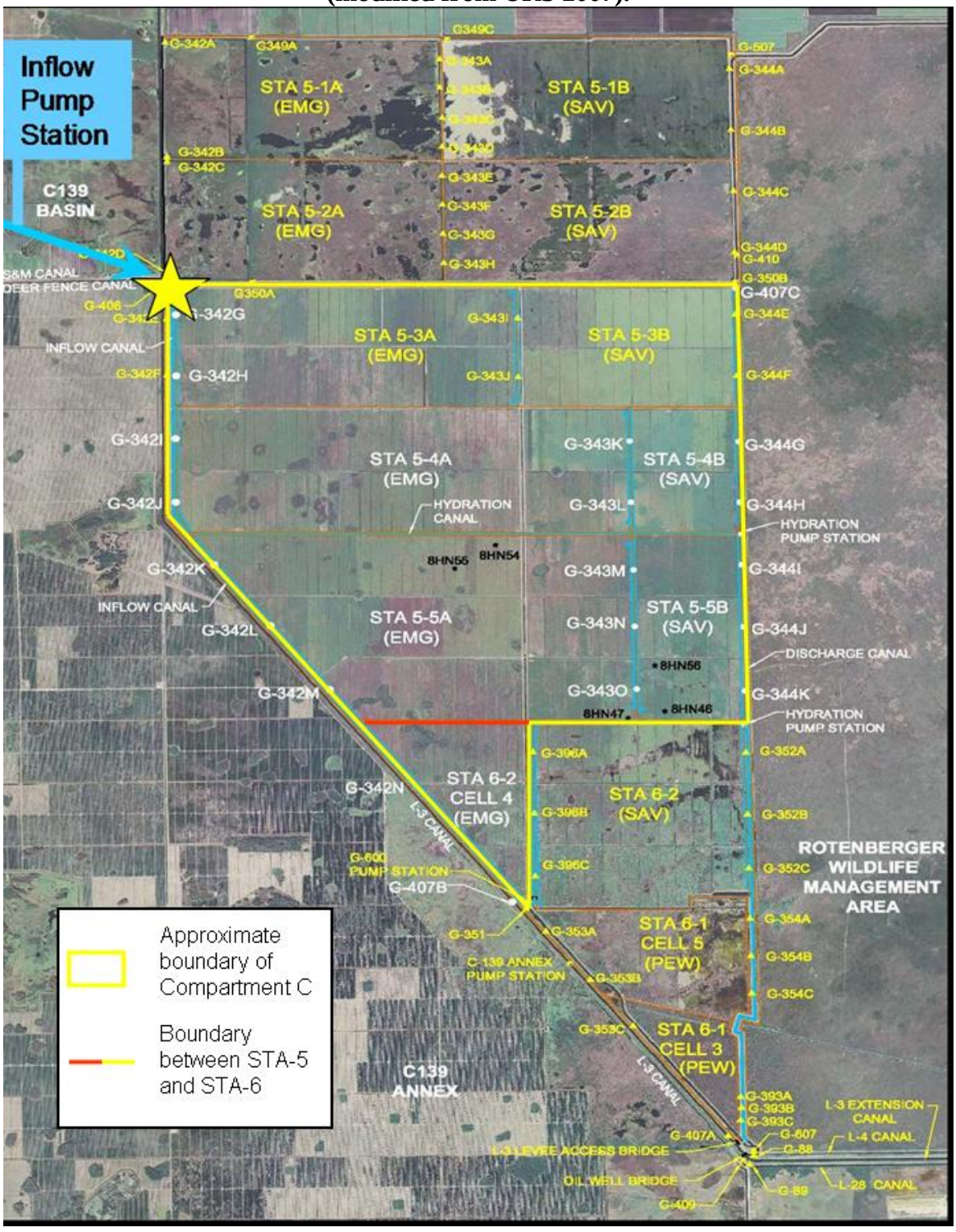


Table 8-2: Summary of Long-term Average Annual Inflow to STA-5, Including Compartment C Build-out.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
C-139 Basin	150,001	42,300	229

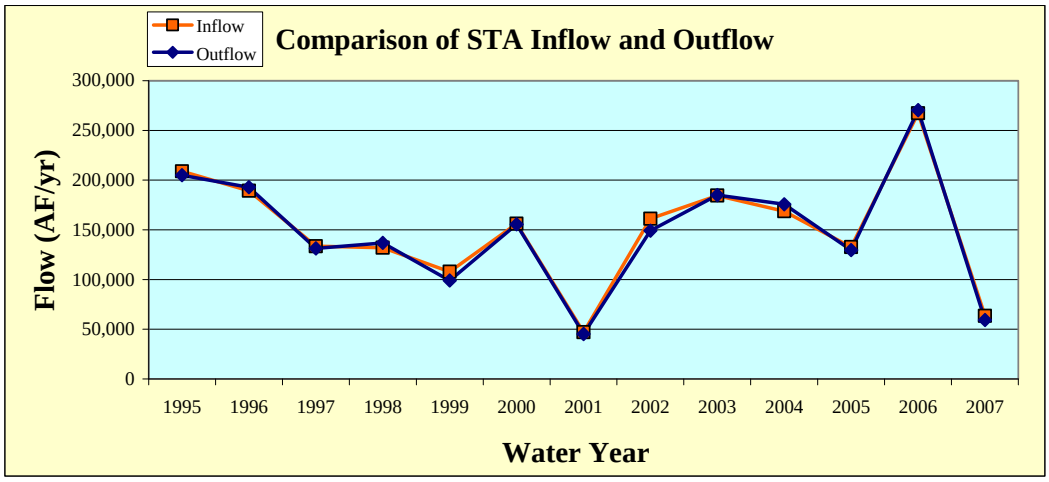
A summary of STA-5 phosphorus performance for Alternative B is presented in the tables and figures below. Copies of the DMSTA output are presented in Appendix B. For the emergent vegetation scenario, a long-term flow-weighted mean outflow concentration range of 22-47 ppb was forecast, however this includes six of the thirteen years when DMSTA forecast levels that fell below the calibration range of 20 ppb for an emergent system; hence this range may be optimistic, particularly in light of STA-5 performance history. Based on the historic performance of STA-5 and the high degree of uncertainty as to whether these DMSTA forecasts accurately represent actual phosphorus removal within the STAs in Compartment C, it is premature to conclude that there is excess treatment capacity in Compartment C. For the SAV scenario, ***presented only for comparison and not as a forecast of STA-5 performance***, DMSTA forecast long-term outflow concentrations below the low end of the SAV calibration data set (15 ppb) and these were set to the low end value; hence this range is overly optimistic particularly in light of STA-5 performance history. DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix B. For the emergent vegetation scenario no warnings messages were generated. However, DMSTA forecast 7% of the time the depth in the upstream cells was less than 10 cm, indicating the potential for insufficient water availability to maintain the minimum desirable water depth of 15 cm. For the SAV scenario, thirteen messages were generated, identifying that mean depths, flow/widths and outflow phosphorus concentrations were below the range of the SAV calibration data sets. In addition, DMSTA forecast 7% of the time the depth in the upstream cells was less than 10 cm, indicating the potential for insufficient water availability to maintain the minimum desirable water depth of 15 cm.

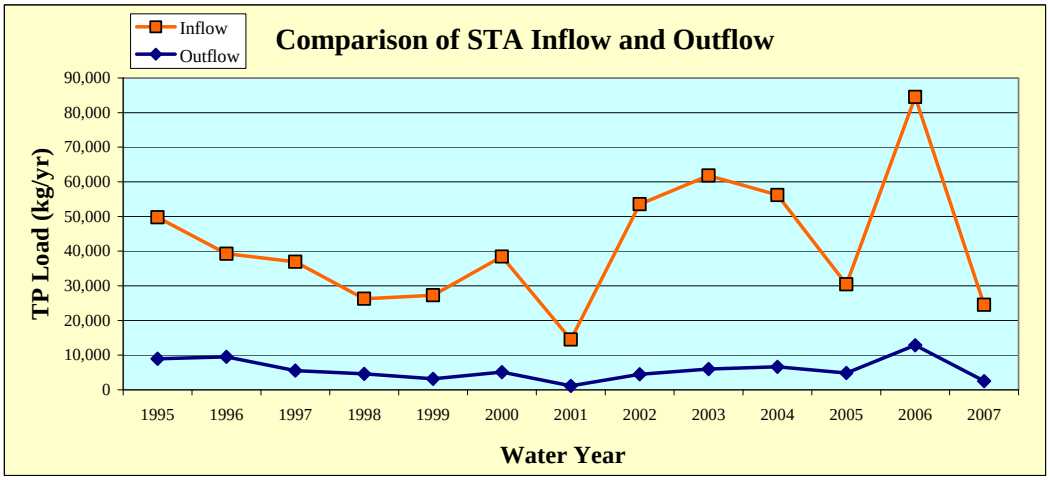
Table 8-3: Summary of DMSTA Results for STA-5, Including Comp. C Build-out.

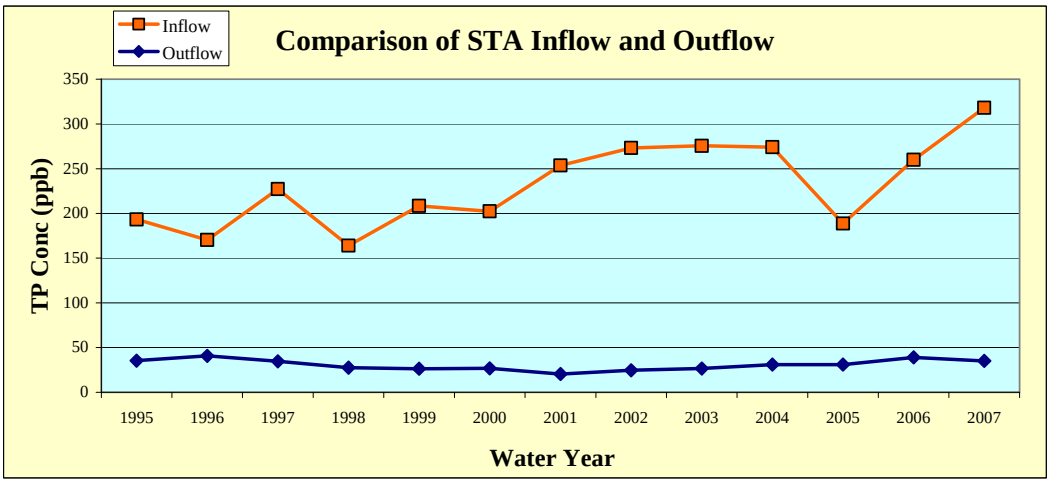
Parameter	Unit	STA-5 - Emergent	STA-5 - SAV
Effective Treatment Area	acres	10,940	10,940
Average Annual Inflow			
Volume	AF/yr	150,001	150,001
TP Load	kg/yr	42,300	42,300
TP Concentration	ppb	229	229
Average Annual Outflow			
Volume	AF/yr	148,717	148,717
Flow-weighted Mean TP Concentration			
Upper Conf. Limit for Settling Rate	ppb	21.7(6)	15.0 (13)
Mean Estimate of Settling Rate	ppb	32.0	15.0 (13)
Lower Conf. Limit for Settling Rate	ppb	46.5	19.0 (11)
Geometric Mean TP Concentration			
Upper Conf. Limit for Settling Rate	ppb	20.2	15.0
Mean Estimate of Settling Rate	ppb	30.2	15.0
Lower Conf. Limit for Settling Rate	ppb	44.3	17.3
TP Load (Using Mean TP Conc.)	kg/yr	5,870	2,752
Diversion Volumes and Loads			
Volume	AF/yr	0	0
TP Load	kg/yr	0	0
TP Concentration	ppb	-	-

Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value.
There is associated uncertainty in these predictions and actual performance will vary.
2. Outflow values highlighted in yellow had one or more years of the 13 years simulated below the low end of the calibration data set (enumerated by the number in parentheses).
3. Results for SAV in the downstream cells are presented for comparison only; the emergent vegetation scenario is currently used as a forecast for STA-5

Figure 8-2: Comparison of Inflows and Outflows for STA-5 With Emergent Vegetation in All Cells, Including Compartment C Build-out.

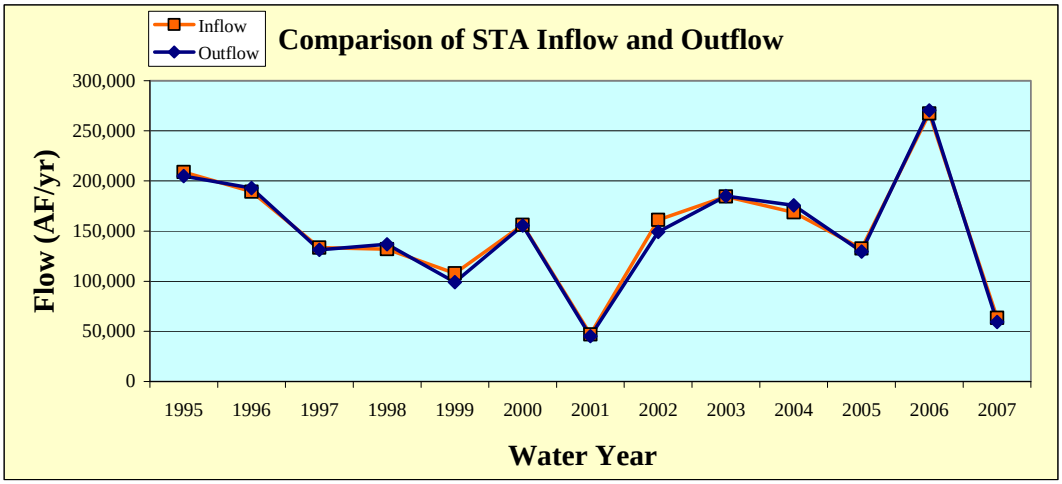


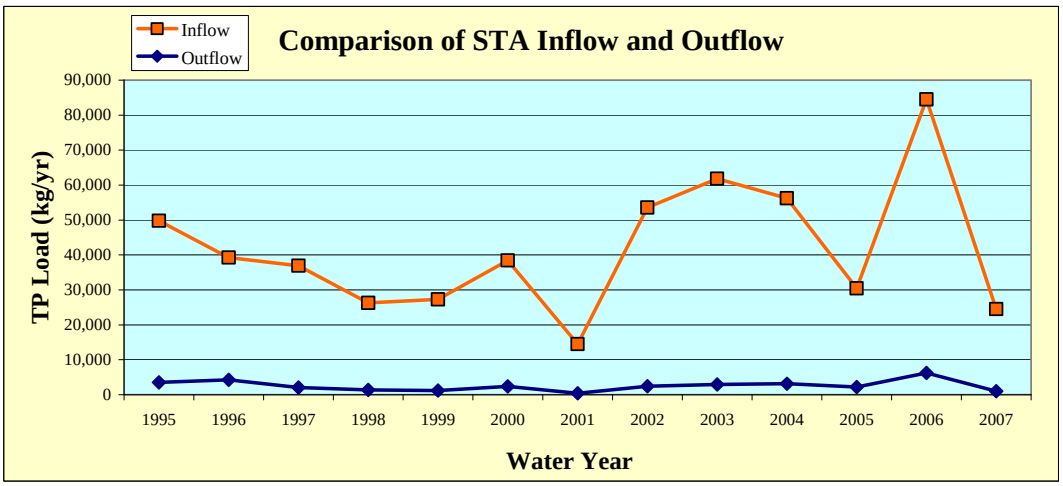


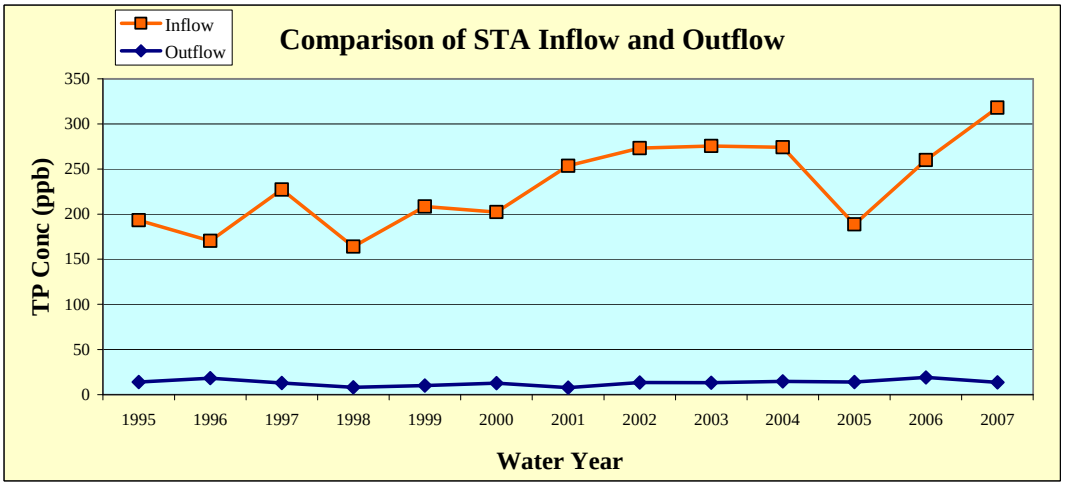


Note: TP concentrations below 15 ppb have not been sustained.

Figure 8-3: Summary of DMSTA Results for STA-5 With SAV in Downstream Cells.







Note: TP concentrations below 15 ppb have not been sustained.

9. STA-6

The combined C-139 Basin and C-139 Annex runoff will be distributed to STA-5 and STA-6 to balance the phosphorus loading rate among the flow-ways of the STAs (see **Table 8-1** above). A summary of the long-term average inflows to STA-6 is presented in **Table 9-1.**

Table 9-1: Summary of Long-term Average Annual Inflow to STA-6, Including Compartment C Build-out.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
C-139 Basin	20,062	5,657	229
C-139 Annex	41,480	4,987	97
Total	**61,542**	**10,644**	**140**

A summary of STA-6 phosphorus performance for Alternative B is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix B. DMSTA forecast a best case scenario long-term flow-weighted mean phosphorus concentration of 10 ppb which is below the minimum of the calibration data sets for the vegetation in the treatment cells, and that forecast was replaced in Table 9-2 by 13 ppb[2]. The adjusted outflow phosphorus levels in Table 9-2 may still portray optimistic results in that the best performing STA (STA-3/4) is presently averaging about 19 ppb, with a 5 ppb standard deviation on annual values. Although the simulated performance appears to suggest additional treatment capacity may available in the 2,754 acres of STA-6, based on the historic performance of STA-5 and the high degree of uncertainty as to whether these DMSTA forecasts accurately represent actual phosphorus removal within the STAs in Compartment C, it is premature to conclude that there is excess treatment capacity in Compartment C. DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix B. Eight messages were generated, identifying that mean depths, flow/widths and outflow phosphorus concentrations were below the range of the calibration data sets. In addition, the mean inflow concentration (140 ppb) was above the calibration range for the Prior Existing Wetland (PEW) data sets, further suggesting that the forecast outflow concentration may be optimistic.

[2] For STA-6, two flow-ways have SAV in the downstream cell which has a minimum calibration concentration of 15 ppb, and one has Prior Existing Wetlands (PEW) which has a minimum calibration concentration of 8 ppb. The flow-weighted minimum concentration for the three flow-ways is 13 ppb.

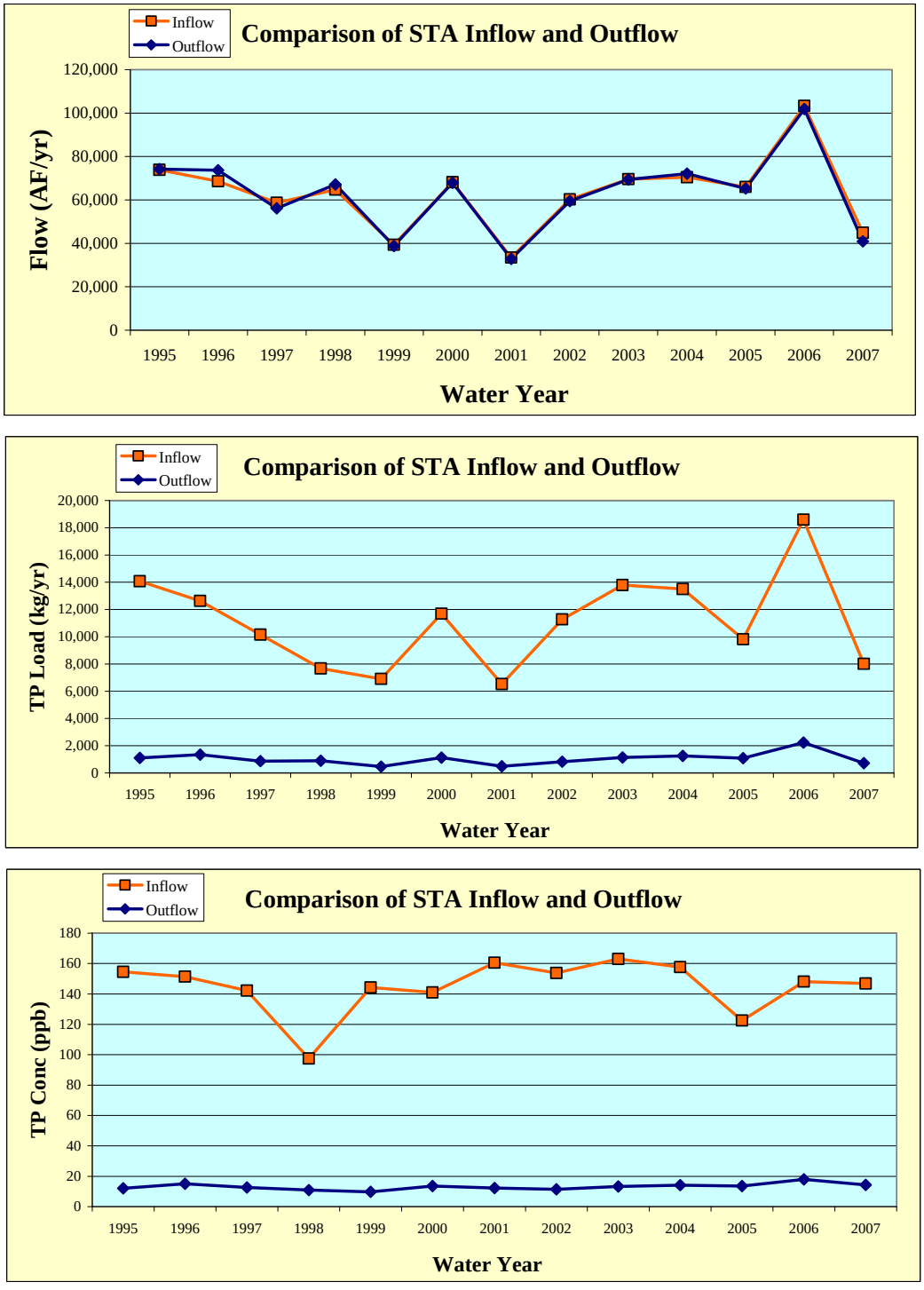
Table 9-2: Summary of DMSTA Results for STA-6, Including Comp. C Build-out.

Parameter	Unit	STA-6
Effective Treatment Area	acres	2,754
Average Annual Inflow		
Volume	AF/yr	61,542
TP Load	kg/yr	10,644
TP Concentration	ppb	140
Average Annual Outflow		
Volume	AF/yr	61,494
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	13.0 (11)
Mean Estimate of Settling Rate	ppb	13.0 (7)
Lower Conf. Limit for Settling Rate	ppb	16.9 (1)
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	13.0
Mean Estimate of Settling Rate	ppb	13.0
Lower Conf. Limit for Settling Rate	ppb	16.3
TP Load (Using Mean TP Conc.)	kg/yr	986
Diversion Volumes and Loads		
Volume	AF/yr	0
TP Load	kg/yr	0
TP Concentration	ppb	-

Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.

2. Outflow values highlighted in yellow had one or more years of the 13 years simulated below the low end of the calibration data set (enumerated by the number in parentheses). The lowest sustainable STA outflow phosphorus concentration is 19 ppb (STA-3/4), with a standard deviation of 5 ppb.

Figure 9-1: Comparison of Inflows and Outflows for STA-6.



Note: TP concentrations below 15 ppb have not been sustained.

10. Summary

A summary of the simulated phosphorus removal performance in the STAs, the EAASR A-1 and the full build-out of the treatment areas in Compartments B and C is presented in **Table 10-1** below[3]. For STA-6, DMSTA forecast a best case scenario long-term flow-weighted mean phosphorus concentration below the minimum of the calibration data sets for the vegetation in the treatment cells, and that forecast was replaced in Table 10-1 by 13 ppb[4]. The adjusted outflow phosphorus levels in Table 10-1 may still portray optimistic results in that the best performing STA (STA-3/4) is presently averaging about 19 ppb, with a 5 ppb standard deviation on annual values. Simulated long-term average annual flow-weighted mean outflow concentrations from the individual STAs ranged from 13-47 ppb. On a cumulative basis, the simulated long-term average annual concentration ranged from 20-30 ppb. In consideration of the forecast error of ±23%, this suggests a potential long-term range of 15-37 ppb for the cumulative long-term average annual outflow concentration.

The estimated allocation of discharges to the Water Conservation Areas is summarized in **Table 10-2**.

Phosphorus Concentrations for Lake Okeechobee Releases. Table 10-1 presents DMSTA modeling results for the EAASR A-1 and STA-3/4 using an average phosphorus concentration for Lake Okeechobee releases of 100 ppb, which corresponds to recent levels. An alternative simulation was conducted assuming an average phosphorus concentration for Lake Okeechobee releases of 150 ppb. While this assumed 50% increase in concentration increased the simulated phosphorus load to the EAASR A-1 by a long-term average of 23.2 metric tons/yr, the simulated net increase to STA-3/4 was 15.6 metric tons/yr. The 7.6 metric ton/yr balance either accumulated in the reservoir storage or was discharged to the EAA to satisfy irrigation demand. DMSTA simulated an increase in the long-term STA-3/4 outflow concentration of about 4 ppb, resulting in a predicted long-term average annual increase of about 2.9 metric tons/yr of phosphorus to the Everglades compared to the simulations that used an average Lake release concentration of 100 ppb. In addition to the STA discharge, it is estimated that an additional 4.75 metric tons per year of phosphorus will enter the Everglades in Lake Okeechobee deliveries for downstream water supply, including the Big Cypress Basin Seminole Indian Reservation.

[3] These simulated forecasts of STA performance are made for the comparison of alternatives and not for the development of effluent limits. Effluent limits are determined through the State of Florida's issuance of permits for these facilities.

[4] For STA-6, two flow-ways have SAV in the downstream cell which has a minimum calibration concentration of 15 ppb, and one has Prior Existing Wetlands (PEW) which has a minimum calibration concentration of 15 ppb. The flow-weighted minimum concentration for the three flow-ways is 13 ppb.

Table 10-1: Summary of DMSTA Modeling Results.

Parameter	Unit	STA-1E	STA-1W	STA-2	Comp. B North	Comp. B South	Comp. B Combined	EAASR A-1 Note 3	STA-3/4	STA-5 - Emergent	STA-6	All
Effective Treatment Area	acres	5,132	6,670	6,338	5,824	2,796	8,620	15,200	16,543	10,940	2,754	56,997
Average Annual Inflow												
Volume	AF/yr	193,332	243,570	186,096	185,765	62,504	248,269	571,919	610,797	150,001	61,542	1,693,607
TP Load	kg/yr	41,959	54,533	24,881	25,096	7,276	32,372	67,496	64,343	42,300	10,644	271,032
TP Concentration	ppb	176	182	108	110	94	106	96	85	229	140	130
Phosphorus Loading Rate	$g/m^2/yr$	2.0	2.0	1.0	1.1	0.6	0.9	1.1	1.0	1.0	1.0	1.17
Average Annual Outflow												
Volume	AF/yr	190,293	245,336	189,582	190,843	67,001	257,844	395,639	595,822	148,717	61,494	1,689,088
Flow-weighted Mean TP Concentration												
Upper Conf. Limit for Settling Rate	ppb	20.0 (10)	21.3 (4)	14.2 (4)	15.0 (30)	15.0 (35)	15.0 (30)	-	17.1 (19)	21.7(6)	13.0 (11)	20.1
Mean Estimate of Settling Rate	ppb	26.7 (1)	27.3	17.5 (1)	15.7 (17)	15.0 (31)	15.7 (17)	80.0	20.6 (12)	32.0	13.0 (7)	21.9
Lower Conf. Limit for Settling Rate	ppb	35.2	34.8	21.8	19.1 (6)	15.8 (18)	19.1 (6)	-	24.7 (7)	46.5	16.9 (1)	30.0
Geometric Mean TP Concentration												
Upper Conf. Limit for Settling Rate	ppb	17.9	20.2	13.5	15.0	15.0	15.0	-	15.0	20.2	13.0	-
Mean Estimate of Settling Rate	ppb	24.2	26.0	16.7	15.0	15.0	15.5	94.2	16.8	30.2	13.0	-
Lower Conf. Limit for Settling Rate	ppb	32.3	33.3	21.0	17.8	15.0	17.1	-	20.2	44.3	16.3	-
TP Load (Using Mean TP Conc.)	kg/yr	6,269	8,270	4,084	3,704	1,240	4,944	39,054	15,120	5,870	986	45,543
Receiving Water	WCA	1	1	2A	2A	2A	2A	EAA/STA-3/4	2A & 3A	Rot. & 3A	3A	
Diversion Volumes and Loads (See Note 4)												
Volume	AF/yr	24,373	0	0	0	0	0	0	82,358	0	0	106,731
TP Load	kg/yr	2,892	0	0	0	0	0	0	10,300	0	0	13,192
TP Concentration	ppb	96	-	-	-	-	-	-	101	-	-	100

Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value.
There is associated uncertainty in these predictions and actual performance will vary.
2. Outflow values highlighted in yellow had one or more years below the low end of the calibration data set (enumerated by the number in parentheses).
For all areas except STA-5 and STA-6, a total of 35 water years (WY66-00) were simulated; for STA-5 and STA-6 a total of 13 water years (WY95-07) were simulated.
The lowest sustainable STA outflow phosphorus concentration is 19 ppb (STA-3/4), with a standard deviation of 5 ppb.
3. Outflows shown from EAASR are outflows to STA-3/4; total outflows, including irrigation releases, were 546,691 AF/yr and 52,201 kg/yr at 77 ppb.
4. Diversion around STA-1E is directed to C-51E. Diversion around STA-3/4 is for downstream water supply users. While the SFWMM simulated small diversion volumes of EAA runoff, for the purpose of estimating phosphorus removal performance, these were simulated by DMSTA as being captured in the STAs.
Diversions may occur based on the daily hydraulic and treatment capacity of the treatment areas.

Table 10-2: Estimated Allocation of Discharges to Receiving Waters.

Parameter	Unit	WCA-1	WCA-2A	WCA-3A	Other	Total
Volume	AF/yr	435,629	582,678	678,781	98,732	1,795,819
TP Load (at mean settling rate)	kg/yr	14,539	12,460	25,909	5,827	58,735
TP Concentration	ppb	27	17	31	48	27

"Other" includes discharges to C-51 East and Rotenberger, assumed to receive 50% of STA-5 discharges.

11. References

ADA Engineering, Inc. and Burns and McDonnell Engineering Inc. 2005. Everglades Agricultural Area Regional Feasibility Study, prepared for SFWMD. October 2005.

Black and Veatch 2006. EAA Storage Reservoir A1 Basis of Design Report. Prepared for the South Florida Water Management District. January 2006.

Brown and Caldwell 2007. Compartment B Build-out Basis of Design Report, prepared for the South Florida Water Management District. July 2007.

Brown and Caldwell 2007. Compartment B Build-out Preliminary Design Report Stormwater Treatment Area, prepared for the South Florida Water Management District. Oct. 2007.

Burns & McDonnell, 2003. Final Report, Everglades Protection Area Tributary Basins, Long-Term Plan for Achieving Water Quality Goals; prepared for the South Florida Water Management District, October 2003.

Goforth G. 2007a. Updated Flow and Phosphorus Data Sets for the ECP Basins Covering the Period May 1, 1994 – April 30, 2007. Prepared for the U.S. Army Corps of Engineers and South Florida Water Management District. August 2007.

Goforth G. 2007b. Updated STA Inflow Data Sets for the 2010 Period. Prepared for the U.S. Army Corps of Engineers and South Florida Water Management District. October 2007.

Pietro, K., R. Bearzotti, M. Chimney, G. Germain and N. Iricanin. 2007. Draft – STA Performance, Compliance and Optimization; Chapter 5 in the SFER. August 2007.

URS Corporation 2007. Graphic presented at 8/23/07 Long-Term Plan Quarterly Meeting.

Walker, W. and R. Kadlec 2005. Dynamic Model for Stormwater Treatment Areas, prepared for the U. S. Department of Interior and the U. S. Army Corps of Engineers.

Appendix A. 2010A8 Simulation Model Assumptions

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
Regional Input Data				
Climate	• The climatic period of record is from 1965 to 2000. • Rainfall estimates have been revised and updated for 1965-2000. • Revised evapotranspiration methods have been used for 1965-2000.	• Same as Base	• Same as Base	• Same as Base
Topography	Updated November 2001 and September 2003 using latest available information (in NGVD 29 datum). Nov 2001 update (Documented in November 2001 SFWMD memorandum from M. Hinton to K. Tarboton) includes: • USGS High Accuracy Elevation data from helicopter surveys collected 1999-2000 for Everglades National Park and Water Conservation Area (WCA) 3 south of Alligator Alley • USGS Lidar data (May 1999) for WCA-3A north of Alligator Alley • Lindahl, Browning, Ferrari & Helstrom 1999 survey for Rotenberger Wildlife Management	• Same as Base	• Same as Base	• Same as Base

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
	Area. • Stormwater Treatment Area surveys from 1990s • Aerometric Corp. 1986 survey of the 8-1/2 square mile area • Includes estimate of Everglades Agricultural Area subsidence • Other data as in SFWMM v3.7 • FWC survey 1992 for the Holey Land Wildlife Management Area. September 2003 update includes: • Reverting to FWC 1992 survey data for Rotenberger Wildlife Management Area. • DHI gridded data from Kimley –Horn contracted survey of EAA, 2002-2003. Regridded to 2x2 scale for EAA outside of STAs and WMAs.			
Sea Level	• Sea level data from six long-term NOAA stations were used to generate a historic record to use as sea level boundary conditions for the 1965 to 2000 evaluation period.	• Same as Base	• Same as Base	• Same as Base
Land Use	• The land use coverage is intermediate between 2000B2 and 2050B2	• Same as Base	• Same as Base	• Same as Base
Natural Area Land Cover	Vegetation classes and their spatial distribution in the natural areas comes from the following data:	• Same as Base	• Same as Base	• Same as Base

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
(Vegetation)	• Walsh 1995 aerial photography in Everglades National Park • Rutchey 1995 classification in WCA-3B, WCA-3A north of Alligator Alley and the Miami Canal, WCA-2A & 2B • Richardson 1990 data for Loxahatchee National Wildlife Refuge • FLUCCS 1995 for Big Cypress National Preserve, Holey Land & Rotenberger Wildlife Management Areas & WCA-3A south of Alligator Alley and Miami Canal. (Documented in August 2003 SFWMD memorandum from J. Barnes and K. Tarboton to J. Obeysekera).			
Lake Okeechobee Service Area				
LOSA Basins	• Southern Indian Prairie Basin, S-4, North Lake Shore and Northeast Lake Shore demands and runoff based on AFSIRS (Agricultural Field-Scale Irrigation Requirement Simulation) modeling using 2010 LU projections.	• Same as Base	• Same as Base	• Same as Base
Lake Okeechobee	• Lake Okeechobee Regulation Schedule WSE according to WSE decision trees, with pulse releases in Zone D modeled as Level III pulse in upper third of the zone, Level II pulse in middle third of the zone, and Level I pulse in the lower	Same as Base, plus: • Lowered EAA Storage Injection Line as compares to	• Same as Base	Same as Base, plus: • Lowered EAA Storage Injection Line

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
	third of the zone, when the decision tree calls for regulatory releases to the estuaries in that zone. • WSE thresholds derived from the Class Limit Adjustment (CLA) WSE modification: Increase the frequency of Pulse Releases in Zone D of WSE. • Modified WSE thresholds for zone D1 to improve utilization of EAA reservoir. • Lake Okeechobee Supply Side Management guidelines are used to implement Lake Okeechobee Service Area water restriction cutbacks as per rule 40E-21 and 40E-22. The Lake Okeechobee service area water shortage triggering line is the line starting at 13.0 ft on October 1 and ending at 10.5 ft on May 31, with additional breakpoints defined in between. • Emergency flood control backpumping to Lake Okeechobee from the Everglades Agricultural Area. • Kissimmee River Restoration and Headwaters Revitalization Project are complete. • Lake Okeechobee environmental releases to supplement reservoir deliveries to Caloosahatchee and St. Lucie Estuaries. • Environmental deliveries to WCA-3A according to Rainfall Driven Operations as means of operating the EAA Reservoirs.	Base, by an average of 0.28 ft		as compares to Base, by an average of 0.28 ft

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
	• Lake Okeechobee BMP makeup water deliveries to WCAs are not made. • Adaptive protocols are included. • Flood control releases South through STA-3/4 and WCAs are not performed in this simulation.			

Acceler8 Projects	Acceler8 Projects On Line by 2010 – See A8 Website.
	• C44 Reservoirs: 9315 acres, depth 5 .ft.
	• C43 Reservoirs: 11000 acres, depth 15 ft.
	• EAA Reservoirs- A-1 Reservoir
	A-1 Reservoir simulated as two interconnected compartments.
	Compartment 1: irrigation, 9600 acres, depth 12 ft.
	Compartment 2: environment 6400 acres, depth 12 ft.
	• WPA's
	  • Site 1 Impoundment: 1660 acres; depth 8 ft.
	  • C-9 Impoundment: 1739 acres; depth 4 ft.
	  • C-11 Impoundment: 1730 acres; depth 4 ft.
	  • Acme Basin B discharge to C51W and then to STA1E
	  • WCA-3A/3B Seepage Management Area
		Same as Base, plus:
		• Decreased inflow capacity to A-1 Res from NNR Basin from 2775 cfs to 800 cfs
			• Same as Base	Same as Base, plus:
				• Decreased inflow capacity to A-1 Res from NNR Basin from 2775 cfs to 800 cfs

Caloosahatchee River Basin	• Caloosahatchee River Basin irrigation demands and runoff were estimated using the AFSIRS method based on projected 2010 land use. • Public water supply daily intake from the river	• Same as Base	• Same as Base	• Same as Base

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
	is included in the analysis. • C43 reservoir supplements basin irrigation needs and estuarine environmental needs.			
St. Lucie Canal Basin	• St. Lucie Canal Basin demands estimated using the AFSIRS method based on projected 2010 land use. • Basin demands include the Florida Power & Light reservoir at Indiantown. • C44 reservoir supplements basin irrigation needs and estuarine environmental needs.	• Same as Base	• Same as Base	• Same as Base
Seminole Brighton Reservation	• Brighton reservation demands were estimated using AFSIRS method based on existing planted acreage in a manner consistent with that applied to other basins not in the distributed mesh of the SFWMM. • The 2 in 10 demand set forth in the Seminole Compact Work plan equals 2,262 MGM (million gallons/month). AFSIRS modeled 2 in 10 demands equaled 2,383 MGM. • While estimated demands, and therefore deliveries, for every month of simulation do not equate to monthly entitlement quantities as per Table 7, Agreement 41-21 (Nov. 1992), tribal rights to these quantities are preserved. • Lake Okeechobee low stage management	• Same as Base	• Same as Base	• Same as Base

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
	applies to this agreement.			
Seminole Big Cypress Reservation	• Big Cypress Reservation irrigation demands and runoff were estimated using the AFSIRS method based on existing planted acreage in a manner consistent with that applied to other basins not in the distributed mesh of the SFWMM. • The 2 in 10 demand set forth in the Seminole Compact Work Plan equals 2,606 MGM. AFSIRS modeled 2 in 10 demands equaled 2,659 MGM. • While estimated demands, and therefore deliveries, for every month of simulation do not equate to monthly entitlement quantities as per the District's Final Order and Tribe's Resolution establishing the Big Cypress Reservation entitlement, tribal rights to these quantities are preserved. • Lake Okeechobee low stage management applies to this agreement.	• Same as Base	• Same as Base	• Same as Base
Seminole Hollywood Reservation	• Hollywood Reservation demands are set forth under VI. C of the Tribal Rights Compact. • Tribal sources of water supply include various bulk sale agreements with municipal service suppliers.	• Same as Base	• Same as Base	• Same as Base

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
Everglades Agricultural Area	• Everglades Agricultural Area irrigation demands are simulated using climatic data for the 36 year period of record and a soil moisture accounting algorithm, with parameters calibrated to match historical regional supplemental deliveries from Lake Okeechobee. • SFWMM EAA runoff and irrigation demand response to rainfall was calibrated for 1984-95 and verified for 1979-1983/1996-2000. No runoff reduction adjustment was necessary to account for Best Management Practices (BMPs). • Minimum elevation at which farmers can pump water out of the major canals for supplemental irrigation is 8.0 ft. • EAA Reservoirs A1 16,000 acres o Compartment 1: 9600 acres o Compartment 2: 6400 acres • Rain Driven Operation applied to operate the EAA reservoirs for the Everglades Restoration Project	Same as Base, plus: • Reduced inflow capacity to EAA A-1 reservoir from North New River Basin from 2775 cfs to 800 cfs	• Same as Base	Same as Base, plus: • Reduced inflow capacity to EAA A-1 reservoir from North New River Basin from 2775 cfs to 800 cfs
Everglades Construction Project Stormwater	• STA-1E: 5132 acres total treatment area • STA-1W: 6670 acres total treatment area • STA-2 : 6430 acres total treatment area	Same as Base, plus: • Buildout STA B: 6,722 acres total treatment	Same as Base, plus: • Buildout STA B: 6,722 acres total treatment	Same as Base, plus: • Buildout STA B: 6,722 acres

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
Treatment Areas	• STA 2-Cell 4: 1902 acres total treatment area • STA-3/4: 16543 acres total treatment area • STA-5: 6095 acres total treatment • STA-6: 2257 acres total treatment • Operation of STAs assumes maintenance of a 6" minimum depth.	area. Source: North New River runoff and STA-2 flow • Buildout STA C: 6,230 acres total treatment areas. Source 139 Basin and Annex	area. Source: North New River runoff • Buildout STA C: 6,230 acres total treatment areas. Source 139 Basin and Annex	total treatment area. Source: North New River runoff • Buildout STA C: 6,230 acres total treatment areas. Source 139 Basin and Annex
Holey Land Wildlife WMA	• As per Memorandum of Agreement between the FWC and the District.	• Same as Base	• Same as Base	• Same as Base
Rotenberger Wildlife WMA	• Interim Operational Schedule as defined in the Operation Plan for Rotenberger (SFWMD Jan 2002).	• Same as Base	• Same as Base	• Same as Base
Water Conservation Areas				
Water Conservation Area 1 (ARM Loxahatchee National Wildlife Refuge)	• Current C&SF Regulation Schedule. Includes regulatory releases to tide through LEC canals. • No net outflow to maintain minimum stages in the LEC Service Area canals (salinity control), if water levels are less than minimum operating criteria of 14 ft. The bottom floor of the schedule (Zone C) is the area below 14 ft. Any water supply releases below the floor will be matched by an equivalent volume of inflow from Lake Okeechobee.	• Same as Base	• Same as Base	• Same as Base

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
Water Conservation Area 2 A&B	• Current C&SF regulation schedule. Includes regulatory releases to tide through LEC canals. • No net outflow to maintain minimum stages in the LEC Service Area canals (salinity control), if water levels in WCA-2A are less than minimum operating criteria of 10.5 ft. Any water supply releases below the floor will be matched by an equivalent volume of inflow from Lake Okeechobee.	• Same as Base	• Same as Base	• Same as Base
Water Conservation Area 3 A&B	• Rainfall driven operational criteria for determining timing of deliveries to and discharges from WCA-3A and WCA-3B. • No net outflow to maintain minimum stages in the LEC Service Area canals (salinity control), if water levels are less than minimum operating criteria of 7.5 ft in WCA-3A. Any water supply releases below the floor will be matched by an equivalent volume of inflow from Lake Okeechobee. • Structural and operational modifications for L-67 canal conveyance and S-355 structures as in the federally authorized Modified Water Deliver Project. •	• Same as Base	• Same as Base	• Same as Base
Lower East Coast Service Areas				

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
Public Water Supply and Irrigation	• 2010 projections based upon permitted allocation to utilities by 2005, with 2010 well field distribution and inclusion of utility ASR. • Irrigation demands are based upon existing land use (updated through 2010) and calculated using AFSIRS, reduced to account for landscape and golf course areas irrigated using reuse water and landscape areas irrigated using public water supply.	• Same as Base	• Same as Base	• Same as Base
Other Natural Areas	• For the Northwest Fork of the Loxahatchee River, the District operates the G-92 structure and associated structures to provide approximately 50 cfs over Lainhart Dam to the Northwest Fork, when sufficient water is available in C-18 Canal. • Flows to Pond Apple Slough through S-13A are adjusted in the model to approximate measured flows at the structure. • Flows to Biscayne Bay are simulated through Snake Creek, North Bay, the Miami River, Central Bay and South Bay.	• Same as Base	• Same as Base	• Same as Base

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
Coastal Basin Canal Facilities and Operations	• C-4 Flood Mitigation Project • C-11 Water Quality Treatment Critical Project (S-381 and S-9A) • Releases from WCA-3A to ENP and the South Dade Conveyance System (SDCS) will follow the Interim Operational Plan (2002 IOP EIS): o Decreased S-12 flood control discharges & increased flood control discharges to SDCS o Structures S-343A, S-343B, S-344 and S-12A are closed Nov. 1 to July 15 o Structure S-12B is closed Jan. 1 to July 15. o Structure S-12C is closed Feb. 1 to July 15. South Dade Conveyance System operations will follow IOP for protection of the Cape Sable	• Same as Base	• Same as Base	• Same as Base
Lower East Coast	• C-4 Impoundment – 843.5 acres	• Same as Base	• Same as Base	• Same as Base
Upper East Coast Operational CERP	• L-8 Reservoir: 870 acres, depth 44 ft.	• Same as Base	• Same as Base	• Same as Base
Western Basins and Big Cypress National Preserve				
Western Basins	• Estimated and updated historical inflows from western basins at two locations: G-136 and G-406. The G-406 location represents potential inflow from the C-139 Basin into STA 5. Data for the period 1978 - 2000 is the same as the	• Same as Base	• Same as Base	• Same as Base

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
	data used for the C-139 Basin Rule development. (Documented in June 2002 SFWMD memorandum from L. Cadavid and L. Brion to J. Obeysekera).			
Big Cypress National Preserve	• Tamiami Trail culverts are not modeled in SFWMM due to the coarse (2x2 mile) model resolution.	• Same as Base	• Same as Base	• Same as Base
Everglades National Park and Florida Bay				
Everglades National Park & Lower East Coast	• Water deliveries to Everglades National Park are based upon Everglades Rain-driven operations. (WCA3A, 3B, ENP) • L29 constraint set to 9.2' per Tamiami Trail GRR Nov 2001 • 8.5 SMA as per the federally authorized Alternative 6D of the 8.5 SMA project. • Northern C111 project (2002 IOP EIS) • Southern C111 project modeled per C-111 Project 1994 GRR • IOP (partial implementation): o South Dade Structures modeled per 2002 IOP EIS o S12 and S343's operation under IOP schedules 2002 IOP EIS	• Same as Base	• Same as Base	• Same as Base
Region-wide Water Management and Related Operations				

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
Water Shortage Rules	• The existing condition reflects the existing water shortage policies in 2005 as reflected in South Florida Water Management District Chapters 40E-21 and 40E-22, FAC	• Same as Base	• Same as Base	• Same as Base

Appendix B. DMSTA Output

STA-1E

DMSTA2- Inputs & Outputs Project: STA 1E EIS Model Release: 07/05/07 Current Date: 11/11/2007

Input Variable	Units	Value	Case Description:
Design Case Name	-	All EIS AltB	All cells
Input Series Name		TS_All_EIS_AltB	
Starting Date for Simulation	-	05/01/65	East Distribution Cell modeled as two cells in parallel; minimal treatment in EDC (K=0.01 m/yr)
Ending Date for Simulation	-	04/30/00	West Distribution Cell modeled as two cells in parallel; minimal treatment in WDC (K=0.01 m/yr)
Starting Date for Output	-	05/01/65	
Integration Steps Per Day	-	4	
Number of Iterations	-	0	
Output Averaging Interval	days	365	
Inflow Conc Scale Factor	-	1	
Rainfall P Conc	ppb	10	
Atmospheric P Load (Dry)	mg/m2-yr	20	

Simulation Type: Uncertainty Analysis

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	27	35	20
GM Outflow C (ppb)	24	32	18
Load Reduction %	85%	80%	89%
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	3	0.0%
Warning/Error Messages	4	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	EDCE	1	2	EDCW	3	4N	4S	WDCW	7	WDCE	5	6
Vegetation Type	-->	none	EMG_3	SAV_3	none	EMG_3	SAV_3	SAV_3	none	EMG_3	none	EMG_3	SAV_3
Inflow Fraction	-	0.215903431			0.386989363				0.167819		0.229288		
Downstream Cell Number	-	2	3		5	6	7		9	12	11.00	12.00	
Surface Area	km2	0.95	2.25	2.23	0.95	2.38	2.61	3.04	1.17	1.69	1.17	2.31	4.25
Mean Width of Flow Path	km	0.66	1.55	1.55	0.66	1.55	1.55	1.55	0.75	1.61	0.75	1.18	0.75
Number of Tanks in Series	-	0.5	3.0	3.0	0.5	3.0	3.0	3.0	0.5	3.0	0.5	3.0	3.0
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	38.1	38.1	38.1	91.44	38.1	38.1	38.1	99.06	38.1	38.1	38.1	38.1
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4	4	4	4	4	4	4	4	4	4
Outflow Coefficient - Intercept	-	1	1	1	1	1	1	1	1	1	1	1	1
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm									0.0054			0.0057
Inflow Seepage Control Elev	cm									69			94
Inflow Seepage Conc	ppb									20			20
Outflow Seepage Rate	(cm/d) / cm	0.0095	0.0042	0.0042	0.0095			0.0054	0.01		0.01		
Outflow Seepage Control Elev	cm	-137	-137	-99	-87			-38	-15		-76		
Max Outflow Seepage Conc	ppb	20	20	20	20			20	20		20		
Seepage Recycle to Cell Number	-	1	1	1	4			7					
Seepage Recycle Fraction	-	1	1	1	1			1					
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	30	30	30	30	30	30	30	30	30	30	30	30
Initial P Storage Per Unit Area	mg/m2	500	500	500	500	500	500	500	500	500	500	500	500
Initial Water Column Depth	cm	50	50	50	50	50	50	50	50	50	50	50	50
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3	3	3	3	3	3	3	3	3	3
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22	22	22	22	22	22	22	22	22	22
C2 = Conc at Half-Max Uptake	ppb	300	300	300	300	300	300	300	300	300	300	300	300
K = Net Settling Rate at Steady State	m/yr	0.0	16.8	52.5	0.0	16.8	52.5	52.5	0.0	16.8	0.0	16.8	52.5
Z1 = Saturated Uptake Depth	cm	40	40	40	40	40	40	40	40	40	40	40	40
Z2 = Lower Penalty Depth	cm	100	100	100	100	100	100	100	100	100	100	100	100
Z3 = Upper Penalty Depth	cm	200	200	200	200	200	200	200	200	200	200	200	200

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	16.20	16.91	17.63	18.06	18.77	19.49	20.20	20.60	21.34	21.74	22.46	23.17	23.17
Run Date	-	11/11/07	11/11/07	11/11/07	11/11/07	11/11/07	11/11/07	11/11/07	11/11/07	11/11/07	11/11/07	11/11/07	11/11/07	11/11/07
Starting Date for Simulation	-	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65
Starting Date for Output	-	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65
Ending Date	-	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00
Output Duration	days	12784	12784	12784	12784	12784	12784	12784	12784	12784	12784	12784	12784	12784
Cell Label		EDCE	1	2	EDCW	3	4N	4S	WDCW	7	WDCE	5	6	Total
Downstream Cell Label		1	2	Outflow	3	4N	4S	Outflow	7	6	5	6	Outflow	-
Network Simulation Name	-	none	none	none	none	none	none	none	none	none	none	none	none	none
Simulation Type	-	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta
Surface Area	km2	0.95	2.25	2.23	0.95	2.38	2.61	3.04	1.17	1.69	1.17	2.31	4.25	25.02
Mean Rainfall	cm/yr	142.94	142.94	142.94	142.94	142.94	142.94	142.94	142.94	142.94	142.94	142.94	142.94	142.9
Mean ET	cm/yr	128.86	128.86	128.50	128.86	128.86	128.86	128.86	128.86	128.86	128.57	128.66	128.86	128.8
Cell Inflow Volume	hm3/yr	51.5	63.3	57.0	92.4	92.5	92.8	93.2	40.1	35.4	54.7	49.2	85.9	238.6
Cell Inflow Load	kg/yr	9065.8	8685.2	5388.4	16249.7	15500.2	12030.7	5153.7	7046.8	6245.0	9627.8	8690.4	9534.8	41990
Cell Inflow Conc	ppb	176	137	94	176	168	130	55	176	176	176	177	111	175.9
Treated Outflow Volume	hm3/yr	63.3	57.0	52.2	92.5	92.8	93.2	93.6	35.4	36.4	49.2	49.5	88.9	234.7
Treated Outflow Load	kg/yr	8685.2	5388.4	1554.7	15500.2	12030.7	5153.7	2078.9	6245.0	3988.8	8690.4	5546.0	2636	6269
Treated FWM Outflow Conc	ppb	137	94	30	168	130	55	22	176	110	177	112	30	26.7
Upper Confidence Limit	ppb	137.3	102.9	38.1	167.6	137.4	67.5	29.9	176.4	121.4	176.7	124.0	39.1	35.2
Lower Confidence Limit	ppb	137.2	84.8	22.7	167.6	120.3	43.9	16.4	176.4	96.5	176.7	98.5	22.1	20.0
Total Outflow Volume + Bypass	hm3/yr	63.3	57.0	52.2	92.5	92.8	93.2	93.6	35.4	36.4	49.2	49.5	88.9	234.7
Total Outflow Load + Bypass	kg/yr	8685.2	5388.4	1554.7	15500.2	12030.7	5153.7	2078.9	6245.0	3988.8	8690.4	5546.0	2635.6	6269.2
Total FWM Outflow Conc	ppb	137.3	94.5	29.8	167.6	129.6	55.3	22.2	176.4	109.7	176.7	112.0	29.7	26.7
Bypass Load	kg/yr	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Bypass Load	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.0
Maximum Inflow	hm3/d	0.25	0.29	0.27	0.45	0.45	0.45	0.46	0.19	0.18	0.27	0.25	0.44	1.16
Maximum Outflow	hm3/d	0.29	0.27	0.26	0.45	0.45	0.46	0.47	0.18	0.19	0.25	0.26	0.46	1.18
Surface Load Reduction	kg/yr	745	3297	3834	869	3469	6877	3179	802	2256	937	3144	6899	35721
Load Trapped in Sediments	kg/yr	0	2694	3657	0	3549	6965	3133	0	2328	0	3223	7092	32642
Overall Load Reduction	%	4%	38%	71%	5%	22%	57%	60%	11%	36%	10%	36%	72%	85%
Lower Confidence Limit	%	0.0	0.3	0.7	0.0	0.2	0.5	0.6	0.1	0.3	0.1	0.3	0.7	80%
Upper Confidence Limit	%	0.0	0.4	0.8	0.0	0.3	0.6	0.6	0.1	0.4	0.1	0.4	0.8	89%
Daily Geometric Mean	ppb	102.7	88.5	24.0	141.9	122.9	46.8	16.5	166.9	102.9	163.3	109.1	22.2	#N/A
Outflow Geo Mean - Composites	ppb	135.2	92.0	27.2	166.5	127.0	51.3	20.0	175.7	106.4	176.1	109.0	26.8	24.2
Upper Confidence Limit	ppb	135.2	100.6	35.2	166.5	135.1	63.6	27.3	175.7	118.6	176.1	121.4	35.8	32.3
Lower Confidence Limit	ppb	135.1	82.0	20.6	166.5	117.3	40.0	14.6	175.7	92.8	176.1	95.0	19.7	17.9
Frequency Outflow Conc > 10 ppb	%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Frequency Outflow Conc > 20 ppb	%	100%	100%	81%	100%	100%	100%	50%	100%	100%	100%	100%	83%	97%
Frequency Outflow Conc > 50 ppb	%	100%	100%	0%	100%	100%	53%	0%	100%	100%	100%	100%	0%	75%
Freq Outflow Volume > 10 ppb	%	100%	100%	100%	100%	100%	100%	96%	100%	100%	100%	100%	100%	100%
95th Percentile Outflow Conc	ppb	153.60	109.64	40.34	181.56	146.66	75.25	30.99	193.26	125.87	192.73	127.93	41.00	37
Mean Biomass P Storage	mg/m2	737	3766	1647	938	4679	2683	1037	1002	4330	814	4386	1684	2470
Storage Increase / Net Removal	%	2066%	0%	0%	2690%	0%	0%	0%	2894%	0%	2806%	0%	0%	0%
Net Storage Turnover Rate	1/yr	0.0	11.1	34.8	0.0	11.1	34.8	34.7	0.0	11.1	0.0	11.1	34.7	18.5
Unit Area P Load	mg/m2-yr	9533	3858	2411	17087	6500	4607	1693	6023	3691	8229	3759	2245	1678
Unit Area P Removal	mg/m2-yr	0	1197	1636	0	1488	2667	1029	0	1376	0	1394	1670	1305
Mean Water Load	cm/d	14.8	7.7	7.0	26.6	10.6	9.7	8.4	9.4	5.7	12.8	5.8	5.5	2.6
Max Water Load	cm/d	26.3	12.7	12.1	47.1	18.9	17.4	15.1	16.6	10.8	22.7	10.9	10.4	4.6
Mean Depth	cm	68	53	51	94	59	59	58	98	47	58	53	68	61
Minimum Depth	cm	59.9	46.5	43.3	92.8	50.5	50.1	49.8	84.8	42.1	43.2	41.8	57.0	52
Maximum Depth	cm	76.1	60.1	59.5	97.9	67.9	68.1	69.0	100.7	54.2	69.4	62.6	82.1	71
Frequency Depth < 10 cm	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.0%
Flow/Width	m2/day	214	112	101	383	163	164	165	146	60	200	114	314	178.5
HRT Days	days	4.6	6.9	7.3	3.6	5.5	6.0	7.0	10.5	8.2	4.5	9.1	12.3	23.5
Mean Velocity	cm/sec	0.37	0.24	0.23	0.47	0.32	0.32	0.33	0.17	0.15	0.40	0.25	0.53	0.33
Seepage Outflow / Total Outflow	%	0%	0%	0%	0%	0%	0%	0%	12%	0%	10%	0%	0%	4%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
95th Percentile Outflow Volume	hm3/d	0.2	0.2	0.2	0.4	0.4	0.4	0.4	0.2	0.2	0.2	0.2	0.4	1.0
95th Percentile Outflow Load	kg/d	35.6	23.9	8.3	64.1	53.2	26.9	11.5	26.6	18.5	36.6	25.5	14.6	34.4
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Range Check - Mean Depth	-			0.82			0.94	0.94						3
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-			0.62										1
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-													0
Water Balance Error	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%
Mass Balance Error	%	0.00%	0.01%	0.01%	0.00%	0.01%	0.01%	0.01%	0.00%	0.01%	0.00%	0.01%	0.01%	0.02%
Warning or Error Messages		Cell# 3 Depth out of calib. range for SAV_3: 51 vs. 62 - 87 cm Cell# 3 Flow/Width out of calib. range for SAV_3: 101 vs. 162 - 374 m2/day							Cell# 6 Depth out of calib. range for SAV_3: 59 vs. 62 - 87 cm Cell# 7 Depth out of calib. range for SAV_3: 58 vs. 62 - 87 cm					4

STA-1W

DMSTA2- Inputs & Outputs Project: STA 1W EIS Model Release: 07/05/07 Current Date: 11/11/2007

Input Variable	Units	Value
Design Case Name	-	EIS AltB
Input Series Name		TS_EIS_AltB
Starting Date for Simulation	-	05/01/65
Ending Date for Simulation	-	04/30/00
Starting Date for Output	-	05/01/65
Integration Steps Per Day	-	4
Number of Iterations	-	0
Output Averaging Interval	days	365
Inflow Conc Scale Factor	-	1
Rainfall P Conc	ppb	10
Atmospheric P Load (Dry)	mg/m2-yr	20

Case Description: STA-1W with Long Term Plan Enhancements; Include all S-5A Basin and EBWCD Runoff; Balanced loading rate among STA-1E and STA-1W

Simulation Type: Uncertainty Analysis

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	27	35	21
GM Outflow C (ppb)	26	33	20
Load Reduction %	85%	81%	88%
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	-0.2%	0.4%
Iterations & Convergence	3	0.1%
Warning/Error Messages	7	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	1A	1B	3	2A	2B	4	5A	5B				
Vegetation Type	-->	EMG_3	SAV_3	SAV_3	EMG_3	SAV_3	SAV_3	EMG_3	SAV_3				
Inflow Fraction	-	0.377211394			0.194752624			0.428036					
Downstream Cell Number	-	2	3		5	6		8					
Surface Area	km2	3.02	3.02	4.15	1.91	1.90	1.45	2.28	9.28				
Mean Width of Flow Path	km	1.10	1.10	1.10	2.40	2.00	1.30	1.78	2.34				
Number of Tanks in Series	-	2.0	2.0	2.0	2.0	2.0	2.0	2.0	3.0				
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	38.1	38.1	38.1	38.1	38.1	38.1	38.1	38.1				
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4	4	4	4	4	4				
Outflow Coefficient - Intercept	-	1	1	1	1	1	1	1	1				
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm	0.0035	0.0018	0.0023									
Inflow Seepage Control Elev	cm	172	172	185									
Inflow Seepage Conc	ppb	20	20	20									
Outflow Seepage Rate	(cm/d) / cm			0.0014	0.0016	0.0016	0.0021	0.0156	0.0049				
Outflow Seepage Control Elev	cm			-60	-46	-46	-46	-46	-46				
Max Outflow Seepage Conc	ppb			20	20	20	20	20	20				
Seepage Recycle to Cell Number	-							1	1				
Seepage Recycle Fraction	-							0.91	0.8				
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	30	30	30	30	30	30	30	30				
Initial P Storage Per Unit Area	mg/m2	500	500	500	500	500	500	500	500				
Initial Water Column Depth	cm	200	200	200	200	200	200	200	200				
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3	3	3	3	3	3				
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22	22	22	22	22	22				
C2 = Conc at Half-Max Uptake	ppb	300	300	300	300	300	300	300	300				
K = Net Settling Rate at Steady State	m/yr	16.8	52.5	52.5	16.8	52.5	52.5	16.8	52.5				
Z1 = Saturated Uptake Depth	cm	40	40	40	40	40	40	40	40				
Z2 = Lower Penalty Depth	cm	100	100	100	100	100	100	100	100				
Z3 = Upper Penalty Depth	cm	200	200	200	200	200	200	200	200				

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	31.54	32.91	34.31	36.66	37.83	39.08	40.63	42.06					42.06
Run Date	-	11/11/07	11/11/07	11/11/07	11/11/07	11/11/07	11/11/07	11/11/07	11/11/07					11/11/07
Starting Date for Simulation	-	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65					05/01/65
Starting Date for Output	-	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65					05/01/65
Ending Date	-	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00					04/30/00
Output Duration	days	12784	12784	12784	12784	12784	12784	12784	12784					12784
Cell Label		1A	1B	3	2A	2B	4	5A	5B					Total
Downstream Cell Label		1B	3	Outflow	2B	4	Outflow	5B	Outflow					-
Network Simulation Name	-	none	none	none	none	none	none	none	none					none
Simulation Type	-	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta					Uncerta
Surface Area	km2	3.02	3.02	4.15	1.91	1.90	1.45	2.28	9.28					27.00
Mean Rainfall	cm/yr	134.86	134.86	134.86	134.86	134.86	134.86	134.86	134.86					134.9
Mean ET	cm/yr	129.91	129.91	129.91	129.80	129.72	129.59	123.03	127.26					128.4
Cell Inflow Volume	hm3/yr	113.4	140.2	142.4	58.6	57.6	56.7	128.7	117.3					300.7
Cell Inflow Load	kg/yr	20585.7	17189.4	9169.6	10628.3	7726.2	3201.1	23359.4	16306.3					54573
Cell Inflow Conc	ppb	182	123	64	182	134	56	182	139					181.5
Treated Outflow Volume	hm3/yr	140.2	142.4	143.9	57.6	56.7	55.8	117.3	103.0					302.6
Treated Outflow Load	kg/yr	17189.4	9169.6	4119.6	7726.2	3201.1	1659.3	16306.3	2490.9					8270
Treated FWM Outflow Conc	ppb	123	64	29	134	56	30	139	24					27.3
Upper Confidence Limit	ppb	128.6	74.9	36.8	143.2	68.5	38.6	145.3	30.0					34.8
Lower Confidence Limit	ppb	115.4	53.9	21.9	123.3	45.4	22.9	131.9	19.6					21.3
Total Outflow Volume + Bypass	hm3/yr	140.2	142.4	143.9	57.6	56.7	55.8	117.3	103.0					302.6
Total Outflow Load + Bypass	kg/yr	17189.4	9169.6	4119.6	7726.2	3201.1	1659.3	16306.3	2490.9					8269.8
Total FWM Outflow Conc	ppb	122.6	64.4	28.6	134.0	56.4	29.8	139.0	24.2					27.3
Bypass Load	kg/yr	0	0	0	0	0	0	0	0					0.0
Bypass Load	%	0%	0%	0%	0%	0%	0%	0%	0%					0.0
Maximum Inflow	hm3/d	0.49	0.58	0.59	0.25	0.25	0.26	0.55	0.52					1.30
Maximum Outflow	hm3/d	0.58	0.59	0.61	0.25	0.26	0.26	0.52	0.50					1.36
Surface Load Reduction	kg/yr	3837	8020	5050	2902	4525	1542	7053	13815					46304
Load Trapped in Sediments	kg/yr	4015	8160	5185	2768	4492	1549	2895	12697					41762
Overall Load Reduction	%	16%	47%	55%	27%	59%	48%	30%	85%					85%
Lower Confidence Limit	%	0.1	0.4	0.5	0.2	0.5	0.4	0.3	0.8					81%
Upper Confidence Limit	%	0.2	0.5	0.6	0.3	0.6	0.5	0.3	0.9					88%
Daily Geometric Mean	ppb	109.7	54.7	22.4	140.2	50.4	23.0	158.5	19.6					#N/A
Outflow Geo Mean - Composites	ppb	120.9	62.1	27.3	132.0	53.7	28.1	136.1	22.9					26.0
Upper Confidence Limit	ppb	127.1	72.7	35.3	141.5	65.7	36.6	142.7	28.5					33.3
Lower Confidence Limit	ppb	113.5	51.6	20.7	121.0	42.9	21.6	128.7	18.5					20.2
Frequency Outflow Conc > 10 ppb	%	100%	100%	100%	100%	100%	100%	100%	100%					100%
Frequency Outflow Conc > 20 ppb	%	100%	100%	94%	100%	100%	94%	100%	75%					100%
Frequency Outflow Conc > 50 ppb	%	100%	92%	0%	100%	69%	0%	100%	0%					92%
Freq Outflow Volume > 10 ppb	%	100%	100%	100%	100%	100%	100%	100%	99%					100%
95th Percentile Outflow Conc	ppb	132.84	77.99	37.10	144.93	69.46	38.14	153.81	31.29					35
Mean Biomass P Storage	mg/m2	4186	2712	1248	4554	2358	1067	3987	1363					2312
Storage Increase / Net Removal	%	0%	0%	0%	0%	0%	0%	0%	0%					0%
Net Storage Turnover Rate	1/yr	11.1	34.9	35.0	11.2	35.0	35.1	11.2	35.1					23.4
Unit Area P Load	mg/m2-yr	6825	5699	2208	5574	4060	2209	10266	1757					2021
Unit Area P Removal	mg/m2-yr	1331	2705	1248	1452	2361	1069	1272	1368					1546
Mean Water Load	cm/d	10.3	12.7	9.4	8.4	8.3	10.7	15.5	3.5					3.0
Max Water Load	cm/d	16.2	19.2	14.3	13.2	13.4	17.7	24.4	5.7					4.8
Mean Depth	cm	67	69	70	44	45	48	46	46					55
Minimum Depth	cm	59.6	60.8	61.7	37.1	37.2	36.6	32.8	28.4					43
Maximum Depth	cm	77.1	78.7	80.1	51.3	53.6	59.1	61.1	60.1					66
Frequency Depth < 10 cm	%	0%	0%	0%	0%	0%	0%	0%	0%					0.0%
Flow/Width	m2/day	282	349	354	67	79	119	198	137					205.6
HRT Days	days	6.5	5.4	7.5	5.2	5.4	4.5	3.0	13.3					17.9
Mean Velocity	cm/sec	0.48	0.59	0.59	0.18	0.20	0.29	0.49	0.35					0.41
Seepage Outflow / Total Outflow	%	0%	0%	2%	2%	2%	2%	1%	3%					3%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					0.0
95th Percentile Outflow Volume	hm3/d	0.6	0.6	0.6	0.2	0.2	0.2	0.5	0.5					1.3
95th Percentile Outflow Load	kg/d	74.2	43.0	20.1	34.7	15.9	8.5	75.8	13.1					41.6
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A					#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A					#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A					#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A					#N/A
Range Check - Mean Depth	-					0.72	0.77		0.74					3
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-	1.34				0.49	0.74		0.85					4
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-													0
Water Balance Error	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%					0.00%
Mass Balance Error	%	0.01%	0.01%	0.01%	0.01%	0.02%	0.01%	-0.41%	-0.01%					-0.16%
Warning or Error Messages														7

Cell# 1 Flow/Width out of calib. range for EMG_3: 282 vs. 26 - 210 m2/day
Cell# 5 Depth out of calib. range for SAV_3: 45 vs. 62 - 87 cm
Cell# 5 Flow/Width out of calib. range for SAV_3: 79 vs. 162 - 374 m2/day
Cell# 6 Depth out of calib. range for SAV_3: 48 vs. 62 - 87 cm
Cell# 6 Flow/Width out of calib. range for SAV_3: 119 vs. 162 - 374 m2/day
Cell# 8 Depth out of calib. range for SAV_3: 46 vs. 62 - 87 cm
Cell# 8 Flow/Width out of calib. range for SAV_3: 137 vs. 162 - 374 m2/day

STA-2

DMSTA2- Inputs & Outputs — **Project: STA 2 EIS** — Model Release: 07/05/07 — Current Date: 11/6/2007

Input Variable	Units	Value
Design Case Name	-	EIS AltB
Input Series Name		TS_EIS_AltB
Starting Date for Simulation	-	05/01/65
Ending Date for Simulation	-	04/30/00
Starting Date for Output	-	05/01/65
Integration Steps Per Day	-	4
Number of Iterations	-	0
Output Averaging Interval	days	365
Inflow Conc Scale Factor	-	1
Rainfall P Conc	ppb	10
Atmospheric P Load (Dry)	mg/m2-yr	20
Cell Number -->		**1**
Cell Label	-	1
Vegetation Type	-->	PEW_3
Inflow Fraction	-	0.283710055
Downstream Cell Number	-	
Surface Area	km2	7.28
Mean Width of Flow Path	km	1.58
Number of Tanks in Series	-	3.0
Minimum Depth for Releases	cm	
Release 1 Series Name		
Release 2 Series Name		
Outflow Series Name		
Depth Series Name		
Outflow Control Depth	cm	52.73
Outflow Weir Depth	cm	
Outflow Coefficient - Exponent	-	4
Outflow Coefficient - Intercept	-	1
Bypass Depth	cm	
Maximum Inflow	hm3/day	
Maximum Outflow	hm3/day	
Inflow Seepage Rate	(cm/d) / cm	0.008
Inflow Seepage Control Elev	cm	76
Inflow Seepage Conc	ppb	20
Outflow Seepage Rate	(cm/d) / cm	0.004
Outflow Seepage Control Elev	cm	-61
Max Outflow Seepage Conc	ppb	20
Seepage Recycle to Cell Number	-	1
Seepage Recycle Fraction	-	1
Seepage Discharge Fraction	-	
Initial Water Column Conc	ppb	30
Initial P Storage Per Unit Area	mg/m2	500
Initial Water Column Depth	cm	200
C0 = Conc at 0 g/m2 P Storage	ppb	3
C1 = Conc at 1 g/m2 P storage	ppb	22
C2 = Conc at Half-Max Uptake	ppb	300
K = Net Settling Rate at Steady State	m/yr	34.9
Z1 = Saturated Uptake Depth	cm	40
Z2 = Lower Penalty Depth	cm	100
Z3 = Upper Penalty Depth	cm	200

Case Description:

Analysis for WY 1966-2000

Inflow time series includes allowance of 38 cfs (27,500 ac-ft/yr) seepage from WCA-2A to Supply Canal

Cells 1-3

Simulation Type: Uncertainty Analysis

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	17	22	14
GM Outflow C (ppb)	17	21	13
Load Reduction %	84%	80%	87%
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.1%	0.1%
Iterations & Convergence	2	0.4%
Warning/Error Messages	3	

Output Variables	Units	1	2	3	Overall
Execution Time	sec/yr	3.63	4.31	5.49	5.49
Run Date	-	11/06/07	11/06/07	11/06/07	11/06/07
Starting Date for Simulation	-	05/01/65	05/01/65	05/01/65	05/01/65
Starting Date for Output	-	05/01/65	05/01/65	05/01/65	05/01/65
Ending Date	-	04/30/00	04/30/00	04/30/00	04/30/00
Output Duration	days	12784	12784	12784	12784
Cell Label		1	2	3	Total
Downstream Cell Label		Outflow	Outflow	Outflow	-
Network Simulation Name	-	none	none	none	none
Simulation Type	-	Uncerta	Uncerta	Uncerta	Uncerta
Surface Area	km2	7.28	9.19	9.19	25.66
Mean Rainfall	cm/yr	128.59	128.59	128.59	128.6
Mean ET	cm/yr	127.14	127.14	127.14	127.1
Cell Inflow Volume	hm3/yr	65.2	82.3	82.3	229.7
Cell Inflow Load	kg/yr	7127.3	8997.3	8997.3	25122
Cell Inflow Conc	ppb	109	109	109	109.4
Treated Outflow Volume	hm3/yr	69.0	82.4	82.4	233.8
Treated Outflow Load	kg/yr	1425.9	1704.6	953.3	4084
Treated FWM Outflow Conc	ppb	21	21	12	17.5
Upper Confidence Limit	ppb	26.2	26.2	13.8	21.8
Lower Confidence Limit	ppb	16.4	16.4	10.0	14.2
Total Outflow Volume + Bypass	hm3/yr	69.0	82.4	82.4	233.8
Total Outflow Load + Bypass	kg/yr	1425.9	1704.6	953.3	4083.8
Total FWM Outflow Conc	ppb	20.7	20.7	11.6	17.5
Bypass Load	kg/yr	0	0	0	0.0
Bypass Load	%	0%	0%	0%	0.0
Maximum Inflow	hm3/d	0.28	0.35	0.35	0.97
Maximum Outflow	hm3/d	0.29	0.36	0.36	1.01
Surface Load Reduction	kg/yr	5934	7711	8181	21038
Load Trapped in Sediments	kg/yr	5869	7325	8252	21446
Overall Load Reduction	%	80%	81%	89%	84%
Lower Confidence Limit	%	0.7	0.8	0.9	80%
Upper Confidence Limit	%	0.8	0.8	0.9	87%
Daily Geometric Mean	ppb	14.7	15.1	6.4	#N/A
Outflow Geo Mean - Composites	ppb	19.8	19.8	10.9	16.7
Upper Confidence Limit	ppb	25.3	25.3	13.0	21.0
Lower Confidence Limit	ppb	15.6	15.6	9.5	13.5
Frequency Outflow Conc > 10 ppb	%	100%	100%	67%	100%
Frequency Outflow Conc > 20 ppb	%	47%	47%	0%	75%
Frequency Outflow Conc > 50 ppb	%	0%	0%	0%	19%
Freq Outflow Volume > 10 ppb	%	99%	99%	44%	92%
95th Percentile Outflow Conc	ppb	24.59	24.74	14.50	21
Mean Biomass P Storage	mg/m2	1213	1199	898	1095
Storage Increase / Net Removal	%	0%	0%	0%	0%
Net Storage Turnover Rate	1/yr	23.3	23.3	35.0	26.7
Unit Area P Load	mg/m2-yr	979	979	979	979
Unit Area P Removal	mg/m2-yr	806	797	898	836
Mean Water Load	cm/d	2.5	2.5	2.5	2.5
Max Water Load	cm/d	3.8	3.8	3.8	3.8
Mean Depth	cm	59	52	52	54
Minimum Depth	cm	55.1	45.2	45.2	48
Maximum Depth	cm	63.0	60.2	60.2	61
Frequency Depth < 10 cm	%	0%	0%	0%	0.0%
Flow/Width	m2/day	113	113	113	112.7
HRT Days	days	24.0	21.2	21.2	22.0
Mean Velocity	cm/sec	0.22	0.25	0.25	0.24
Seepage Outflow / Total Outflow	%	0%	0%	0%	0%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.0
95th Percentile Outflow Volume	hm3/d	0.3	0.3	0.3	1.0
95th Percentile Outflow Load	kg/d	6.7	8.2	4.9	19.9
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A	#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A	#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A	#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A	#N/A
Range Check - Mean Depth	-			0.84	1
Range Check - Freq Depth < 10 cm	-				0
Range Check - Flow/Width	-			0.70	1
Range Check - Inflow Conc	-				0
Range Check - Outflow Conc	-			0.78	1
Water Balance Error	%	0.00%	0.00%	0.00%	0.00%
Mass Balance Error	%	0.02%	0.03%	0.13%	0.06%
Warning or Error Messages		Cell# 3 Depth out of calib. range for SAV_3: 52 vs. 62 - 87 cm Cell# 3 Flow/Width out of calib. range for SAV_3: 113 vs. 162 - 374 m2/day		Cell# 3 Outflow Conc out of calib. range for SAV_3: 12 vs. 15 - 153 ppb	3

Compartment B – North Build-out

DMSTA2- Inputs & Outputs — **Project: COMP B EIS** — Model Release: 07/05/07 — Current Date: 11/6/2007

Input Variable	Units	Value	Case Description:
Design Case Name	-	NBO EIS AltB	Analysis for WY 1966-2000
Input Series Name		TS_NBO_EIS_A	Receives re-directed inflow from STA-2
Starting Date for Simulation	-	05/01/65	
Ending Date for Simulation	-	04/30/00	
Starting Date for Output	-	05/01/65	
Integration Steps Per Day	-	4	
Number of Iterations	-	0	
Output Averaging Interval	days	365	
Inflow Conc Scale Factor	-	1	
Rainfall P Conc	ppb	10	
Atmospheric P Load (Dry)	mg/m2-yr	20	

Simulation Type:	Uncertainty Analysis		
Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	16	19	13
GM Outflow C (ppb)	15	18	12
Load Reduction %	85%	82%	88%
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.1%	0.1%
Iterations & Convergence	3	0.0%
Warning/Error Messages	3	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	NBO1	NBO2	Cell 4									
Vegetation Type	-->	EMG_3	SAV_3	SAV_3									
Inflow Fraction	-	1											
Downstream Cell Number	-	2	3										
Surface Area	km2	4.35	11.53	7.70									
Mean Width of Flow Path	km	6.50	5.00	2.50									
Number of Tanks in Series	-	3.0	3.0	3.0									
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	38.1	38.1	42.7									
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4									
Outflow Coefficient - Intercept	-	1	1	1									
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm	0.033	0.0124	0.0064									
Inflow Seepage Control Elev	cm	48	48	60									
Inflow Seepage Conc	ppb	75	75	75									
Outflow Seepage Rate	(cm/d) / cm	0.0045	0.0017										
Outflow Seepage Control Elev	cm	42	42										
Max Outflow Seepage Conc	ppb	20	20										
Seepage Recycle to Cell Number	-	1	1										
Seepage Recycle Fraction	-	0.75	0.75										
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	30	30	30									
Initial P Storage Per Unit Area	mg/m2	500	500	500									
Initial Water Column Depth	cm	200	200	200									
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3									
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22									
C2 = Conc at Half-Max Uptake	ppb	300	300	300									
K = Net Settling Rate at Steady State	m/yr	16.8	52.5	52.5									
Z1 = Saturated Uptake Depth	cm	40	40	40									
Z2 = Lower Penalty Depth	cm	100	100	100									
Z3 = Upper Penalty Depth	cm	200	200	200									

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	5.09	5.74	6.60										6.60
Run Date	-	11/06/07	11/06/07	11/06/07										11/06/07
Starting Date for Simulation	-	05/01/65	05/01/65	05/01/65										05/01/65
Starting Date for Output	-	05/01/65	05/01/65	05/01/65										05/01/65
Ending Date	-	04/30/00	04/30/00	04/30/00										04/30/00
Output Duration	days	12784	12784	12784										12784
Cell Label		NBO1	NBO2	Cell 4										Total
Downstream Cell Label		NBO2	Cell 4	Outflow										-
Network Simulation Name	-	none	none	none										none
Simulation Type	-	Uncerta	Uncerta	Uncerta										Uncerta
Surface Area	km2	4.35	11.53	7.70										23.58
Mean Rainfall	cm/yr	128.59	128.59	128.59										128.6
Mean ET	cm/yr	133.86	133.86	133.86										133.9
Cell Inflow Volume	hm3/yr	229.3	232.8	234.2										229.3
Cell Inflow Load	kg/yr	25114.4	20876.6	6603.6										25114
Cell Inflow Conc	ppb	110	90	28										109.5
Treated Outflow Volume	hm3/yr	232.8	234.2	235.4										235.4
Treated Outflow Load	kg/yr	20876.6	6603.6	3704.1										3704
Treated FWM Outflow Conc	ppb	90	28	16										15.7
Upper Confidence Limit	ppb	93.6	33.6	19.1										19.1
Lower Confidence Limit	ppb	85.0	23.6	13.3										13.3
Total Outflow Volume + Bypass	hm3/yr	232.8	234.2	235.4										235.4
Total Outflow Load + Bypass	kg/yr	20876.6	6603.6	3704.1										3704.1
Total FWM Outflow Conc	ppb	89.7	28.2	15.7										15.7
Bypass Load	kg/yr	0	0	0										0.0
Bypass Load	%	0%	0%	0%										0.0
Maximum Inflow	hm3/d	1.23	1.25	1.26										1.23
Maximum Outflow	hm3/d	1.25	1.26	1.28										1.28
Surface Load Reduction	kg/yr	4259	14273	2900										21410
Load Trapped in Sediments	kg/yr	4567	14828	3266										22660
Overall Load Reduction	%	17%	68%	44%										85%
Lower Confidence Limit	%	0.1	0.6	0.4										82%
Upper Confidence Limit	%	0.2	0.7	0.4										88%
Daily Geometric Mean	ppb	79.4	18.0	8.5										#N/A
Outflow Geo Mean - Composites	ppb	88.3	26.3	14.7										14.7
Upper Confidence Limit	ppb	92.5	31.6	17.8										17.8
Lower Confidence Limit	ppb	83.3	21.9	12.5										12.5
Frequency Outflow Conc > 10 ppb	%	100%	100%	94%										94%
Frequency Outflow Conc > 20 ppb	%	100%	89%	3%										50%
Frequency Outflow Conc > 50 ppb	%	100%	0%	0%										3%
Freq Outflow Volume > 10 ppb	%	100%	99%	76%										76%
95th Percentile Outflow Conc	ppb	95.54	34.29	19.12										19
Mean Biomass P Storage	mg/m2	3295	1286	423										1375
Storage Increase / Net Removal	%	0%	0%	0%										0%
Net Storage Turnover Rate	1/yr	11.2	35.0	35.1										24.5
Unit Area P Load	mg/m2-yr	5773	1811	858										1065
Unit Area P Removal	mg/m2-yr	1050	1286	424										961
Mean Water Load	cm/d	14.4	5.5	8.3										2.7
Max Water Load	cm/d	28.3	10.8	16.4										5.2
Mean Depth	cm	48	51	61										54
Minimum Depth	cm	37.9	43.6	48.6										44
Maximum Depth	cm	56.6	62.4	75.6										66
Frequency Depth < 10 cm	%	0%	0%	0%										0.0%
Flow/Width	m2/day	97	127	257										163.9
HRT Days	days	3.3	9.2	7.3										20.1
Mean Velocity	cm/sec	0.23	0.29	0.49										0.34
Seepage Outflow / Total Outflow	%	0%	0%	0%										0%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00										0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00										0.0
95th Percentile Outflow Volume	hm3/d	1.1	1.1	1.1										1.1
95th Percentile Outflow Load	kg/d	97.6	34.5	19.9										19.9
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A										#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A										#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A										#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A										#N/A
Range Check - Mean Depth	-		0.82	0.98										2
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-		0.79											1
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-													0
Water Balance Error	%	0.00%	0.00%	0.00%										0.00%
Mass Balance Error	%	0.08%	0.03%	0.06%										0.12%
Warning or Error Messages		Cell# 2 Depth out of calib. range for SAV_3: 51 vs. 62 - 87 cm Cell# 2 Flow/Width out of calib. range for SAV_3: 127 vs. 162 - 374 m2/day							Cell# 3 Depth out of calib. range for SAV_3: 61 vs. 62 - 87 cm					3

Compartment B – South Build-out

DMSTA2- Inputs & Outputs — **Project: COMP B EIS** — Model Release: 07/05/07 — Current Date: 11/6/2007

Input Variable	Units	Value	Case Description:
Design Case Name	-	SBO EIS AltB	Analysis for WY 1966-2000
Input Series Name		TS_SBO_EIS_A	Receives inflow from S-7/S-2 Basin
Starting Date for Simulation	-	05/01/65	
Ending Date for Simulation	-	04/30/00	
Starting Date for Output	-	05/01/65	
Integration Steps Per Day	-	4	
Number of Iterations	-	0	
Output Averaging Interval	days	365	
Inflow Conc Scale Factor	-	1	
Rainfall P Conc	ppb	10	
Atmospheric P Load (Dry)	mg/m2-yr	20	

Simulation Type: Uncertainty Analysis

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	13	16	11
GM Outflow C (ppb)	12	15	10
Load Reduction %	85%	82%	88%
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	3	0.0%
Warning/Error Messages	3	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	SBO1	SBO2										
Vegetation Type	-->	EMG_3	SAV_3										
Inflow Fraction	-	1											
Downstream Cell Number	-	2											
Surface Area	km2	5.98	5.34										
Mean Width of Flow Path	km	2.00	1.50										
Number of Tanks in Series	-	3.0	3.0										
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	38.1	38.1										
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4										
Outflow Coefficient - Intercept	-	1	1										
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm	0.0133	0.0164										
Inflow Seepage Control Elev	cm	53	63										
Inflow Seepage Conc	ppb	75	15										
Outflow Seepage Rate	(cm/d) / cm												
Outflow Seepage Control Elev	cm												
Max Outflow Seepage Conc	ppb												
Seepage Recycle to Cell Number	-												
Seepage Recycle Fraction	-												
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	30	30										
Initial P Storage Per Unit Area	mg/m2	500	500										
Initial Water Column Depth	cm	200	200										
C0 = Conc at 0 g/m2 P Storage	ppb	3	3										
C1 = Conc at 1 g/m2 P storage	ppb	22	22										
C2 = Conc at Half-Max Uptake	ppb	300	300										
K = Net Settling Rate at Steady State	m/yr	16.8	52.5										
Z1 = Saturated Uptake Depth	cm	40	40										
Z2 = Lower Penalty Depth	cm	100	100										
Z3 = Upper Penalty Depth	cm	200	200										

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	3.69	4.37											4.37
Run Date	-	11/06/07	11/06/07											11/06/07
Starting Date for Simulation	-	05/01/65	05/01/65											05/01/65
Starting Date for Output	-	05/01/65	05/01/65											05/01/65
Ending Date	-	04/30/00	04/30/00											04/30/00
Output Duration	days	12784	12784											12784
Cell Label		SBO1	SBO2											Total
Downstream Cell Label		SBO2	Outflow											-
Network Simulation Name	-	none	none											none
Simulation Type	-	Uncerta	Uncerta											Uncerta
Surface Area	km2	5.98	5.34											11.32
Mean Rainfall	cm/yr	128.59	128.59											128.6
Mean ET	cm/yr	133.86	133.86											133.9
Cell Inflow Volume	hm3/yr	77.2	79.2											77.2
Cell Inflow Load	kg/yr	7280.9	3635.9											7281
Cell Inflow Conc	ppb	94	46											94.4
Treated Outflow Volume	hm3/yr	79.2	82.6											82.6
Treated Outflow Load	kg/yr	3635.9	1057.0											1057
Treated FWM Outflow Conc	ppb	46	13											12.8
Upper Confidence Limit	ppb	53.1	15.8											15.8
Lower Confidence Limit	ppb	38.8	10.6											10.6
Total Outflow Volume + Bypass	hm3/yr	79.2	82.6											82.6
Total Outflow Load + Bypass	kg/yr	3635.9	1057.0											1057.0
Total FWM Outflow Conc	ppb	45.9	12.8											12.8
Bypass Load	kg/yr	0	0											0.0
Bypass Load	%	0%	0%											0.0
Maximum Inflow	hm3/d	0.43	0.44											0.43
Maximum Outflow	hm3/d	0.44	0.45											0.45
Surface Load Reduction	kg/yr	3645	2579											6224
Load Trapped in Sediments	kg/yr	4017	2810											6827
Overall Load Reduction	%	50%	71%											85%
Lower Confidence Limit	%	0.4	0.7											82%
Upper Confidence Limit	%	0.6	0.7											88%
Daily Geometric Mean	ppb	39.7	7.7											#N/A
Outflow Geo Mean - Composites	ppb	44.4	11.9											11.9
Upper Confidence Limit	ppb	51.8	14.7											14.7
Lower Confidence Limit	ppb	37.2	9.8											9.8
Frequency Outflow Conc > 10 ppb	%	100%	83%											83%
Frequency Outflow Conc > 20 ppb	%	100%	0%											11%
Frequency Outflow Conc > 50 ppb	%	11%	0%											0%
Freq Outflow Volume > 10 ppb	%	100%	67%											67%
95th Percentile Outflow Conc	ppb	52.55	15.86											16
Mean Biomass P Storage	mg/m2	2109	526											1362
Storage Increase / Net Removal	%	0%	0%											0%
Net Storage Turnover Rate	1/yr	11.1	35.0											15.5
Unit Area P Load	mg/m2-yr	1218	681											643
Unit Area P Removal	mg/m2-yr	672	526											603
Mean Water Load	cm/d	3.5	4.1											1.9
Max Water Load	cm/d	7.1	8.2											3.8
Mean Depth	cm	51	56											53
Minimum Depth	cm	44.3	47.6											46
Maximum Depth	cm	62.2	68.9											65
Frequency Depth < 10 cm	%	0%	0%											0.0%
Flow/Width	m2/day	106	145											124.0
HRT Days	days	14.3	13.7											28.4
Mean Velocity	cm/sec	0.24	0.30											0.27
Seepage Outflow / Total Outflow	%	0%	0%											0%
Release 1 Outflow Volume	hm3/yr	0.00	0.00											0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00											0.0
95th Percentile Outflow Volume	hm3/d	0.4	0.4											0.4
95th Percentile Outflow Load	kg/d	17.2	5.2											5.2
Simulated / Specified Mean Depth	%	#N/A	#N/A											#N/A
Release 1 Demand Met	%	#N/A	#N/A											#N/A
Release 2 Demand Met	%	#N/A	#N/A											#N/A
Outflow Demand Met	%	#N/A	#N/A											#N/A
Range Check - Mean Depth	-		0.90											1
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-		0.89											1
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-		0.86											1
Water Balance Error	%	0.00%	0.00%											0.00%
Mass Balance Error	%	0.03%	0.01%											0.03%
Warning or Error Messages		Cell# 2 Depth out of calib. range for SAV_3: 56 vs. 62 - 87 cm Cell# 2 Flow/Width out of calib. range for SAV_3: 145 vs. 162 - 374 m2/day							Cell# 2 Outflow Conc out of calib. range for SAV_3: 13 vs. 15 - 153 ppb					3

EAASR With Lake Okeechobee TP=100 ppb

DMSTA2- Inputs & Outputs — Project: PROJECT_EAASR_STA34_NETWORK_EIS_ALTB — Model Release: 07/05/07 — Current Date: 11/6/2007

Case Description:
Compartment A-1
15,200 acres (from A8)
Inflow volumes, outflow volumes, and depths from SFWMM simulation
Reservoir settling rate = 5.0 m/yr
Lake Okeechobee deliveries at 100 ppb

Simulation Type:

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	84.9	#N/A	#N/A
GM Outflow C (ppb)	94.2	#N/A	#N/A
Load Reduction %	16%	#N/A	#N/A
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	2	0.5%
Warning/Error Messages	0	

Input Variable	Units	Value	1	2	3	4	5	6	7	8	9	10	11	12
Design Case Name	-	A1												
Input Series Name		TS_A1												
Starting Date for Simulation	-	01/01/65												
Ending Date for Simulation	-	04/30/00												
Starting Date for Output	-	05/01/65												
Integration Steps Per Day	-	4												
Number of Iterations	-	0												
Output Averaging Interval	days	1												
Inflow Conc Scale Factor	-	1												
Rainfall P Conc	ppb	10												
Atmospheric P Load (Dry)	mg/m2-yr	20												
Cell Number -->		**1**												
Cell Label	-	1												
Vegetation Type	-->	none												
Inflow Fraction	-	1												
Downstream Cell Number	-													
Surface Area	km2	61.54												
Mean Width of Flow P	km	6.70												
Number of Tanks in Series	-	1.0												
Minimum Depth for Releases	cm	15												
Release 1 Series Name		IRRIG												
Release 2 Series Name														
Outflow Series Name		TO_STA												
Depth Series Name		A1_DEPTH												
Outflow Control Depth	cm													
Outflow Weir Depth	cm													
Outflow Coefficient - Exponent	-	1.5												
Outflow Coefficient - Intercept	-	8												
Bypass Depth	cm													
Maximum Inflow	hm3/day													
Maximum Outflow	hm3/day	9.05233												
Inflow Seepage Rate	(cm/d) / cm													
Inflow Seepage Control Elev	cm													
Inflow Seepage Conc	ppb													
Outflow Seepage Rate	(cm/d) / cm	0.00081												
Outflow Seepage Control Elev	cm	6												
Max Outflow Seepage Conc	ppb	100												
Seepage Recycle to Cell Number	-	1												
Seepage Recycle Fraction	-	0.75												
Seepage Discharge Fraction	-													
Initial Water Column Conc	ppb	105												
Initial P Storage Per Unit Area	mg/m2	525												
Initial Water Column Depth	cm	150												
C0 = Conc at 0 g/m2 P Storage	ppb	3												
C1 = Conc at 1 g/m2 P storage	ppb	150												
C2 = Conc at Half-Max Uptake	ppb													
K = Net Settling Rate at Steady State	m/yr	5.0												
Z1 = Saturated Uptake Depth	cm	40												
Z2 = Lower Penalty Depth	cm	100												
Z3 = Upper Penalty Depth	cm	400												

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	1.47												1.47
Run Date	-	11/06/07												11/06/07
Starting Date for Simulation	-	01/01/65												01/01/65
Starting Date for Output	-	05/01/65												05/01/65
Ending Date	-	04/30/00												04/30/00
Output Duration	days	12784												12784
Cell Label		1												Total
Downstream Cell Label		Outflow												-
Network Simulation Name	-	EAASR_NET												EAASR_NET
Simulation Type	-	Base												Base
Surface Area	km2	61.54												61.54
Mean Rainfall	cm/yr	130.73												130.7
Mean ET	cm/yr	125.65												125.6
Cell Inflow Volume	hm3/yr	706.0												706.0
Cell Inflow Load	kg/yr	67545.5												67545
Cell Inflow Conc	ppb	96												95.7
Treated Outflow Volume	hm3/yr	509.7												509.7
Treated Outflow Load	kg/yr	43280.3												43280
Treated FWM Outflow Conc	ppb	85												84.9
Upper Confidence Limit	ppb	#N/A												#N/A
Lower Confidence Limit	ppb	#N/A												#N/A
Total Outflow Volume + Bypass	hm3/yr	696.0												696.0
Total Outflow Load + Bypass	kg/yr	56427.7												56427.7
Total FWM Outflow Conc	ppb	81.1												81.1
Bypass Load	kg/yr	0												0.0
Bypass Load	%	0%												0.0
Maximum Inflow	hm3/d	9.92												9.92
Maximum Outflow	hm3/d	10.16												10.16
Surface Load Reduction	kg/yr	26123												24265
Load Trapped in Sediments	kg/yr	11943												11943
Overall Load Reduction	%	16%												16%
Lower Confidence Limit	%	#N/A												#N/A
Upper Confidence Limit	%	#N/A												#N/A
Daily Geometric Mean	ppb	68.4												#N/A
Outflow Geo Mean - Composites	ppb	94.2												94.2
Upper Confidence Limit	ppb	#N/A												#N/A
Lower Confidence Limit	ppb	#N/A												#N/A
Frequency Outflow Conc > 10 ppb	%	100%												100%
Frequency Outflow Conc > 20 ppb	%	100%												100%
Frequency Outflow Conc > 50 ppb	%	91%												100%
Freq Outflow Volume > 10 ppb	%	73%												73%
95th Percentile Outflow Conc	ppb	664.98												665
Mean Biomass P Storage	mg/m2	405												405
Storage Increase / Net Removal	%	2%												2%
Net Storage Turnover Rate	1/yr	16.8												16.8
Unit Area P Load	mg/m2-yr	1098												1098
Unit Area P Removal	mg/m2-yr	194												194
Mean Water Load	cm/d	3.1												3.1
Max Water Load	cm/d	16.1												16.1
Mean Depth	cm	196												196
Minimum Depth	cm	1.0												1
Maximum Depth	cm	388.8												389
Frequency Depth < 10 cm	%	13%												13.0%
Flow/Width	m2/day	288												288.5
HRT Days	days	62.5												62.5
Mean Velocity	cm/sec	0.17												0.17
Seepage Outflow / Total Outflow	%	1%												2%
Release 1 Outflow Volume	hm3/yr	186.32												186.3
Release 2 Outflow Volume	hm3/yr	0.00												0.0
95th Percentile Outflow Volume	hm3/d	9.1												9.1
95th Percentile Outflow Load	kg/d	753.8												753.8
Simulated / Specified Mean Depth	%	100%												1.0
Release 1 Demand Met	%	90%												0.9
Release 2 Demand Met	%	#N/A												#N/A
Outflow Demand Met	%	104%												1.0
Range Check - Mean Depth	-													0
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-													0
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-													0
Water Balance Error	%	0.00%												0.00%
Mass Balance Error	%	0.00%												0.00%
Warning or Error Messages														0

EAASR With Lake Okeechobee TP=150 ppb

DMSTA2- Inputs & Outputs Project: PROJECT_EAASR_STA34_NETWORK_EIS_ALTB Model Release: 07/05/07
Current Date: 11/10/2007

Input Variable	Units	Value	Case Description:
Design Case Name	-	A1 150	Compartment A-1
Input Series Name		TS_A1_150	15,200 acres (from A8)
Starting Date for Simulation	-	01/01/65	Inflow volumes, outflow volumes, and depths from SFWMM simulation
Ending Date for Simulation	-	04/30/00	Reservoir settling rate = 5.0 m/yr
Starting Date for Output	-	05/01/65	Lake inflow = 150 ppb
Integration Steps Per Day	-	4	Simulation Type:
Number of Iterations	-	0	
Output Averaging Interval	days	1	
Inflow Conc Scale Factor	-	1	
Rainfall P Conc	ppb	10	
Atmospheric P Load (Dry)	mg/m2-yr	20	

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	115.1	#N/A	#N/A
GM Outflow C (ppb)	118.6	#N/A	#N/A
Load Reduction %	16%	#N/A	#N/A
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	2	0.9%
Warning/Error Messages	0	

Cell Number -->	1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	1											
Vegetation Type	none											
Inflow Fraction	1											
Downstream Cell Number	-											
Surface Area	61.54											
Mean Width of Flow Pa	6.70											
Number of Tanks in Series	1.0											
Minimum Depth for Releases	15											
Release 1 Series Name	IRRIG											
Release 2 Series Name												
Outflow Series Name	TO_STA											
Depth Series Name	A1_DEPTH											
Outflow Control Depth												
Outflow Weir Depth												
Outflow Coefficient - Exponent	1.5											
Outflow Coefficient - Intercept	8											
Bypass Depth												
Maximum Inflow												
Maximum Outflow	9.05233											
Inflow Seepage Rate												
Inflow Seepage Control Elev												
Inflow Seepage Conc												
Outflow Seepage Rate	0.00081											
Outflow Seepage Control Elev	6											
Max Outflow Seepage Conc	100											
Seepage Recycle to Cell Number	1											
Seepage Recycle Fraction	0.75											
Seepage Discharge Fraction												
Initial Water Column Conc	105											
Initial P Storage Per Unit Area	525											
Initial Water Column Depth	150											
C0 = Conc at 0 g/m2 P Storage	3											
C1 = Conc at 1 g/m2 P storage	150											
C2 = Conc at Half-Max Uptake												
K = Net Settling Rate at Steady State	5.0											
Z1 = Saturated Uptake Depth	40											
Z2 = Lower Penalty Depth	100											
Z3 = Upper Penalty Depth	400											

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	1.44												1.44
Run Date	-	11/10/07												11/10/07
Starting Date for Simulation	-	01/01/65												01/01/65
Starting Date for Output	-	05/01/65												05/01/65
Ending Date	-	04/30/00												04/30/00
Output Duration	days	12784												12784
Cell Label		1												Total
Downstream Cell Label		Outflow												-
Network Simulation Name	-	AASR_NET 150												EAASR_NET 1
Simulation Type	-	Base												Base
Surface Area	km2	61.54												61.54
Mean Rainfall	cm/yr	130.73												130.7
Mean ET	cm/yr	125.65												125.6
Cell Inflow Volume	hm3/yr	706.0											572346.8	706.0
Cell Inflow Load	kg/yr	90779.3												90779
Cell Inflow Conc	ppb	129												128.6
Treated Outflow Volume	hm3/yr	509.7											413242.6	509.7
Treated Outflow Load	kg/yr	58648.7												58649
Treated FWM Outflow Conc	ppb	115												115.1
Upper Confidence Limit	ppb	#N/A												#N/A
Lower Confidence Limit	ppb	#N/A												#N/A
Total Outflow Volume + Bypass	hm3/yr	696.0												696.0
Total Outflow Load + Bypass	kg/yr	75814.7												75814.7
Total FWM Outflow Conc	ppb	108.9												108.9
Bypass Load	kg/yr	0												0.0
Bypass Load	%	0%												0.0
Maximum Inflow	hm3/d	9.92												9.92
Maximum Outflow	hm3/d	10.16												10.16
Surface Load Reduction	kg/yr	34331												32131
Load Trapped in Sediments	kg/yr	15110												15110
Overall Load Reduction	%	16%												16%
Lower Confidence Limit	%	#N/A												#N/A
Upper Confidence Limit	%	#N/A												#N/A
Daily Geometric Mean	ppb	84.1												#N/A
Outflow Geo Mean - Composites	ppb	118.6												118.6
Upper Confidence Limit	ppb	#N/A												#N/A
Lower Confidence Limit	ppb	#N/A												#N/A
Frequency Outflow Conc > 10 ppb	%	100%												100%
Frequency Outflow Conc > 20 ppb	%	100%												100%
Frequency Outflow Conc > 50 ppb	%	92%												100%
Freq Outflow Volume > 10 ppb	%	73%												73%
95th Percentile Outflow Conc	ppb	790.07												790
Mean Biomass P Storage	mg/m2	522												522
Storage Increase / Net Removal	%	3%												3%
Net Storage Turnover Rate	1/yr	16.5												16.5
Unit Area P Load	mg/m2-yr	1475												1475
Unit Area P Removal	mg/m2-yr	246												246
Mean Water Load	cm/d	3.1												3.1
Max Water Load	cm/d	16.1												16.1
Mean Depth	cm	196												196
Minimum Depth	cm	1.0												1
Maximum Depth	cm	388.8												389
Frequency Depth < 10 cm	%	13%												13.0%
Flow/Width	m2/day	288												288.5
HRT Days	days	62.5												62.5
Mean Velocity	cm/sec	0.17												0.17
Seepage Outflow / Total Outflow	%	1%												2%
Release 1 Outflow Volume	hm3/yr	186.32												186.3
Release 2 Outflow Volume	hm3/yr	0.00												0.0
95th Percentile Outflow Volume	hm3/d	9.1												9.1
95th Percentile Outflow Load	kg/d	1054.8												1054.8
Simulated / Specified Mean Depth	%	100%												1.0
Release 1 Demand Met	%	90%												0.9
Release 2 Demand Met	%	#N/A												#N/A
Outflow Demand Met	%	104%												1.0
Range Check - Mean Depth	-													0
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-													0
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-													0
Water Balance Error	%	0.00%												0.00%
Mass Balance Error	%	0.00%												0.00%
Warning or Error Messages														0

STA-3/4 With Lake Okeechobee TP=100 ppb

DMSTA2- Inputs & Outputs Project: PROJECT_EAASR_STA34_NETWORK_EIS_ALTB Model Release: 07/05/07 Current Date: 11/6/2007

Input Variable	Units	Value	Case Description:
Design Case Name	-	STA34 ind	STA-3/4 stand alone
Input Series Name		TS_STA34_ind	Inflows distributed uniformly based on area
Starting Date for Simulation	-	01/01/65	Lake Okeechobee deliveries at 100 ppb
Ending Date for Simulation	-	04/30/00	PSTA Demo in Cell 2B modeled as SAV_3
Starting Date for Output	-	05/01/65	Used EAASR inflows from network simulation to run uncertainty analysis
Integration Steps Per Day	-	4	
Number of Iterations	-	0	
Output Averaging Interval	days	365	
Inflow Conc Scale Factor	-	1	
Rainfall P Conc	ppb	10	
Atmospheric P Load (Dry)	mg/m2-yr	20	

Simulation Type: Uncertainty Analysis

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	21	25	17
GM Outflow C (ppb)	17	20	14
Load Reduction %	77%	72%	81%
Bypass Load (%)	0.0%		

Diagnostics

H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	2	0.3%
Warning/Error Messages	6	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	1A	1B	2A	2B	3A	3B						
Vegetation Type	-->	EMG_3	SAV_3	EMG_3	SAV_3	EMG_3	SAV_3						
Inflow Fraction	-	0.394547543		0.328598199		0.276854							
Downstream Cell Number	-	2		4		6							
Surface Area	km2	12.30	14.12	10.29	11.72	8.72	9.83						
Mean Width of Flow Path	km	3.42	4.50	2.89	4.02	4.88	4.88						
Number of Tanks in Series	-	3.0	3.0	3.0	3.0	3.0	3.0						
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	38.1	38.1	38.1	38.1	38.1	38.1						
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4	4	4	4						
Outflow Coefficient - Intercept	-	1	1	1	1	1	1						
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm												
Inflow Seepage Control Elev	cm												
Inflow Seepage Conc	ppb												
Outflow Seepage Rate	(cm/d) / cm	0.0058	0.0029	0.0014		0.0038							
Outflow Seepage Control Elev	cm	16	40	-67		-64							
Max Outflow Seepage Conc	ppb	20	20	20	20	20	20						
Seepage Recycle to Cell Number	-	1		3		5							
Seepage Recycle Fraction	-	0.5	0.5	0.5	0.5	0.5	0.5						
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	52	12	55	15	55	15						
Initial P Storage Per Unit Area	mg/m2	2400	615	2400	615	2400	615						
Initial Water Column Depth	cm	60	60	60	60	60	60						
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3	3	3	3						
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22	22	22	22						
C2 = Conc at Half-Max Uptake	ppb	300	300	300	300	300	300						
K = Net Settling Rate at Steady State	m/yr	16.8	52.5	16.8	52.5	16.8	52.5						
Z1 = Saturated Uptake Depth	cm	40	40	40	40	40	40						
Z2 = Lower Penalty Depth	cm	100	100	100	100	100	100						
Z3 = Upper Penalty Depth	cm	200	200	200	200	200	200						

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	5.58	6.31	7.02	7.76	8.46	9.17							9.17
Run Date	-	11/06/07	11/06/07	11/06/07	11/06/07	11/06/07	11/06/07							11/06/07
Starting Date for Simulation	-	01/01/65	01/01/65	01/01/65	01/01/65	01/01/65	01/01/65							01/01/65
Starting Date for Output	-	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65							05/01/65
Ending Date	-	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00							04/30/00
Output Duration	days	12784	12784	12784	12784	12784	12784							12784
Cell Label		1A	1B	2A	2B	3A	3B							Total
Downstream Cell Label		1B	Outflow	2B	Outflow	3B	Outflow							-
Network Simulation Name	-	none	none	none	none	none	none							none
Simulation Type	-	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta							Uncerta
Surface Area	km2	12.30	14.12	10.29	11.72	8.72	9.83							66.98
Mean Rainfall	cm/yr	129.99	129.99	129.99	129.99	129.99	129.99							130.0
Mean ET	cm/yr	134.33	134.00	134.06	133.96	132.93	133.72							133.9
Cell Inflow Volume	hm3/yr	297.5	291.7	247.8	244.1	208.7	201.8							754.0
Cell Inflow Load	kg/yr	25404.9	16610.6	21158.4	13879.5	17826.6	11386.7							64390
Cell Inflow Conc	ppb	85	57	85	57	85	56							85.4
Treated Outflow Volume	hm3/yr	291.7	289.8	244.1	243.7	201.8	201.5							734.9
Treated Outflow Load	kg/yr	16610.6	5917.5	13879.5	5010.0	11386.7	4192.8							15120
Treated FWM Outflow Conc	ppb	57	20	57	21	56	21							20.6
Upper Confidence Limit	ppb	61.7	24.5	61.6	24.7	60.9	24.8							24.7
Lower Confidence Limit	ppb	51.7	16.9	51.7	17.0	51.5	17.4							17.1
Total Outflow Volume + Bypass	hm3/yr	291.7	289.8	244.1	243.7	201.8	201.5							734.9
Total Outflow Load + Bypass	kg/yr	16610.6	5917.5	13879.5	5010.0	11386.7	4192.8							15120.4
Total FWM Outflow Conc	ppb	56.9	20.4	56.9	20.6	56.4	20.8							20.6
Bypass Load	kg/yr	0	0	0	0	0	0							0.0
Bypass Load	%	0%	0%	0%	0%	0%	0%							0.0
Maximum Inflow	hm3/d	1.88	1.86	1.56	1.56	1.32	1.30							4.75
Maximum Outflow	hm3/d	1.86	1.86	1.56	1.56	1.30	1.31							4.73
Surface Load Reduction	kg/yr	8900	10716	7344	8869	6573	7194							49269
Load Trapped in Sediments	kg/yr	8616	11005	7140	9166	5735	7443							49106
Overall Load Reduction	%	35%	64%	34%	64%	36%	63%							77%
Lower Confidence Limit	%	0.3	0.6	0.3	0.6	0.3	0.6							72%
Upper Confidence Limit	%	0.4	0.7	0.4	0.7	0.4	0.7							81%
Daily Geometric Mean	ppb	48.4	11.8	48.2	11.9	49.0	12.0							#N/A
Outflow Geo Mean - Composites	ppb	51.6	16.5	51.4	16.6	51.1	17.3							16.8
Upper Confidence Limit	ppb	57.0	20.0	56.8	20.1	56.1	20.6							20.2
Lower Confidence Limit	ppb	45.8	13.7	45.7	13.8	45.8	14.5							14.0
Frequency Outflow Conc > 10 ppb	%	100%	92%	100%	92%	100%	92%							92%
Frequency Outflow Conc > 20 ppb	%	100%	33%	100%	33%	100%	33%							67%
Frequency Outflow Conc > 50 ppb	%	61%	0%	61%	0%	58%	0%							33%
Freq Outflow Volume > 10 ppb	%	100%	91%	100%	91%	100%	92%							91%
95th Percentile Outflow Conc	ppb	66.59	26.09	66.67	26.35	66.32	26.11							26
Mean Biomass P Storage	mg/m2	2210	792	2190	795	2079	770							1432
Storage Increase / Net Removal	%	1%	1%	1%	1%	1%	1%							1%
Net Storage Turnover Rate	1/yr	11.1	34.4	11.1	34.4	11.1	34.4							17.9
Unit Area P Load	mg/m2-yr	2065	1176	2056	1185	2045	1159							961
Unit Area P Removal	mg/m2-yr	700	779	694	782	658	757							733
Mean Water Load	cm/d	6.6	5.7	6.6	5.7	6.6	5.6							3.1
Max Water Load	cm/d	15.2	13.2	15.2	13.3	15.1	13.2							7.1
Mean Depth	cm	56	55	56	54	47	49							53
Minimum Depth	cm	36.5	31.0	35.3	30.2	29.0	27.7							32
Maximum Depth	cm	78.7	76.1	78.6	74.9	65.3	67.8							74
Frequency Depth < 10 cm	%	0%	0%	0%	0%	0%	0%							0.0%
Flow/Width	m2/day	238	178	235	166	117	113							178.3
HRT Days	days	8.5	9.6	8.5	9.4	7.1	8.6							17.2
Mean Velocity	cm/sec	0.49	0.38	0.49	0.36	0.29	0.27							0.38
Seepage Outflow / Total Outflow	%	2%	0%	1%	0%	3%	0%							2%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00							0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00							0.0
95th Percentile Outflow Volume	hm3/d	1.6	1.6	1.4	1.4	1.1	1.1							4.1
95th Percentile Outflow Load	kg/d	103.0	38.8	86.3	32.9	71.3	27.4							99.2
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Range Check - Mean Depth	-		0.88		0.87		0.78							3
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-	1.13		1.12			0.70							3
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-													0
Water Balance Error	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%							0.00%
Mass Balance Error	%	0.02%	0.02%	0.02%	0.02%	0.00%	0.03%							0.03%
Warning or Error Messages		Cell# 1 Flow/Width out of calib. range for EMG_3: 238 vs. 26 - 210 m2/day Cell# 2 Depth out of calib. range for SAV_3: 55 vs. 62 - 87 cm Cell# 3 Flow/Width out of calib. range for EMG_3: 235 vs. 26 - 210 m2/day					Cell# 4 Depth out of calib. range for SAV_3: 54 vs. 62 - 87 cm Cell# 6 Depth out of calib. range for SAV_3: 49 vs. 62 - 87 cm Cell# 6 Flow/Width out of calib. range for SAV_3: 113 vs. 162 - 374 m2/day						6

STA-3/4 With Lake Okeechobee TP=150 ppb

DMSTA2- Inputs & Outputs **Project: PROJECT_EAASR_STA34_NETWORK_EIS_ALTB** Model Release: 07/05/07

Current Date: 11/11/2007

Input Variable	Units	Value	Case Description:
Design Case Name	-	STA34 ind 150	STA-3/4 stand alone
Input Series Name	-	TS_STA34_ind_1	Inflows distributed uniformly based on area
Starting Date for Simulation	-	01/01/65	Lake Okeechobee deliveries at 150 ppb
Ending Date for Simulation	-	04/30/00	PSTA Demo in Cell 2B modeled as SAV_3
Starting Date for Output	-	05/01/65	Used EAASR inflows from network simulation to run uncertainty analysis
Integration Steps Per Day	-	4	
Number of Iterations	-	0	
Output Averaging Interval	days	365	
Inflow Conc Scale Factor	-	1	
Rainfall P Conc	ppb	10	
Atmospheric P Load (Dry)	mg/m2-yr	20	

Simulation Type: Uncertainty Analysis

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	25	30	20
GM Outflow C (ppb)	20	24	16
Load Reduction %	77%	73%	82%
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	2	0.8%
Warning/Error Messages	6	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	1A	1B	2A	2B	3A	3B						
Vegetation Type	-->	EMG_3	SAV_3	EMG_3	SAV_3	EMG_3	SAV_3						
Inflow Fraction	-	0.394547543		0.328598199		0.276854							
Downstream Cell Number	-	2		4		6							
Surface Area	km2	12.30	14.12	10.29	11.72	8.72	9.83						
Mean Width of Flow Path	km	3.42	4.50	2.89	4.02	4.88	4.88						
Number of Tanks in Series	-	3.0	3.0	3.0	3.0	3.0	3.0						
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	38.1	38.1	38.1	38.1	38.1	38.1						
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4	4	4	4						
Outflow Coefficient - Intercept	-	1	1	1	1	1	1						
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm												
Inflow Seepage Control Elev	cm												
Inflow Seepage Conc	ppb												
Outflow Seepage Rate	(cm/d) / cm	0.0058	0.0029	0.0014		0.0038							
Outflow Seepage Control Elev	cm	16	40	-67		-64							
Max Outflow Seepage Conc	ppb	20	20	20	20	20	20						
Seepage Recycle to Cell Number	-	1		3		5							
Seepage Recycle Fraction	-	0.5	0.5	0.5	0.5	0.5	0.5						
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	52	12	55	15	55	15						
Initial P Storage Per Unit Area	mg/m2	2400	615	2400	615	2400	615						
Initial Water Column Depth	cm	60	60	60	60	60	60						
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3	3	3	3						
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22	22	22	22						
C2 = Conc at Half-Max Uptake	ppb	300	300	300	300	300	300						
K = Net Settling Rate at Steady State	m/yr	16.8	52.5	16.8	52.5	16.8	52.5						
Z1 = Saturated Uptake Depth	cm	40	40	40	40	40	40						
Z2 = Lower Penalty Depth	cm	100	100	100	100	100	100						
Z3 = Upper Penalty Depth	cm	200	200	200	200	200	200						

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	7.90	8.60	9.45	10.30	11.07	12.00							12.00
Run Date	-	11/11/07	11/11/07	11/11/07	11/11/07	11/11/07	11/11/07							11/11/07
Starting Date for Simulation	-	01/01/65	01/01/65	01/01/65	01/01/65	01/01/65	01/01/65							01/01/65
Starting Date for Output	-	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65							05/01/65
Ending Date	-	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00							04/30/00
Output Duration	days	12784	12784	12784	12784	12784	12784							12784
Cell Label		1A	1B	2A	2B	3A	3B							Total
Downstream Cell Label		1B	Outflow	2B	Outflow	3B	Outflow							-
Network Simulation Name	-	none	none	none	none	none	none							none
Simulation Type	-	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta							Uncerta
Surface Area	km2	12.30	14.12	10.29	11.72	8.72	9.83							66.98
Mean Rainfall	cm/yr	129.99	129.99	129.99	129.99	129.99	129.99							130.0
Mean ET	cm/yr	134.33	134.00	134.06	133.96	132.93	133.72							133.9
Cell Inflow Volume	hm3/yr	297.5	291.7	247.8	244.1	208.7	201.8						611254	754.0
Cell Inflow Load	kg/yr	31562.2	20877.4	26286.5	17445.1	22147.2	14285.3							79996
Cell Inflow Conc	ppb	106	72	106	71	106	71							106.1
Treated Outflow Volume	hm3/yr	291.7	289.8	244.1	243.7	201.8	201.5						595822	734.9
Treated Outflow Load	kg/yr	20877.4	7069.8	17445.1	5989.5	14285.3	5005.8							18065
Treated FWM Outflow Conc	ppb	72	24	71	25	71	25							24.6
Upper Confidence Limit	ppb	77.5	29.7	77.3	29.9	76.3	30.0							29.9
Lower Confidence Limit	ppb	65.0	19.9	65.0	20.0	64.6	20.4							20.1
Total Outflow Volume + Bypass	hm3/yr	291.7	289.8	244.1	243.7	201.8	201.5							734.9
Total Outflow Load + Bypass	kg/yr	20877.4	7069.8	17445.1	5989.5	14285.3	5005.8							18065.1
Total FWM Outflow Conc	ppb	71.6	24.4	71.5	24.6	70.8	24.8							24.6
Bypass Load	kg/yr	0	0	0	0	0	0							0.0
Bypass Load	%	0%	0%	0%	0%	0%	0%							0.0
Maximum Inflow	hm3/d	1.88	1.86	1.56	1.56	1.32	1.30							4.75
Maximum Outflow	hm3/d	1.86	1.86	1.56	1.56	1.30	1.31							4.73
Surface Load Reduction	kg/yr	10790	13832	8906	11456	7995	9280							61931
Load Trapped in Sediments	kg/yr	10322	14074	8549	11727	6838	9507							61017
Overall Load Reduction	%	34%	66%	34%	66%	35%	65%							77%
Lower Confidence Limit	%	0.3	0.6	0.3	0.6	0.3	0.6							73%
Upper Confidence Limit	%	0.4	0.7	0.4	0.7	0.4	0.7							82%
Daily Geometric Mean	ppb	60.9	14.4	60.6	14.5	61.2	14.6							#N/A
Outflow Geo Mean - Composites	ppb	64.4	19.6	64.1	19.8	63.2	20.5							19.9
Upper Confidence Limit	ppb	71.1	24.1	70.7	24.3	69.2	24.8							24.4
Lower Confidence Limit	ppb	57.1	16.0	57.0	16.1	56.6	16.9							16.3
Frequency Outflow Conc > 10 ppb	%	100%	92%	100%	92%	100%	92%							92%
Frequency Outflow Conc > 20 ppb	%	100%	58%	100%	58%	100%	58%							72%
Frequency Outflow Conc > 50 ppb	%	78%	0%	78%	0%	75%	3%							58%
Freq Outflow Volume > 10 ppb	%	100%	93%	100%	93%	100%	94%							93%
95th Percentile Outflow Conc	ppb	89.03	35.37	89.15	35.80	88.39	35.52							36
Mean Biomass P Storage	mg/m2	2648	1013	2622	1017	2480	984							1748
Storage Increase / Net Removal	%	1%	1%	1%	1%	1%	1%							1%
Net Storage Turnover Rate	1/yr	11.1	34.5	11.1	34.4	11.1	34.4							18.2
Unit Area P Load	mg/m2-yr	2565	1478	2554	1489	2541	1454							1194
Unit Area P Removal	mg/m2-yr	839	997	831	1001	784	968							911
Mean Water Load	cm/d	6.6	5.7	6.6	5.7	6.6	5.6							3.1
Max Water Load	cm/d	15.2	13.2	15.2	13.3	15.1	13.2							7.1
Mean Depth	cm	56	55	56	54	47	49							53
Minimum Depth	cm	36.5	31.0	35.3	30.2	29.0	27.7							32
Maximum Depth	cm	78.7	76.1	78.6	74.9	65.3	67.8							74
Frequency Depth < 10 cm	%	0%	0%	0%	0%	0%	0%							0.0%
Flow/Width	m2/day	238	178	235	166	117	113							178.3
HRT Days	days	8.5	9.6	8.5	9.4	7.1	8.6							17.2
Mean Velocity	cm/sec	0.49	0.38	0.49	0.36	0.29	0.27							0.38
Seepage Outflow / Total Outflow	%	2%	0%	1%	0%	3%	0%							2%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00							0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00							0.0
95th Percentile Outflow Volume	hm3/d	1.6	1.6	1.4	1.4	1.1	1.1							4.1
95th Percentile Outflow Load	kg/d	131.1	46.5	109.1	39.5	89.1	32.6							118.6
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Range Check - Mean Depth	-		0.88		0.87		0.78							3
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-	1.13		1.12			0.70							3
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-													0
Water Balance Error	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%							0.00%
Mass Balance Error	%	0.03%	0.02%	0.03%	0.02%	0.00%	0.03%							0.03%
Warning or Error Messages		Cell# 1 Flow/Width out of calib. range for EMG_3: 238 vs. 26 - 210 m2/day					Cell# 4 Depth out of calib. range for SAV_3: 54 vs. 62 - 87 cm							6
		Cell# 2 Depth out of calib. range for SAV_3: 55 vs. 62 - 87 cm					Cell# 6 Depth out of calib. range for SAV_3: 49 vs. 62 - 87 cm							
		Cell# 3 Flow/Width out of calib. range for EMG_3: 235 vs. 26 - 210 m2/day					Cell# 6 Flow/Width out of calib. range for SAV_3: 113 vs. 162 - 374 m2/day							

STA-5 With Emergent Vegetation in All Cells

DMSTA2- Inputs & Outputs **Project: STA 5 EIS** Model Release: 07/05/07 Current Date: 10/19/2007

Input Variable	Units	Value
Design Case Name	-	EIS Alt1 EMG
Input Series Name		TS_EIS_Alt1
Starting Date for Simulation	-	05/01/94
Ending Date for Simulation	-	04/30/07
Starting Date for Output	-	05/01/94
Integration Steps Per Day	-	4
Number of Iterations	-	0
Output Averaging Interval	days	365
Inflow Conc Scale Factor	-	1
Rainfall P Conc	ppb	10
Atmospheric P Load (Dry)	mg/m2-yr	20

Case Description: STA-5 Expanded to Include Full Build-out of Compartment C; Downstream cells considered as EMG_3; Inflows are C-139 Basin

Simulation Type: Uncertainty Analysis

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	32.0	46.5	21.7
GM Outflow C (ppb)	30.2	44.3	20.2
Load Reduction %	86%	80%	91%
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	3	0.1%
Warning/Error Messages	0	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	1A	1B	2A	2B	3A	3B	4A	4B	5A	5B		
Vegetation Type	-->	EMG_3	EMG_3	EMG_3	EMG_3	EMG_3	EMG_3	EMG_3	EMG_3	EMG_3	EMG_3		
Inflow Fraction	-	0.190896424		0.1908964		0.1843939		0.1922898		0.2415235			
Downstream Cell Number	-	2		4		6		8		10			
Surface Area	km2	3.38	4.94	3.38	4.94	4.31	3.72	6.52	1.86	7.73	2.79		
Mean Width of Flow Path	km	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56	2.34	2.34		
Number of Tanks in Series	-	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	38.1	60.96	38.1	60.96	38.1	60.96	38.1	60.96	38.1	60.96		
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4	4	4	4	4	4	4	4		
Outflow Coefficient - Intercept	-	1	1	1	1	1	1	1	1	1	1		
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm												
Inflow Seepage Control Elev	cm												
Inflow Seepage Conc	ppb												
Outflow Seepage Rate	(cm/d) / cm	0.0075	0.0075										
Outflow Seepage Control Elev	cm	-46	-38										
Max Outflow Seepage Conc	ppb	20	20										
Seepage Recycle to Cell Number	-	1	2										
Seepage Recycle Fraction	-	1	1										
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	30	30	30	30	30	30	30	30	30	30		
Initial P Storage Per Unit Area	mg/m2	500	500	500	500	500	500	500	500	500	500		
Initial Water Column Depth	cm	200	200	200	200	200	200	200	200	200	200		
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3	3	3	3	3	3	3	3		
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22	22	22	22	22	22	22	22		
C2 = Conc at Half-Max Uptake	ppb	300	300	300	300	300	300	300	300	300	300		
K = Net Settling Rate at Steady State	m/yr	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8		
Z1 = Saturated Uptake Depth	cm	40	40	40	40	40	40	40	40	40	40		
Z2 = Lower Penalty Depth	cm	100	100	100	100	100	100	100	100	100	100		
Z3 = Upper Penalty Depth	cm	200	200	200	200	200	200	200	200	200	200		

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	19.62	20.46	21.31	22.16	22.92	23.77	24.62	25.46	26.31	27.16			27.16
Run Date	-	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07			10/18/07
Starting Date for Simulation	-	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94			05/01/94
Starting Date for Output	-	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94			05/01/94
Ending Date	-	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07			04/30/07
Output Duration	days	4748	4748	4748	4748	4748	4748	4748	4748	4748	4748			4748
Cell Label		1A	1B	2A	2B	3A	3B	4A	4B	5A	5B			Total
Downstream Cell Label		1B	Outflow	2B	Outflow	3B	Outflow	4B	Outflow	5B	Outflow			-
Network Simulation Name	-	none	none	none	none	none	none	none	none	none	none			none
Simulation Type	-	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta			Uncerta
Surface Area	km2	3.38	4.94	3.38	4.94	4.31	3.72	6.52	1.86	7.73	2.79			43.58
Mean Rainfall	cm/yr	127.21	127.21	127.21	127.21	127.21	127.21	127.21	127.21	127.21	127.21			127.2
Mean ET	cm/yr	131.28	131.30	131.23	131.30	131.23	131.30	130.99	131.30	131.02	131.30			131.2
Cell Inflow Volume	hm3/yr	35.3	35.2	35.3	35.2	34.1	34.0	35.6	35.4	44.7	44.4		150124.5	185.2
Cell Inflow Load	kg/yr	8081.3	3096.5	8081.3	3679.6	7806.1	2827.4	8140.3	2026.2	10224.6	2711.2			42334
Cell Inflow Conc	ppb	229	88	229	104	229	83	229	57	229	61			228.6
Treated Outflow Volume	hm3/yr	35.2	35.0	35.2	35.0	34.0	33.8	35.4	35.3	44.4	44.3		148716.7	183.4
Treated Outflow Load	kg/yr	3096.5	945.5	3679.6	1114.1	2827.4	1074.8	2026.2	1227.4	2711.2	1504.1			5866
Treated FWM Outflow Conc	ppb	88	27	104	32	83	32	57	35	61	34			32.0
Upper Confidence Limit	ppb	102.9	37.1	124.9	47.1	104.0	47.2	76.0	50.7	80.2	49.8			46.5
Lower Confidence Limit	ppb	72.8	19.3	83.9	21.3	63.8	21.1	41.8	23.4	44.8	22.8			21.7
Total Outflow Volume + Bypass	hm3/yr	35.2	35.0	35.2	35.0	34.0	33.8	35.4	35.3	44.4	44.3			183.4
Total Outflow Load + Bypass	kg/yr	3096.5	945.5	3679.6	1114.1	2827.4	1074.8	2026.2	1227.4	2711.2	1504.1			5865.9
Total FWM Outflow Conc	ppb	87.9	27.0	104.5	31.8	83.2	31.8	57.3	34.8	61.0	33.9			32.0
Bypass Load	kg/yr	0	0	0	0	0	0	0	0	0	0			0.0
Bypass Load	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			0.0
Maximum Inflow	hm3/d	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.18	0.22	0.22			0.90
Maximum Outflow	hm3/d	0.17	0.17	0.17	0.17	0.17	0.17	0.18	0.18	0.22	0.22			0.91
Surface Load Reduction	kg/yr	5153	2405	4402	2566	4979	1753	6114	799	7513	1207			36468
Load Trapped in Sediments	kg/yr	3956	2133	4514	2727	5121	1874	6328	860	7767	1298			36579
Overall Load Reduction	%	62%	69%	54%	70%	64%	62%	75%	39%	73%	45%			86%
Lower Confidence Limit	%	0.6	0.6	0.5	0.6	0.5	0.5	0.7	0.3	0.7	0.4			80%
Upper Confidence Limit	%	0.7	0.7	0.6	0.7	0.7	0.7	0.8	0.4	0.8	0.5			91%
Daily Geometric Mean	ppb	91.1	22.6	110.0	26.8	84.7	26.6	55.5	29.2	59.7	28.4			#N/A
Outflow Geo Mean - Composites	ppb	82.9	25.6	97.2	30.2	76.8	30.1	52.5	32.6	56.0	31.9			30.2
Upper Confidence Limit	ppb	97.7	35.4	117.4	45.0	96.8	45.1	70.2	47.8	74.2	47.1			44.3
Lower Confidence Limit	ppb	68.0	18.2	77.2	19.9	58.3	19.8	38.0	21.8	40.7	21.2			20.2
Frequency Outflow Conc > 10 ppb	%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%			100%
Frequency Outflow Conc > 20 ppb	%	100%	92%	100%	100%	100%	100%	100%	100%	100%	100%			100%
Frequency Outflow Conc > 50 ppb	%	100%	0%	100%	0%	100%	0%	54%	0%	62%	0%			100%
Freq Outflow Volume > 10 ppb	%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%			100%
95th Percentile Outflow Conc	ppb	115.68	33.33	128.72	39.59	108.26	39.61	76.17	43.65	80.98	42.22			40
Mean Biomass P Storage	mg/m2	3607	1369	4143	1744	3692	1587	3025	1451	3129	1462			2618
Storage Increase / Net Removal	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			0%
Net Storage Turnover Rate	1/yr	4.2	4.1	4.2	4.1	4.2	4.1	4.2	4.1	4.2	4.1			4.2
Unit Area P Load	mg/m2-yr	2391	627	2391	745	1810	759	1249	1088	1322	971			971
Unit Area P Removal	mg/m2-yr	1170	432	1335	552	1188	503	971	462	1004	465			839
Mean Water Load	cm/d	2.9	2.0	2.9	2.0	2.2	2.5	1.5	5.2	1.6	4.4			1.2
Max Water Load	cm/d	5.1	3.5	5.1	3.5	3.9	4.5	2.7	9.4	2.8	7.9			2.1
Mean Depth	cm	42	55	42	55	41	55	41	55	40	55			47
Minimum Depth	cm	1.4	22.8	1.2	22.6	1.2	23.2	1.2	23.7	1.2	23.7			10
Maximum Depth	cm	51.7	62.0	51.7	62.0	51.4	61.9	51.7	62.1	49.9	61.6			56
Frequency Depth < 10 cm	%	7%	0%	7%	0%	7%	0%	7%	0%	7%	0%			4.2%
Flow/Width	m2/day	62	62	62	62	60	60	62	62	52	52			59.3
HRT Days	days	14.5	28.4	14.5	28.4	19.0	22.1	27.6	10.6	25.3	12.6			40.4
Mean Velocity	cm/sec	0.17	0.13	0.17	0.13	0.17	0.12	0.18	0.13	0.15	0.11			0.15
Seepage Outflow / Total Outflow	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			0%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.0
95th Percentile Outflow Volume	hm3/d	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2			0.8
95th Percentile Outflow Load	kg/d	15.4	4.6	18.8	5.6	15.6	5.5	11.8	6.3	15.7	7.7			29.7
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A			#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A			#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A			#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A			#N/A
Range Check - Mean Depth	-													0
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-													0
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-													0
Water Balance Error	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%			0.00%
Mass Balance Error	%	0.00%	0.00%	-0.02%	0.00%	-0.01%	0.00%	-0.01%	0.00%	-0.01%	0.00%			-0.01%
Warning or Error Messages														0

STA-5 With SAV in the Downstream Cells

DMSTA2- Inputs & Outputs Project: STA 5 EIS Model Release: 07/05/07 Current Date: 10/19/2007

Input Variable	Units	Value
Design Case Name	-	EIS Alt1 SAV
Input Series Name		TS_EIS_Alt1
Starting Date for Simulation	-	05/01/94
Ending Date for Simulation	-	04/30/07
Starting Date for Output	-	05/01/94
Integration Steps Per Day	-	4
Number of Iterations	-	0
Output Averaging Interval	days	365
Inflow Conc Scale Factor	-	1
Rainfall P Conc	ppb	10
Atmospheric P Load (Dry)	mg/m2-yr	20

Case Description: STA-5 Expanded to Include Full Build-out of Compartment C; Downstream cells considered as SAV_3; Inflows are C-139 Basin

Simulation Type: Uncertainty Analysis

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	14.1	19.0	11.0
GM Outflow C (ppb)	12.8	17.3	10.0
Load Reduction %	94%	92%	95%
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	3	0.0%
Warning/Error Messages	13	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	1A	1B	2A	2B	3A	3B	4A	4B	5A	5B		
Vegetation Type	-->	EMG_3	SAV_3	EMG_3	SAV_3	EMG_3	SAV_3	EMG_3	SAV_3	EMG_3	SAV_3		
Inflow Fraction	-	0.190896424		0.1908964		0.1843939		0.1922898		0.2415235			
Downstream Cell Number	-	2		4		6		8		10			
Surface Area	km2	3.38	4.94	3.38	4.94	4.31	3.72	6.52	1.86	7.73	2.79		
Mean Width of Flow Path	km	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56	2.34	2.34		
Number of Tanks in Series	-	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	38.1	60.96	38.1	60.96	38.1	60.96	38.1	60.96	38.1	60.96		
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4	4	4	4	4	4	4	4		
Outflow Coefficient - Intercept	-	1	1	1	1	1	1	1	1	1	1		
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm												
Inflow Seepage Control Elev	cm												
Inflow Seepage Conc	ppb												
Outflow Seepage Rate	(cm/d) / cm	0.0075	0.0075										
Outflow Seepage Control Elev	cm	-46	-38										
Max Outflow Seepage Conc	ppb	20	20										
Seepage Recycle to Cell Number	-	1	2										
Seepage Recycle Fraction	-	1	1										
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	30	30	30	30	30	30	30	30	30	30		
Initial P Storage Per Unit Area	mg/m2	500	500	500	500	500	500	500	500	500	500		
Initial Water Column Depth	cm	200	200	200	200	200	200	200	200	200	200		
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3	3	3	3	3	3	3	3		
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22	22	22	22	22	22	22	22		
C2 = Conc at Half-Max Uptake	ppb	300	300	300	300	300	300	300	300	300	300		
K = Net Settling Rate at Steady State	m/yr	16.8	52.5	16.8	52.5	16.8	52.5	16.8	52.5	16.8	52.5		
Z1 = Saturated Uptake Depth	cm	40	40	40	40	40	40	40	40	40	40		
Z2 = Lower Penalty Depth	cm	100	100	100	100	100	100	100	100	100	100		
Z3 = Upper Penalty Depth	cm	200	200	200	200	200	200	200	200	200	200		

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	104.39	106.39	109.70	113.24	115.93	118.78	122.16	124.39	127.55	133.55			133.55
Run Date	-	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07			10/18/07
Starting Date for Simulation	-	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94			05/01/94
Starting Date for Output	-	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94			05/01/94
Ending Date	-	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07			04/30/07
Output Duration	days	4748	4748	4748	4748	4748	4748	4748	4748	4748	4748			4748
Cell Label		1A	1B	2A	2B	3A	3B	4A	4B	5A	5B			Total
Downstream Cell Label		1B	Outflow	2B	Outflow	3B	Outflow	4B	Outflow	5B	Outflow			-
Network Simulation Name	-	none	none	none	none	none	none	none	none	none	none			none
Simulation Type	-	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta			Uncerta
Surface Area	km2	3.38	4.94	3.38	4.94	4.31	3.72	6.52	1.86	7.73	2.79			43.58
Mean Rainfall	cm/yr	127.21	127.21	127.21	127.21	127.21	127.21	127.21	127.21	127.21	127.21			127.2
Mean ET	cm/yr	131.28	131.30	131.23	131.30	131.23	131.30	130.99	131.30	131.02	131.30			131.2
Cell Inflow Volume	hm3/yr	35.3	35.2	35.3	35.2	34.1	34.0	35.6	35.4	44.7	44.4			185.2
Cell Inflow Load	kg/yr	8081.3	3096.5	8081.3	3679.6	7806.1	2827.4	8140.3	2026.2	10224.6	2711.2			42334
Cell Inflow Conc	ppb	229	88	229	104	229	83	229	57	229	61			228.6
Treated Outflow Volume	hm3/yr	35.2	35.0	35.2	35.0	34.0	33.8	35.4	35.3	44.4	44.3			183.4
Treated Outflow Load	kg/yr	3096.5	389.4	3679.6	415.3	2827.4	434.0	2026.2	626.7	2711.2	723.9			2589
Treated FWM Outflow Conc	ppb	88	11	104	12	83	13	57	18	61	16			14.1
Upper Confidence Limit	ppb	102.9	13.8	124.9	15.1	104.0	16.9	76.0	25.3	80.2	23.0			19.0
Lower Confidence Limit	ppb	72.8	9.3	83.9	9.8	63.8	10.3	41.8	13.0	44.8	12.2			11.0
Total Outflow Volume + Bypass	hm3/yr	35.2	35.0	35.2	35.0	34.0	33.8	35.4	35.3	44.4	44.3			183.4
Total Outflow Load + Bypass	kg/yr	3096.5	389.4	3679.6	415.3	2827.4	434.0	2026.2	626.7	2711.2	723.9			2589.3
Total FWM Outflow Conc	ppb	87.9	11.1	104.5	11.9	83.2	12.8	57.3	17.8	61.0	16.3			14.1
Bypass Load	kg/yr	0	0	0	0	0	0	0	0	0	0			0.0
Bypass Load	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			0.0
Maximum Inflow	hm3/d	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.18	0.22	0.22			0.90
Maximum Outflow	hm3/d	0.17	0.17	0.17	0.17	0.17	0.17	0.18	0.18	0.22	0.22			0.91
Surface Load Reduction	kg/yr	5153	2872	4402	3264	4979	2393	6114	1399	7513	1987			39744
Load Trapped in Sediments	kg/yr	3956	2832	4514	3426	5121	2515	6328	1460	7767	2079			39998
Overall Load Reduction	%	62%	87%	54%	89%	64%	85%	75%	69%	73%	73%			94%
Lower Confidence Limit	%	0.6	0.9	0.5	0.9	0.5	0.8	0.7	0.7	0.7	0.7			92%
Upper Confidence Limit	%	0.7	0.9	0.6	0.9	0.7	0.8	0.8	0.7	0.8	0.7			95%
Daily Geometric Mean	ppb	91.1	6.2	110.0	6.3	84.7	7.0	55.5	10.9	59.7	9.7			#N/A
Outflow Geo Mean - Composites	ppb	82.9	10.2	97.2	10.8	76.8	11.7	52.5	16.0	56.0	14.8			12.8
Upper Confidence Limit	ppb	97.7	12.7	117.4	13.8	96.8	15.4	70.2	22.8	74.2	20.8			17.3
Lower Confidence Limit	ppb	68.0	8.6	77.2	8.9	58.3	9.3	38.0	11.8	40.7	11.1			10.0
Frequency Outflow Conc > 10 ppb	%	100%	62%	100%	69%	100%	77%	100%	92%	100%	85%			85%
Frequency Outflow Conc > 20 ppb	%	100%	0%	100%	0%	100%	0%	100%	15%	100%	15%			15%
Frequency Outflow Conc > 50 ppb	%	100%	0%	100%	0%	100%	0%	54%	0%	62%	0%			0%
Freq Outflow Volume > 10 ppb	%	100%	54%	100%	60%	100%	66%	100%	88%	100%	84%			75%
95th Percentile Outflow Conc	ppb	115.68	13.65	128.72	14.97	108.26	16.63	76.17	24.09	80.98	21.99			19
Mean Biomass P Storage	mg/m2	3607	570	4143	687	3692	668	3025	773	3129	734			2254
Storage Increase / Net Removal	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			0%
Net Storage Turnover Rate	1/yr	4.2	13.1	4.2	13.1	4.2	13.1	4.2	13.2	4.2	13.2			5.3
Unit Area P Load	mg/m2-yr	2391	627	2391	745	1810	759	1249	1088	1322	971			971
Unit Area P Removal	mg/m2-yr	1170	573	1335	694	1188	675	971	784	1004	744			918
Mean Water Load	cm/d	2.9	2.0	2.9	2.0	2.2	2.5	1.5	5.2	1.6	4.4			1.2
Max Water Load	cm/d	5.1	3.5	5.1	3.5	3.9	4.5	2.7	9.4	2.8	7.9			2.1
Mean Depth	cm	42	55	42	55	41	55	41	55	40	55			47
Minimum Depth	cm	1.4	22.8	1.2	22.6	1.2	23.2	1.2	23.7	1.2	23.7			10
Maximum Depth	cm	51.7	62.0	51.7	62.0	51.4	61.9	51.7	62.1	49.9	61.6			56
Frequency Depth < 10 cm	%	7%	0%	7%	0%	7%	0%	7%	0%	7%	0%			4.2%
Flow/Width	m2/day	62	62	62	62	60	60	62	62	52	52			59.3
HRT Days	days	14.5	28.4	14.5	28.4	19.0	22.1	27.6	10.6	25.3	12.6			40.4
Mean Velocity	cm/sec	0.17	0.13	0.17	0.13	0.17	0.12	0.18	0.13	0.15	0.11			0.15
Seepage Outflow / Total Outflow	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			0%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.0
95th Percentile Outflow Volume	hm3/d	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2			0.8
95th Percentile Outflow Load	kg/d	15.4	1.9	18.8	2.1	15.6	2.3	11.8	3.5	15.7	4.0			13.8
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A			#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A			#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A			#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A			#N/A
Range Check - Mean Depth	-		0.89		0.89		0.89		0.89		0.88			5
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-		0.38		0.38		0.37		0.38		0.32			5
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-		0.75		0.80		0.86							3
Water Balance Error	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%			0.00%
Mass Balance Error	%	0.00%	0.00%	-0.02%	0.00%	-0.01%	0.00%	-0.01%	0.00%	-0.01%	0.00%			-0.01%
Warning or Error Messages		Cell# 2 Depth out of calib. range for SAV_3: 55 vs. 62 - 87 cm Cell# 2 Flow/Width out of calib. range for SAV_3: 62 vs. 162 - 374 m2/day Cell# 2 Outflow Conc out of calib. range for SAV_3: 11 vs. 15 - 153 ppb Cell# 4 Depth out of calib. range for SAV_3: 55 vs. 62 - 87 cm Cell# 4 Flow/Width out of calib. range for SAV_3: 62 vs. 162 - 374 m2/day Cell# 4 Outflow Conc out of calib. range for SAV_3: 12 vs. 15 - 153 ppb Cell# 6 Depth out of calib. range for SAV_3: 55 vs. 62 - 87 cm Cell# 6 Flow/Width out of calib. range for SAV_3: 60 vs. 162 - 374 m2/day Cell# 6 Outflow Conc out of calib. range for SAV_3: 13 vs. 15 - 153 ppb Cell# 8 Depth out of calib. range for SAV_3: 55 vs. 62 - 87 cm								Cell# 8 Flow/Width out of calib. range for SAV_3: 62 vs. 162 - 374 m2/day Cell# 10 Depth out of calib. range for SAV_3: 55 vs. 62 - 87 cm Cell# 10 Flow/Width out of calib. range for SAV_3: 52 vs. 162 - 374 m2/day			13

STA-6

DMSTA2- Inputs & Outputs Project: STA 6 EIS Model Release: 07/05/07 Current Date: 10/18/2007

Input Variable	Units	Value	Case Description:
Design Case Name	-	EIS Alt1	STA-6 3 flow-ways
Input Series Name		TS_EIS_Alt1	Inflows are a mixture of C-139 Basin and C-139 Annex (USSO)
Starting Date for Simulation	-	05/01/94	
Ending Date for Simulation	-	04/30/07	
Starting Date for Output	-	05/01/94	
Integration Steps Per Day	-	4	
Number of Iterations	-	0	
Output Averaging Interval	days	365	
Inflow Conc Scale Factor	-	1	
Rainfall P Conc	ppb	10	
Atmospheric P Load (Dry)	mg/m2-yr	20	

Simulation Type: Uncertainty Analysis

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	12.9	16.9	10.2
GM Outflow C (ppb)	12.4	16.3	9.8
Load Reduction %	91%	88%	93%
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	3	0.0%
Warning/Error Messages	8	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	3	5	2	4								
Vegetation Type	-->	PEW_3	PEW_3	EMG_3	SAV_3								
Inflow Fraction	-	0.0865	0.2301	0.6835									
Downstream Cell Number	-			4									
Surface Area	km2	0.99	2.64	2.23	5.62								
Mean Width of Flow Path	km	0.61	1.31	1.14	2.39								
Number of Tanks in Series	-	3.0	3.0	3.0	3.0								
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	28.3464	35.3568	38.1	48.8								
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4	4								
Outflow Coefficient - Intercept	-	1	1	1	1								
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm												
Inflow Seepage Control Elev	cm												
Inflow Seepage Conc	ppb												
Outflow Seepage Rate	(cm/d) / cm												
Outflow Seepage Control Elev	cm												
Max Outflow Seepage Conc	ppb												
Seepage Recycle to Cell Number	-												
Seepage Recycle Fraction	-												
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	30	30	30	30								
Initial P Storage Per Unit Area	mg/m2	500	500	500	500								
Initial Water Column Depth	cm	200	200	200	200								
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3	3								
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22	22								
C2 = Conc at Half-Max Uptake	ppb	300	300	300	300								
K = Net Settling Rate at Steady Stat	m/yr	34.9	34.9	16.8	52.5								
Z1 = Saturated Uptake Depth	cm	40	40	40	40								
Z2 = Lower Penalty Depth	cm	100	100	100	100								
Z3 = Upper Penalty Depth	cm	200	200	200	200								

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	9.15	9.92	10.69	11.46									11.46
Run Date	-	10/18/07	10/18/07	10/18/07	10/18/07									10/18/07
Starting Date for Simulation	-	05/01/94	05/01/94	05/01/94	05/01/94									05/01/94
Starting Date for Output	-	05/01/94	05/01/94	05/01/94	05/01/94									05/01/94
Ending Date	-	04/30/07	04/30/07	04/30/07	04/30/07									04/30/07
Output Duration	days	4748	4748	4748	4748									4748
Cell Label		3	5	2	4									Total
Downstream Cell Label		Outflow	Outflow	4	Outflow									-
Network Simulation Name	-	none	none	none	none									none
Simulation Type	-	Uncerta	Uncerta	Uncerta	Uncerta									Uncerta
Surface Area	km2	0.99	2.64	2.23	5.62									11.47
Mean Rainfall	cm/yr	129.55	129.55	129.55	129.55									129.5
Mean ET	cm/yr	130.68	130.68	130.68	130.68									130.7
Cell Inflow Volume	hm3/yr	6.6	17.5	51.9	51.9									76.0
Cell Inflow Load	kg/yr	921.5	2451.2	7281.1	4779.1									10654
Cell Inflow Conc	ppb	140	140	140	92									140.2
Treated Outflow Volume	hm3/yr	6.6	17.5	51.9	51.8									75.9
Treated Outflow Load	kg/yr	108.5	282.5	4779.1	586.0									977
Treated FWM Outflow Conc	ppb	17	16	92	11									12.9
Upper Confidence Limit	ppb	22.6	22.1	101.4	14.4									16.9
Lower Confidence Limit	ppb	12.4	12.2	81.5	9.2									10.2
Total Outflow Volume + Bypass	hm3/yr	6.6	17.5	51.9	51.8									75.9
Total Outflow Load + Bypass	kg/yr	108.5	282.5	4779.1	586.0									977.1
Total FWM Outflow Conc	ppb	16.5	16.2	92.1	11.3									12.9
Bypass Load	kg/yr	0	0	0	0									0.0
Bypass Load	%	0%	0%	0%	0%									0.0
Maximum Inflow	hm3/d	0.03	0.08	0.23	0.23									0.34
Maximum Outflow	hm3/d	0.03	0.08	0.23	0.23									0.34
Surface Load Reduction	kg/yr	813	2169	2502	4193									9677
Load Trapped in Sediments	kg/yr	846	2256	2575	4378									10055
Overall Load Reduction	%	88%	88%	34%	88%									91%
Lower Confidence Limit	%	0.8	0.8	0.3	0.9									88%
Upper Confidence Limit	%	0.9	0.9	0.4	0.9									93%
Daily Geometric Mean	ppb	15.5	13.5	88.5	7.4									#N/A
Outflow Geo Mean - Composites	ppb	16.0	15.6	89.9	10.8									12.4
Upper Confidence Limit	ppb	22.0	21.4	99.5	13.8									16.3
Lower Confidence Limit	ppb	12.0	11.8	79.1	8.8									9.8
Frequency Outflow Conc > 10 ppb	%	100%	100%	100%	62%									92%
Frequency Outflow Conc > 20 ppb	%	8%	8%	100%	0%									8%
Frequency Outflow Conc > 50 ppb	%	0%	0%	100%	0%									0%
Freq Outflow Volume > 10 ppb	%	98%	95%	100%	53%									72%
95th Percentile Outflow Conc	ppb	20.11	19.54	107.88	13.59									15
Mean Biomass P Storage	mg/m2	1279	1282	3616	775									1487
Storage Increase / Net Removal	%	0%	0%	0%	0%									0%
Net Storage Turnover Rate	1/yr	8.7	8.7	4.2	13.1									7.7
Unit Area P Load	mg/m2-yr	929	928	3269	851									929
Unit Area P Removal	mg/m2-yr	852	854	1156	780									876
Mean Water Load	cm/d	1.8	1.8	6.4	2.5									1.8
Max Water Load	cm/d	3.0	3.0	10.5	4.2									3.0
Mean Depth	cm	36	40	52	51									47
Minimum Depth	cm	12.3	19.3	23.2	33.8									27
Maximum Depth	cm	43.2	46.7	62.7	56.1									54
Frequency Depth < 10 cm	%	0%	0%	0%	0%									0.0%
Flow/Width	m2/day	29	37	125	59									64.3
HRT Days	days	20.0	22.3	8.2	20.1									26.2
Mean Velocity	cm/sec	0.09	0.10	0.28	0.14									0.15
Seepage Outflow / Total Outflow	%	0%	0%	0%	0%									0%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00									0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00									0.0
95th Percentile Outflow Volume	hm3/d	0.0	0.1	0.2	0.2									0.3
95th Percentile Outflow Load	kg/d	0.5	1.2	19.8	2.6									4.2
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A	#N/A									#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A	#N/A									#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A	#N/A									#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A	#N/A									#N/A
Range Check - Mean Depth	-	0.97			0.82									2
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-	0.43	0.53		0.37									3
Range Check - Inflow Conc	-	1.28	1.28											2
Range Check - Outflow Conc	-				0.76									1
Water Balance Error	%	0.00%	0.00%	0.00%	0.00%									0.00%
Mass Balance Error	%	0.00%	0.00%	0.00%	0.00%									0.00%
Warning or Error Messages		Cell# 1 Depth out of calib. range for PEW_3: 36 vs. 38 - 66 cm Cell# 1 Flow/Width out of calib. range for PEW_3: 29 vs. 69 - 276 m2/day Cell# 1 Inflow Conc out of calib. range for PEW_3: 140 vs. 8 - 110 ppb Cell# 2 Flow/Width out of calib. range for PEW_3: 37 vs. 69 - 276 m2/day Cell# 2 Inflow Conc out of calib. range for PEW_3: 140 vs. 8 - 110 ppb Cell# 4 Depth out of calib. range for SAV_3: 51 vs. 62 - 87 cm Cell# 4 Flow/Width out of calib. range for SAV_3: 59 vs. 162 - 374 m2/day Cell# 4 Outflow Conc out of calib. range for SAV_3: 11 vs. 15 - 153 ppb												8

STA Phosphorus Modeling For the 2010 Planning Period: Alternative C

Work Order No. CN040902-WO03R2

Prepared for

US Army Corps of Engineers®

South Florida Water Management District

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FINAL REPORT

December 23, 2007

December 23, 2007

Ms. Kelly Gracie
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U.S. Army Corps of Engineers
South Florida Water Management District
Tetra Tech Contract No. CN040902-WO03R2
STA Phosphorus Modeling for the 2010 Period: Alternative C

Dear Ms. Gracie:

I am pleased to submit this final report titled "STA Phosphorus Modeling for the 2010 Planning Period: Alternative C". This document constitutes the final deliverable for Alternative C under Tetra Tech EC Purchase Order 1025202 dated October 19, 2007.

I gratefully acknowledge the valuable contributions of the staff of the South Florida Water Management District, and the technical review by yourself, staff of the District and of the U. S. Army Corps of Engineers, in the development of the information contained in this report.

Certification

I hereby certify, as a Professional Engineer in the State of Florida, that the information in this document was assembled under my direct personal charge. This report is not intended or represented to be suitable for reuse without specific verification or adaptation by the Engineer. This certification is made in accordance with the provisions of the Laws and Rules of the Florida Board of Professional Engineers under Chapter 61G15-29, Florida Administrative Code.

_____
Gary F. Goforth, P.E. Florida P.E. # 35525

Date: 12/23/07
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1. Introduction

As part of the evaluation of alternatives for the Environmental Impact Statement (EIS) associated with the full build-out of Compartments B and C, the phosphorus removal performance of the Stormwater Treatment Areas (STAs) were projected using the DMSTA model (Walker and Kadlec 2005). Four alternatives were simulated for the EIS, and this report presents the results of the STA simulations for Alternative C. Daily flow data from the South Florida Water Management Model (SFWMM) for this alternative were combined with phosphorus data to create the input time series for the DMSTA model, following the method utilized in the recently updated STA performance projections (Goforth 2007b). For STA-5 and STA-6, historic basin flow and phosphorus data were utilized in lieu of the SFWMM output. Additional details of the input data set and model setup are provided in Sections 2-9 of this report.

1.1. Scope of Work

This work constitutes Task 7 of CN040902-WO03.Ta18 - Preparation of an Environmental Impact Statement for Everglades Agricultural Area Conveyance and Regional Treatment Project Plus Compartments B and C - between the District and Tetra Tech EC, Inc. This work is being performed under Purchase Order No. 1025202, which was issued on October 19, 2007, between Tetra Tech EC, Inc., and Gary Goforth, Inc.

The scope of work for this Purchase Order consists of conducting DMSTA modeling for the four alternatives being evaluated for the Environmental Impact Statement associated with the full build-out of Compartments B and C. To expedite the preparation of the EIS, separate reports were generated for each alternative summarizing the phosphorus performance projections. This report presents the results of the simulation of Alternative C; other reports address the other alternatives.

1.2. Regional Conditions for the 2010 Planning Period

This present analysis focuses on the regional conditions that are anticipated to be present in the 2010 time frame, including the full build-out of Compartments B and C. The anticipated status of the water resources projects within the basins tributary to the STAs (shown in **Figure 1-1**) is provided in the **Table 1-1**. These regional hydrologic conditions were simulated using the 2010A8 Alternative C simulation of the SFWMM, also referred to as "Simulation Alt1". Under this alternative, Compartment B receives runoff from the North New River Basin in excess of that which can be delivered into or stored in the EAA A-1, providing some assistance to STA-3/4 and possibly STA-2. Appendix A contains a more complete summary of the key modeling assumptions used in this simulation throughout the South Florida area.

Figure 1-1: Overview of EAA And Surrounding Basins.

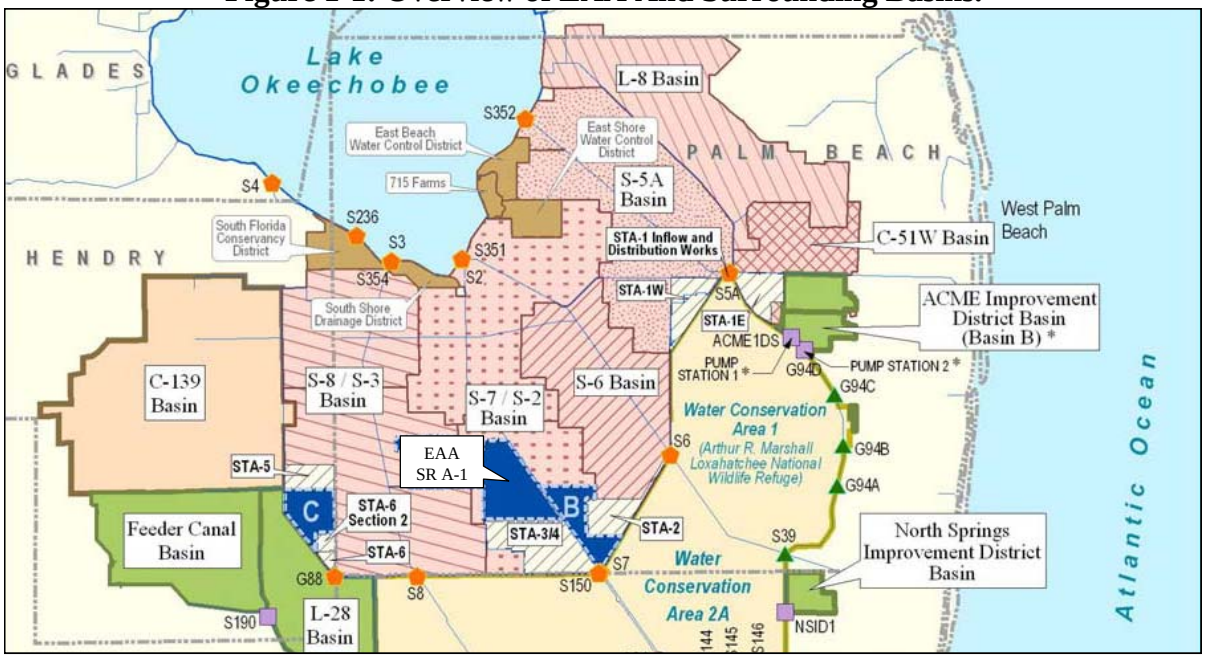


Table 1-1: Anticipated Status of Regional Water Resource Projects in the 2010 Period.

Project	Status During the 2010 Period
Original Everglades Construction Project	All 6 STAs are fully operational, including STA-6 Section 2. Approximately 20% of the S-5A Basin runoff diverted to the Hillsboro Canal through existing facilities. Ch. 298 District and 715 Farms diversions in place. No EAA runoff reduction adjustment necessary to account for Best Management Practices.
Compartment B	The full area of Compartment B is operational as effective treatment area.
Compartment C	The full area of Compartment C is operational as effective treatment area.
EAA Storage Reservoir A-1	16,000-acre reservoir operable with a 12-ft depth
Acme Basin B	Runoff directed away from WCA-1 and discharged to C-51W, and then to STA-1E
L-8 Reservoir	Partially completed: 870 acres, depth 44 ft. Facilities not completed for diversion away from S-5A/C-51W.
Everglades Agricultural Area Conveyance and Regional Treatment Project (ECART)	Not completed

1.3. Phosphorus Modeling

The phosphorus removal performance of the STAs, EAA Storage Reservoir and treatment areas of Compartments B and C were estimated using the July 5, 2007 release of the Dynamic Model for Stormwater Treatment Areas, Model Version 2 (DMSTA, 09/30/2005), developed for the U.S. Department of the Interior and the U.S. Army Corps of Engineers by W. Walker and R. Kadlec. Outflow phosphorus concentrations are calculated based on:

- daily input data, consisting of flow, phosphorus concentrations, rainfall evapotranspiration (ET), depth (optional) and releases (optional);
- mass and water balances calculated for each time step for each treatment cell or reservoir compartment,
- treatment area configuration, cell size, flow path width, vegetation type, estimates of hydraulic mixing, outflow hydraulics, seepage estimates;
- phosphorus removal rates that can be either user-defined or available within DMSTA based on calibration data sets extracted from numerous vegetation types, phosphorus characteristics and hydraulic regimes of many south Florida wetland treatment systems through early 2005.

DMSTA was used to predict annual and long-term average flow-weighted mean concentrations, with a 365-day averaging period. In addition, STA performance uncertainty analyses were conducted, using the 10%, mean and 90% values of the settling rates for the specific vegetation types. These projections are subject to the assumptions, constraints and limitations of DMSTA modeling and STA operations, including the following.

- DMSTA calibrations are based upon data from fully functional treatment cells with viable vegetation communities that have near optimal performance. The range of treatment characteristics for each vegetation type is summarized in **Table 1-2**.
- In addition to consideration of the range of calibration treatment characteristics, other important factors not yet incorporated into the model include calcium requirements, antecedent soils, and assumed intensive management, particularly for the enhanced vegetation types.
- DMSTA generates error/warning notices if simulated conditions exceed the range of the calibration characteristics presented in **Table 1-3**.
- The use of the DMSTA calibration vegetation types, e.g., SAV, assumes that the vegetation will be maintained in the long-term. This assumption may produce overly optimistic long-term performance projections for treatment areas subject to periodic disturbance such as hurricanes, droughts and other extreme conditions.
- DMSTA does not allow a treatment cell to dry out, and hence does not reproduce the vegetative responses and phosphorus dynamics (e.g., post-dry-out spikes) observed in treatment cells that periodically go dry. Hence the phosphorus removal performance simulated for large wetland systems with limited water availability, such as Compartment C, may be overly optimistic. Other methods should be used to estimate

the supplemental water required to either avoid dryout or to estimate the phosphorus performance for these large systems that experience periodic dryout.

- STA performance projections are subject to the complete set of DMSTA assumptions, which can be found at http://www.wwwalker.net/DMSTA/index.htm.
- Additional uncertainty exists in flow estimates and regional water management.

Table 1-2: Calibration Dataset Ranges (Draft, from www.wwwalker.net/dmsta/).

Variable	Units	EMERG		PEW		SAV		PSTA		RESERV	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Calib Period	days	641	4017	693	4017	693	1522	245	1062	1460	5843
Calib K	m/yr	12	23	27	49	46	64	18	34	1	8
Mean Depth	cm	35	76	38	66	62	87	13	52	90	304
Max Depth	cm	47	131	71	123	75	132	22	65	187	457
Freq Z < 10 cm	%	0%	9%	0%	13%	0%	0%	0%	38%	0%	0%
Hydraulic Load	cm/day	1.1	6.5	3.0	6.9	5.1	12.7	2.8	14.6	0.4	17.6
Residence Time	days	8	66	7	22	5	17	1	19	8	714
Velocity	cm/sec	0.04	0.45	0.16	0.48	0.30	0.64	0.01	1.12	0.05	1.32
Flow/Width	md/2	26	210	69	276	162	374	3	132	68	1135
Areal Load	mg/m2-yr	382	2908	222	1919	1649	5279	142	1447	212	11781
Storage	mg/m2	921	4299	171	1494	903	2959	96	911	200	4994
Inflow Conc	ppb	39	283	17	110	36	153	7	56	78	1144
FWM Outflow Conc	ppb	20	150	8	28	15	57	6	15	50	767
Outflow GeoMean	ppb	19	125	8	21	15	55	5	15	39	725
Marsh GeoMean	ppb	19	128	8	20	16	56	5	15	38	725

Table 1-3: Variable Ranges for Model Applications - Used to Trigger Warning Messages (Draft, from www.wwwalker.net/dmsta/).

Calibration	K (m/yr)	CV(K)	Depth (cm)		Q/W (m2/d)		Conc (ppb)		Freq Z < 10 cm (%)	
			Min	Max	Min	Max	Min	Max	Min	Max
EMERG_3	16.8	0.20	35	76	26	210	19.5	800	0%	9%
PEW_3	34.9	0.21	38	66	69	276	8.0	110	0%	13%
SAV_3	52.5	0.16	62	87	162	374	14.9	153	0%	0%
PSTA_3	23.6	0.22	13	60	3	132	5.9	56	0%	38%
RES_3	5.0	0.45	90	304	68	1135	50.3	1144	0%	0%

When evaluating DMSTA results, particular attention needs to be given to the simulated outflow concentration, in that DMSTA does not constrain the reported values to minimum levels observed in the calibration data sets reported in Table 1-2. In other words, the model may forecast outflow concentrations lower than have been observed in the field. Forecast error is inherent when using any simulation model. These errors result from limitations of the calibration datasets (measurement error, short duration, etc.) and other sources that are difficult to quantify. Based on information from the DMSTA website (http://www.wwwalker.net/DMSTA/index.htm) and Walker (personal communication), the DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. In addition, the following disclaimer is offered by the authors of DMSTA:

DMSTA2 is a modeling tool with a constrained range of applicability. It has been developed and calibrated to information specific to South Florida. It is intended for use in evaluating Everglades Protection Project by individuals with experience in hydrologic & water quality

modeling. It should not be exercised in any situation without careful examination of all features, assumptions and calibrations, as they relate to a given application and to the supporting research upon which the calibrations are based. When properly calibrated by the user, the hydraulics portion of DMSTA2 is thought to generate predictions that are adequate for the purpose of simulating phosphorus dynamics. The hydraulic simulations should not be relied upon for designing flood control measures, designing levees, for any other purposes in which life and/or property may be at risk. The user assumes all risks associated with using the model for designing treatment areas or any other purpose.

Proper use of DMSTA2 requires thorough understanding of calibration results & limitations & further documentation provided below. Sample input files are for demonstration purposes. None reflect actual designs. Atmospheric deposition, hydraulic, or seepage input values should not be interpreted as defaults or recommended values. While P cycling parameters are suggested for various situations and within well-defined calibration boundaries, users must decide which calibration is appropriate in any situation.

Additional information on the development, calibration and application of DMSTA can be found at: **www.wwwalker.net/dmsta.**

The general method used for development of the daily flow and phosphorus input data sets was described in *Updated STA Inflow Data Sets for the 2010 Period* (Goforth 2007b); STA-specific variations to this general method are described in Sections 2-9. Daily rainfall and ET for all the treatment areas except STA-5 and STA-6 were provided by the District as part of the SFWMM modeling. For STA-5 and STA-6, actual rainfall and ET were used based on local gauges. Treatment cell dimensions, hydraulic characteristics and vegetation types were consistent with values used in the 2005 EAA Regional Feasibility Study (ADA/Burns & McDonnell 2005), modified for consistency with updated information obtained from the on-going Compartments B and C design (Brown & Caldwell 2007, URS 2007). All STA enhancements described in the Everglades *Long-Term Plan* scheduled for completion by the end of 2010 are assumed to be completed (Burns & McDonnell 2003, as amended).

2. STA-1E

Working in concert with STA-1W, STA-1E will capture and treat runoff from the C-51 Basin, Acme Basin B, L-8 Basin, S-5A Basin and the East Beach Water Control District (EBWCD). A schematic of STA-1E is presented in **Figure 2-1**. The daily flow terms from the SFWMM simulation were utilized for the DMSTA modeling with the following modifications:

- ***For all alternatives***, 25% of the L-8 Basin runoff passing through S-5AE is assumed to be captured and treated in STA-1E, compared to the complete diversion of L-8 Basin runoff assumed in the SFWMM.
- ***For all alternatives,*** the SFWMM flow term for the transfer of water from the STA-1 Inflow Basin to STA-1E was modified to balance the phosphorus loading rate among STA-1E and STA-1W, yielding a PLR of approximately 2 $g/m^2/yr$ for both STAs, including re-directed flows from STA-1W that exceed the inflow capacity of 3,250 cfs.
- ***For all alternatives,*** runoff from the EBWCD was re-directed to STA-1E at the same percentage as the S-5A Basin runoff diversion to STA-1E. The estimate of runoff from the EBWCD and the remaining Ch. 298 Districts and Closter Farms was based on historic runoff volumes from these basins to the maximum extent practicable, as the SFWMM simulations do not well represent either the total discharges or the distribution of these discharges from these basins. Runoff volumes for the period May 1, 1994 through April 30, 2000 are available for direct use, while the runoff volumes for the remainder of the 35-year period (May 1, 1965 through April 30, 1994) were estimated by indirect methods. Consistent with the approach utilized in the *Updated STA Inflow Data Sets for the 2010 Period*, daily runoff volumes were estimated as a fixed percentage of the daily runoff from the adjacent primary basin of the EAA (Goforth 2007b). That fixed percentage was derived as the ratio of the overall runoff from each Ch. 298 District basin to the overall runoff from the adjacent EAA basin over the WY1995-2007 period. In recognition of the changes in EAA basin contributing area over the WY1995-2007 period due to conversion of agriculture lands to STAs, the EAA runoff was normalized to the effective basin areas reflected in the SFWMM simulation.

The long-term average annual inflow to STA-1E by source is summarized in **Table 2-1** for Alternative C. Although the long-term goal is to treat less inflow in STA-1E than shown in Table 2-1, it is recognized that during the interim period before ECART and the L-8 Basin projects are complete, STA-1E inflows will be higher than the long-term goals. With complete diversion of the L-8 Basin runoff and without implementation of ECART, the long-term average annual inflows to STA-1E will be lower than presented in Table 2-1. It should also be noted that significantly higher phosphorus loads to STA-1E are estimated in the present analysis than in the 2005 EAA Regional Feasibility Study (ADA/Burns & McDonnell 2006), due principally to higher phosphorus concentrations during the updated period of record, observed following the 2004 hurricanes. A longer period of record will be

utilized in the 2009 update of the STA data sets, and it is likely that lower concentrations will be applied to future STA-1E inflows at that time.

Figure 2-1: Schematic of STA-1E (Not to Scale).

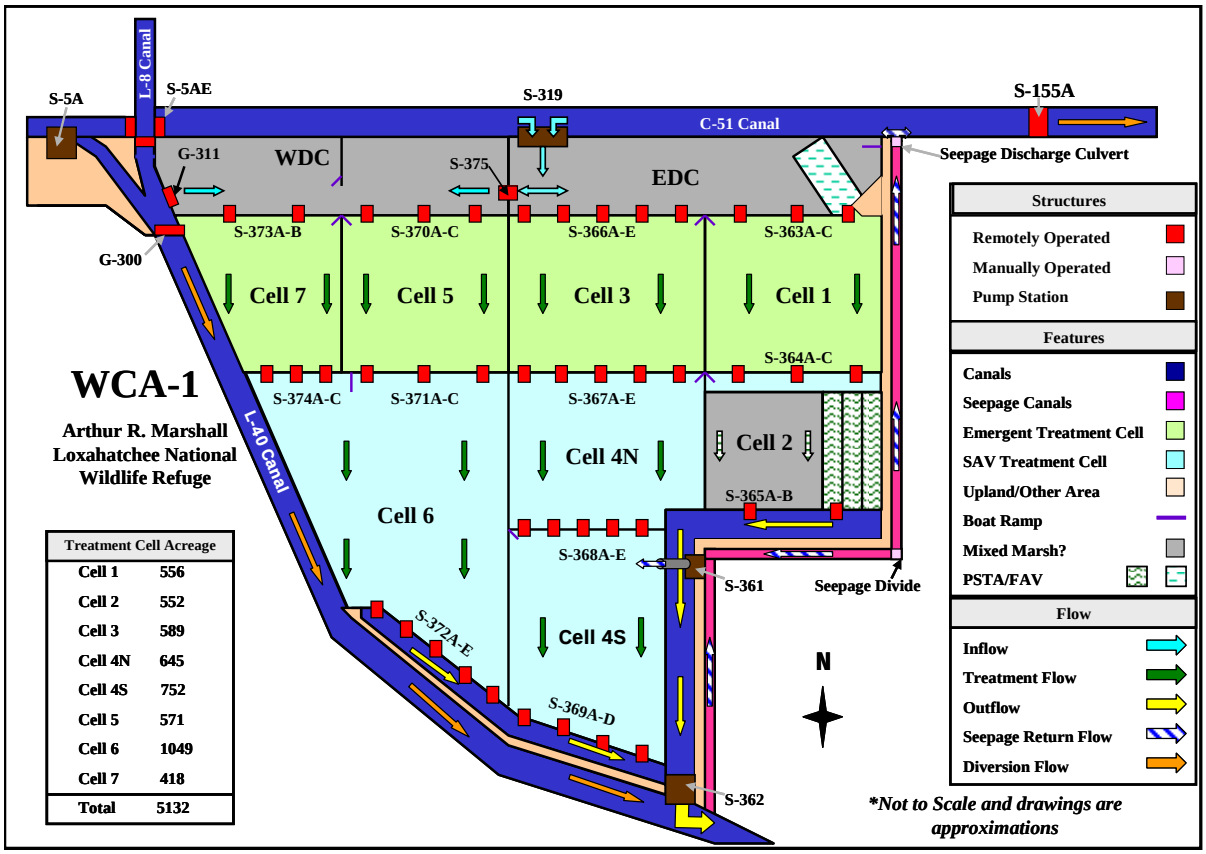


Table 2-1: Summary of Long-term Average Annual Inflow to STA-1E.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
C-51W Basin	131,034	31,733	196
Acme Basin B	35,051	4,913	114
L-8 Basin	8,481	1,008	96
S-5A Basin	18,162	3,782	356
EBWCD	982	567	468
Total	**193,710**	**42,004**	**176**

Prior to construction, the existing ground elevation at STA-1E exhibited a slope from the northeast to the southwest of more than 7 feet. When constructed by the U. S. Army Corps of Engineers, the majority of the treatment cells were leveled to minimize hydraulic short-circuiting and areas of deep depths. However, the East and West Distribution Cells were not leveled and still retain the relatively steep slope that existed prior to the STA construction. As a result, the cells are characterized by areas of high ground without wetland vegetation,

areas of deep ponds, and an irregular inundation/dry out cycle. Unlike the Buffer Cell of the prototype STA (the Everglades Nutrient Removal Project), phosphorus removal within the East and West Distribution Cells is not anticipated to be reliable. Hence, these cells are not considered as part of the effective treatment area of STA-1E, and were modeled with an effective settling rate of 0.01 m/yr.

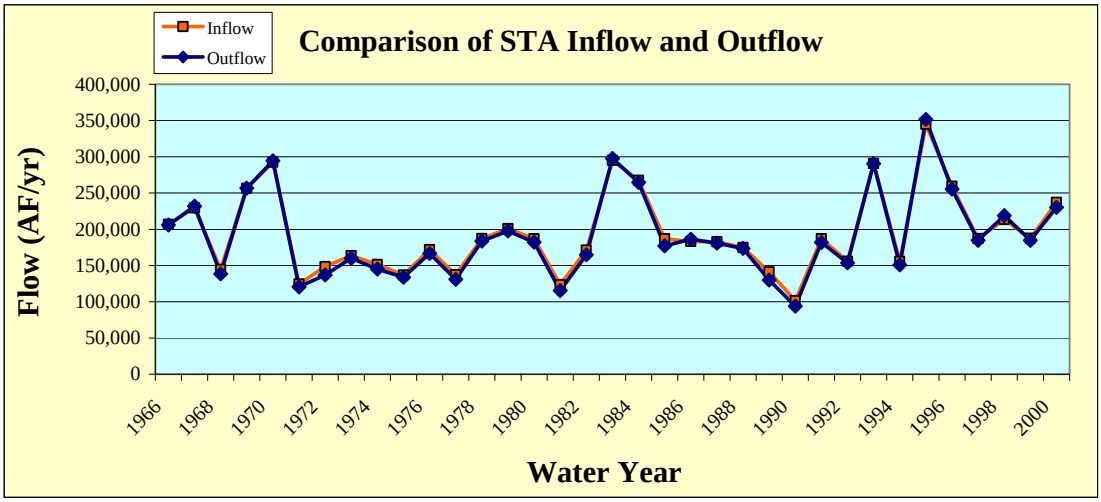
A summary of STA-1E phosphorus performance for Alternative C is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix B. A long-term flow-weighted mean outflow concentration range of 20-35 ppb was forecast, however this includes years when DMSTA forecast levels that fell below the calibration range of 15 ppb for an SAV system, and hence may be optimistic. DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix B. For Cells 2, 4S and 4S, the mean depths were slightly lower than the SAV calibration range. Also for Cell 2, the mean flow/width was slightly lower than the range in the SAV calibration data sets. For all alternatives, a portion of the L-8 Basin runoff was simulated as being diverted to the eastern C-51 Basin.

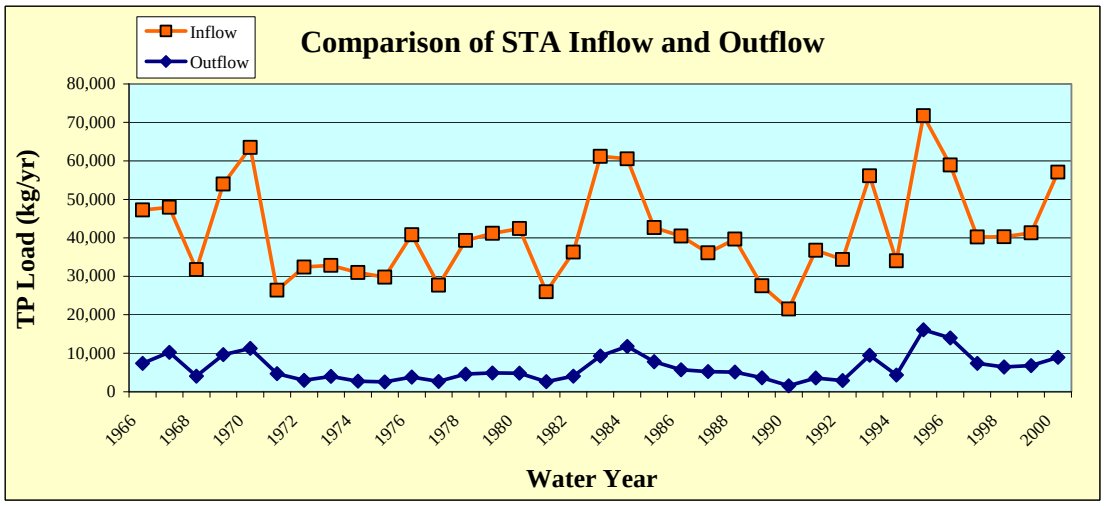
Table 2-2: Summary of DMSTA Results for STA-1E.

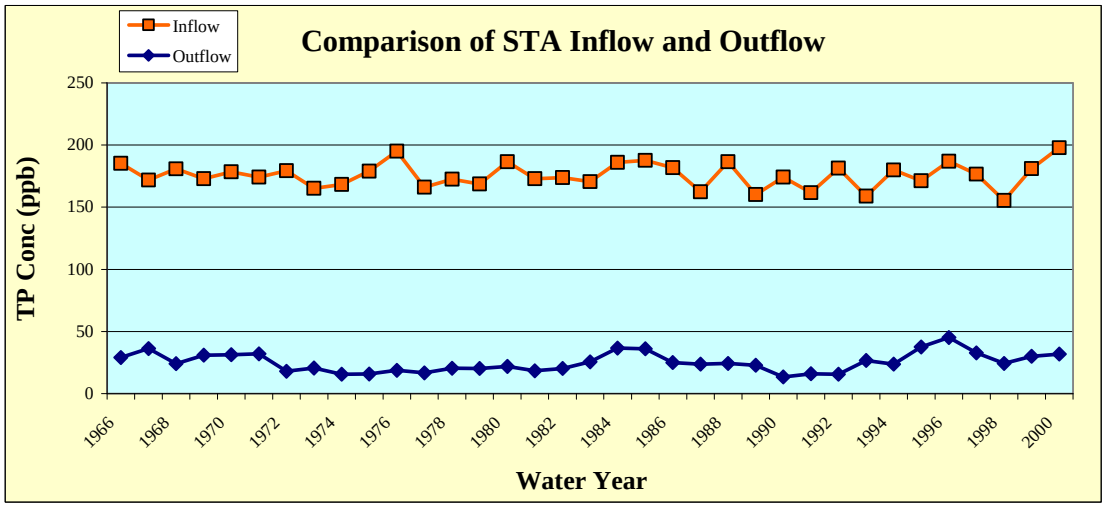
Parameter	Unit	STA-1E
Effective Treatment Area	acres	5,132
Average Annual Inflow		
Volume	AF/yr	193,710
TP Load	kg/yr	42,004
TP Concentration	ppb	176
Average Annual Outflow		
Volume	AF/yr	190,746
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	20.0 (10)
Mean Estimate of Settling Rate	ppb	26.8 (1)
Lower Conf. Limit for Settling Rate	ppb	35.3
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	17.9
Mean Estimate of Settling Rate	ppb	24.2
Lower Conf. Limit for Settling Rate	ppb	32.4
TP Load (Using Mean TP Conc.)	kg/yr	6,299
Diversion Volumes and Loads		
Volume	AF/yr	25,444
TP Load	kg/yr	3,024
TP Concentration	ppb	96

Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.
2. Outflow values highlighted in yellow had one or more years of the 35 years simulated below the low end of the calibration data set (enumerated by the number in parentheses).
3. Diversions related to STA-1E are directed to eastern C-51.

Figure 2-2: Comparison of Inflows and Outflows for STA-1E.







3. STA-1W

Working in concert with STA-1E, STA-1W will capture and treat runoff from the S-5A Basin, East Beach Water Control District (EBWCD), L-8 Basin and a portion of C-51 Basin, Acme Basin B when re-directed from STA-1E. A schematic of STA-1W is presented in **Figure 3-1**. The daily flow terms from the SFWMM simulation were utilized for the DMSTA modeling with the following modifications:

- ***For all alternatives,*** the SFWMM flow term for the transfer of water from the STA-1 Inflow Basin to STA-1E was modified to balance the phosphorus loading rate among STA-1E and STA-1W, yielding a PLR of approximately 2 $g/m^2/yr$ for both STAs, including re-directed flows from STA-1W that exceed the inflow capacity of 3,250 cfs.
- ***For all alternatives,*** the estimate of runoff from the EBWCD and the remaining Ch. 298 Districts and Closter Farms was based on historic runoff volumes from these basins to the maximum extent practicable, as the SFWMM simulations do not well represent either the total discharges or the distribution of these discharges from these basins. Runoff volumes for the period May 1, 1994 through April 30, 2000 are available for direct use, while the runoff volumes for the remainder of the 35-year period (May 1, 1965 through April 30, 1994) were estimated by indirect methods. Consistent with the approach utilized in the *Updated STA Inflow Data Sets for the 2010 Period*, daily runoff volumes were estimated as a fixed percentage of the daily runoff from the adjacent primary basin of the EAA (Goforth 2007b). That fixed percentage was derived as the ratio of the overall runoff from each Ch. 298 District basin to the overall runoff from the adjacent EAA basin over the WY1995-2007 period. In recognition of the changes in EAA basin contributing area over the WY1995-2007 period due to conversion of agriculture lands to STAs, the EAA runoff was normalized to the effective basin areas reflected in the SFWMM simulation.
- ***For all alternatives,*** a small amount of S-5A Basin Runoff was simulated in SFWMM as being diverted untreated to WCA-1 (6,767 AF/yr; 1,358 kg/yr and 163 ppb). For the purpose of estimating phosphorus removal performance, these diversions were simulated by DMSTA as being captured in STA-1W. Actual diversion may occur based on the daily hydraulic and treatment capacity of the treatment areas.

The long-term average annual inflow to STA-1W by source is summarized in **Table 3-1**. Although the long-term goal is to treat less inflow in STA-1W than shown in **Table 3-1**, it is recognized that during the interim period before ECART and the L-8 Basin projects are complete, STA-1W inflows will be higher than the long-term goals.

Figure 3-1: Schematic of STA-1W (Not to Scale).

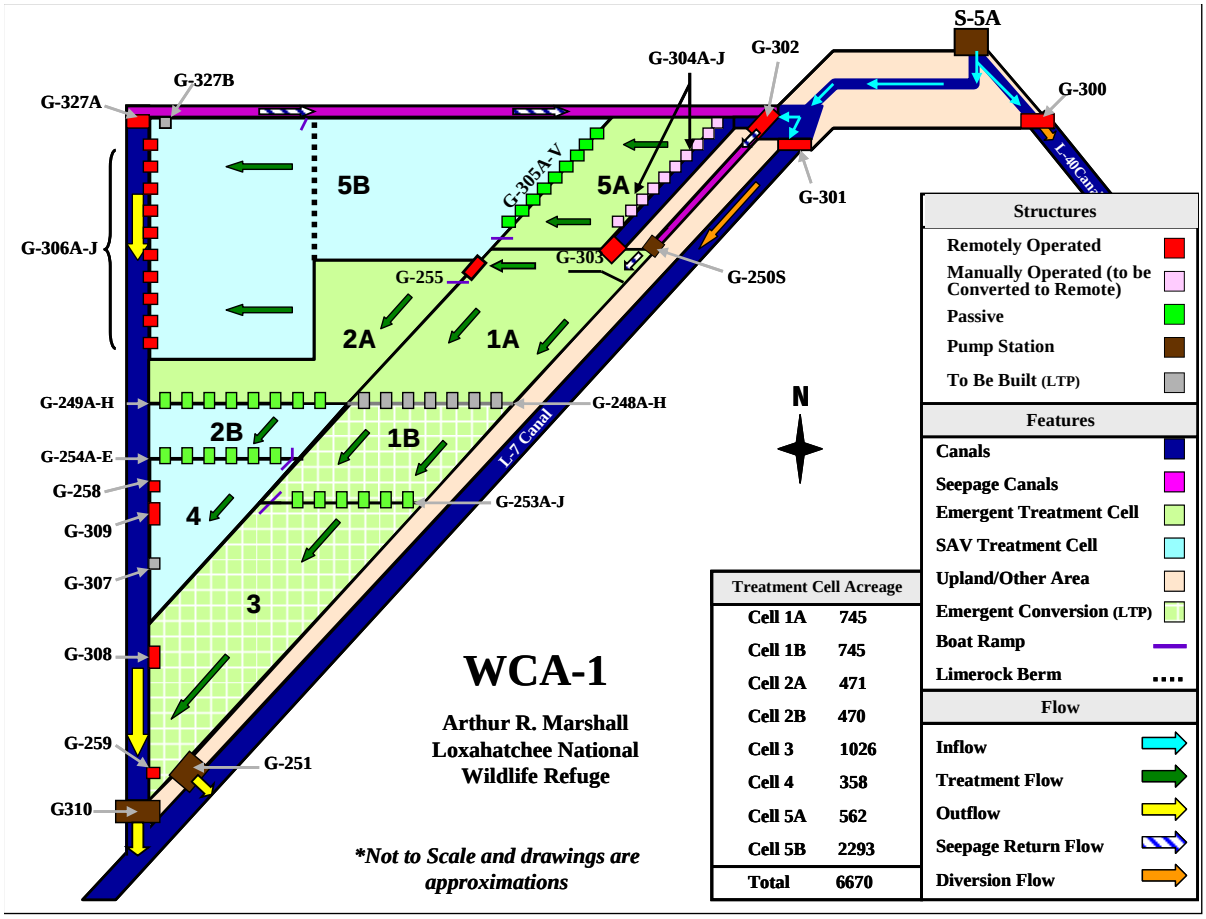


Table 3-1: Summary of Long-term Average Annual Inflow to STA-1W.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
S-5A Basin	228,743	45,870	163
EBWCD	15,117	8,721	468
Total	**243,885**	**54,596**	**181**

A summary of STA-1W phosphorus performance for Alternative C is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix B. A long-term flow-weighted mean outflow concentration range of 21-35 ppb was forecast, however this includes years when DMSTA forecast levels that fell below the calibration range of 15 ppb for an SAV system, and hence may be optimistic. DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix B. For Cells 2B, 4 and 5B the mean depths and flow/width were slightly below the range of the SAV calibration data sets. For Cell 1A, the flow/width was about 30% above the range of the emergent calibration data sets.

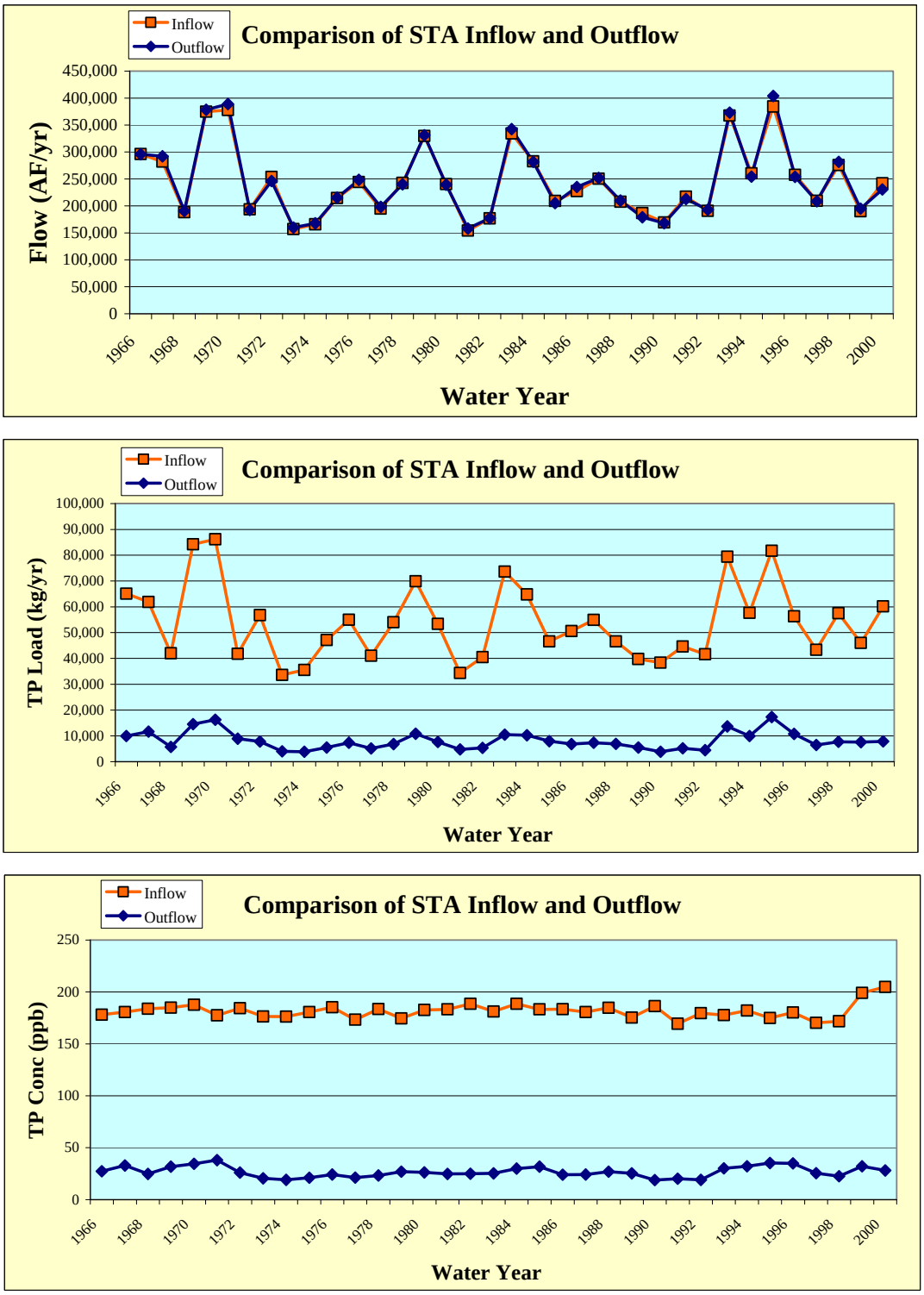
Table 3-2: Summary of DMSTA Results for STA-1W.

Parameter	Unit	STA-1W
Effective Treatment Area	acres	6,670
Average Annual Inflow		
Volume	AF/yr	243,885
TP Load	kg/yr	54,596
TP Concentration	ppb	181
Average Annual Outflow		
Volume	AF/yr	245,636
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	21.3 (4)
Mean Estimate of Settling Rate	ppb	27.4
Lower Conf. Limit for Settling Rate	ppb	34.9
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	20.2
Mean Estimate of Settling Rate	ppb	26.0
Lower Conf. Limit for Settling Rate	ppb	33.3
TP Load (Using Mean TP Conc.)	kg/yr	8,287
Diversion Volumes and Loads		
Volume	AF/yr	0
TP Load	kg/yr	0
TP Concentration	ppb	-

Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.

2. Outflow values highlighted in yellow had one or more years of the 35 years simulated below the low end of the calibration data set (enumerated by the number in parentheses).

Figure 3-2: Comparison of Inflows and Outflows for STA-1W.



4. STA-2

A schematic of STA-2 is presented in **Figure 4-1**. The daily flow terms from the SFWMM simulation were utilized for the DMSTA modeling with the following modifications:

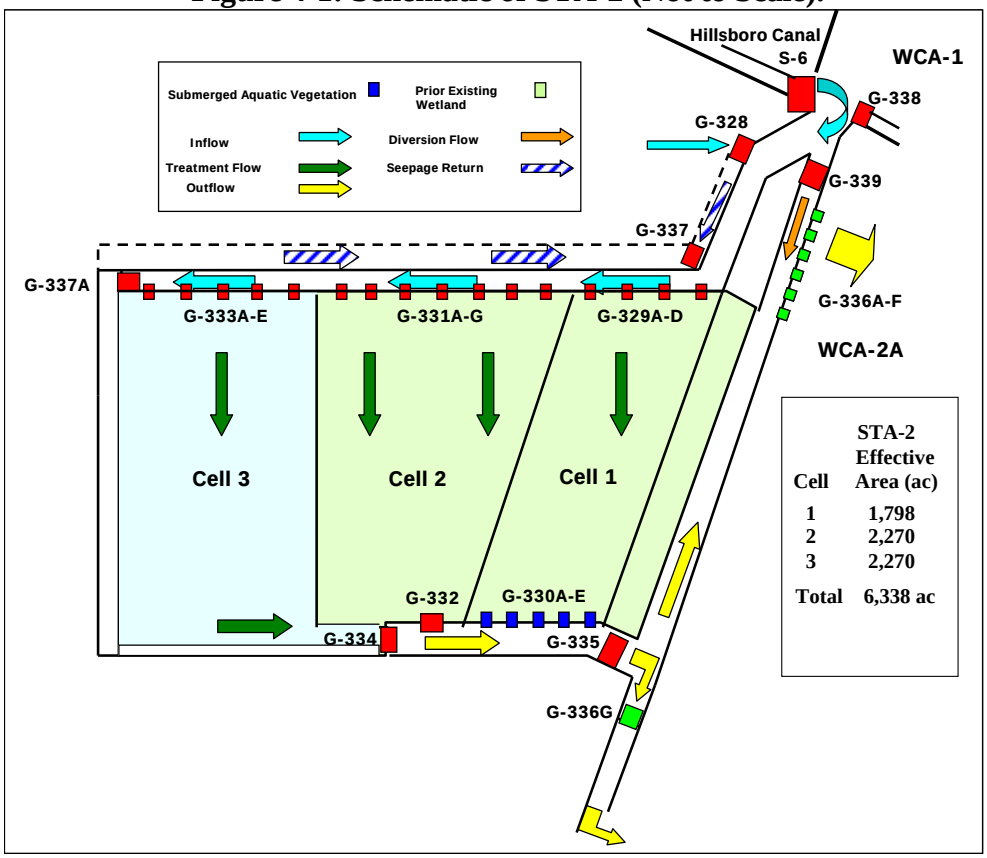
- ***For all alternatives,*** an additional inflow to the STA-2 Supply Canal equal to 38 cfs was added to the runoff inflow to represent the seepage from the adjacent WCA-2A into the adjacent Supply Canal for STA-2, which extends approximately 18,500 feet from the S-6 pump station to the northeast corner of Cell 1. A phosphorus concentration of 15 ppb was used to estimate the phosphorus contribution of this seepage.
- ***For all alternatives,*** the estimate of runoff from the ESWCD and Closter Farms was based on historic runoff volumes from these basins to the maximum extent practicable, as the SFWMM simulations do not well represent either the total discharges or the distribution of these discharges from these basins. Runoff volumes for the period May 1, 1994 through April 30, 2000 are available for direct use, while the runoff volumes for the remainder of the 35-year period (May 1, 1965 through April 30, 1994) were estimated by indirect methods. Consistent with the approach utilized in the *Updated STA Inflow Data Sets for the 2010 Period*, daily runoff volumes were estimated as a fixed percentage of the daily runoff from the adjacent primary basin of the EAA (Goforth 2007b). That fixed percentage was derived as the ratio of the overall runoff from each Ch. 298 District basin to the overall runoff from the adjacent EAA basin over the WY1995-2007 period. In recognition of the changes in EAA basin contributing area over the WY1995-2007 period due to conversion of agriculture lands to STAs, the EAA runoff was normalized to the effective basin areas reflected in the SFWMM simulation.

The long-term average annual inflow to STA-2 by source is summarized in **Table 4-1**. Although the long-term goal is to treat less inflow in STA-2 than shown in **Table 4-1**, it is recognized that during the interim period before ECART is implemented, STA-2 inflows will be higher than the long-term goals.

Table 4-1: Long-term Average Annual Inflow to STA-2.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
WCA-2A Seepage	27,530	509	15
S-5A Basin	62,844	12,630	163
ESWCD & 715 Farms	31,993	5,215	132
S-6/S-2 Basin	180,023	23,467	106
Inflow Prior to Re-direction	302,390	41,822	112
Re-direct to Compartment B	0	0	-
Net Inflow	**302,390**	**41,822**	**112**

Figure 4-1: Schematic of STA-2 (Not to Scale).



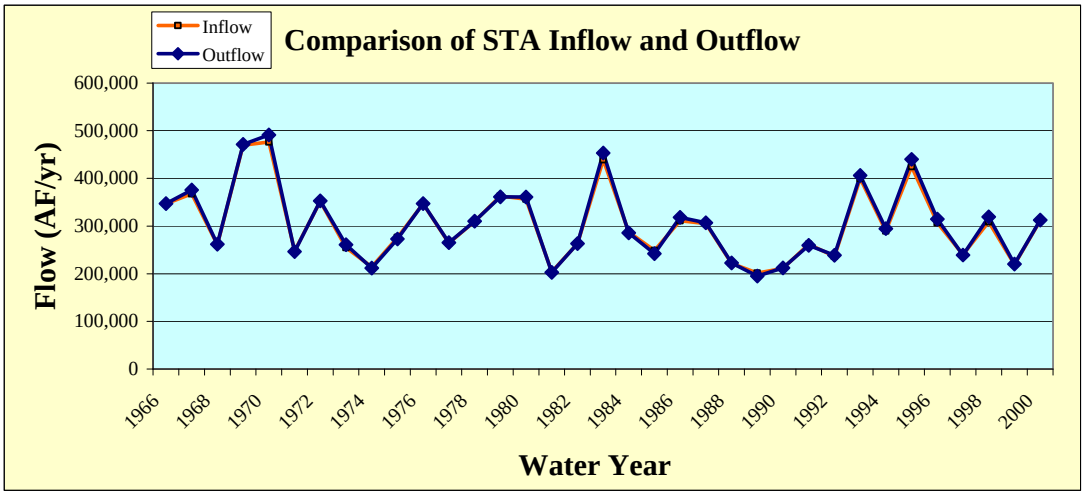
A summary of STA-2 phosphorus performance for Alternative C is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix B. A long-term flow-weighted mean outflow concentration range of 22-34 ppb was forecast. DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix B. For Cells 1 and 2, the long-term average inflow concentration was <2% above the range of the prior existing wetland (PEW) calibration data sets. For Cell 3 the mean depth was slightly above the range of the SAV calibration data sets.

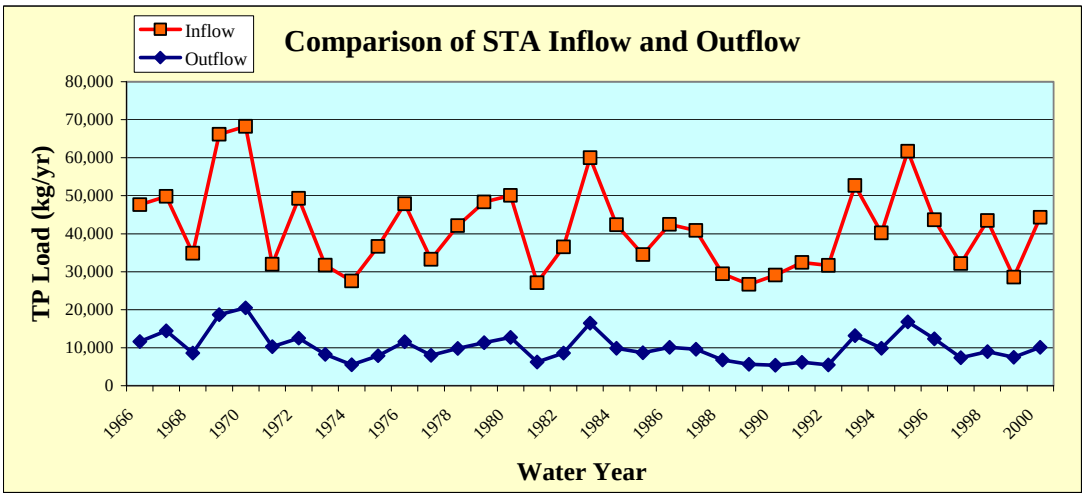
Table 4-2: Summary of DMSTA Results for STA-2.

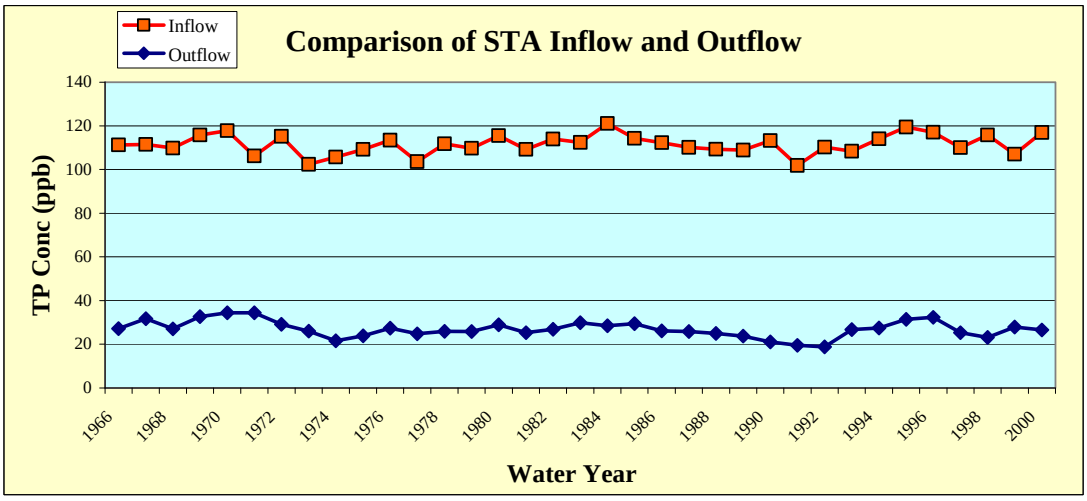
Parameter	Unit	STA-2
Effective Treatment Area	acres	6,338
Average Annual Inflow		
Volume	AF/yr	302,390
TP Load	kg/yr	41,822
TP Concentration	ppb	112
Average Annual Outflow		
Volume	AF/yr	305,045
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	21.9
Mean Estimate of Settling Rate	ppb	27.5
Lower Conf. Limit for Settling Rate	ppb	34.0
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	20.9
Mean Estimate of Settling Rate	ppb	26.4
Lower Conf. Limit for Settling Rate	ppb	32.9
TP Load (Using Mean TP Conc.)	kg/yr	10,338
Diversion Volumes and Loads		
Volume	AF/yr	0
TP Load	kg/yr	0
TP Concentration	ppb	-

Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.

Figure 4-2: Comparison of Inflows and Outflows for STA-2.



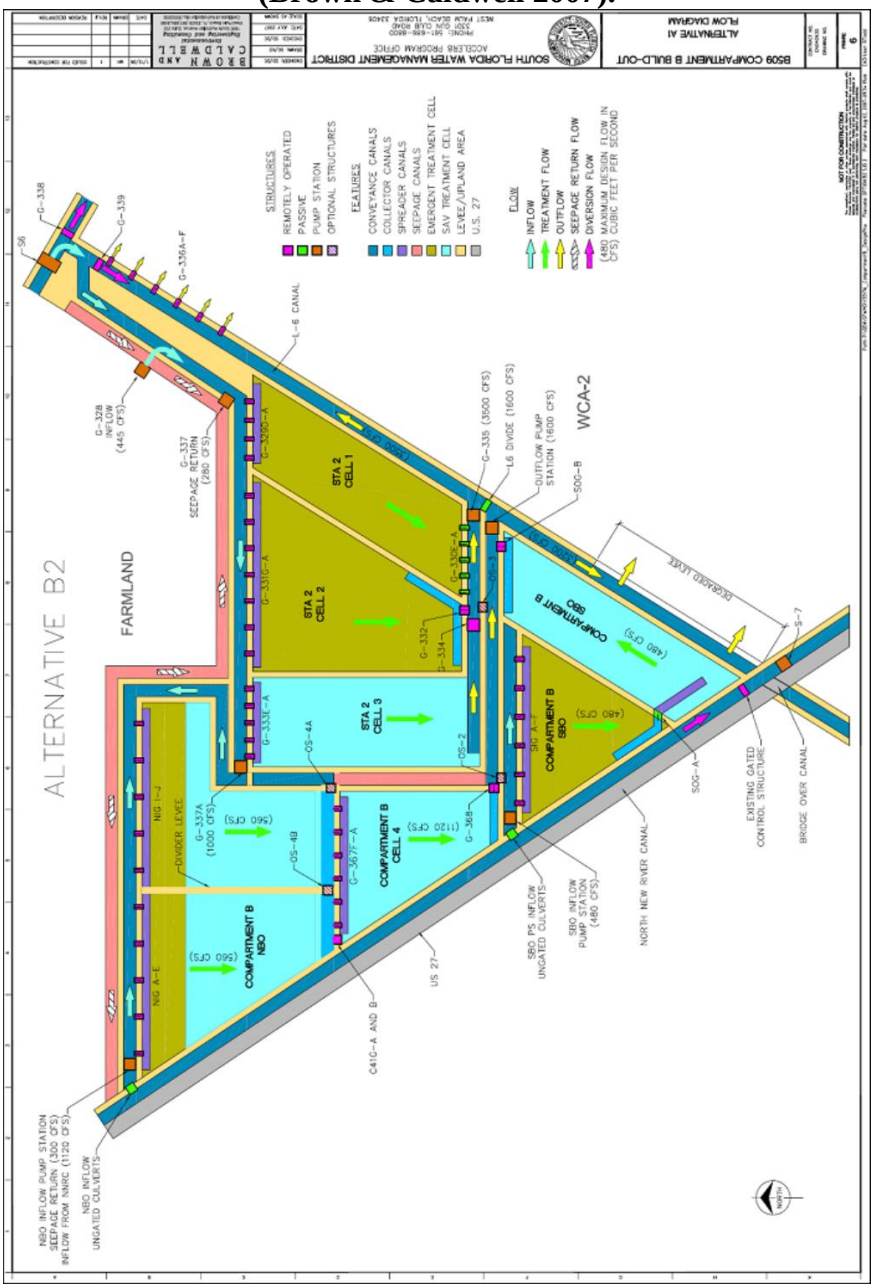




5. Compartment B

A preliminary schematic of the Compartment B Build-out is presented in **Figure 5-1** (Brown & Caldwell 2007).

Figure 5-1: Preliminary Schematic of Compartment B Build-out, Subject to Revision (Brown & Caldwell 2007).



Compartment B will consist of two independent treatment areas (Brown and Caldwell 2007). The North Build-out will consist of three cells, with the initial two cells containing approximately 3,922 acres of effective treatment area followed by the existing Cell 4 of STA-2. While the Build-out is still under preliminary design, the present configuration includes a north-south interior levee that will divide the upper area into two parallel cells. Inflows will come from the North New River Canal and inflows re-directed from STA-2, and will be limited to a total of 1,120 cfs. After passing through the North Build-out, treated discharges will be conveyed to a new 1,600-cfs outflow pump station located directly south of the STA-2 outflow pump station G-335 (Brown and Caldwell 2007). The South Build-out will consist of two cells in series, with the initial cell containing approximately 1,477 acres of effective treatment area followed by an additional 1,319 acres. Inflows will come from the North New River Canal and will be limited to 480 cfs. Treated discharges will be conveyed to the new 1,600-cfs outflow pump station located directly south of the STA-2 outflow pump station G-335 (Brown and Caldwell 2007).

For the purpose of phosphorus removal performance modeling, Compartment B was simulated as two distinct treatment areas. The daily flow terms from the SFWMM simulation were utilized for the DMSTA modeling with the following distribution among the North Build-out and South Build-out:

- ***For all alternatives,*** all inflows re-directed from STA-2 were captured and treated in the North Build-out (no re-direction was included as part of the Alternative C SFWMM scenario). The South Build-out received the initial 480 cfs of all inflows from the North New River Canal, and the North Build-out received the balance of North New River inflows.

The resulting long-term average annual inflow to Compartment B by source is summarized in **Table 5-1**, showing the inflows before and after the re-direction.

Table 5-1: Long-term Average Annual Inflow to Compartment B.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
S-7/S-2 Basin	105,613	12,355	95
Re-direction from STA-2			
WCA-2A Seepage	0	0	-
S-6/S-2 Basin	0	0	-
S-5 Basin	0	0	-
ESWCD & 715 Farms	0	0	-
Total	**105,613**	**12,355**	**95**

A summary of Compartment B phosphorus performance for Alternative C is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix B. The long-term average phosphorus loading rate to Compartment B for this alternative was 0.4 $g/m^2/yr$, reflecting substantial excess treatment capacity. DMSTA forecast long-term

average annual phosphorus concentrations below the minimum of the calibration data sets for SAV (15 ppb), and those forecasts were replaced in Table 5-2 by 15 ppb. The adjusted outflow phosphorus levels in Table 5-2 may still portray optimistic results in that the best performing STA (STA-3/4) is presently averaging about 19 ppb, with a 5 ppb standard deviation on annual values. DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix B. For the North and South Build-out cells, the mean depth and flow/width were below the range of the SAV calibration data sets. For the North Build-out, the simulated inflow concentration (15 ppb) was below the SAV calibration data sets.

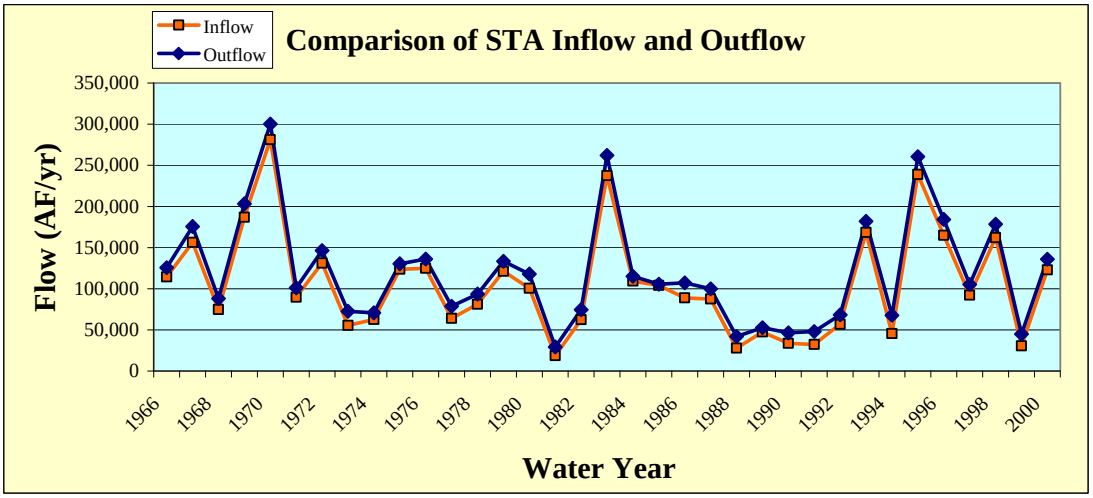
Table 5-2: DMSTA Results for Compartment B.

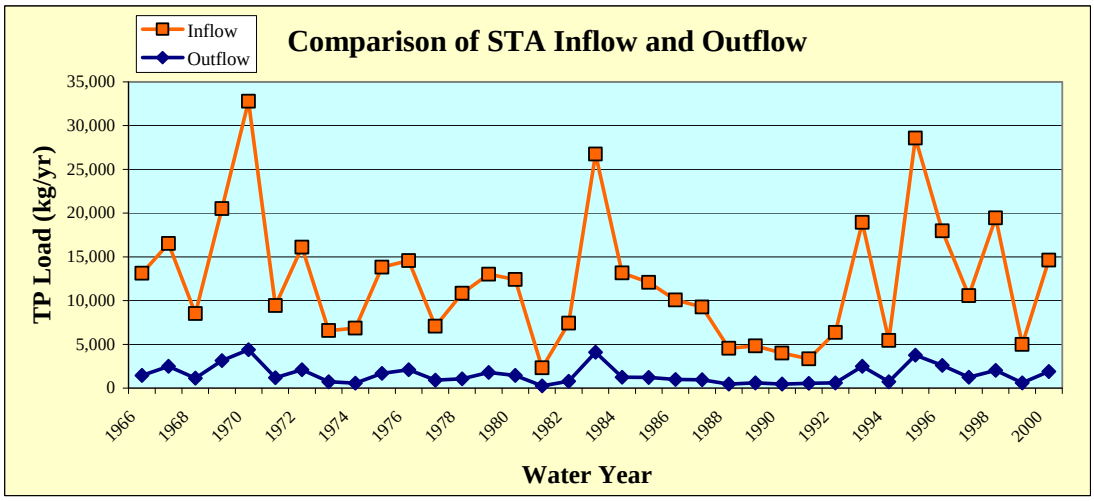
Parameter	Unit	Comp. B North	Comp. B South	Comp. B Combined
Effective Treatment Area	acres	5,824	2,796	8,620
Average Annual Inflow				
Volume	AF/yr	58,159	47,453	105,613
TP Load	kg/yr	6,823	5,532	12,355
TP Concentration	ppb	95	95	95
Average Annual Outflow				
Volume	AF/yr	66,364	53,214	119,578
Flow-weighted Mean TP Concentration				
Upper Conf. Limit for Settling Rate	ppb	15.0 (35)	15 (35)	15.0 (35)
Mean Estimate of Settling Rate	ppb	15.0 (35)	15 (34)	15.0 (35)
Lower Conf. Limit for Settling Rate	ppb	15.0 (35)	15 (23)	15 (35)
Geometric Mean TP Concentration				
Upper Conf. Limit for Settling Rate	ppb	15.0	15.0	15.0
Mean Estimate of Settling Rate	ppb	15.0	15.0	15.0
Lower Conf. Limit for Settling Rate	ppb	15.0	15.0	15.0
TP Load (Using Mean TP Conc.)	kg/yr	1,228	985	2,212
Diversion Volumes and Loads				
Volume	AF/yr	0	0	0
TP Load	kg/yr	0	0	0
TP Concentration	ppb	-	-	-

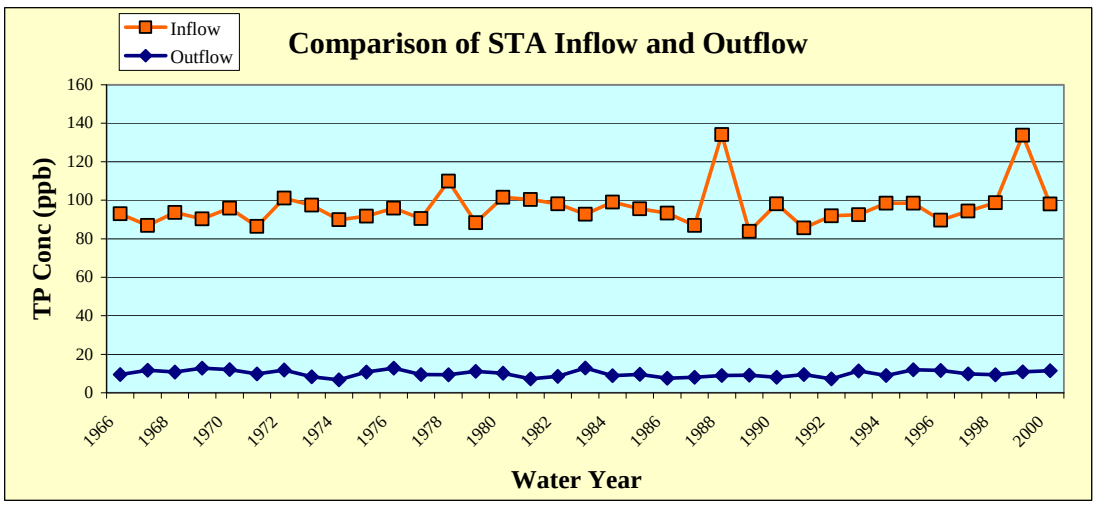
Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.

2. Outflow values highlighted in yellow had one or more years of the 35 year simulated below the low end of the calibration data set (enumerated by the number in parentheses). The lowest sustainable STA outflow phosphorus concentration is 19 ppb (STA-3/4), with a standard deviation of 5 ppb.

Figure 5-2: Comparison of Inflows and Outflows for Compartment B.







Note: TP concentrations below 15 ppb have not been sustained.

6. EAA Storage Reservoir A-1

The network feature of DMSTA was used to model the combined EAA Storage Reservoir A-1 (EAASR A-1) and STA-3/4 system. This simulation generated a daily time series of flow and phosphorus levels from the reservoir back to the EAA for irrigation releases and to STA-3/4 for subsequent treatment. Upon review of the outflow time series to STA-3/4, it was observed that DMSTA was simulating releases during the dry season when the SFWMM results indicated no releases from the reservoir to STA-3/4. Further, the phosphorus concentrations associated with these dry season releases were quite high. For the purpose of the STA-3/4 inflow, the DMSTA-generated time series was replaced by the daily flows from the SFWMM results and the phosphorus concentrations from DMSTA. Although this didn't resolve all of the high concentrations during the dry seasons, it reduced the frequency of their occurrence. This new time series was then used in combination with basin runoff flows for an independent DMSTA simulation of STA-3/4 that allowed an uncertainty analysis of the STA performance, using the 10%, mean and 90% values of the effective settling rates for the specific vegetation types within STA-3/4.

For all alternatives, several assumptions were incorporated in the DMSTA modeling of the EAASR A-1:

- The SFWMM models the EAASR as two reservoir compartments, EARSN and EARSS. These were simulated in DMSTA as a single reservoir cell.
- Many reservoir characteristics were identical to those evaluated during the Basis of Design Report for the EAASR A-1 (Black and Veatch 2006):
  - The effective treatment area of the EAASR A-1 is 15,200 acres
  - The minimum depth for releases is 15.2 cm
  - The outflow weir depth for bypass is 12.5 ft
  - Seepage characteristics
- Other reservoir characteristics include:
  - The average flow width is 4.5 miles which is the average of the east-west width at the north end of EAASR and the width at the south end
  - The mean settling rate for the reservoir calibration data sets (5 m/yr) was used to simulate phosphorus removal in the reservoir.
- Daily rainfall and evapotranspiration from the SFWMM scenario were used in the DMSTA simulation.
- Reservoir depths from the SFWMM scenario were used in the DMSTA simulation. The depth time series provides an appropriate range of depths in the reservoir, based on model assumptions of footprint and volume, but is not intended as a true estimate of reservoir depth. Reservoir depth time series are not recommended for calculations outside the 2x2, however, the depth time series can be used as a reference for feasibility-level work such as the present analysis.

- The daily flow time series from the SFWMM simulation quantifying the flow from the EAASR to STA-3/4 (WCS4S and EVBLSS) were used as outflow time series within the DMSTA simulation of the reservoir.

Using the recent phosphorus concentration of Lake Okeechobee releases as 100 ppb, the long-term average annual inflow to the EAASR A-1 by source is summarized in **Table 6-1**.

Table 6-1: Summary of Long-term Average Annual Inflow to EAASR A-1.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
S-7/S-2 Basin	120,110	14,076	95
S-8/S-3 Basin	99,201	10,230	84
Lake Okee.	328,689	40,592	100
Total	**548,000**	**64,898**	**96**

A summary of EAASR A-1 phosphorus performance for Alternative C is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix B. No warning or error messages were generated during the DMSTA simulation for the EAASR A-1. However, the minimum simulated depth was 1 cm, indicating that DMSTA numerically prevented dry-out by reducing the rates of ET, seepage, etc. In reality the reservoir would have dried out and phosphorus levels may temporarily increase upon rewetting; depending on how much time passes between rewetting and discharge to the STA, the impact of this temporary increase in phosphorus levels could vary, however, the long-term concentration shown in Table 6-2 may be optimistic.

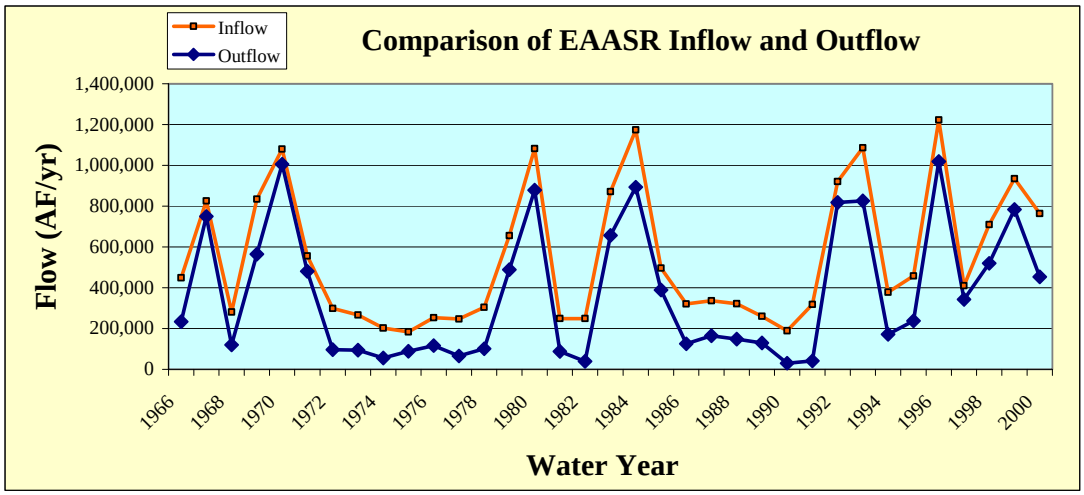
Table 6-2: Summary of DMSTA Results for EAASR A-1 (Lake TP Conc. of 100 ppb).

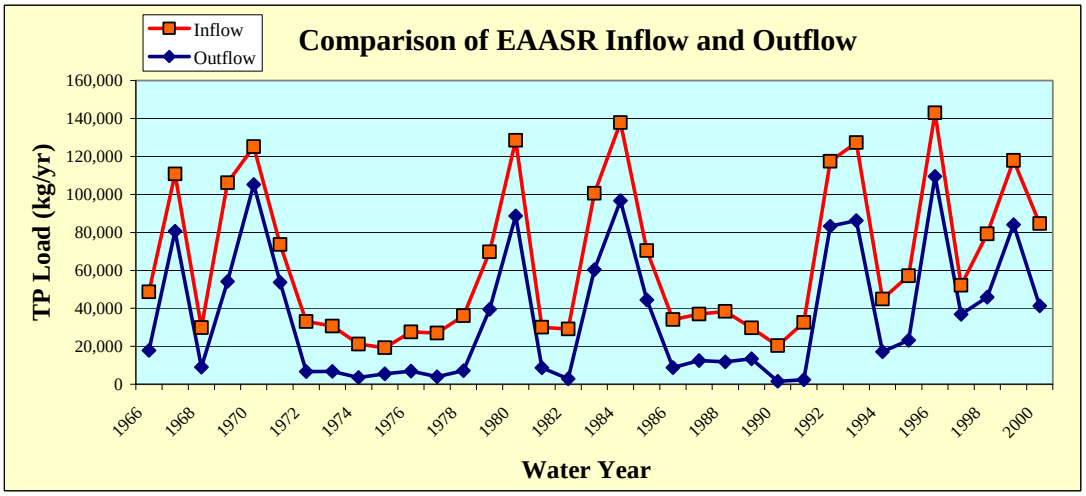
Parameter	Unit	EAASR A-1 Note 2
Effective Treatment Area	acres	15,200
Average Annual Inflow		
Volume	AF/yr	548,000
TP Load	kg/yr	64,898
TP Concentration	ppb	96
Average Annual Outflow		
Volume	AF/yr	371,559
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	-
Mean Estimate of Settling Rate	ppb	79.8
Lower Conf. Limit for Settling Rate	ppb	-
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	-
Mean Estimate of Settling Rate	ppb	92.2
Lower Conf. Limit for Settling Rate	ppb	-
TP Load (Using Mean TP Conc.)	kg/yr	36,564
Diversion Volumes and Loads		
Volume	AF/yr	0
TP Load	kg/yr	0
TP Concentration	ppb	-

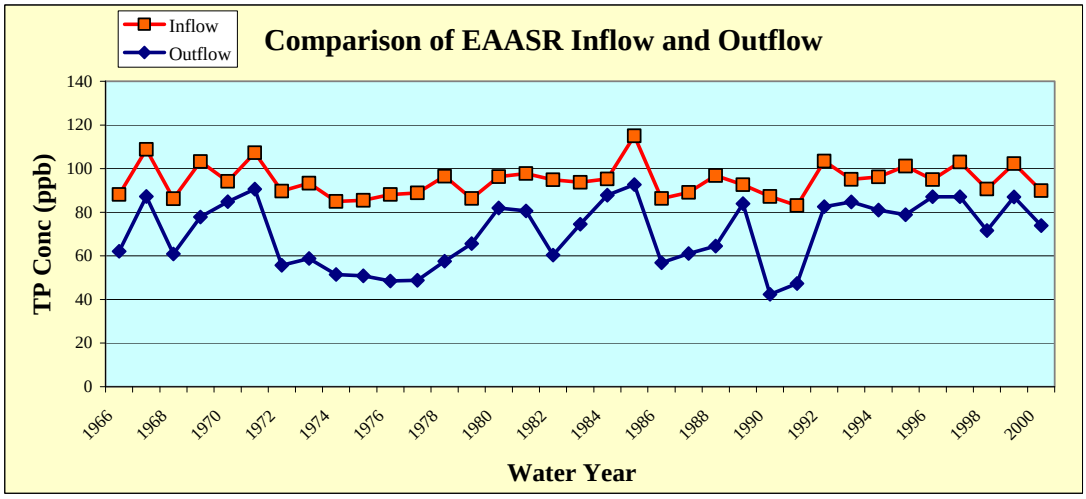
Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.

2. Shown are outflows to STA-3/4 after adjustment (see text); total outflows, including irrigation releases, were 523,005 AF/yr and 49,579 kg/yr at 77 ppb.

Figure 6-1: Comparison of Inflows and Outflows for EAASR A-1 (Lake TP Concentration of 100 ppb).







6.1. Sensitivity Analysis: Lake Okeechobee TP Concentration of 150 ppb

As an analysis of the sensitivity of the EAA reservoir and STA-3/4 performance to the phosphorus concentration of Lake Okeechobee releases, this section describes the performance of EAASR A-1 if the phosphorus concentration of Lake releases is 150 ppb at the inflow to the reservoir. With this assumption, the long-term average annual inflow to the EAASR A-1 by source is summarized in **Table 6-3**.

Table 6-3: Summary of Long-term Average Annual Inflow to EAASR.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
S-7/S-2 Basin	120,110	14,076	95
S-8/S-3 Basin	99,201	10,230	84
Lake Okee.	328,689	60,894	150
Total	**548,000**	**85,200**	**126**

A summary of EAASR A-1 phosphorus performance for Alternative C is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix B. **The net effect of assuming a Lake Okeechobee phosphorus concentration of 150 ppb appears to be about 27 ppb at the outflow of the reservoir to STA-3/4, resulting in a long-term average additional 12.4 metric tons/yr of phosphorus to STA-3/4.**

No warning or error messages were generated during the DMSTA simulation for the EAASR A-1. However, the minimum simulated depth was 1 cm, indicating that DMSTA numerically prevented dry-out by reducing the rates of ET, seepage, etc. In reality the reservoir would have dried out and phosphorus levels would likely increase upon rewetting; thus the long-term concentration shown in Table 6-4 may be optimistic.

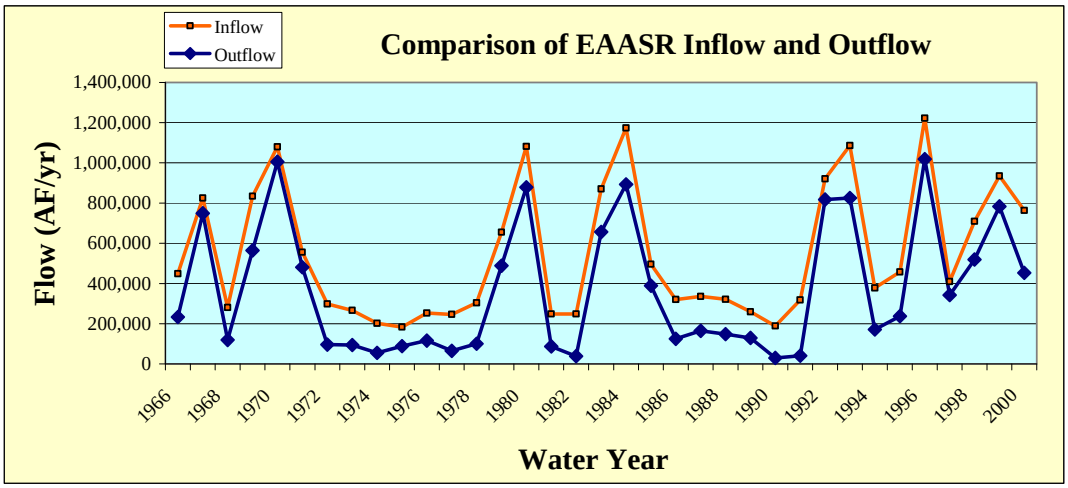
Table 6-4: Summary of DMSTA Results for EAASR A-1 (Lake TP Conc. of 150 ppb).

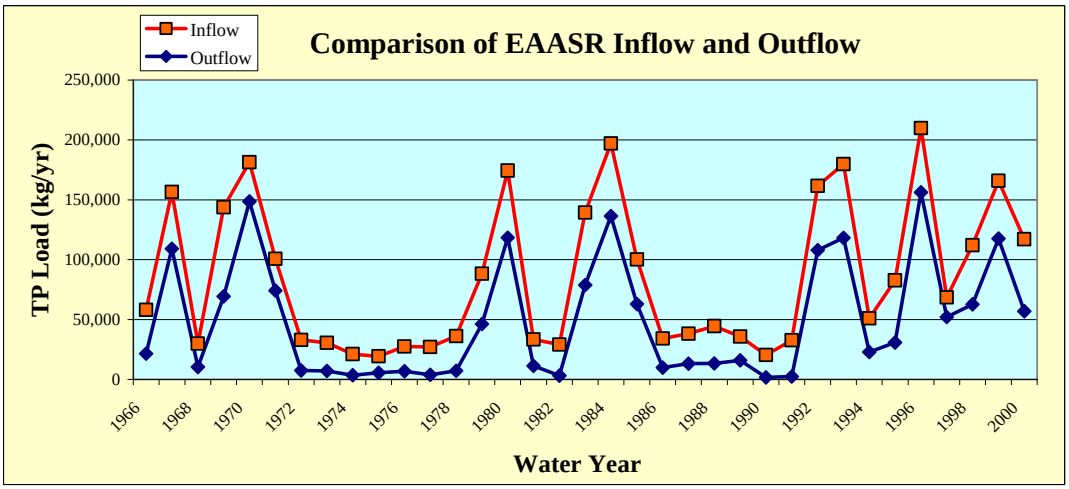
Parameter	Unit	EAASR A-1 Note 2
Effective Treatment Area	acres	15,200
Average Annual Inflow		
Volume	AF/yr	548,000
TP Load	kg/yr	85,200
TP Concentration	ppb	126
Average Annual Outflow		
Volume	AF/yr	371,559
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	-
Mean Estimate of Settling Rate	ppb	106.9
Lower Conf. Limit for Settling Rate	ppb	-
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	.-
Mean Estimate of Settling Rate	ppb	113.6
Lower Conf. Limit for Settling Rate	ppb	-
TP Load (Using Mean TP Conc.)	kg/yr	48,977
Diversion Volumes and Loads		
Volume	AF/yr	0
TP Load	kg/yr	0
TP Concentration	ppb	-

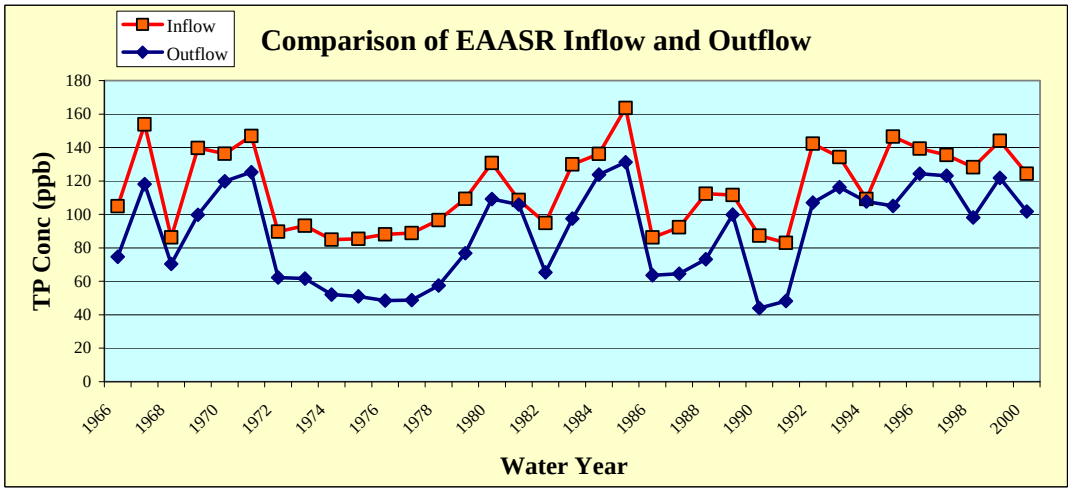
Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.

2. Shown are outflows to STA-3/4 after adjustment (see text); total outflows, including irrigation releases, were 523,005 AF/yr and 65,476 kg/yr at 101 ppb.

Figure 6-2: Comparison of Inflows and Outflows for EAASR A-1 (Lake TP Concentration of 150 ppb).



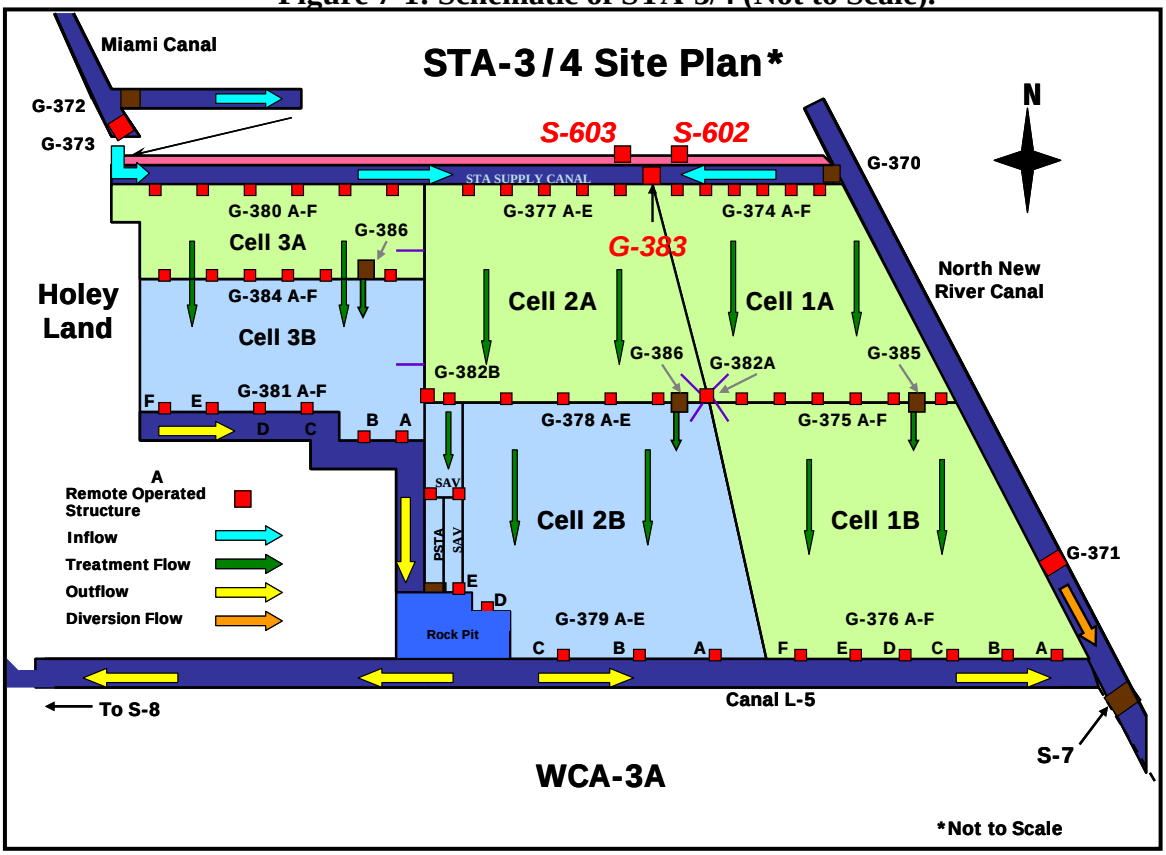




7. STA-3/4

A schematic of STA-3/4 is presented in **Figure 7-1B**, showing the two proposed structures (S-602 and S-603) that will allow transfer of water from the EAA Storage Reservoir to the STA.

Figure 7-1: Schematic of STA-3/4 (Not to Scale).



The simulated inflows to STA-3/4 are summarized in **Table 7-1**. The daily flow terms from the SFWMM simulation were utilized for the DMSTA modeling with the following modifications:

- ***For all alternatives,*** the estimate of runoff from the South Shore Drainage District and the South Florida Conservancy District was based on historic runoff volumes from these basins to the maximum extent practicable, as the SFWMM simulations do not well represent either the total discharges or the distribution of these discharges from these basins. Runoff volumes for the period May 1, 1994 through April 30, 2000 are available for direct use, while the runoff volumes for the remainder of the 35-year period (May 1, 1965 through April 30, 1994) were estimated by indirect methods. Consistent with the approach utilized in the *Updated STA Inflow Data Sets for the 2010 Period*, daily runoff volumes were estimated as a fixed percentage of the

daily runoff from the adjacent primary basin of the EAA (Goforth 2007b). That fixed percentage was derived as the ratio of the overall runoff from each Ch. 298 District basin to the overall runoff from the adjacent EAA basin over the WY1995-2007 period. In recognition of the changes in EAA basin contributing area over the WY1995-2007 period due to conversion of agriculture lands to STAs, the EAA runoff was normalized to the effective basin areas reflected in the SFWMM simulation.

- ***For all alternatives,*** a small amount of Miami Canal Runoff was simulated in SFWMM as being diverted untreated to the Water Conservation Area 3A. For the purpose of estimating phosphorus removal performance, these diversions were simulated by DMSTA as being captured in STA-3/4. Actual diversion may occur based on the daily hydraulic and treatment capacity of the treatment areas.

Table 7-1: Summary of Long-term Average Annual Inflow to STA-3/4 (Lake TP Conc of 100 ppb).

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
S-7/S-2 Basin	34,691	4,191	98
S-8/S-3 Basin	131,356	13,244	82
C-139 Basin	13,231	3,411	209
SSDD	10,539	1,324	102
SFCD	24,110	3,363	113
EAA SR	371,559	36,564	80
Total	**589,905**	**62,012**	**85**

Totals are less than the sum of the components due to daily net negative values within the basin.

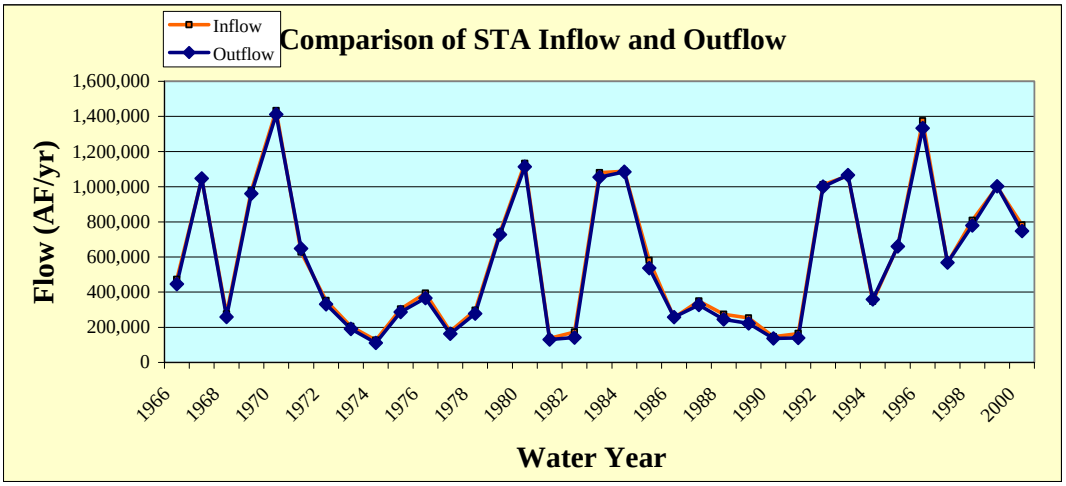
A summary of STA-3/4 phosphorus performance for Alternative C is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix B. A long-term flow-weighted mean outflow concentration range of 17-24 ppb was forecast, however this includes years when DMSTA forecast levels that fell below the calibration range of 15 ppb for an SAV system, and hence may be optimistic. DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix B. For Cells 1A and 2A, the mean flow/width was about 25% above the range of the emergent calibration data sets. For Cell 3B, the mean flow/width was about 25% below the range of the SAV calibration data sets. For the three SAV cells, the simulated mean depths were slightly below the range of the SAV calibration data sets, although the simulated minimum depths were above 30 cm. Diversion around the STA was simulated to provide water supply to downstream users, including the Big Cypress Basin Seminole Indian Reservation.

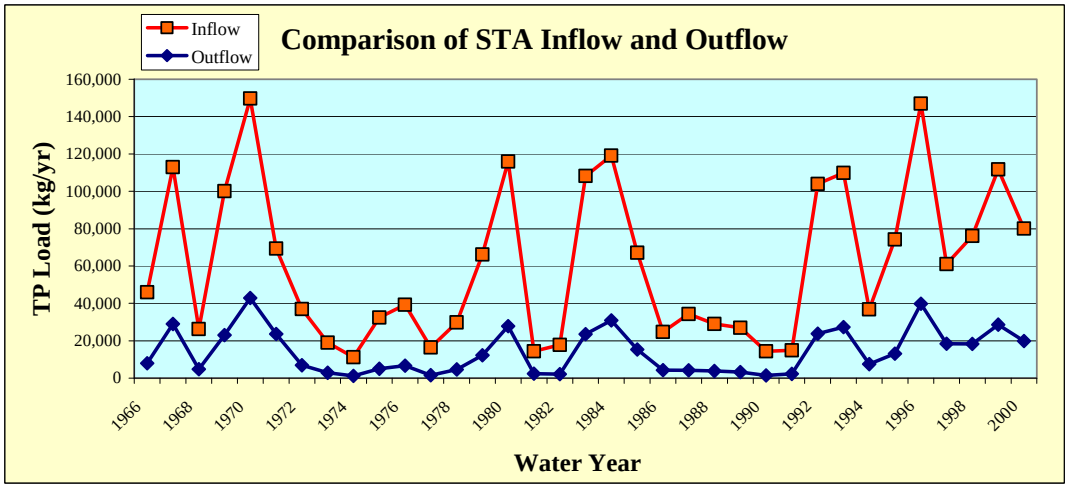
Table 7-2: Summary of DMSTA Results for STA-3/4 (Lake TP Conc. of 100 ppb).

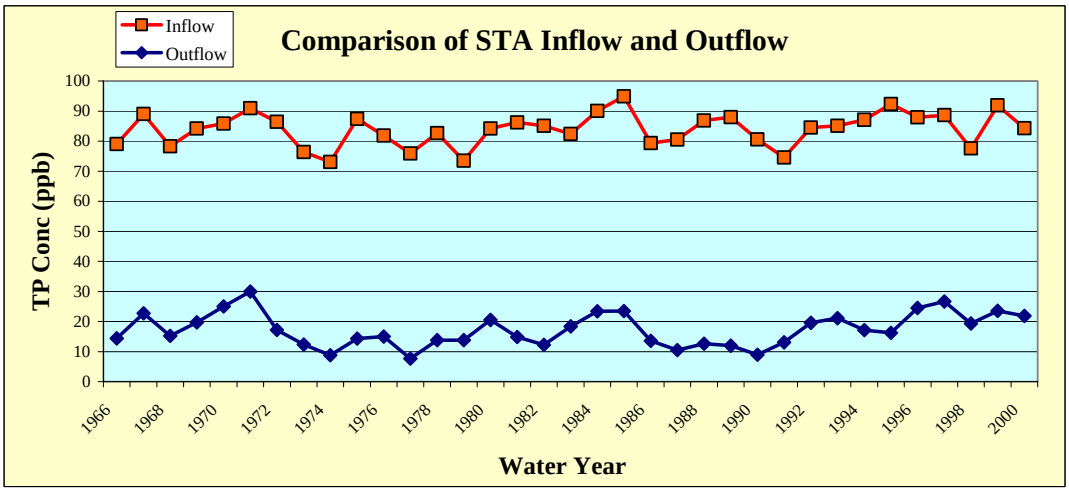
Parameter	Unit	STA-3/4
Effective Treatment Area	acres	16,543
Average Annual Inflow		
Volume	AF/yr	589,905
TP Load	kg/yr	62,012
TP Concentration	ppb	85
Average Annual Outflow		
Volume	AF/yr	574,973
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	16.6 (20)
Mean Estimate of Settling Rate	ppb	20.0 (16)
Lower Conf. Limit for Settling Rate	ppb	24.0 (9)
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	15.0
Mean Estimate of Settling Rate	ppb	16.4
Lower Conf. Limit for Settling Rate	ppb	19.7
TP Load (Using Mean TP Conc.)	kg/yr	14,194
Diversion Volumes and Loads		
Volume	AF/yr	85,832
TP Load	kg/yr	10,681
TP Concentration	ppb	101

Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.
2. Outflow values highlighted in yellow had one or more years of the 35 years simulated below the low end of the calibration data set (enumerated by the number in parentheses). The lowest sustainable STA outflow phosphorus concentration is 19 ppb (STA-3/4), with a standard deviation of 5 ppb.
3. Diversion is primarily for downstream water supply users.

Figure 7-2: Comparison of Inflows and Outflows for STA-3/4 (Lake TP Concentration of 100 ppb).







Note: TP concentrations below 15 ppb have not been sustained.

7.1. Sensitivity Analysis: Lake Okeechobee TP Concentration of 150 ppb

As an analysis of the sensitivity of STA performance to the phosphorus concentration of Lake Okeechobee releases, this section describes the performance of STA-3/4 if the phosphorus concentration of Lake releases is 150 ppb at the inflow to the EAASR. With this assumption, the inflows to STA-3/4 are summarized in **Table 7-3**. With the assumed higher concentration in the Lake releases, the estimated total annual average inflow to STA-3/4 increased approximately 17 ppb, or about 12.4 metric tons/yr.

Table 7-3: Summary of Long-term Average Annual Inflow to STA-3/4 (Lake TP Conc of 150 ppb).

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
S-7/S-2 Basin	34,691	4,191	98
S-8/S-3 Basin	131,356	13,244	82
C-139 Basin	13,231	3,411	209
SSDD	10,539	1,324	102
SFCD	24,110	3,363	113
EAA SR	371,559	53,278	116
Total	**589,905**	**74,425**	**102**

A summary of STA-3/4 phosphorus performance for Alternative C is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix B. A long-term flow-weighted mean outflow concentration range of 19-28 ppb was forecast, however this includes years when DMSTA forecast levels that fell below the calibration range of 15 ppb for an SAV system, and hence may be optimistic. These results compare to a simulated range of 17-24 ppb with a concentrations of Lake releases averaging 100 ppb. **The net effect of assuming a Lake Okeechobee phosphorus concentration of 150 ppb appears to be about 4 ppb at the outflow of STA-3/4, resulting in a long-term average annual increase of about 2.3 metric tons of phosphorus to the Everglades compared to an average Lake release concentration of 100 ppb.** In addition to the STA discharge, it is estimated that an additional 5 metric tons per year of phosphorus will enter the Everglades in Lake Okeechobee deliveries for downstream water supply, including the Big Cypress Basin Seminole Indian Reservation.

DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix B. For Cells 1A and 2A, the mean flow/width was about 25% above the range of the emergent calibration data sets. For Cell 3B, the mean flow/width was about 25% below the range of the SAV calibration data sets. For the three SAV cells, the simulated mean depths were slightly below the range of the SAV calibration data sets, although the simulated minimum depths were above 30 cm. Diversion around the STA was simulated to provide

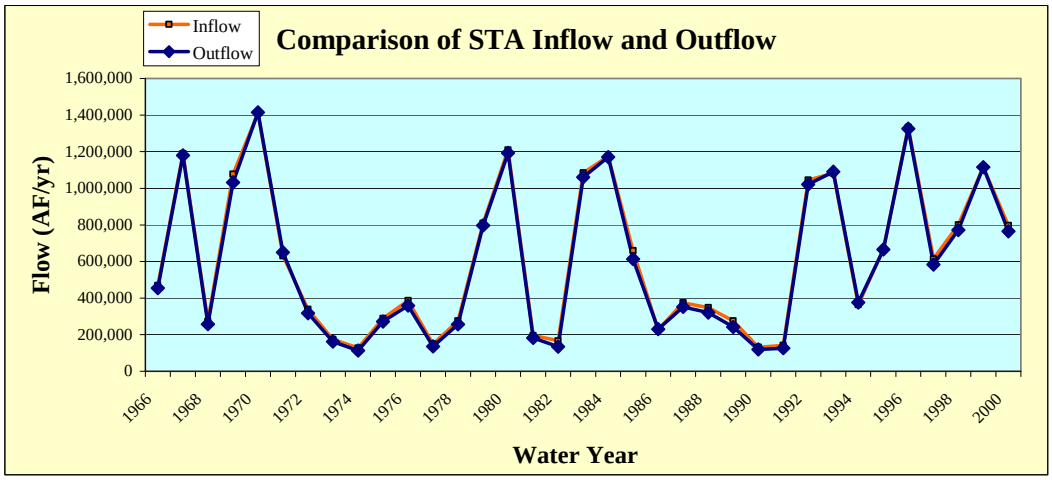
water supply to downstream users, including the Big Cypress Basin Seminole Indian Reservation.

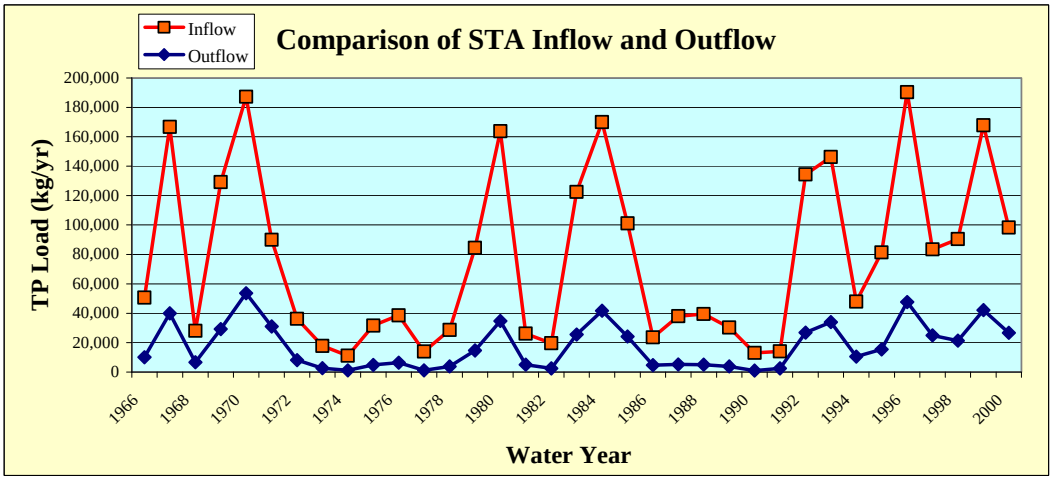
Table 7-4: Summary of DMSTA Results for STA-3/4 (Lake Conc. of 150 ppb).

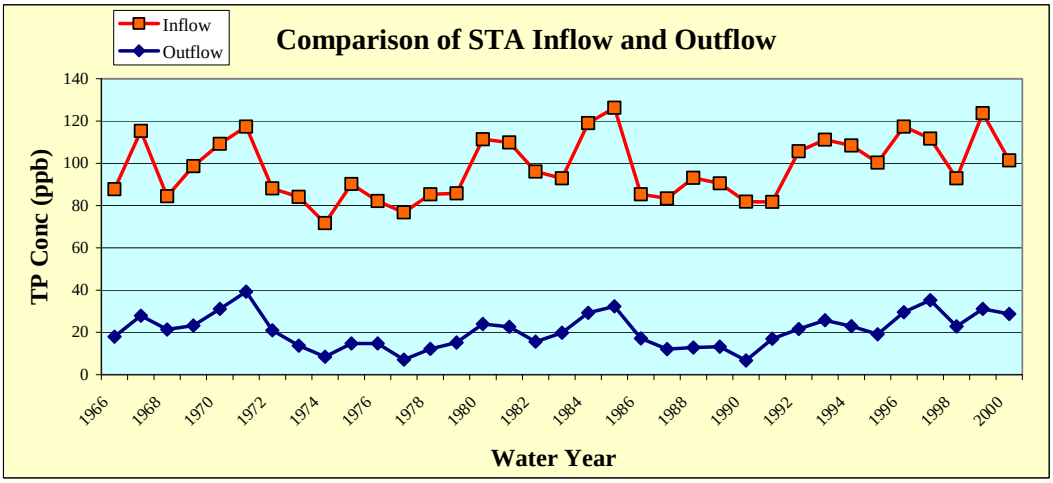
Parameter	Unit	STA-3/4
Effective Treatment Area	acres	16,543
Average Annual Inflow		
Volume	AF/yr	589,905
TP Load	kg/yr	74,425
TP Concentration	ppb	102
Average Annual Outflow		
Volume	AF/yr	574,973
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	19.1 (14)
Mean Estimate of Settling Rate	ppb	23.3 (10)
Lower Conf. Limit for Settling Rate	ppb	28.3 (4)
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	15.2
Mean Estimate of Settling Rate	ppb	18.5
Lower Conf. Limit for Settling Rate	ppb	22.5
TP Load (Using Mean TP Conc.)	kg/yr	16,529
Diversion Volumes and Loads		
Volume	AF/yr	85,832
TP Load	kg/yr	15,698
TP Concentration	ppb	148

Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.
2. Outflow values highlighted in yellow had one or more years of the 35 years simulated below the low end of the calibration data set (enumerated by the number in parentheses). The lowest sustainable STA outflow phosphorus concentration is 19 ppb (STA-3/4), with a standard deviation of 5 ppb.
3. Diversion is primarily for downstream water supply users.

Figure 7-3: Comparison of Inflows and Outflows for STA-3/4 (Lake TP Concentration of 150 ppb).







Note: TP concentrations below 15 ppb have not been sustained.

8. STA-5

Inflow data sets for STA-5 and STA-6 utilized the historic flows and phosphorus loads for the WY1995-2007 period. For the purpose of developing the STA-5 inflow data set, STA-5 was assumed to be comprised of the existing 3 flow-ways of STA-5, along with the 4th and 5th flow-ways of Compartment C that are soon to be constructed (see **Figure 8-1**; URS 2007). The combined C-139 Basin and C-139 Annex runoff will likely be distributed to STA-5 and STA-6 in an attempt to balance the phosphorus loading rate among the flow-ways of the STAs (see **Table 8-1**). A summary of inflows to STA-5 is presented in **Table 8-2**.

Table 8-1: Estimate of Inflow Distribution to Balance the PLR to STA-5 and STA-6.

Flow-way	Area	TP inflow	Flow at PLR	Load	PLR
STA-5 1	2,055	229	28,177	7,945	0.96
STA-5 2	2,055	229	28,177	7,945	0.96
STA-5 3	1,985	229	27,217	7,674	0.96
STA-5 4	2,176	229	29,836	8,413	0.96
STA-5 5	2,669	229	36,595	10,319	0.96
STA-6 3	1,857	178	32,692	7,180	0.96
STA-6 5	652	97	20,970	2,521	0.96
STA-6 2	245	97	7,880	947	0.96
Total	13,694	203	211,544	52,944	0.96

At this time, it is extremely difficult to forecast the phosphorus removal performance of STA-5. Since the first full water year of operation (2001), the annual inflow concentrations have ranged from 165 ppb to 299 ppb, with a 7-yr average of 235 ppb (Pietro et al. 2007). The phosphorus loading rate has been considerably higher than the other STAs, ranging from 0.94 g/m^2/yr to 4.01 g/m^2/yr with a 7-yr average of 2.1 g/m^2/yr. The long-term outflow concentration has ranged from 82-192 ppb, with a 7-yr average of 105 ppb. These characteristics are more similar to the DMSTA emergent vegetation calibration data set than to the SAV data set, which may be related to different soil type than in the EAA STAs (more mineral content) and less calcium in the inflow waters than the EAA STAs. In consideration of the anticipated reduced phosphorus loading rate when the additional treatment cells within Compartment C begin operation, the 2005 Study estimated the performance of STA-5 using the average performance of two DMSTA simulations:

1. Assuming the phosphorus removal downstream cell in each flow-way performs similar to the emergent calibration data set; and
2. Assuming the phosphorus removal downstream cell in each flow-way performs similar to the SAV calibration data set.

For comparison purposes, a similar set of simulations were conducted during the present analysis, ***however, until such time that the STA-5 performance improves, and until performance data for the newly constructed Flow-way 3 is available, the forecast performance will be based on assuming the phosphorus removal of the downstream cell in each flow-way performs similar to the emergent calibration data set.***

Figure 8-1: Preliminary Layout of Compartment C Build-out; Subject to Revision (modified from URS 2007).

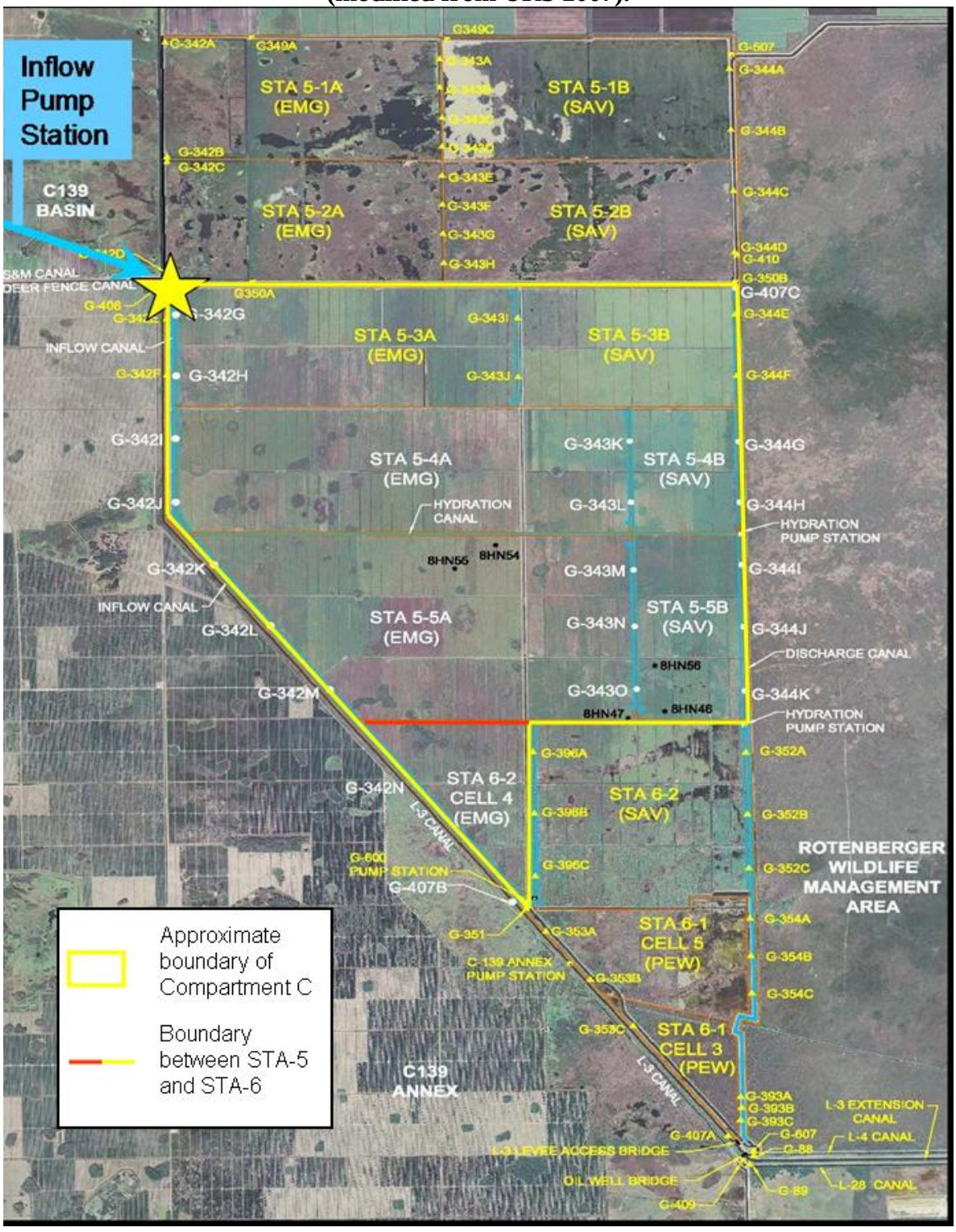


Table 8-2: Summary of Long-term Average Annual Inflow to STA-5, Including Compartment C Build-out.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
C-139 Basin	150,001	42,300	229

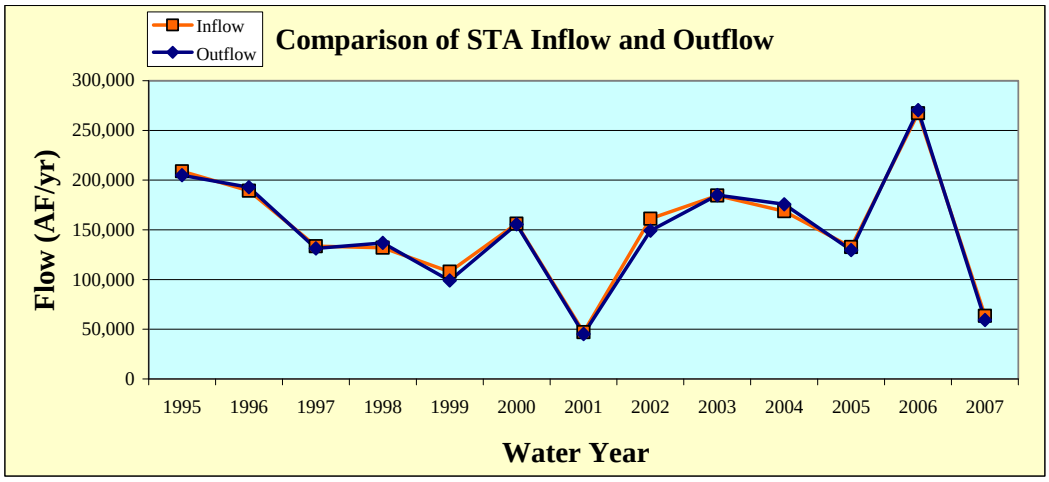
A summary of STA-5 phosphorus performance for Alternative C is presented in the tables and figures below. Copies of the DMSTA output are presented in Appendix B. For the emergent vegetation scenario, a long-term flow-weighted mean outflow concentration range of 22-47 ppb was forecast, however this includes six of the thirteen years when DMSTA forecast levels that fell below the calibration range of 20 ppb for an emergent system; hence this range may be optimistic, particularly in light of STA-5 performance history. Based on the historic performance of STA-5 and the high degree of uncertainty as to whether these DMSTA forecasts accurately represent actual phosphorus removal within the STAs in Compartment C, it is premature to conclude that there is excess treatment capacity in Compartment C. For the SAV scenario, ***presented only for comparison and not as a forecast of STA-5 performance***, DMSTA forecast long-term outflow concentrations below the low end of the SAV calibration data set (15 ppb) and these were set to the low end value; hence this range is overly optimistic particularly in light of STA-5 performance history. DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix B. For the emergent vegetation scenario no warnings messages were generated. However, DMSTA forecast 7% of the time the depth in the upstream cells was less than 10 cm, indicating the potential for insufficient water availability to maintain the minimum desirable water depth of 15 cm. For the SAV scenario, thirteen messages were generated, identifying that mean depths, flow/widths and outflow phosphorus concentrations were below the range of the SAV calibration data sets. In addition, DMSTA forecast 7% of the time the depth in the upstream cells was less than 10 cm, indicating the potential for insufficient water availability to maintain the minimum desirable water depth of 15 cm.

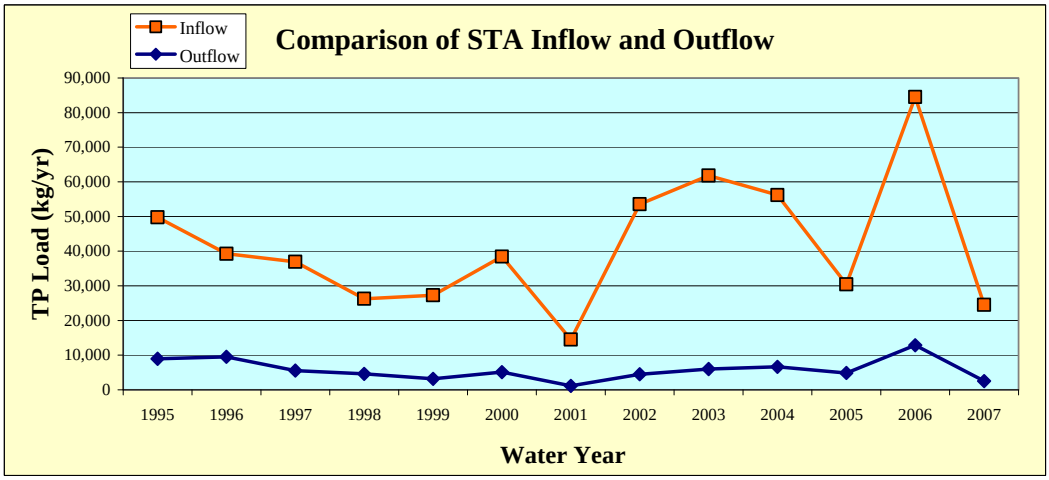
Table 8-3: Summary of DMSTA Results for STA-5, Including Comp. C Build-out.

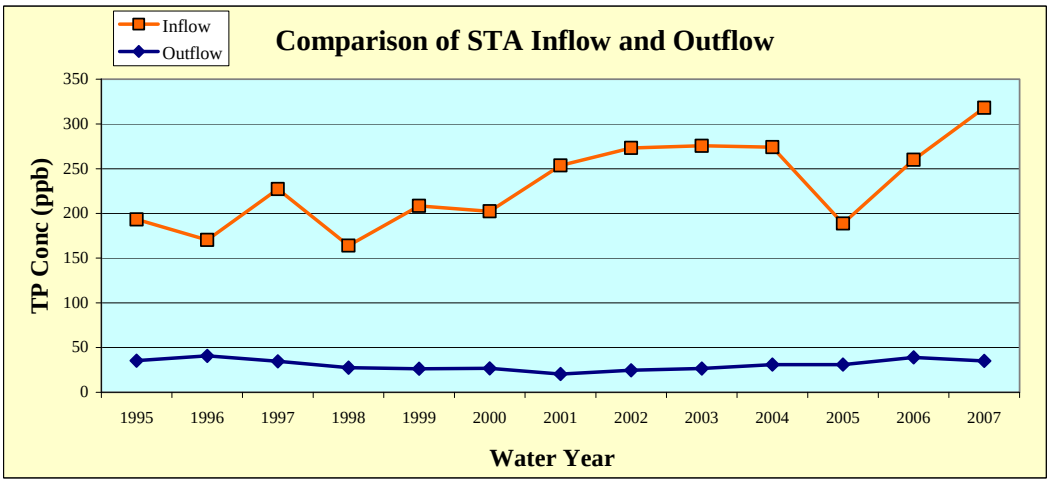
Parameter	Unit	STA-5 - Emergent	STA-5 - SAV
Effective Treatment Area	acres	10,940	10,940
Average Annual Inflow			
Volume	AF/yr	150,001	150,001
TP Load	kg/yr	42,300	42,300
TP Concentration	ppb	229	229
Average Annual Outflow			
Volume	AF/yr	148,717	148,717
Flow-weighted Mean TP Concentration			
Upper Conf. Limit for Settling Rate	ppb	21.7(6)	15.0 (13)
Mean Estimate of Settling Rate	ppb	32.0	15.0 (13)
Lower Conf. Limit for Settling Rate	ppb	46.5	19.0 (11)
Geometric Mean TP Concentration			
Upper Conf. Limit for Settling Rate	ppb	20.2	15.0
Mean Estimate of Settling Rate	ppb	30.2	15.0
Lower Conf. Limit for Settling Rate	ppb	44.3	17.3
TP Load (Using Mean TP Conc.)	kg/yr	5,870	2,752
Diversion Volumes and Loads			
Volume	AF/yr	0	0
TP Load	kg/yr	0	0
TP Concentration	ppb	-	-

Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value.
There is associated uncertainty in these predictions and actual performance will vary.
2. Outflow values highlighted in yellow had one or more years of the 13 years simulated below the low end of the calibration data set (enumerated by the number in parentheses).
3. Results for SAV in the downstream cells are presented for comparison only; the emergent vegetation scenario is currently used as a forecast for STA-5

Figure 8-2: Comparison of Inflows and Outflows for STA-5 With Emergent Vegetation in All Cells, Including Compartment C Build-out.

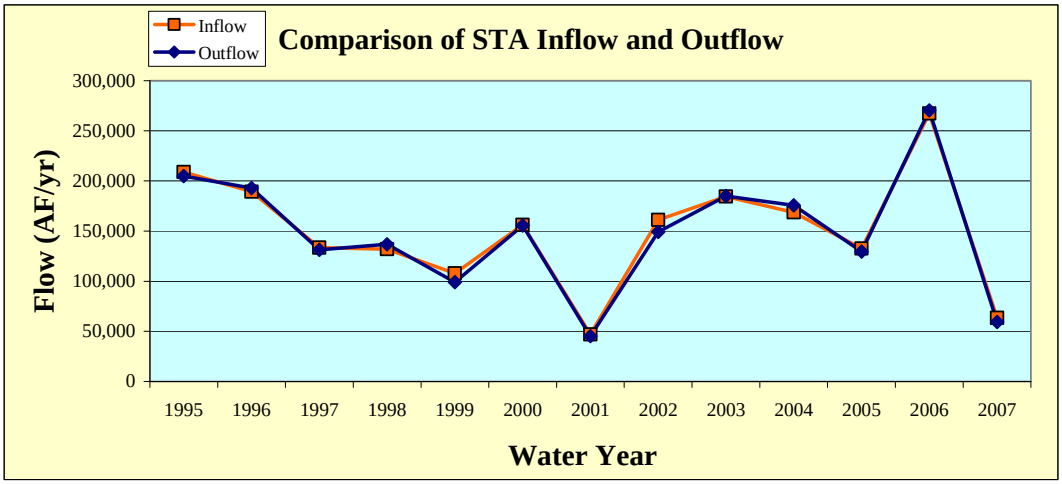


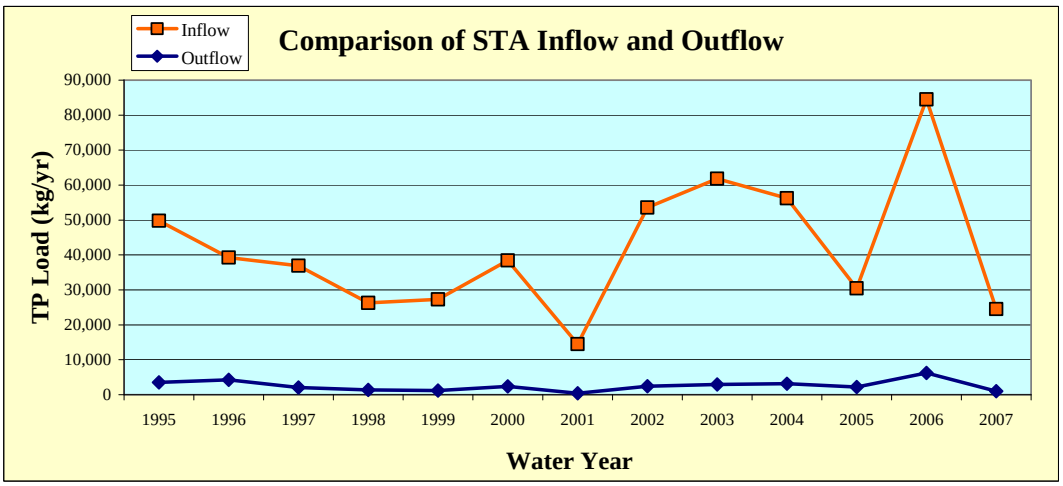


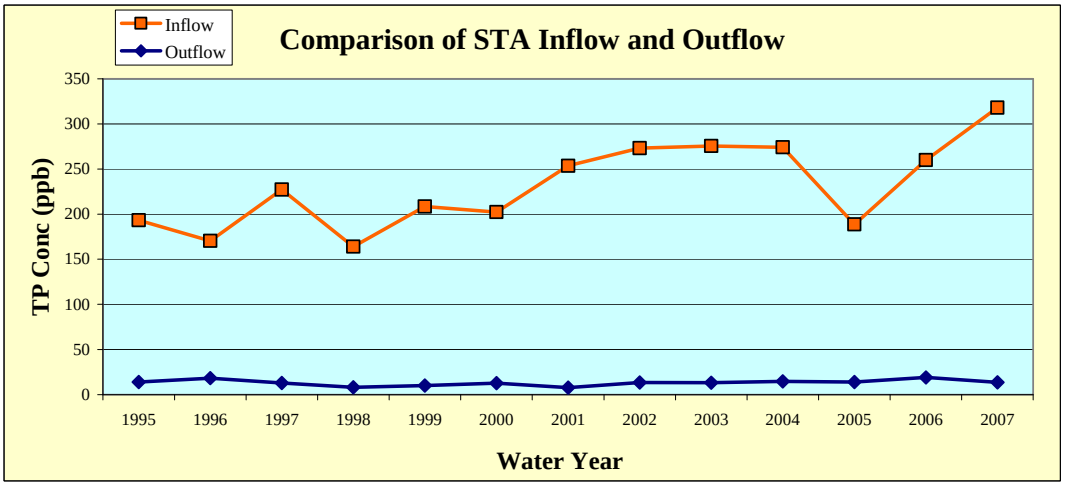


Note: TP concentrations below 15 ppb have not been sustained.

Figure 8-3: Summary of DMSTA Results for STA-5 With SAV in Downstream Cells.







Note: TP concentrations below 15 ppb have not been sustained.

9. STA-6

The combined C-139 Basin and C-139 Annex runoff will be distributed to STA-5 and STA-6 to balance the phosphorus loading rate among the flow-ways of the STAs (see **Table 8-1** above). A summary of the long-term average inflows to STA-6 is presented in **Table 9-1.**

Table 9-1: Summary of Long-term Average Annual Inflow to STA-6, Including Compartment C Build-out.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
C-139 Basin	20,062	5,657	229
C-139 Annex	41,480	4,987	97
Total	**61,542**	**10,644**	**140**

A summary of STA-6 phosphorus performance for Alternative C is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix B. DMSTA forecast a best case scenario long-term flow-weighted mean phosphorus concentration of 10 ppb which is below the minimum of the calibration data sets for the vegetation in the treatment cells, and that forecast was replaced in Table 9-2 by 13 ppb[1]. The adjusted outflow phosphorus levels in Table 9-2 may still portray optimistic results in that the best performing STA (STA-3/4) is presently averaging about 19 ppb, with a 5 ppb standard deviation on annual values. Although the simulated performance appears to suggest additional treatment capacity may available in the 2,754 acres of STA-6, based on the historic performance of STA-5 and the high degree of uncertainty as to whether these DMSTA forecasts accurately represent actual phosphorus removal within the STAs in Compartment C, it is premature to conclude that there is excess treatment capacity in Compartment C. DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix B. Eight messages were generated, identifying that mean depths, flow/widths and outflow phosphorus concentrations were below the range of the calibration data sets. In addition, the mean inflow concentration (140 ppb) was above the calibration range for the Prior Existing Wetland (PEW) data sets, further suggesting that the forecast outflow concentration may be optimistic.

[1] For STA-6, two flow-ways have SAV in the downstream cell which has a minimum calibration concentration of 15 ppb, and one has Prior Existing Wetlands (PEW) which has a minimum calibration concentration of 8 ppb. The flow-weighted minimum concentration for the three flow-ways is 13 ppb.

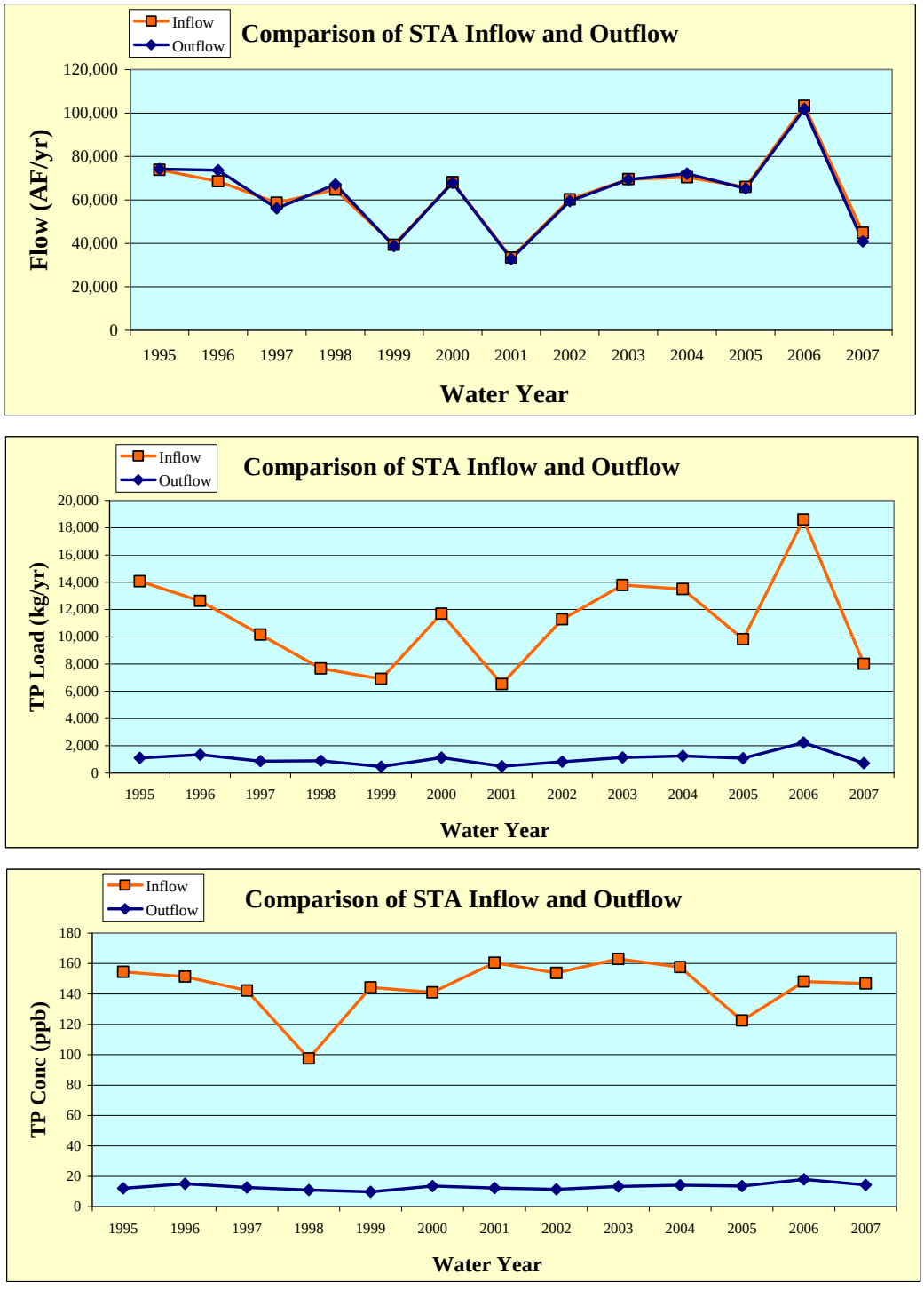
Table 9-2: Summary of DMSTA Results for STA-6, Including Comp. C Build-out.

Parameter	Unit	STA-6
Effective Treatment Area	acres	2,754
Average Annual Inflow		
Volume	AF/yr	61,542
TP Load	kg/yr	10,644
TP Concentration	ppb	140
Average Annual Outflow		
Volume	AF/yr	61,494
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	13.0 (11)
Mean Estimate of Settling Rate	ppb	13.0 (7)
Lower Conf. Limit for Settling Rate	ppb	16.9 (1)
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	13.0
Mean Estimate of Settling Rate	ppb	13.0
Lower Conf. Limit for Settling Rate	ppb	16.3
TP Load (Using Mean TP Conc.)	kg/yr	986
Diversion Volumes and Loads		
Volume	AF/yr	0
TP Load	kg/yr	0
TP Concentration	ppb	-

Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.

2. Outflow values highlighted in yellow had one or more years of the 13 years simulated below the low end of the calibration data set (enumerated by the number in parentheses). The lowest sustainable STA outflow phosphorus concentration is 19 ppb (STA-3/4), with a standard deviation of 5 ppb.

Figure 9-1: Comparison of Inflows and Outflows for STA-6.



Note: TP concentrations below 15 ppb have not been sustained.

10. Summary

A summary of the simulated phosphorus removal performance in the STAs, the EAASR A-1 and the full build-out of the treatment areas in Compartments B and C is presented in **Table 10-1** below[2]. For Compartment B, DMSTA forecast long-term flow-weighted mean phosphorus concentrations below the minimum of the calibration data sets for the vegetation in the treatment cells, and those forecasts were replaced in Table 10-1 by 15 ppb. For STA-6, DMSTA forecast a best case scenario long-term flow-weighted mean phosphorus concentration below the minimum of the calibration data sets for the vegetation in the treatment cells, and that forecast was replaced in Table 10-1 by 13 ppb[3]. The adjusted outflow phosphorus levels in Table 10-1 may still portray optimistic results in that the best performing STA (STA-3/4) is presently averaging about 19 ppb, with a 5 ppb standard deviation on annual values. Simulated long-term average annual flow-weighted mean outflow concentrations from the individual STAs ranged from 13-47 ppb. On a cumulative basis, the simulated long-term average annual concentration ranged from 20-31 ppb. In consideration of the forecast error of ±23%, this suggests a potential long-term range of 15-38 ppb for the cumulative long-term average annual outflow concentration.

The estimated allocation of discharges to the Water Conservation Areas is summarized in **Table 10-2**.

Phosphorus Concentrations for Lake Okeechobee Releases. Table 10-1 presents DMSTA modeling results for the EAASR A-1 and STA-3/4 using an average phosphorus concentration for Lake Okeechobee releases of 100 ppb, which corresponds to recent levels. An alternative simulation was conducted assuming an average phosphorus concentration for Lake Okeechobee releases of 150 ppb. While this assumed 50% increase in concentration increased the simulated phosphorus load to the EAASR A-1 by a long-term average of 20.3 metric tons/yr, the simulated net increase to STA-3/4 was 12.4 metric tons/yr. The 8 metric ton/yr balance either accumulated in the reservoir soil storage or was discharged to the EAA to satisfy irrigation demand. DMSTA simulated an increase in the long-term STA-3/4 outflow concentration of about 4 ppb, resulting in a predicted long-term average annual increase of about 2.3 metric tons/yr of phosphorus to the Everglades compared to the simulations that used an average Lake release concentration of 100 ppb. In addition to the STA discharge, it is estimated that an additional 5 metric tons per year of phosphorus will enter the Everglades in Lake Okeechobee deliveries for downstream water supply, including the Big Cypress Basin Seminole Indian Reservation.

[2] These simulated forecasts of STA performance are made for the comparison of alternatives and not for the development of effluent limits. Effluent limits are determined through the State of Florida's issuance of permits for these facilities.

[3] For STA-6, two flow-ways have SAV in the downstream cell which has a minimum calibration concentration of 15 ppb, and one has Prior Existing Wetlands (PEW) which has a minimum calibration concentration of 15 ppb. The flow-weighted minimum concentration for the three flow-ways is 13 ppb.

Table 10-1: Summary of DMSTA Modeling Results.

Parameter	Unit	STA-1E	STA-1W	STA-2	Comp. B North	Comp. B South	Comp. B Combined	EAASR A-1 Note 3	STA-3/4	STA-5 - Emergent	STA-6	All
Effective Treatment Area	acres	5,132	6,670	6,338	5,824	2,796	8,620	15,200	16,543	10,940	2,754	56,997
Average Annual Inflow												
Volume	AF/yr	193,710	243,885	302,390	58,159	47,453	105,613	548,000	589,905	150,001	61,542	1,647,045
TP Load	kg/yr	42,004	54,596	41,822	6,823	5,532	12,355	64,898	62,012	42,300	10,644	265,733
TP Concentration	ppb	176	181	112	95	95	95	96	85	229	140	131
Phosphorus Loading Rate	g/m^2/yr	2.0	2.0	1.6	0.3	0.5	0.4	1.1	0.9	1.0	1.0	1.2
Average Annual Outflow												
Volume	AF/yr	190,746	245,636	305,045	66,364	53,214	119,578	371,559	574,973	148,717	61,494	1,646,189
Flow-weighted Mean TP Concentration												
Upper Conf. Limit for Settling Rate	ppb	20.0 (10)	21.3 (4)	21.9	15.0 (35)	15 (35)	15.0 (35)	-	16.6 (20)	21.7(6)	13.0 (11)	20.1
Mean Estimate of Settling Rate	ppb	26.8 (1)	27.4	27.5	15.0 (35)	15 (34)	15.0 (35)	79.8	20.0 (16)	32.0	13.0 (7)	23.7
Lower Conf. Limit for Settling Rate	ppb	35.3	34.9	34.0	15.0 (35)	15 (23)	15 (35)	-	24.0 (9)	46.5	16.9 (1)	31.0
Geometric Mean TP Concentration												
Upper Conf. Limit for Settling Rate	ppb	17.9	20.2	20.9	15.0	15.0	15.0	-	15.0	20.2	13.0	-
Mean Estimate of Settling Rate	ppb	24.2	26.0	26.4	15.0	15.0	15.0	92.2	16.4	30.2	13.0	-
Lower Conf. Limit for Settling Rate	ppb	32.4	33.3	32.9	15.0	15.0	15.0	-	19.7	44.3	16.3	-
TP Load (Using Mean TP Conc.)	kg/yr	6,299	8,287	10,338	1,228	985	2,212	36,564	14,194	5,870	986	48,187
Receiving Water	WCA	1	1	2A	2A	2A	2A	EAA/STA-3/4	2A & 3A	Rot. & 3A	3A	
Diversion Volumes and Loads (See Note 4)												
Volume	AF/yr	25,444	0	0	0	0	0	0	85,832	0	0	111,276
TP Load	kg/yr	3,024	0	0	0	0	0	0	10,681	0	0	13,705
TP Concentration	ppb	96	-	-	-	-	-	-	101	-	-	100

Notes:
1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value.
   There is associated uncertainty in these predictions and actual performance will vary.
2. Outflow values highlighted in yellow had one or more years below the low end of the calibration data set (enumerated by the number in parentheses).
   For all areas except STA-5 and STA-6, a total of 35 water years (WY66-00) were simulated; for STA-5 and STA-6 a total of 13 water years (WY95-07) were simulated.
   The lowest sustainable STA outflow phosphorus concentration is 19 ppb (STA-3/4), with a standard deviation of 5 ppb.
3. Outflows shown from EAASR are outflows to STA-3/4; total outflows, including irrigation releases, were 546,113 AF/yr and 52,232 kg/yr at 78 ppb.
4. Diversion around STA-1E is directed to C-51E. Diversion around STA-3/4 is for downstream water supply users. While the SFWMM simulated small diversion volumes of EAA runoff, for the purpose of estimating phosphorus removal performance, these were simulated by DMSTA as being captured in the STAs.
   Diversions may occur based on the daily hydraulic and treatment capacity of the treatment areas.

Table 10-2: Estimated Allocation of Discharges to Receiving Waters.

Parameter	Unit	WCA-1	WCA-2A	WCA-3A	Other	Total
Volume	**AF/yr**	436,382	555,142	666,139	99,803	1,757,465
TP Load (at mean settling rate)	**kg/yr**	14,586	15,773	24,977	5,363	60,698
TP Concentration	**ppb**	27	23	30	44	28

"Other" includes discharges to C-51 East and Rotenberger, assumed to receive 50% of STA-5 discharges.

11. References

ADA Engineering, Inc. and Burns and McDonnell Engineering Inc. 2005. Everglades Agricultural Area Regional Feasibility Study, prepared for SFWMD. October 2005.

Black and Veatch 2006. EAA Storage Reservoir A1 Basis of Design Report. Prepared for the South Florida Water Management District. January 2006.

Brown and Caldwell 2007. Compartment B Build-out Basis of Design Report, prepared for the South Florida Water Management District. July 2007.

Brown and Caldwell 2007. Compartment B Build-out Preliminary Design Report Stormwater Treatment Area, prepared for the South Florida Water Management District. Oct. 2007.

Burns & McDonnell, 2003. Final Report, Everglades Protection Area Tributary Basins, Long-Term Plan for Achieving Water Quality Goals; prepared for the South Florida Water Management District, October 2003.

Goforth G. 2007a. Updated Flow and Phosphorus Data Sets for the ECP Basins Covering the Period May 1, 1994 – April 30, 2007. Prepared for the U.S. Army Corps of Engineers and South Florida Water Management District. August 2007.

Goforth G. 2007b. Updated STA Inflow Data Sets for the 2010 Period. Prepared for the U.S. Army Corps of Engineers and South Florida Water Management District. October 2007.

Pietro, K., R. Bearzotti, M. Chimney, G. Germain and N. Iricanin. 2007. Draft – STA Performance, Compliance and Optimization; Chapter 5 in the SFER. August 2007.

URS Corporation 2007. Graphic presented at 8/23/07 Long-Term Plan Quarterly Meeting.

Walker, W. and R. Kadlec 2005. Dynamic Model for Stormwater Treatment Areas, prepared for the U. S. Department of Interior and the U. S. Army Corps of Engineers.

Appendix A. 2010A8 Simulation Model Assumptions

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
Regional Input Data				
Climate	• The climatic period of record is from 1965 to 2000. • Rainfall estimates have been revised and updated for 1965-2000. • Revised evapotranspiration methods have been used for 1965-2000.	• Same as Base	• Same as Base	• Same as Base
Topography	Updated November 2001 and September 2003 using latest available information (in NGVD 29 datum). Nov 2001 update (Documented in November 2001 SFWMD memorandum from M. Hinton to K. Tarboton) includes: • USGS High Accuracy Elevation data from helicopter surveys collected 1999-2000 for Everglades National Park and Water Conservation Area (WCA) 3 south of Alligator Alley • USGS Lidar data (May 1999) for WCA-3A north of Alligator Alley • Lindahl, Browning, Ferrari & Helstrom 1999 survey for Rotenberger Wildlife Management	• Same as Base	• Same as Base	• Same as Base

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
	Area. • Stormwater Treatment Area surveys from 1990s • Aerometric Corp. 1986 survey of the 8-1/2 square mile area • Includes estimate of Everglades Agricultural Area subsidence • Other data as in SFWMM v3.7 • FWC survey 1992 for the Holey Land Wildlife Management Area. September 2003 update includes: • Reverting to FWC 1992 survey data for Rotenberger Wildlife Management Area. • DHI gridded data from Kimley –Horn contracted survey of EAA, 2002-2003. Regridded to 2x2 scale for EAA outside of STAs and WMAs.			
Sea Level	• Sea level data from six long-term NOAA stations were used to generate a historic record to use as sea level boundary conditions for the 1965 to 2000 evaluation period.	• Same as Base	• Same as Base	• Same as Base
Land Use	• The land use coverage is intermediate between 2000B2 and 2050B2	• Same as Base	• Same as Base	• Same as Base
Natural Area Land Cover	Vegetation classes and their spatial distribution in the natural areas comes from the following data:	• Same as Base	• Same as Base	• Same as Base

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
(Vegetation)	• Walsh 1995 aerial photography in Everglades National Park • Rutchey 1995 classification in WCA-3B, WCA-3A north of Alligator Alley and the Miami Canal, WCA-2A & 2B • Richardson 1990 data for Loxahatchee National Wildlife Refuge • FLUCCS 1995 for Big Cypress National Preserve, Holey Land & Rotenberger Wildlife Management Areas & WCA-3A south of Alligator Alley and Miami Canal. (Documented in August 2003 SFWMD memorandum from J. Barnes and K. Tarboton to J. Obeysekera).			
Lake Okeechobee Service Area				
LOSA Basins	• Southern Indian Prairie Basin, S-4, North Lake Shore and Northeast Lake Shore demands and runoff based on AFSIRS (Agricultural Field-Scale Irrigation Requirement Simulation) modeling using 2010 LU projections.	• Same as Base	• Same as Base	• Same as Base
Lake Okeechobee	• Lake Okeechobee Regulation Schedule WSE according to WSE decision trees, with pulse releases in Zone D modeled as Level III pulse in upper third of the zone, Level II pulse in middle third of the zone, and Level I pulse in the lower	Same as Base, plus: • Lowered EAA Storage Injection Line as compares to	• Same as Base	Same as Base, plus: • Lowered EAA Storage Injection Line

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
	third of the zone, when the decision tree calls for regulatory releases to the estuaries in that zone. • WSE thresholds derived from the Class Limit Adjustment (CLA) WSE modification: Increase the frequency of Pulse Releases in Zone D of WSE. • Modified WSE thresholds for zone D1 to improve utilization of EAA reservoir. • Lake Okeechobee Supply Side Management guidelines are used to implement Lake Okeechobee Service Area water restriction cutbacks as per rule 40E-21 and 40E-22. The Lake Okeechobee service area water shortage triggering line is the line starting at 13.0 ft on October 1 and ending at 10.5 ft on May 31, with additional breakpoints defined in between. • Emergency flood control backpumping to Lake Okeechobee from the Everglades Agricultural Area. • Kissimmee River Restoration and Headwaters Revitalization Project are complete. • Lake Okeechobee environmental releases to supplement reservoir deliveries to Caloosahatchee and St. Lucie Estuaries. • Environmental deliveries to WCA-3A according to Rainfall Driven Operations as means of operating the EAA Reservoirs.	Base, by an average of 0.28 ft		as compares to Base, by an average of 0.28 ft

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
	• Lake Okeechobee BMP makeup water deliveries to WCAs are not made. • Adaptive protocols are included. • Flood control releases South through STA-3/4 and WCAs are not performed in this simulation.			

Acceler8 Projects	Acceler8 Projects On Line by 2010 – See A8 Website.
	• C44 Reservoirs: 9315 acres, depth 5 .ft.
	• C43 Reservoirs: 11000 acres, depth 15 ft.
	• EAA Reservoirs- A-1 Reservoir
	A-1 Reservoir simulated as two interconnected compartments.
	Compartment 1: irrigation, 9600 acres, depth 12 ft.
	Compartment 2: environment 6400 acres, depth 12 ft.
	• WPA's
	  • Site 1 Impoundment: 1660 acres; depth 8 ft.
	  • C-9 Impoundment: 1739 acres; depth 4 ft.
	  • C-11 Impoundment: 1730 acres; depth 4 ft.
	  • Acme Basin B discharge to C51W and then to STA1E
	  • WCA-3A/3B Seepage Management Area
		Same as Base, plus:
		• Decreased inflow capacity to A-1 Res from NNR Basin from 2775 cfs to 800 cfs
			• Same as Base	Same as Base, plus:
				• Decreased inflow capacity to A-1 Res from NNR Basin from 2775 cfs to 800 cfs

Caloosahatchee River Basin	• Caloosahatchee River Basin irrigation demands and runoff were estimated using the AFSIRS method based on projected 2010 land use. • Public water supply daily intake from the river	• Same as Base	• Same as Base	• Same as Base

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
	is included in the analysis. • C43 reservoir supplements basin irrigation needs and estuarine environmental needs.			
St. Lucie Canal Basin	• St. Lucie Canal Basin demands estimated using the AFSIRS method based on projected 2010 land use. • Basin demands include the Florida Power & Light reservoir at Indiantown. • C44 reservoir supplements basin irrigation needs and estuarine environmental needs.	• Same as Base	• Same as Base	• Same as Base
Seminole Brighton Reservation	• Brighton reservation demands were estimated using AFSIRS method based on existing planted acreage in a manner consistent with that applied to other basins not in the distributed mesh of the SFWMM. • The 2 in 10 demand set forth in the Seminole Compact Work plan equals 2,262 MGM (million gallons/month). AFSIRS modeled 2 in 10 demands equaled 2,383 MGM. • While estimated demands, and therefore deliveries, for every month of simulation do not equate to monthly entitlement quantities as per Table 7, Agreement 41-21 (Nov. 1992), tribal rights to these quantities are preserved. • Lake Okeechobee low stage management	• Same as Base	• Same as Base	• Same as Base

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
	applies to this agreement.			
Seminole Big Cypress Reservation	• Big Cypress Reservation irrigation demands and runoff were estimated using the AFSIRS method based on existing planted acreage in a manner consistent with that applied to other basins not in the distributed mesh of the SFWMM. • The 2 in 10 demand set forth in the Seminole Compact Work Plan equals 2,606 MGM. AFSIRS modeled 2 in 10 demands equaled 2,659 MGM. • While estimated demands, and therefore deliveries, for every month of simulation do not equate to monthly entitlement quantities as per the District's Final Order and Tribe's Resolution establishing the Big Cypress Reservation entitlement, tribal rights to these quantities are preserved. • Lake Okeechobee low stage management applies to this agreement.	• Same as Base	• Same as Base	• Same as Base
Seminole Hollywood Reservation	• Hollywood Reservation demands are set forth under VI. C of the Tribal Rights Compact. • Tribal sources of water supply include various bulk sale agreements with municipal service suppliers.	• Same as Base	• Same as Base	• Same as Base

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
Everglades Agricultural Area	• Everglades Agricultural Area irrigation demands are simulated using climatic data for the 36 year period of record and a soil moisture accounting algorithm, with parameters calibrated to match historical regional supplemental deliveries from Lake Okeechobee. • SFWMM EAA runoff and irrigation demand response to rainfall was calibrated for 1984-95 and verified for 1979-1983/1996-2000. No runoff reduction adjustment was necessary to account for Best Management Practices (BMPs). • Minimum elevation at which farmers can pump water out of the major canals for supplemental irrigation is 8.0 ft. • EAA Reservoirs A1 16,000 acres o Compartment 1: 9600 acres o Compartment 2: 6400 acres • Rain Driven Operation applied to operate the EAA reservoirs for the Everglades Restoration Project	Same as Base, plus: • Reduced inflow capacity to EAA A-1 reservoir from North New River Basin from 2775 cfs to 800 cfs	• Same as Base	Same as Base, plus: • Reduced inflow capacity to EAA A-1 reservoir from North New River Basin from 2775 cfs to 800 cfs
Everglades Construction Project Stormwater	• STA-1E: 5132 acres total treatment area • STA-1W: 6670 acres total treatment area • STA-2 : 6430 acres total treatment area	Same as Base, plus: • Buildout STA B: 6,722 acres total treatment	Same as Base, plus: • Buildout STA B: 6,722 acres total treatment	Same as Base, plus: • Buildout STA B: 6,722 acres

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
Treatment Areas	• STA 2-Cell 4: 1902 acres total treatment area • STA-3/4: 16543 acres total treatment area • STA-5: 6095 acres total treatment • STA-6: 2257 acres total treatment • Operation of STAs assumes maintenance of a 6" minimum depth.	area. Source: North New River runoff and STA-2 flow • Buildout STA C: 6,230 acres total treatment areas. Source 139 Basin and Annex	area. Source: North New River runoff • Buildout STA C: 6,230 acres total treatment areas. Source 139 Basin and Annex	total treatment area. Source: North New River runoff • Buildout STA C: 6,230 acres total treatment areas. Source 139 Basin and Annex
Holey Land Wildlife WMA	• As per Memorandum of Agreement between the FWC and the District.	• Same as Base	• Same as Base	• Same as Base
Rotenberger Wildlife WMA	• Interim Operational Schedule as defined in the Operation Plan for Rotenberger (SFWMD Jan 2002).	• Same as Base	• Same as Base	• Same as Base
Water Conservation Areas				
Water Conservation Area 1 (ARM Loxahatchee National Wildlife Refuge)	• Current C&SF Regulation Schedule. Includes regulatory releases to tide through LEC canals. • No net outflow to maintain minimum stages in the LEC Service Area canals (salinity control), if water levels are less than minimum operating criteria of 14 ft. The bottom floor of the schedule (Zone C) is the area below 14 ft. Any water supply releases below the floor will be matched by an equivalent volume of inflow from Lake Okeechobee.	• Same as Base	• Same as Base	• Same as Base

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
Water Conservation Area 2 A&B	• Current C&SF regulation schedule. Includes regulatory releases to tide through LEC canals. • No net outflow to maintain minimum stages in the LEC Service Area canals (salinity control), if water levels in WCA-2A are less than minimum operating criteria of 10.5 ft. Any water supply releases below the floor will be matched by an equivalent volume of inflow from Lake Okeechobee.	• Same as Base	• Same as Base	• Same as Base
Water Conservation Area 3 A&B	• Rainfall driven operational criteria for determining timing of deliveries to and discharges from WCA-3A and WCA-3B. • No net outflow to maintain minimum stages in the LEC Service Area canals (salinity control), if water levels are less than minimum operating criteria of 7.5 ft in WCA-3A. Any water supply releases below the floor will be matched by an equivalent volume of inflow from Lake Okeechobee. • Structural and operational modifications for L-67 canal conveyance and S-355 structures as in the federally authorized Modified Water Deliver Project. •	• Same as Base	• Same as Base	• Same as Base
Lower East Coast Service Areas				

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
Public Water Supply and Irrigation	• 2010 projections based upon permitted allocation to utilities by 2005, with 2010 well field distribution and inclusion of utility ASR. • Irrigation demands are based upon existing land use (updated through 2010) and calculated using AFSIRS, reduced to account for landscape and golf course areas irrigated using reuse water and landscape areas irrigated using public water supply.	• Same as Base	• Same as Base	• Same as Base
Other Natural Areas	• For the Northwest Fork of the Loxahatchee River, the District operates the G-92 structure and associated structures to provide approximately 50 cfs over Lainhart Dam to the Northwest Fork, when sufficient water is available in C-18 Canal. • Flows to Pond Apple Slough through S-13A are adjusted in the model to approximate measured flows at the structure. • Flows to Biscayne Bay are simulated through Snake Creek, North Bay, the Miami River, Central Bay and South Bay.	• Same as Base	• Same as Base	• Same as Base

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
Coastal Basin Canal Facilities and Operations	• C-4 Flood Mitigation Project • C-11 Water Quality Treatment Critical Project (S-381 and S-9A) • Releases from WCA-3A to ENP and the South Dade Conveyance System (SDCS) will follow the Interim Operational Plan (2002 IOP EIS): o Decreased S-12 flood control discharges & increased flood control discharges to SDCS o Structures S-343A, S-343B, S-344 and S-12A are closed Nov. 1 to July 15 o Structure S-12B is closed Jan. 1 to July 15. o Structure S-12C is closed Feb. 1 to July 15. South Dade Conveyance System operations will follow IOP for protection of the Cape Sable	• Same as Base	• Same as Base	• Same as Base
Lower East Coast	• C-4 Impoundment – 843.5 acres	• Same as Base	• Same as Base	• Same as Base
Upper East Coast Operational CERP	• L-8 Reservoir: 870 acres, depth 44 ft.	• Same as Base	• Same as Base	• Same as Base
Western Basins and Big Cypress National Preserve				
Western Basins	• Estimated and updated historical inflows from western basins at two locations: G-136 and G-406. The G-406 location represents potential inflow from the C-139 Basin into STA 5. Data for the period 1978 - 2000 is the same as the	• Same as Base	• Same as Base	• Same as Base

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
	data used for the C-139 Basin Rule development. (Documented in June 2002 SFWMD memorandum from L. Cadavid and L. Brion to J. Obeysekera).			
Big Cypress National Preserve	• Tamiami Trail culverts are not modeled in SFWMM due to the coarse (2x2 mile) model resolution.	• Same as Base	• Same as Base	• Same as Base
Everglades National Park and Florida Bay				
Everglades National Park & Lower East Coast	• Water deliveries to Everglades National Park are based upon Everglades Rain-driven operations. (WCA3A, 3B, ENP) • L29 constraint set to 9.2' per Tamiami Trail GRR Nov 2001 • 8.5 SMA as per the federally authorized Alternative 6D of the 8.5 SMA project. • Northern C111 project (2002 IOP EIS) • Southern C111 project modeled per C-111 Project 1994 GRR • IOP (partial implementation): o South Dade Structures modeled per 2002 IOP EIS o S12 and S343's operation under IOP schedules 2002 IOP EIS	• Same as Base	• Same as Base	• Same as Base
Region-wide Water Management and Related Operations				

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
Water Shortage Rules	• The existing condition reflects the existing water shortage policies in 2005 as reflected in South Florida Water Management District Chapters 40E-21 and 40E-22, FAC	• Same as Base	• Same as Base	• Same as Base

Appendix B. DMSTA Output

STA-1E

DMSTA2- Inputs & Outputs Project: STA 1E EIS Model Release: 07/05/07 Current Date: 11/17/2007

Input Variable	Units	Value	Case Description:
Design Case Name	-	All EIS AltC	All cells
Input Series Name		TS_All_EIS_AltC	
Starting Date for Simulation	-	05/01/65	East Distribution Cell modeled as two cells in parallel; minimal treatment in EDC (K=0.01 m/yr)
Ending Date for Simulation	-	04/30/00	West Distribution Cell modeled as two cells in parallel; minimal treatment in WDC (K=0.01 m/yr)
Starting Date for Output	-	05/01/65	
Integration Steps Per Day	-	4	
Number of Iterations	-	0	
Output Averaging Interval	days	365	
Inflow Conc Scale Factor	-	1	
Rainfall P Conc	ppb	10	
Atmospheric P Load (Dry)	mg/m2-yr	20	

Simulation Type:	Uncertainty Analysis		
Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	27	35	20
GM Outflow C (ppb)	24	32	18
Load Reduction %	85%	80%	89%
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	3	0.0%
Warning/Error Messages	4	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	EDCE	1	2	EDCW	3	4N	4S	WDCW	7	WDCE	5	6
Vegetation Type	-->	none	EMG_3	SAV_3	none	EMG_3	SAV_3	SAV_3	none	EMG_3	none	EMG_3	SAV_3
Inflow Fraction	-	0.215903431			0.386989363				0.167819		0.229288		
Downstream Cell Number	-	2	3		5	6	7		9	12	11.00	12.00	
Surface Area	km2	0.95	2.25	2.23	0.95	2.38	2.61	3.04	1.17	1.69	1.17	2.31	4.25
Mean Width of Flow Path	km	0.66	1.55	1.55	0.66	1.55	1.55	1.55	0.75	1.61	0.75	1.18	0.75
Number of Tanks in Series	-	0.5	3.0	3.0	0.5	3.0	3.0	3.0	0.5	3.0	0.5	3.0	3.0
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	38.1	38.1	38.1	91.44	38.1	38.1	38.1	99.06	38.1	38.1	38.1	38.1
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4	4	4	4	4	4	4	4	4	4
Outflow Coefficient - Intercept	-	1	1	1	1	1	1	1	1	1	1	1	1
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm									0.0054			0.0057
Inflow Seepage Control Elev	cm									69			94
Inflow Seepage Conc	ppb									20			20
Outflow Seepage Rate	(cm/d) / cm	0.0095	0.0042	0.0042	0.0095			0.0054	0.01		0.01		
Outflow Seepage Control Elev	cm	-137	-137	-99	-87			-38	-15		-76		
Max Outflow Seepage Conc	ppb	20	20	20	20			20	20		20		
Seepage Recycle to Cell Number	-	1	1	1	4			7					
Seepage Recycle Fraction	-	1	1	1	1			1					
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	30	30	30	30	30	30	30	30	30	30	30	30
Initial P Storage Per Unit Area	mg/m2	500	500	500	500	500	500	500	500	500	500	500	500
Initial Water Column Depth	cm	50	50	50	50	50	50	50	50	50	50	50	50
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3	3	3	3	3	3	3	3	3	3
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22	22	22	22	22	22	22	22	22	22
C2 = Conc at Half-Max Uptake	ppb	300	300	300	300	300	300	300	300	300	300	300	300
K = Net Settling Rate at Steady State	m/yr	0.0	16.8	52.5	0.0	16.8	52.5	52.5	0.0	16.8	0.0	16.8	52.5
Z1 = Saturated Uptake Depth	cm	40	40	40	40	40	40	40	40	40	40	40	40
Z2 = Lower Penalty Depth	cm	100	100	100	100	100	100	100	100	100	100	100	100
Z3 = Upper Penalty Depth	cm	200	200	200	200	200	200	200	200	200	200	200	200

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	17.17	17.89	18.60	19.00	19.71	20.43	21.14	21.54	22.26	22.66	23.34	24.06	24.06
Run Date	-	11/05/07	11/05/07	11/05/07	11/05/07	11/05/07	11/05/07	11/05/07	11/05/07	11/05/07	11/05/07	11/05/07	11/05/07	11/05/07
Starting Date for Simulation	-	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65
Starting Date for Output	-	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65
Ending Date	-	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00
Output Duration	days	12784	12784	12784	12784	12784	12784	12784	12784	12784	12784	12784	12784	12784
Cell Label	-	EDCE	1	2	EDCW	3	4N	4S	WDCW	7	WDCE	5	6	Total
Downstream Cell Label		1	2	Outflow	3	4N	4S	Outflow	7	6	5	6	Outflow	-
Network Simulation Name	-	none	none	none	none	none	none	none	none	none	none	none	none	none
Simulation Type	-	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta
Surface Area	km2	0.95	2.25	2.23	0.95	2.38	2.61	3.04	1.17	1.69	1.17	2.31	4.25	25.02
Mean Rainfall	cm/yr	142.94	142.94	142.94	142.94	142.94	142.94	142.94	142.94	142.94	142.94	142.94	142.94	142.9
Mean ET	cm/yr	128.87	128.87	128.50	128.87	128.87	128.87	128.87	128.87	128.87	128.58	128.66	128.87	128.8
Cell Inflow Volume	hm3/yr	51.6	63.4	57.2	92.6	92.7	93.0	93.4	40.1	35.5	54.8	49.3	86.1	239.2
Cell Inflow Load	kg/yr	9078.0	8698.0	5399.7	16271.5	15523.1	12054.9	5173.2	7056.2	6255.6	9640.7	8704.4	9560.3	42046
Cell Inflow Conc	ppb	176	137	94	176	167	130	55	176	176	176	176	111	175.8
Treated Outflow Volume	hm3/yr	63.4	57.2	52.4	92.7	93.0	93.4	93.8	35.5	36.5	49.3	49.6	89.1	235.3
Treated Outflow Load	kg/yr	8698.0	5399.7	1560.8	15523.1	12054.9	5173.2	2089.4	6255.6	3999.7	8704.4	5560.6	2649	6299
Treated FWM Outflow Conc	ppb	137	94	30	167	130	55	22	176	110	176	112	30	26.8
Upper Confidence Limit	ppb	137.2	102.9	38.1	167.4	137.3	67.5	30.0	176.3	121.4	176.5	124.0	39.1	35.3
Lower Confidence Limit	ppb	137.1	84.8	22.8	167.4	120.3	44.0	16.4	176.3	96.5	176.5	98.5	22.2	20.0
Total Outflow Volume + Bypass	hm3/yr	63.4	57.2	52.4	92.7	93.0	93.4	93.8	35.5	36.5	49.3	49.6	89.1	235.3
Total Outflow Load + Bypass	kg/yr	8698.0	5399.7	1560.8	15523.1	12054.9	5173.2	2089.4	6255.6	3999.7	8704.4	5560.6	2648.9	6299.2
Total FWM Outflow Conc	ppb	137.2	94.5	29.8	167.4	129.6	55.4	22.3	176.3	109.7	176.5	112.0	29.7	26.8
Bypass Load	kg/yr	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Bypass Load	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.0
Maximum Inflow	hm3/d	0.25	0.29	0.27	0.45	0.45	0.46	0.46	0.20	0.18	0.27	0.25	0.45	1.17
Maximum Outflow	hm3/d	0.29	0.27	0.26	0.45	0.46	0.46	0.47	0.18	0.19	0.25	0.26	0.46	1.19
Surface Load Reduction	kg/yr	745	3298	3839	868	3468	6882	3188	801	2256	936	3144	6911	35747
Load Trapped in Sediments	kg/yr	0	2693	3660	0	3548	6970	3142	0	2328	0	3222	7104	32667
Overall Load Reduction	%	4%	38%	71%	5%	22%	57%	60%	11%	36%	10%	36%	72%	85%
Lower Confidence Limit	%	0.0	0.3	0.7	0.0	0.2	0.5	0.6	0.1	0.3	0.1	0.3	0.7	80%
Upper Confidence Limit	%	0.0	0.4	0.8	0.0	0.3	0.6	0.6	0.1	0.4	0.1	0.4	0.8	89%
Daily Geometric Mean	ppb	102.6	88.6	24.0	141.7	122.8	46.9	16.6	166.7	102.9	163.2	109.2	22.2	#N/A
Outflow Geo Mean - Composites	ppb	135.1	91.9	27.3	166.4	127.0	51.4	20.1	175.6	106.4	176.0	109.0	26.8	24.2
Upper Confidence Limit	ppb	135.1	100.6	35.3	166.4	135.1	63.6	27.4	175.6	118.5	176.0	121.4	35.8	32.4
Lower Confidence Limit	ppb	135.0	82.0	20.6	166.4	117.3	40.1	14.6	175.6	92.8	176.0	95.0	19.8	17.9
Frequency Outflow Conc > 10 ppb	%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Frequency Outflow Conc > 20 ppb	%	100%	100%	81%	100%	100%	100%	53%	100%	100%	100%	100%	83%	97%
Frequency Outflow Conc > 50 ppb	%	100%	100%	0%	100%	100%	53%	0%	100%	100%	100%	100%	0%	75%
Freq Outflow Volume > 10 ppb	%	100%	100%	100%	100%	100%	100%	96%	100%	100%	100%	100%	100%	100%
95th Percentile Outflow Conc	ppb	153.41	109.58	40.38	181.51	146.53	75.42	31.10	192.89	125.78	192.39	127.85	41.06	37
Mean Biomass P Storage	mg/m2	737	3764	1648	939	4677	2684	1040	1003	4329	813	4385	1687	2471
Storage Increase / Net Removal	%	2065%	0%	0%	2687%	0%	0%	0%	2891%	0%	2804%	0%	0%	0%
Net Storage Turnover Rate	1/yr	0.0	11.1	34.8	0.0	11.1	34.8	34.7	0.0	11.1	0.0	11.1	34.7	18.5
Unit Area P Load	mg/m2-yr	9546	3864	2416	17110	6510	4616	1699	6031	3697	8240	3765	2251	1681
Unit Area P Removal	mg/m2-yr	0	1197	1638	0	1488	2669	1032	0	1376	0	1394	1673	1306
Mean Water Load	cm/d	14.9	7.7	7.0	26.7	10.6	9.8	8.4	9.4	5.7	12.8	5.8	5.6	2.6
Max Water Load	cm/d	26.5	12.8	12.2	47.4	19.0	17.5	15.2	16.7	10.9	22.8	10.9	10.5	4.7
Mean Depth	cm	68	53	51	94	59	59	58	98	47	58	53	68	61
Minimum Depth	cm	59.9	46.5	43.2	92.8	50.5	50.1	49.7	84.6	42.1	43.1	41.7	57.1	52
Maximum Depth	cm	76.2	60.1	59.5	98.0	67.9	68.1	69.0	100.7	54.3	69.5	62.6	82.1	71
Frequency Depth < 10 cm	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.0%
Flow/Width	m2/day	214	112	101	384	164	164	165	147	60	200	114	314	178.9
HRT Days	days	4.6	6.9	7.3	3.5	5.5	6.0	7.0	10.5	8.2	4.5	9.1	12.3	23.4
Mean Velocity	cm/sec	0.37	0.24	0.23	0.47	0.32	0.32	0.33	0.17	0.15	0.40	0.25	0.53	0.33
Seepage Outflow / Total Outflow	%	0%	0%	0%	0%	0%	0%	0%	12%	0%	10%	0%	0%	4%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
95th Percentile Outflow Volume	hm3/d	0.2	0.2	0.2	0.4	0.4	0.4	0.4	0.2	0.2	0.2	0.2	0.4	1.0
95th Percentile Outflow Load	kg/d	35.6	23.9	8.3	64.2	53.2	26.8	11.5	26.6	18.5	36.6	25.4	14.6	34.4
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Range Check - Mean Depth	-			0.82			0.94	0.94						3
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-			0.62										1
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-													0
Water Balance Error	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%
Mass Balance Error	%	0.00%	0.01%	0.01%	0.00%	0.01%	0.01%	0.01%	0.00%	0.01%	0.00%	0.01%	0.01%	0.02%
Warning or Error Messages		Cell# 3 Depth out of calib. range for SAV_3: 51 vs. 62 - 87 cm Cell# 3 Flow/Width out of calib. range for SAV_3: 101 vs. 162 - 374 m2/day						Cell# 6 Depth out of calib. range for SAV_3: 59 vs. 62 - 87 cm Cell# 7 Depth out of calib. range for SAV_3: 58 vs. 62 - 87 cm						4

STA-1W

DMSTA2- Inputs & Outputs — **Project: STA 1W EIS** — Model Release: 07/05/07 — Current Date: 11/17/2007

Case Description:
STA-1W with Long Term Plan Enhancements
Include all S-5A Basin and EBWCD Runoff
Balanced loading rate among STA-1E and STA-1W

Simulation Type: Uncertainty Analysis

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	27	35	21
GM Outflow C (ppb)	26	33	20
Load Reduction %	85%	81%	88%
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	-0.2%	0.4%
Iterations & Convergence	3	0.1%
Warning/Error Messages	7	

Input Variable	Units	Value
Design Case Name	-	EIS AltC
Input Series Name		TS_EIS_AltC
Starting Date for Simulation	-	05/01/65
Ending Date for Simulation	-	04/30/00
Starting Date for Output	-	05/01/65
Integration Steps Per Day	-	4
Number of Iterations	-	0
Output Averaging Interval	days	365
Inflow Conc Scale Factor	-	1
Rainfall P Conc	ppb	10
Atmospheric P Load (Dry)	mg/m2-yr	20

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	1A	1B	3	2A	2B	4	5A	5B				
Vegetation Type	-->	EMG_3	SAV_3	SAV_3	EMG_3	SAV_3	SAV_3	EMG_3	SAV_3				
Inflow Fraction	-	0.377211394			0.194752624			0.428036					
Downstream Cell Number	-	2	3		5	6		8					
Surface Area	km2	3.02	3.02	4.15	1.91	1.90	1.45	2.28	9.28				
Mean Width of Flow Path	km	1.10	1.10	1.10	2.40	2.00	1.30	1.78	2.34				
Number of Tanks in Series	-	2.0	2.0	2.0	2.0	2.0	2.0	2.0	3.0				
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	38.1	38.1	38.1	38.1	38.1	38.1	38.1	38.1				
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4	4	4	4	4	4				
Outflow Coefficient - Intercept	-	1	1	1	1	1	1	1	1				
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm	0.0035	0.0018	0.0023									
Inflow Seepage Control Elev	cm	172	172	185									
Inflow Seepage Conc	ppb	20	20	20									
Outflow Seepage Rate	(cm/d) / cm			0.0014	0.0016	0.0016	0.0021	0.0156	0.0049				
Outflow Seepage Control Elev	cm			-60	-46	-46	-46	-46	-46				
Max Outflow Seepage Conc	ppb			20	20	20	20	20	20				
Seepage Recycle to Cell Number	-							1	1				
Seepage Recycle Fraction	-							0.91	0.8				
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	30	30	30	30	30	30	30	30				
Initial P Storage Per Unit Area	mg/m2	500	500	500	500	500	500	500	500				
Initial Water Column Depth	cm	200	200	200	200	200	200	200	200				
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3	3	3	3	3	3				
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22	22	22	22	22	22				
C2 = Conc at Half-Max Uptake	ppb	300	300	300	300	300	300	300	300				
K = Net Settling Rate at Steady State	m/yr	16.8	52.5	52.5	16.8	52.5	52.5	16.8	52.5				
Z1 = Saturated Uptake Depth	cm	40	40	40	40	40	40	40	40				
Z2 = Lower Penalty Depth	cm	100	100	100	100	100	100	100	100				
Z3 = Upper Penalty Depth	cm	200	200	200	200	200	200	200	200				

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	10.03	10.54	11.09	11.63	12.14	12.69	13.23	13.91					13.91
Run Date	-	11/17/07	11/17/07	11/17/07	11/17/07	11/17/07	11/17/07	11/17/07	11/17/07					11/17/07
Starting Date for Simulation	-	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65					05/01/65
Starting Date for Output	-	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65					05/01/65
Ending Date	-	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00					04/30/00
Output Duration	days	12784	12784	12784	12784	12784	12784	12784	12784					12784
Cell Label		1A	1B	3	2A	2B	4	5A	5B					Total
Downstream Cell Label		1B	3	Outflow	2B	4	Outflow	5B	Outflow					-
Network Simulation Name	-	none	none	none	none	none	none	none	none					none
Simulation Type	-	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta					Uncerta
Surface Area	km2	3.02	3.02	4.15	1.91	1.90	1.45	2.28	9.28					27.00
Mean Rainfall	cm/yr	134.86	134.86	134.86	134.86	134.86	134.86	134.86	134.86					134.9
Mean ET	cm/yr	129.95	129.95	129.95	129.83	129.76	129.62	123.08	127.31					128.4
Cell Inflow Volume	hm3/yr	113.6	140.4	142.6	58.6	57.7	56.8	128.9	117.5					301.1
Cell Inflow Load	kg/yr	20609.2	17211.9	9185.9	10640.4	7737.6	3207.7	23386.1	16329.5					54636
Cell Inflow Conc	ppb	181	123	64	181	134	56	181	139					181.5
Treated Outflow Volume	hm3/yr	140.4	142.6	144.0	57.7	56.8	55.8	117.5	103.1					303.0
Treated Outflow Load	kg/yr	17211.9	9185.9	4128.2	7737.6	3207.7	1663.0	16329.5	2496.1					8287
Treated FWM Outflow Conc	ppb	123	64	29	134	56	30	139	24					27.4
Upper Confidence Limit	ppb	128.6	75.0	36.9	143.2	68.5	38.6	145.3	30.0					34.9
Lower Confidence Limit	ppb	115.4	53.9	21.9	123.3	45.4	22.9	131.9	19.6					21.3
Total Outflow Volume + Bypass	hm3/yr	140.4	142.6	144.0	57.7	56.8	55.8	117.5	103.1					303.0
Total Outflow Load + Bypass	kg/yr	17211.9	9185.9	4128.2	7737.6	3207.7	1663.0	16329.5	2496.1					8287.4
Total FWM Outflow Conc	ppb	122.6	64.4	28.7	134.1	56.5	29.8	139.0	24.2					27.4
Bypass Load	kg/yr	0	0	0	0	0	0	0	0					0.0
Bypass Load	%	0%	0%	0%	0%	0%	0%	0%	0%					0.0
Maximum Inflow	hm3/d	0.49	0.58	0.59	0.25	0.25	0.26	0.56	0.53					1.30
Maximum Outflow	hm3/d	0.58	0.59	0.61	0.25	0.26	0.26	0.53	0.50					1.36
Surface Load Reduction	kg/yr	3838	8026	5058	2903	4530	1545	7057	13833					46348
Load Trapped in Sediments	kg/yr	4017	8167	5192	2769	4497	1552	2897	12716					41806
Overall Load Reduction	%	16%	47%	55%	27%	59%	48%	30%	85%					85%
Lower Confidence Limit	%	0.1	0.4	0.5	0.2	0.5	0.4	0.3	0.8					81%
Upper Confidence Limit	%	0.2	0.5	0.6	0.3	0.6	0.5	0.3	0.9					88%
Daily Geometric Mean	ppb	109.8	54.8	22.4	140.3	50.5	23.0	158.4	19.6					#N/A
Outflow Geo Mean - Composites	ppb	121.0	62.1	27.3	132.0	53.8	28.1	136.1	22.9					26.0
Upper Confidence Limit	ppb	127.1	72.8	35.3	141.5	65.7	36.6	142.8	28.5					33.3
Lower Confidence Limit	ppb	113.5	51.6	20.8	121.0	43.0	21.6	128.8	18.5					20.2
Frequency Outflow Conc > 10 ppb	%	100%	100%	100%	100%	100%	100%	100%	100%					100%
Frequency Outflow Conc > 20 ppb	%	100%	100%	94%	100%	100%	94%	100%	75%					100%
Frequency Outflow Conc > 50 ppb	%	100%	92%	0%	100%	69%	0%	100%	0%					92%
Freq Outflow Volume > 10 ppb	%	100%	100%	100%	100%	100%	100%	100%	99%					100%
95th Percentile Outflow Conc	ppb	132.87	78.05	37.13	144.94	69.50	38.20	153.81	31.34					35
Mean Biomass P Storage	mg/m2	4187	2714	1250	4555	2360	1069	3989	1365					2314
Storage Increase / Net Removal	%	0%	0%	0%	0%	0%	0%	0%	0%					0%
Net Storage Turnover Rate	1/yr	11.1	34.9	35.0	11.2	35.0	35.1	11.2	35.1					23.4
Unit Area P Load	mg/m2-yr	6833	5707	2211	5580	4066	2213	10278	1759					2023
Unit Area P Removal	mg/m2-yr	1332	2708	1250	1452	2363	1071	1273	1370					1548
Mean Water Load	cm/d	10.3	12.7	9.4	8.4	8.3	10.7	15.5	3.5					3.1
Max Water Load	cm/d	16.2	19.3	14.3	13.3	13.4	17.7	24.4	5.7					4.8
Mean Depth	cm	67	69	70	44	45	48	46	46					55
Minimum Depth	cm	59.6	61.0	61.9	37.1	37.3	37.5	33.1	28.7					43
Maximum Depth	cm	77.1	78.7	80.1	51.3	53.6	59.1	61.1	60.1					66
Frequency Depth < 10 cm	%	0%	0%	0%	0%	0%	0%	0%	0%					0.0%
Flow/Width	m2/day	283	349	355	67	79	120	198	137					205.9
HRT Days	days	6.5	5.4	7.4	5.2	5.4	4.5	3.0	13.2					17.9
Mean Velocity	cm/sec	0.49	0.59	0.59	0.18	0.20	0.29	0.49	0.35					0.41
Seepage Outflow / Total Outflow	%	0%	0%	2%	2%	2%	2%	1%	3%					3%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					0.0
95th Percentile Outflow Volume	hm3/d	0.6	0.6	0.6	0.2	0.2	0.2	0.5	0.5					1.3
95th Percentile Outflow Load	kg/d	74.3	43.1	20.1	34.7	15.9	8.5	75.9	13.1					41.7
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A					#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A					#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A					#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A					#N/A
Range Check - Mean Depth	-					0.72	0.77		0.74					3
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-	1.35				0.49	0.74		0.85					4
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-													0
Water Balance Error	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%					0.00%
Mass Balance Error	%	0.01%	0.01%	0.01%	0.01%	0.02%	0.01%	-0.41%	-0.01%					-0.16%
Warning or Error Messages														7

Cell# 1 Flow/Width out of calib. range for EMG_3: 283 vs. 26 - 210 m2/day
Cell# 5 Depth out of calib. range for SAV_3: 45 vs. 62 - 87 cm
Cell# 5 Flow/Width out of calib. range for SAV_3: 79 vs. 162 - 374 m2/day
Cell# 6 Depth out of calib. range for SAV_3: 48 vs. 62 - 87 cm
Cell# 6 Flow/Width out of calib. range for SAV_3: 120 vs. 162 - 374 m2/day
Cell# 8 Depth out of calib. range for SAV_3: 46 vs. 62 - 87 cm
Cell# 8 Flow/Width out of calib. range for SAV_3: 137 vs. 162 - 374 m2/day

STA-2

DMSTA2- Inputs & Outputs **Project: STA 2 EIS** Model Release: 07/05/07 Current Date: 11/7/2007

Input Variable	Units	Value	Case Description:
Design Case Name	-	EIS AltC	Analysis for WY 1966-2000
Input Series Name		TS_EIS_AltC	Inflow time series includes allowance of 38 cfs (27,500 ac-ft/yr) seepage from WCA-2A to Supply Canal
Starting Date for Simulation	-	05/01/65	Cells 1-3
Ending Date for Simulation	-	04/30/00	
Starting Date for Output	-	05/01/65	
Integration Steps Per Day	-	4	Simulation Type: Uncertainty Analysis
Number of Iterations	-	0	Output Variable / Mean / Lower CL / Upper CL
Output Averaging Interval	days	365	FWM Outflow C (ppb) 27 34 22
Inflow Conc Scale Factor	-	1	GM Outflow C (ppb) 26 33 21
Rainfall P Conc	ppb	10	Load Reduction % 75% 69% 80%
Atmospheric P Load (Dry)	mg/m2-yr	20	Bypass Load (%) 0.0%

Diagnostics

H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.1%	0.1%
Iterations & Convergence	3	0.0%
Warning/Error Messages	3	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	1	2	3									
Vegetation Type	-->	PEW_3	PEW_3	SAV_3									
Inflow Fraction	-	0.283710055	0.358144973	0.358144973									
Downstream Cell Number	-												
Surface Area	km2	7.28	9.19	9.19									
Mean Width of Flow Path	km	1.58	2.00	2.00									
Number of Tanks in Series	-	3.0	3.0	6.0									
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	52.73	29.26	29.87									
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4									
Outflow Coefficient - Intercept	-	1	1	1									
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm	0.008											
Inflow Seepage Control Elev	cm	76											
Inflow Seepage Conc	ppb	20											
Outflow Seepage Rate	(cm/d) / cm	0.004	0.006	0.00337									
Outflow Seepage Control Elev	cm	-61	-61	-30									
Max Outflow Seepage Conc	ppb	20	20	20									
Seepage Recycle to Cell Number	-	1	2	3									
Seepage Recycle Fraction	-	1	1	1									
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	30	30	30									
Initial P Storage Per Unit Area	mg/m2	500	500	500									
Initial Water Column Depth	cm	200	200	200									
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3									
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22									
C2 = Conc at Half-Max Uptake	ppb	300	300	300									
K = Net Settling Rate at Steady State	m/yr	34.9	34.9	52.5									
Z1 = Saturated Uptake Depth	cm	40	40	40									
Z2 = Lower Penalty Depth	cm	100	100	100									
Z3 = Upper Penalty Depth	cm	200	200	200									

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	6.11	6.80	7.94										7.94
Run Date	-	11/07/07	11/07/07	11/07/07										11/07/07
Starting Date for Simulation	-	05/01/65	05/01/65	05/01/65										05/01/65
Starting Date for Output	-	05/01/65	05/01/65	05/01/65										05/01/65
Ending Date	-	04/30/00	04/30/00	04/30/00										04/30/00
Output Duration	days	12784	12784	12784										12784
Cell Label		1	2	3										Total
Downstream Cell Label		Outflow	Outflow	Outflow										-
Network Simulation Name	-	none	none	none										none
Simulation Type	-	Uncerta	Uncerta	Uncerta										Uncerta
Surface Area	km2	7.28	9.19	9.19										25.66
Mean Rainfall	cm/yr	128.59	128.59	128.59										128.6
Mean ET	cm/yr	129.37	129.37	129.37										129.4
Cell Inflow Volume	hm3/yr	105.9	133.7	133.7									302616	373.3
Cell Inflow Load	kg/yr	11872.2	14987.0	14987.0										41846
Cell Inflow Conc	ppb	112	112	112										112.1
Treated Outflow Volume	hm3/yr	109.0	133.6	133.6									305045	376.3
Treated Outflow Load	kg/yr	3523.2	4314.6	2500.3										10338
Treated FWM Outflow Conc	ppb	32	32	19										27.5
Upper Confidence Limit	ppb	40.1	40.0	23.2										34.0
Lower Confidence Limit	ppb	25.6	25.6	15.3										21.9
Total Outflow Volume + Bypass	hm3/yr	109.0	133.6	133.6										376.3
Total Outflow Load + Bypass	kg/yr	3523.2	4314.6	2500.3										10338.1
Total FWM Outflow Conc	ppb	32.3	32.3	18.7										27.5
Bypass Load	kg/yr	0	0	0										0.0
Bypass Load	%	0%	0%	0%										0.0
Maximum Inflow	hm3/d	0.46	0.58	0.58										1.61
Maximum Outflow	hm3/d	0.47	0.59	0.59										1.66
Surface Load Reduction	kg/yr	8612	11146	12666										31508
Load Trapped in Sediments	kg/yr	8356	10430	12602										31388
Overall Load Reduction	%	70%	71%	83%										75%
Lower Confidence Limit	%	0.6	0.6	0.8										69%
Upper Confidence Limit	%	0.8	0.8	0.9										80%
Daily Geometric Mean	ppb	25.1	25.7	12.2										#N/A
Outflow Geo Mean - Composites	ppb	31.2	31.1	17.7										26.4
Upper Confidence Limit	ppb	38.9	38.8	22.1										32.9
Lower Confidence Limit	ppb	24.5	24.5	14.4										20.9
Frequency Outflow Conc > 10 ppb	%	100%	100%	100%										100%
Frequency Outflow Conc > 20 ppb	%	100%	100%	22%										100%
Frequency Outflow Conc > 50 ppb	%	0%	0%	0%										92%
Freq Outflow Volume > 10 ppb	%	100%	100%	92%										100%
95th Percentile Outflow Conc	ppb	38.38	38.31	23.52										33
Mean Biomass P Storage	mg/m2	1727	1707	1371										1592
Storage Increase / Net Removal	%	0%	0%	0%										0%
Net Storage Turnover Rate	1/yr	23.3	23.3	35.0										26.9
Unit Area P Load	mg/m2-yr	1631	1631	1631										1631
Unit Area P Removal	mg/m2-yr	1148	1135	1371										1223
Mean Water Load	cm/d	4.0	4.0	4.0										4.0
Max Water Load	cm/d	6.3	6.3	6.3										6.3
Mean Depth	cm	63	57	57										59
Minimum Depth	cm	57.3	48.3	48.2										51
Maximum Depth	cm	69.2	67.3	67.3										68
Frequency Depth < 10 cm	%	0%	0%	0%										0.0%
Flow/Width	m2/day	184	183	183										183.1
HRT Days	days	15.8	14.3	14.3										14.7
Mean Velocity	cm/sec	0.34	0.37	0.37										0.36
Seepage Outflow / Total Outflow	%	0%	0%	0%										0%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00										0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00										0.0
95th Percentile Outflow Volume	hm3/d	0.4	0.6	0.6										1.5
95th Percentile Outflow Load	kg/d	16.0	19.9	12.0										48.0
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A										#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A										#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A										#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A										#N/A
Range Check - Mean Depth	-			0.92										1
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-													0
Range Check - Inflow Conc	-	1.02	1.02											2
Range Check - Outflow Conc	-													0
Water Balance Error	%	0.00%	0.00%	0.00%										0.00%
Mass Balance Error	%	0.02%	0.02%	0.13%										0.06%
Warning or Error Messages		Cell# 1 Inflow Conc out of calib. range for PEW_3: 112 vs. 8 - 110 ppb						Cell# 3 Depth out of calib. range for SAV_3: 57 vs. 62 - 87 cm						3
		Cell# 2 Inflow Conc out of calib. range for PEW_3: 112 vs. 8 - 110 ppb												

Compartment B – North Build-out

DMSTA2- Inputs & Outputs **Project: COMP B EIS** Model Release: 07/05/07 Current Date: 11/7/2007

Input Variable	Units	Value	Case Description:
Design Case Name	-	NBO EIS Altc	Analysis for WY 1966-2000
Input Series Name		TS_NBO_EIS_Altc	
Starting Date for Simulation	-	05/01/65	
Ending Date for Simulation	-	04/30/00	
Starting Date for Output	-	05/01/65	
Integration Steps Per Day	-	4	
Number of Iterations	-	0	
Output Averaging Interval	days	365	
Inflow Conc Scale Factor	-	1	
Rainfall P Conc	ppb	10	
Atmospheric P Load (Dry)	mg/m2-yr	20	

Simulation Type: Uncertainty Analysis

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	9	10	8
GM Outflow C (ppb)	8	9	8
Load Reduction %	89%	88%	90%
Bypass Load (%)	0.0%		

Diagnostics

H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.2%	0.2%
Iterations & Convergence	2	0.6%
Warning/Error Messages	5	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	NBO1	NBO2	Cell 4									
Vegetation Type	-->	EMG_3	SAV_3	SAV_3									
Inflow Fraction	-	1											
Downstream Cell Number	-	2	3										
Surface Area	km2	4.35	11.53	7.70									
Mean Width of Flow Path	km	6.50	5.00	2.50									
Number of Tanks in Series	-	3.0	3.0	3.0									
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	38.1	38.1	42.7									
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4									
Outflow Coefficient - Intercept	-	1	1	1									
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm	0.033	0.0124	0.0064									
Inflow Seepage Control Elev	cm	48	48	60									
Inflow Seepage Conc	ppb	75	75	75									
Outflow Seepage Rate	(cm/d) / cm	0.0045	0.0017										
Outflow Seepage Control Elev	cm	42	42										
Max Outflow Seepage Conc	ppb	20	20										
Seepage Recycle to Cell Number	-	1	1										
Seepage Recycle Fraction	-	0.75	0.75										
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	30	30	30									
Initial P Storage Per Unit Area	mg/m2	500	500	500									
Initial Water Column Depth	cm	200	200	200									
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3									
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22									
C2 = Conc at Half-Max Uptake	ppb	300	300	300									
K = Net Settling Rate at Steady State	m/yr	16.8	52.5	52.5									
Z1 = Saturated Uptake Depth	cm	40	40	40									
Z2 = Lower Penalty Depth	cm	100	100	100									
Z3 = Upper Penalty Depth	cm	200	200	200									

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	3.14	3.83	4.51										4.51
Run Date	-	11/07/07	11/07/07	11/07/07										11/07/07
Starting Date for Simulation	-	05/01/65	05/01/65	05/01/65										05/01/65
Starting Date for Output	-	05/01/65	05/01/65	05/01/65										05/01/65
Ending Date	-	04/30/00	04/30/00	04/30/00										04/30/00
Output Duration	days	12784	12784	12784										12784
Cell Label		NBO1	NBO2	Cell 4										Total
Downstream Cell Label		NBO2	Cell 4	Outflow										-
Network Simulation Name	-	none	none	none										none
Simulation Type	-	Uncerta	Uncerta	Uncerta										Uncerta
Surface Area	km2	4.35	11.53	7.70										23.58
Mean Rainfall	cm/yr	128.59	128.59	128.59										128.6
Mean ET	cm/yr	133.78	133.78	133.78										133.8
Cell Inflow Volume	hm3/yr	71.8	76.2	79.7									58203	71.8
Cell Inflow Load	kg/yr	6828.1	4624.3	1206.7										6828
Cell Inflow Conc	ppb	95	61	15										95.1
Treated Outflow Volume	hm3/yr	76.2	79.7	81.9									66364	81.9
Treated Outflow Load	kg/yr	4624.3	1206.7	751.3										751
Treated FWM Outflow Conc	ppb	61	15	9										9.2
Upper Confidence Limit	ppb	65.8	16.9	10.2										10.2
Lower Confidence Limit	ppb	55.4	13.6	8.4										8.4
Total Outflow Volume + Bypass	hm3/yr	76.2	79.7	81.9										81.9
Total Outflow Load + Bypass	kg/yr	4624.3	1206.7	751.3										751.3
Total FWM Outflow Conc	ppb	60.7	15.1	9.2										9.2
Bypass Load	kg/yr	0	0	0										0.0
Bypass Load	%	0%	0%	0%										0.0
Maximum Inflow	hm3/d	0.55	0.56	0.58										0.55
Maximum Outflow	hm3/d	0.56	0.58	0.59										0.59
Surface Load Reduction	kg/yr	2211	3418	455										6077
Load Trapped in Sediments	kg/yr	2657	4124	897										7677
Overall Load Reduction	%	32%	74%	38%										89%
Lower Confidence Limit	%	0.3	0.7	0.4										88%
Upper Confidence Limit	%	0.4	0.7	0.4										90%
Daily Geometric Mean	ppb	39.4	6.2	4.8										#N/A
Outflow Geo Mean - Composites	ppb	59.0	14.0	8.5										8.5
Upper Confidence Limit	ppb	64.2	15.6	9.3										9.3
Lower Confidence Limit	ppb	53.6	12.8	7.8										7.8
Frequency Outflow Conc > 10 ppb	%	100%	94%	25%										25%
Frequency Outflow Conc > 20 ppb	%	100%	3%	0%										0%
Frequency Outflow Conc > 50 ppb	%	89%	0%	0%										0%
Freq Outflow Volume > 10 ppb	%	100%	68%	38%										38%
95th Percentile Outflow Conc	ppb	68.95	18.70	12.04										12
Mean Biomass P Storage	mg/m2	1921	358	117										568
Storage Increase / Net Removal	%	0%	0%	0%										0%
Net Storage Turnover Rate	1/yr	11.1	34.9	34.9										20.1
Unit Area P Load	mg/m2-yr	1570	401	157										290
Unit Area P Removal	mg/m2-yr	611	358	116										326
Mean Water Load	cm/d	4.5	1.8	2.8										0.8
Max Water Load	cm/d	12.6	4.9	7.5										2.3
Mean Depth	cm	42	42	49										44
Minimum Depth	cm	37.4	37.3	40.6										38
Maximum Depth	cm	48.7	52.5	63.4										55
Frequency Depth < 10 cm	%	0%	0%	0%										0.0%
Flow/Width	m2/day	30	42	87										54.5
HRT Days	days	9.2	23.4	17.4										53.4
Mean Velocity	cm/sec	0.08	0.11	0.21										0.14
Seepage Outflow / Total Outflow	%	0%	0%	0%										0%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00										0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00										0.0
95th Percentile Outflow Volume	hm3/d	0.5	0.5	0.5										0.5
95th Percentile Outflow Load	kg/d	29.3	8.2	5.2										5.2
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A										#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A										#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A										#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A										#N/A
Range Check - Mean Depth	-		0.68	0.79										2
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-		0.26	0.54										2
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-			0.62										1
Water Balance Error	%	0.00%	0.00%	0.00%										0.00%
Mass Balance Error	%	0.18%	0.04%	0.05%										0.19%
Warning or Error Messages		Cell# 2 Depth out of calib. range for SAV_3: 42 vs. 62 - 87 cm Cell# 2 Flow/Width out of calib. range for SAV_3: 42 vs. 162 - 374 m2/day Cell# 3 Depth out of calib. range for SAV_3: 49 vs. 62 - 87 cm						Cell# 3 Flow/Width out of calib. range for SAV_3: 87 vs. 162 - 374 m2/day Cell# 3 Outflow Conc out of calib. range for SAV_3: 9 vs. 15 - 153 ppb						5

Compartment B – South Build-out

DMSTA2- Inputs & Outputs **Project: COMP B EIS** Model Release: 07/05/07 Current Date: 11/7/2007

Input Variable	Units	Value	Case Description:
Design Case Name	-	SBO EIS Alt	Analysis for WY 1966-2000
Input Series Name		TS_SBO_EIS_A	Receives inflow from S-7/S-2 Basin
Starting Date for Simulation	-	05/01/65	
Ending Date for Simulation	-	04/30/00	
Starting Date for Output	-	05/01/65	
Integration Steps Per Day	-	4	
Number of Iterations	-	0	
Output Averaging Interval	days	365	
Inflow Conc Scale Factor	-	1	
Rainfall P Conc	ppb	10	
Atmospheric P Load (Dry)	mg/m2-yr	20	

Simulation Type: Uncertainty Analysis

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	12	15	11
GM Outflow C (ppb)	11	13	10
Load Reduction %	85%	83%	87%
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	3	0.0%
Warning/Error Messages	3	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	SBO1	SBO2										
Vegetation Type	-->	EMG_3	SAV_3										
Inflow Fraction	-	1											
Downstream Cell Number	-	2											
Surface Area	km2	5.98	5.34										
Mean Width of Flow Path	km	2.00	1.50										
Number of Tanks in Series	-	3.0	3.0										
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	38.1	38.1										
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4										
Outflow Coefficient - Intercept	-	1	1										
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm	0.0133	0.0164										
Inflow Seepage Control Elev	cm	53	63										
Inflow Seepage Conc	ppb	75	15										
Outflow Seepage Rate	(cm/d) / cm												
Outflow Seepage Control Elev	cm												
Max Outflow Seepage Conc	ppb												
Seepage Recycle to Cell Number	-												
Seepage Recycle Fraction	-												
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	30	30										
Initial P Storage Per Unit Area	mg/m2	500	500										
Initial Water Column Depth	cm	200	200										
C0 = Conc at 0 g/m2 P Storage	ppb	3	3										
C1 = Conc at 1 g/m2 P storage	ppb	22	22										
C2 = Conc at Half-Max Uptake	ppb	300	300										
K = Net Settling Rate at Steady State	m/yr	16.8	52.5										
Z1 = Saturated Uptake Depth	cm	40	40										
Z2 = Lower Penalty Depth	cm	100	100										
Z3 = Upper Penalty Depth	cm	200	200										

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	3.80	4.51											4.51
Run Date	-	11/07/07	11/07/07											11/07/07
Starting Date for Simulation	-	05/01/65	05/01/65											05/01/65
Starting Date for Output	-	05/01/65	05/01/65											05/01/65
Ending Date	-	04/30/00	04/30/00											04/30/00
Output Duration	days	12784	12784											12784
Cell Label		SBO1	SBO2											Total
Downstream Cell Label		SBO2	Outflow											-
Network Simulation Name	-	none	none											none
Simulation Type	-	Uncerta	Uncerta											Uncerta
Surface Area	km2	5.98	5.34											11.32
Mean Rainfall	cm/yr	128.59	128.59											128.6
Mean ET	cm/yr	133.78	133.78											133.8
Cell Inflow Volume	hm3/yr	58.6	61.2										47489	58.6
Cell Inflow Load	kg/yr	5536.3	2533.2											5536
Cell Inflow Conc	ppb	95	41											94.5
Treated Outflow Volume	hm3/yr	61.2	65.6										53214	65.6
Treated Outflow Load	kg/yr	2533.2	809.1											809
Treated FWM Outflow Conc	ppb	41	12											12.3
Upper Confidence Limit	ppb	48.2	14.6											14.6
Lower Confidence Limit	ppb	34.9	10.6											10.6
Total Outflow Volume + Bypass	hm3/yr	61.2	65.6											65.6
Total Outflow Load + Bypass	kg/yr	2533.2	809.1											809.1
Total FWM Outflow Conc	ppb	41.4	12.3											12.3
Bypass Load	kg/yr	0	0											0.0
Bypass Load	%	0%	0%											0.0
Maximum Inflow	hm3/d	0.40	0.41											0.40
Maximum Outflow	hm3/d	0.41	0.42											0.42
Surface Load Reduction	kg/yr	3003	1724											4727
Load Trapped in Sediments	kg/yr	3421	1969											5390
Overall Load Reduction	%	54%	68%											85%
Lower Confidence Limit	%	0.5	0.7											83%
Upper Confidence Limit	%	0.6	0.7											87%
Daily Geometric Mean	ppb	32.1	6.1											#N/A
Outflow Geo Mean - Composites	ppb	39.1	11.0											11.0
Upper Confidence Limit	ppb	46.0	13.0											13.0
Lower Confidence Limit	ppb	32.6	9.5											9.5
Frequency Outflow Conc > 10 ppb	%	100%	69%											69%
Frequency Outflow Conc > 20 ppb	%	100%	0%											3%
Frequency Outflow Conc > 50 ppb	%	0%	0%											0%
Freq Outflow Volume > 10 ppb	%	100%	62%											62%
95th Percentile Outflow Conc	ppb	47.96	14.60											15
Mean Biomass P Storage	mg/m2	1798	369											1124
Storage Increase / Net Removal	%	0%	0%											0%
Net Storage Turnover Rate	1/yr	11.1	35.0											14.8
Unit Area P Load	mg/m2-yr	926	474											489
Unit Area P Removal	mg/m2-yr	572	369											476
Mean Water Load	cm/d	2.7	3.1											1.4
Max Water Load	cm/d	6.7	7.7											3.5
Mean Depth	cm	47	52											49
Minimum Depth	cm	39.0	41.5											40
Maximum Depth	cm	60.6	66.9											64
Frequency Depth < 10 cm	%	0%	0%											0.0%
Flow/Width	m2/day	80	112											95.1
HRT Days	days	17.6	16.5											34.9
Mean Velocity	cm/sec	0.20	0.25											0.22
Seepage Outflow / Total Outflow	%	0%	0%											0%
Release 1 Outflow Volume	hm3/yr	0.00	0.00											0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00											0.0
95th Percentile Outflow Volume	hm3/d	0.3	0.4											0.4
95th Percentile Outflow Load	kg/d	14.2	5.2											5.2
Simulated / Specified Mean Depth	%	#N/A	#N/A											#N/A
Release 1 Demand Met	%	#N/A	#N/A											#N/A
Release 2 Demand Met	%	#N/A	#N/A											#N/A
Outflow Demand Met	%	#N/A	#N/A											#N/A
Range Check - Mean Depth	-		0.84											1
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-		0.69											1
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-		0.83											1
Water Balance Error	%	0.00%	0.00%											0.00%
Mass Balance Error	%	0.03%	0.01%											0.03%
Warning or Error Messages		Cell# 2 Depth out of calib. range for SAV_3: 52 vs. 62 - 87 cm Cell# 2 Flow/Width out of calib. range for SAV_3: 112 vs. 162 - 374 m2/day							Cell# 2 Outflow Conc out of calib. range for SAV_3: 12 vs. 15 - 153 ppb					3

EAASR With Lake Okeechobee TP=100 ppb

DMSTA2- Inputs & Outputs Project: PROJECT_EAASR_STA34_NETWORK_EIS_ALTC Model Release: 07/05/07 Current Date: 11/7/2007

Input Variable	Units	Value
Design Case Name	-	A1
Input Series Name		TS_A1
Starting Date for Simulation	-	01/01/65
Ending Date for Simulation	-	04/30/00
Starting Date for Output	-	05/01/65
Integration Steps Per Day	-	4
Number of Iterations	-	0
Output Averaging Interval	days	1
Inflow Conc Scale Factor	-	1
Rainfall P Conc	ppb	10
Atmospheric P Load (Dry)	mg/m2-yr	20
Cell Number -->		**1**
Cell Label	-	1
Vegetation Type	-->	none
Inflow Fraction	-	1
Downstream Cell Number	-	
Surface Area	km2	61.54
Mean Width of Flow Pa	km	6.70
Number of Tanks in Series	-	1.0
Minimum Depth for Releases	cm	15
Release 1 Series Name		IRRIG
Release 2 Series Name		
Outflow Series Name		TO_STA
Depth Series Name		A1_DEPTH
Outflow Control Depth	cm	
Outflow Weir Depth	cm	
Outflow Coefficient - Exponent	-	1.5
Outflow Coefficient - Intercept	-	8
Bypass Depth	cm	
Maximum Inflow	hm3/day	
Maximum Outflow	hm3/day	9.05233
Inflow Seepage Rate	(cm/d) / cm	
Inflow Seepage Control Elev	cm	
Inflow Seepage Conc	ppb	
Outflow Seepage Rate	(cm/d) / cm	0.00081
Outflow Seepage Control Elev	cm	6
Max Outflow Seepage Conc	ppb	100
Seepage Recycle to Cell Number	-	1
Seepage Recycle Fraction	-	0.75
Seepage Discharge Fraction	-	
Initial Water Column Conc	ppb	105
Initial P Storage Per Unit Area	mg/m2	525
Initial Water Column Depth	cm	150
C0 = Conc at 0 g/m2 P Storage	ppb	3
C1 = Conc at 1 g/m2 P storage	ppb	150
C2 = Conc at Half-Max Uptake	ppb	
K = Net Settling Rate at Steady State	m/yr	5.0
Z1 = Saturated Uptake Depth	cm	40
Z2 = Lower Penalty Depth	cm	100
Z3 = Upper Penalty Depth	cm	400

Case Description:

Compartment A-1
15,200 acres (from A8)
Inflow volumes, outflow volumes, and depths from SFWMM simulation
Reservoir settling rate = 5.0 m/yr
Lake Okeechobee deliveries at 100 ppb

Simulation Type:

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	85	#N/A	#N/A
GM Outflow C (ppb)	92	#N/A	#N/A
Load Reduction %	17%	#N/A	#N/A
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	2	0.5%
Warning/Error Messages	0	

Output Variables	Units	1	Overall
Execution Time	sec/yr	1.36	1.36
Run Date	-	11/07/07	11/07/07
Starting Date for Simulation	-	01/01/65	01/01/65
Starting Date for Output	-	05/01/65	05/01/65
Ending Date		04/30/00	04/30/00
Output Duration	days	12784	12784
Cell Label		1	Total
Downstream Cell Label		Outflow	-
Network Simulation Name	-	EAASR_NET	EAASR_NET
Simulation Type	-	Base	Base
Surface Area	km2	61.54	61.54
Mean Rainfall	cm/yr	130.73	130.7
Mean ET	cm/yr	125.89	125.9
Cell Inflow Volume	hm3/yr	676.5	676.5
Cell Inflow Load	kg/yr	64945.3	64945
Cell Inflow Conc	ppb	96	96.0
Treated Outflow Volume	hm3/yr	480.1	480.1
Treated Outflow Load	kg/yr	40626.6	40627
Treated FWM Outflow Conc	ppb	85	84.6
Upper Confidence Limit	ppb	#N/A	#N/A
Lower Confidence Limit	ppb	#N/A	#N/A
Total Outflow Volume + Bypass	hm3/yr	666.9	666.9
Total Outflow Load + Bypass	kg/yr	53642.1	53642.1
Total FWM Outflow Conc	ppb	80.4	80.4
Bypass Load	kg/yr	0	0.0
Bypass Load	%	0%	0.0
Maximum Inflow	hm3/d	14.75	14.75
Maximum Outflow	hm3/d	10.03	10.03
Surface Load Reduction	kg/yr	26153	24319
Load Trapped in Sediments	kg/yr	12219	12219
Overall Load Reduction	%	17%	17%
Lower Confidence Limit	%	#N/A	#N/A
Upper Confidence Limit	%	#N/A	#N/A
Daily Geometric Mean	ppb	68.5	#N/A
Outflow Geo Mean - Composites	ppb	92.2	92.2
Upper Confidence Limit	ppb	#N/A	#N/A
Lower Confidence Limit	ppb	#N/A	#N/A
Frequency Outflow Conc > 10 ppb	%	100%	100%
Frequency Outflow Conc > 20 ppb	%	100%	100%
Frequency Outflow Conc > 50 ppb	%	92%	100%
Freq Outflow Volume > 10 ppb	%	72%	72%
95th Percentile Outflow Conc	ppb	671.11	671
Mean Biomass P Storage	mg/m2	408	408
Storage Increase / Net Removal	%	2%	2%
Net Storage Turnover Rate	1/yr	17.0	17.0
Unit Area P Load	mg/m2-yr	1055	1055
Unit Area P Removal	mg/m2-yr	199	199
Mean Water Load	cm/d	3.0	3.0
Max Water Load	cm/d	24.0	24.0
Mean Depth	cm	197	197
Minimum Depth	cm	1.0	1
Maximum Depth	cm	393.1	393
Frequency Depth < 10 cm	%	12%	11.8%
Flow/Width	m2/day	276	276.4
HRT Days	days	65.3	65.3
Mean Velocity	cm/sec	0.16	0.16
Seepage Outflow / Total Outflow	%	1%	2%
Release 1 Outflow Volume	hm3/yr	186.81	186.8
Release 2 Outflow Volume	hm3/yr	0.00	0.0
95th Percentile Outflow Volume	hm3/d	9.1	9.1
95th Percentile Outflow Load	kg/d	749.2	749.2
Simulated / Specified Mean Depth	%	100%	1.0
Release 1 Demand Met	%	90%	0.9
Release 2 Demand Met	%	#N/A	#N/A
Outflow Demand Met	%	105%	1.0
Range Check - Mean Depth	-		0
Range Check - Freq Depth < 10 cm	-		0
Range Check - Flow/Width	-		0
Range Check - Inflow Conc	-		0
Range Check - Outflow Conc	-		0
Water Balance Error	%	0.00%	0.00%
Mass Balance Error	%	0.01%	0.01%
Warning or Error Messages			0

EAASR With Lake Okeechobee TP=150 ppb

DMSTA2- Inputs & Outputs Project: PROJECT_EAASR_STA34_NETWORK_EIS_ALTC Model Release: 07/05/07

Current Date: 11/17/2007

Input Variable	Units	Value	Case Description:
Design Case Name	-	A1 150	Compartment A-1
Input Series Name	-	TS_A1_150	15,200 acres (from A8)
Starting Date for Simulation	-	01/01/65	Inflow volumes, outflow volumes, and depths from SFWMM simulation
Ending Date for Simulation	-	04/30/00	Reservoir settling rate = 5.0 m/yr
Starting Date for Output	-	05/01/65	Lake inflow = 150 ppb
Integration Steps Per Day	-	4	Simulation Type:
Number of Iterations	-	0	
Output Averaging Interval	days	1	
Inflow Conc Scale Factor	-	1	
Rainfall P Conc	ppb	10	
Atmospheric P Load (Dry)	mg/m2-yr	20	

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	112.6	#N/A	#N/A
GM Outflow C (ppb)	113.6	#N/A	#N/A
Load Reduction %	17%	#N/A	#N/A
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	2	0.8%
Warning/Error Messages	0	

Cell Number -->	Units	1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	1											
Vegetation Type	-->	none											
Inflow Fraction	-	1											
Downstream Cell Number	-												
Surface Area	km2	61.54											
Mean Width of Flow Pa	km	6.70											
Number of Tanks in Series	-	1.0											
Minimum Depth for Releases	cm	15											
Release 1 Series Name		IRRIG											
Release 2 Series Name													
Outflow Series Name		TO_STA											
Depth Series Name		A1_DEPTH											
Outflow Control Depth	cm												
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	1.5											
Outflow Coefficient - Intercept	-	8											
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day	9.05233											
Inflow Seepage Rate	(cm/d) / cm												
Inflow Seepage Control Elev	cm												
Inflow Seepage Conc	ppb												
Outflow Seepage Rate	(cm/d) / cm	0.00081											
Outflow Seepage Control Elev	cm	6											
Max Outflow Seepage Conc	ppb	100											
Seepage Recycle to Cell Number	-	1											
Seepage Recycle Fraction	-	0.75											
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	105											
Initial P Storage Per Unit Area	mg/m2	525											
Initial Water Column Depth	cm	150											
C0 = Conc at 0 g/m2 P Storage	ppb	3											
C1 = Conc at 1 g/m2 P storage	ppb	150											
C2 = Conc at Half-Max Uptake	ppb												
K = Net Settling Rate at Steady State	m/yr	5.0											
Z1 = Saturated Uptake Depth	cm	40											
Z2 = Lower Penalty Depth	cm	100											
Z3 = Upper Penalty Depth	cm	400											

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	1.10												1.10
Run Date	-	11/17/07												11/17/07
Starting Date for Simulation	-	01/01/65												01/01/65
Starting Date for Output	-	05/01/65												05/01/65
Ending Date	-	04/30/00												04/30/00
Output Duration	days	12784												12784
Cell Label		1												Total
Downstream Cell Label		Outflow												-
Network Simulation Name	-	AASR_NET 150												EAASR_NET 1
Simulation Type	-	Base												Base
Surface Area	km2	61.54												61.54
Mean Rainfall	cm/yr	130.73												130.7
Mean ET	cm/yr	125.89												125.9
Cell Inflow Volume	hm3/yr	676.5											548410	676.5
Cell Inflow Load	kg/yr	85262.3												85262
Cell Inflow Conc	ppb	126												126.0
Treated Outflow Volume	hm3/yr	480.1											389183	480.1
Treated Outflow Load	kg/yr	54047.4												54047
Treated FWM Outflow Conc	ppb	113												112.6
Upper Confidence Limit	ppb	#N/A												#N/A
Lower Confidence Limit	ppb	#N/A												#N/A
Total Outflow Volume + Bypass	hm3/yr	666.9											540629	666.9
Total Outflow Load + Bypass	kg/yr	70545.5												70545.5
Total FWM Outflow Conc	ppb	105.8												105.8
Bypass Load	kg/yr	0												0.0
Bypass Load	%	0%												0.0
Maximum Inflow	hm3/d	14.75												14.75
Maximum Outflow	hm3/d	10.03												10.03
Surface Load Reduction	kg/yr	33343												31215
Load Trapped in Sediments	kg/yr	15050												15050
Overall Load Reduction	%	17%												17%
Lower Confidence Limit	%	#N/A												#N/A
Upper Confidence Limit	%	#N/A												#N/A
Daily Geometric Mean	ppb	82.1												#N/A
Outflow Geo Mean - Composites	ppb	113.6												113.6
Upper Confidence Limit	ppb	#N/A												#N/A
Lower Confidence Limit	ppb	#N/A												#N/A
Frequency Outflow Conc > 10 ppb	%	100%												100%
Frequency Outflow Conc > 20 ppb	%	100%												100%
Frequency Outflow Conc > 50 ppb	%	92%												100%
Freq Outflow Volume > 10 ppb	%	72%												72%
95th Percentile Outflow Conc	ppb	798.63												799
Mean Biomass P Storage	mg/m2	510												510
Storage Increase / Net Removal	%	3%												3%
Net Storage Turnover Rate	1/yr	16.8												16.8
Unit Area P Load	mg/m2-yr	1386												1386
Unit Area P Removal	mg/m2-yr	245												245
Mean Water Load	cm/d	3.0												3.0
Max Water Load	cm/d	24.0												24.0
Mean Depth	cm	197												197
Minimum Depth	cm	1.0												1
Maximum Depth	cm	393.1												393
Frequency Depth < 10 cm	%	12%												11.8%
Flow/Width	m2/day	276												276.4
HRT Days	days	65.3												65.3
Mean Velocity	cm/sec	0.16												0.16
Seepage Outflow / Total Outflow	%	1%												2%
Release 1 Outflow Volume	hm3/yr	186.81												186.8
Release 2 Outflow Volume	hm3/yr	0.00												0.0
95th Percentile Outflow Volume	hm3/d	9.1												9.1
95th Percentile Outflow Load	kg/d	1028.8												1028.8
Simulated / Specified Mean Depth	%	100%												1.0
Release 1 Demand Met	%	90%												0.9
Release 2 Demand Met	%	#N/A												#N/A
Outflow Demand Met	%	105%												1.0
Range Check - Mean Depth	-													0
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-													0
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-													0
Water Balance Error	%	0.00%												0.00%
Mass Balance Error	%	0.01%												0.01%
Warning or Error Messages														0

STA-3/4 With Lake Okeechobee TP=100 ppb

DMSTA2- Inputs & Outputs Project: PROJECT_EAASR_STA34_NETWORK_EIS_ALTC Model Release: 07/05/07 Current Date: 11/7/2007

Input Variable	Units	Value	Case Description:
Design Case Name	-	STA34 ind	STA-3/4 stand alone
Input Series Name		TS_STA34_ind	Inflows distributed uniformly based on area
Starting Date for Simulation	-	01/01/65	Lake Okeechobee deliveries at 100 ppb
Ending Date for Simulation	-	04/30/00	PSTA Demo in Cell 2B modeled as SAV_3
Starting Date for Output	-	05/01/65	Used EAASR inflows from network simulation to run uncertainty analysis
Integration Steps Per Day	-	4	
Number of Iterations	-	0	
Output Averaging Interval	days	365	
Inflow Conc Scale Factor	-	1	
Rainfall P Conc	ppb	10	
Atmospheric P Load (Dry)	mg/m2-yr	20	

Simulation Type:	Uncertainty Analysis		
Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	20	24	17
GM Outflow C (ppb)	16	20	14
Load Reduction %	77%	73%	81%
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	2	0.2%
Warning/Error Messages	7	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	1A	1B	2A	2B	3A	3B						
Vegetation Type	-->	EMG_3	SAV_3	EMG_3	SAV_3	EMG_3	SAV_3						
Inflow Fraction	-	0.394547543		0.328598199		0.276854							
Downstream Cell Number	-	2		4		6							
Surface Area	km2	12.30	14.12	10.29	11.72	8.72	9.83						
Mean Width of Flow Path	km	3.42	4.50	2.89	4.02	4.88	4.88						
Number of Tanks in Series	-	3.0	3.0	3.0	3.0	3.0	3.0						
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	38.1	38.1	38.1	38.1	38.1	38.1						
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4	4	4	4						
Outflow Coefficient - Intercept	-	1	1	1	1	1	1						
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm												
Inflow Seepage Control Elev	cm												
Inflow Seepage Conc	ppb												
Outflow Seepage Rate	(cm/d) / cm	0.0058	0.0029	0.0014		0.0038							
Outflow Seepage Control Elev	cm	16	40	-67		-64							
Max Outflow Seepage Conc	ppb	20	20	20	20	20	20						
Seepage Recycle to Cell Number	-	1		3		5							
Seepage Recycle Fraction	-	0.5	0.5	0.5	0.5	0.5	0.5						
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	52	12	55	15	55	15						
Initial P Storage Per Unit Area	mg/m2	2400	615	2400	615	2400	615						
Initial Water Column Depth	cm	60	60	60	60	60	60						
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3	3	3	3						
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22	22	22	22						
C2 = Conc at Half-Max Uptake	ppb	300	300	300	300	300	300						
K = Net Settling Rate at Steady State	m/yr	16.8	52.5	16.8	52.5	16.8	52.5						
Z1 = Saturated Uptake Depth	cm	40	40	40	40	40	40						
Z2 = Lower Penalty Depth	cm	100	100	100	100	100	100						
Z3 = Upper Penalty Depth	cm	200	200	200	200	200	200						

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	5.38	6.09	6.76	7.44	8.15	8.83							8.83
Run Date	-	11/07/07	11/07/07	11/07/07	11/07/07	11/07/07	11/07/07							11/07/07
Starting Date for Simulation	-	01/01/65	01/01/65	01/01/65	01/01/65	01/01/65	01/01/65							01/01/65
Starting Date for Output	-	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65							05/01/65
Ending Date	-	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00							04/30/00
Output Duration	days	12784	12784	12784	12784	12784	12784							12784
Cell Label		1A	1B	2A	2B	3A	3B							Total
Downstream Cell Label		1B	Outflow	2B	Outflow	3B	Outflow							-
Network Simulation Name	-	none	none	none	none	none	none							none
Simulation Type	-	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta							Uncerta
Surface Area	km2	12.30	14.12	10.29	11.72	8.72	9.83							66.98
Mean Rainfall	cm/yr	129.99	129.99	129.99	129.99	129.99	129.99							130.0
Mean ET	cm/yr	134.33	133.91	134.02	133.86	132.58	133.70							133.8
Cell Inflow Volume	hm3/yr	287.3	281.5	239.3	235.6	201.6	194.7						590347	728.2
Cell Inflow Load	kg/yr	24484.7	15805.2	20392.1	13195.6	17180.9	10810.4							62058
Cell Inflow Conc	ppb	85	56	85	56	85	56							85.2
Treated Outflow Volume	hm3/yr	281.5	279.7	235.6	235.2	194.7	194.4						574973	709.2
Treated Outflow Load	kg/yr	15805.2	5557.5	13195.6	4702.1	10810.4	3934.9							14194
Treated FWM Outflow Conc	ppb	56	20	56	20	56	20							20.0
Upper Confidence Limit	ppb	61.0	23.9	60.8	24.0	60.0	24.1							24.0
Lower Confidence Limit	ppb	50.9	16.5	50.8	16.6	50.6	16.9							16.6
Total Outflow Volume + Bypass	hm3/yr	281.5	279.7	235.6	235.2	194.7	194.4							709.2
Total Outflow Load + Bypass	kg/yr	15805.2	5557.5	13195.6	4702.1	10810.4	3934.9							14194.4
Total FWM Outflow Conc	ppb	56.1	19.9	56.0	20.0	55.5	20.2							20.0
Bypass Load	kg/yr	0	0	0	0	0	0							0.0
Bypass Load	%	0%	0%	0%	0%	0%	0%							0.0
Maximum Inflow	hm3/d	1.91	1.88	1.59	1.58	1.34	1.32							4.84
Maximum Outflow	hm3/d	1.88	1.87	1.58	1.57	1.32	1.32							4.77
Surface Load Reduction	kg/yr	8784	10270	7261	8494	6504	6876							47863
Load Trapped in Sediments	kg/yr	8508	10555	7038	8784	5614	7119							47618
Overall Load Reduction	%	35%	65%	35%	64%	37%	64%							77%
Lower Confidence Limit	%	0.3	0.6	0.3	0.6	0.3	0.6							73%
Upper Confidence Limit	%	0.4	0.7	0.4	0.7	0.4	0.7							81%
Daily Geometric Mean	ppb	47.7	11.3	47.5	11.4	47.7	11.4							#N/A
Outflow Geo Mean - Composites	ppb	50.7	16.1	50.5	16.2	50.1	16.8							16.4
Upper Confidence Limit	ppb	56.2	19.5	55.9	19.6	55.0	20.0							19.7
Lower Confidence Limit	ppb	44.9	13.5	44.8	13.6	44.8	14.2							13.7
Frequency Outflow Conc > 10 ppb	%	100%	92%	100%	92%	100%	94%							92%
Frequency Outflow Conc > 20 ppb	%	100%	31%	100%	31%	100%	33%							56%
Frequency Outflow Conc > 50 ppb	%	64%	0%	64%	0%	61%	0%							31%
Freq Outflow Volume > 10 ppb	%	100%	90%	100%	90%	100%	91%							90%
95th Percentile Outflow Conc	ppb	65.85	25.37	65.82	25.54	66.11	25.29							25
Mean Biomass P Storage	mg/m2	2182	760	2159	762	2036	737							1399
Storage Increase / Net Removal	%	1%	1%	1%	1%	1%	1%							1%
Net Storage Turnover Rate	1/yr	11.1	34.4	11.1	34.4	11.1	34.4							17.8
Unit Area P Load	mg/m2-yr	1990	1119	1981	1126	1971	1100							927
Unit Area P Removal	mg/m2-yr	691	747	684	750	644	725							711
Mean Water Load	cm/d	6.4	5.5	6.4	5.5	6.3	5.4							3.0
Max Water Load	cm/d	15.5	13.3	15.5	13.5	15.4	13.4							7.2
Mean Depth	cm	56	54	55	53	47	48							53
Minimum Depth	cm	37.9	33.8	37.3	33.1	30.8	30.4							34
Maximum Depth	cm	78.6	76.0	78.4	74.8	65.3	67.7							74
Frequency Depth < 10 cm	%	0%	0%	0%	0%	0%	0%							0.0%
Flow/Width	m2/day	230	171	227	160	113	109							172.1
HRT Days	days	8.7	9.9	8.7	9.7	7.3	8.9							17.7
Mean Velocity	cm/sec	0.48	0.37	0.47	0.35	0.28	0.26							0.37
Seepage Outflow / Total Outflow	%	2%	0%	1%	0%	3%	0%							2%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00							0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00							0.0
95th Percentile Outflow Volume	hm3/d	1.6	1.6	1.3	1.3	1.1	1.1							3.9
95th Percentile Outflow Load	kg/d	97.5	36.2	81.3	30.5	66.5	25.2							92.0
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Range Check - Mean Depth	-		0.87		0.86		0.78							3
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-	1.10		1.08	0.99		0.68							4
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-													0
Water Balance Error	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%							0.00%
Mass Balance Error	%	0.02%	0.02%	0.02%	0.02%	-0.03%	0.03%							0.02%
Warning or Error Messages		Cell# 1 Flow/Width out of calib. range for EMG_3: 230 vs. 26 - 210 m2/day Cell# 2 Depth out of calib. range for SAV_3: 54 vs. 62 - 87 cm Cell# 3 Flow/Width out of calib. range for EMG_3: 227 vs. 26 - 210 m2/day Cell# 4 Depth out of calib. range for SAV_3: 53 vs. 62 - 87 cm					Cell# 4 Flow/Width out of calib. range for SAV_3: 160 vs. 162 - 374 m2/day Cell# 6 Depth out of calib. range for SAV_3: 48 vs. 62 - 87 cm Cell# 6 Flow/Width out of calib. range for SAV_3: 109 vs. 162 - 374 m2/day					7

STA-3/4 With Lake Okeechobee TP=150 ppb

DMSTA2- Inputs & Outputs Project: PROJECT_EAASR_STA34_NETWORK_EIS_ALTC Model Release: 07/05/07

Current Date: 11/17/2007

Input Variable	Units	Value	Case Description:
Design Case Name	-	STA34 ind 150	STA-3/4 stand alone
Input Series Name	-	TS_STA34_ind_1	Inflows distributed uniformly based on area
Starting Date for Simulation	-	01/01/65	Lake Okeechobee deliveries at 150 ppb
Ending Date for Simulation	-	04/30/00	PSTA Demo in Cell 2B modeled as SAV_3
Starting Date for Output	-	05/01/65	Used EAASR inflows from network simulation to run uncertainty analysis
Integration Steps Per Day	-	4	
Number of Iterations	-	0	
Output Averaging Interval	days	365	
Inflow Conc Scale Factor	-	1	
Rainfall P Conc	ppb	10	
Atmospheric P Load (Dry)	mg/m2-yr	20	

Simulation Type: Uncertainty Analysis

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	23.3	28.3	19.1
GM Outflow C (ppb)	18.5	22.5	15.2
Load Reduction %	78%	73%	82%
Bypass Load (%)	0.0%		

Diagnostics

H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	2	0.8%
Warning/Error Messages	7	

Cell Number -->	1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	1A	1B	2A	2B	3A	3B						
Vegetation Type	EMG_3	SAV_3	EMG_3	SAV_3	EMG_3	SAV_3						
Inflow Fraction	0.394547543		0.328598199		0.276854							
Downstream Cell Number	2		4		6							
Surface Area km2	12.30	14.12	10.29	11.72	8.72	9.83						
Mean Width of Flow Path km	3.42	4.50	2.89	4.02	4.88	4.88						
Number of Tanks in Series	3.0	3.0	3.0	3.0	3.0	3.0						
Minimum Depth for Releases cm												
Release 1 Series Name												
Release 2 Series Name												
Outflow Series Name												
Depth Series Name												
Outflow Control Depth cm	38.1	38.1	38.1	38.1	38.1	38.1						
Outflow Weir Depth cm												
Outflow Coefficient - Exponent	4	4	4	4	4	4						
Outflow Coefficient - Intercept	1	1	1	1	1	1						
Bypass Depth cm												
Maximum Inflow hm3/day												
Maximum Outflow hm3/day												
Inflow Seepage Rate (cm/d) / cm												
Inflow Seepage Control Elev cm												
Inflow Seepage Conc ppb												
Outflow Seepage Rate (cm/d) / cm	0.0058	0.0029	0.0014		0.0038							
Outflow Seepage Control Elev cm	16	40	-67		-64							
Max Outflow Seepage Conc ppb	20	20	20	20	20	20						
Seepage Recycle to Cell Number	1		3		5							
Seepage Recycle Fraction	0.5	0.5	0.5	0.5	0.5	0.5						
Seepage Discharge Fraction												
Initial Water Column Conc ppb	52	12	55	15	55	15						
Initial P Storage Per Unit Area mg/m2	2400	615	2400	615	2400	615						
Initial Water Column Depth cm	60	60	60	60	60	60						
C0 = Conc at 0 g/m2 P Storage ppb	3	3	3	3	3	3						
C1 = Conc at 1 g/m2 P storage ppb	22	22	22	22	22	22						
C2 = Conc at Half-Max Uptake ppb	300	300	300	300	300	300						
K = Net Settling Rate at Steady State m/yr	16.8	52.5	16.8	52.5	16.8	52.5						
Z1 = Saturated Uptake Depth cm	40	40	40	40	40	40						
Z2 = Lower Penalty Depth cm	100	100	100	100	100	100						
Z3 = Upper Penalty Depth cm	200	200	200	200	200	200						

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	6.26	7.10	7.93	8.77	9.62	10.47							10.47
Run Date	-	11/17/07	11/17/07	11/17/07	11/17/07	11/17/07	11/17/07							11/17/07
Starting Date for Simulation	-	01/01/65	01/01/65	01/01/65	01/01/65	01/01/65	01/01/65							01/01/65
Starting Date for Output	-	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65							05/01/65
Ending Date	-	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00							04/30/00
Output Duration	days	12784	12784	12784	12784	12784	12784							12784
Cell Label		1A	1B	2A	2B	3A	3B							Total
Downstream Cell Label		1B	Outflow	2B	Outflow	3B	Outflow							-
Network Simulation Name	-	none	none	none	none	none	none							none
Simulation Type	-	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta							Uncerta
Surface Area	km2	12.30	14.12	10.29	11.72	8.72	9.83							66.98
Mean Rainfall	cm/yr	129.99	129.99	129.99	129.99	129.99	129.99							130.0
Mean ET	cm/yr	134.33	133.91	134.02	133.86	132.58	133.70							133.8
Cell Inflow Volume	hm3/yr	287.3	281.5	239.3	235.6	201.6	194.7						590347	728.2
Cell Inflow Load	kg/yr	29385.7	19186.5	24473.8	16010.0	20619.9	13074.4							74479
Cell Inflow Conc	ppb	102	68	102	68	102	67							102.3
Treated Outflow Volume	hm3/yr	281.5	279.7	235.6	235.2	194.7	194.4						574973	709.2
Treated Outflow Load	kg/yr	19186.5	6481.3	16010.0	5482.8	13074.4	4565.2							16529
Treated FWM Outflow Conc	ppb	68	23	68	23	67	23							23.3
Upper Confidence Limit	ppb	74.0	28.2	73.7	28.3	72.6	28.3							28.3
Lower Confidence Limit	ppb	61.8	18.9	61.6	19.0	61.2	19.3							19.1
Total Outflow Volume + Bypass	hm3/yr	281.5	279.7	235.6	235.2	194.7	194.4							709.2
Total Outflow Load + Bypass	kg/yr	19186.5	6481.3	16010.0	5482.8	13074.4	4565.2							16529.2
Total FWM Outflow Conc	ppb	68.1	23.2	67.9	23.3	67.1	23.5							23.3
Bypass Load	kg/yr	0	0	0	0	0	0							0.0
Bypass Load	%	0%	0%	0%	0%	0%	0%							0.0
Maximum Inflow	hm3/d	1.91	1.88	1.59	1.58	1.34	1.32							4.84
Maximum Outflow	hm3/d	1.88	1.87	1.58	1.57	1.32	1.32							4.77
Surface Load Reduction	kg/yr	10304	12728	8528	10527	7679	8509							57950
Load Trapped in Sediments	kg/yr	9882	12969	8160	10791	6492	8730							57024
Overall Load Reduction	%	35%	66%	35%	66%	37%	65%							78%
Lower Confidence Limit	%	0.3	0.6	0.3	0.6	0.3	0.6							73%
Upper Confidence Limit	%	0.4	0.7	0.4	0.7	0.4	0.7							82%
Daily Geometric Mean	ppb	57.3	13.1	56.9	13.3	56.6	13.2							#N/A
Outflow Geo Mean - Composites	ppb	59.6	18.2	59.3	18.4	58.2	18.9							18.5
Upper Confidence Limit	ppb	66.2	22.3	65.7	22.4	64.0	22.8							22.5
Lower Confidence Limit	ppb	52.7	15.0	52.5	15.1	52.0	15.7							15.2
Frequency Outflow Conc > 10 ppb	%	100%	92%	100%	92%	100%	94%							92%
Frequency Outflow Conc > 20 ppb	%	100%	47%	100%	47%	100%	47%							64%
Frequency Outflow Conc > 50 ppb	%	72%	0%	69%	0%	67%	0%							47%
Freq Outflow Volume > 10 ppb	%	100%	92%	100%	92%	100%	92%							92%
95th Percentile Outflow Conc	ppb	86.55	30.90	86.57	31.08	86.68	30.67							31
Mean Biomass P Storage	mg/m2	2538	935	2507	937	2358	905							1652
Storage Increase / Net Removal	%	1%	1%	1%	1%	1%	1%							1%
Net Storage Turnover Rate	1/yr	11.1	34.4	11.1	34.4	11.1	34.4							18.0
Unit Area P Load	mg/m2-yr	2388	1359	2378	1366	2366	1331							1112
Unit Area P Removal	mg/m2-yr	803	918	793	921	745	889							851
Mean Water Load	cm/d	6.4	5.5	6.4	5.5	6.3	5.4							3.0
Max Water Load	cm/d	15.5	13.3	15.5	13.5	15.4	13.4							7.2
Mean Depth	cm	56	54	55	53	47	48							53
Minimum Depth	cm	37.9	33.8	37.3	33.1	30.8	30.4							34
Maximum Depth	cm	78.6	76.0	78.4	74.8	65.3	67.7							74
Frequency Depth < 10 cm	%	0%	0%	0%	0%	0%	0%							0.0%
Flow/Width	m2/day	230	171	227	160	113	109							172.1
HRT Days	days	8.7	9.9	8.7	9.7	7.3	8.9							17.7
Mean Velocity	cm/sec	0.48	0.37	0.47	0.35	0.28	0.26							0.37
Seepage Outflow / Total Outflow	%	2%	0%	1%	0%	3%	0%							2%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00							0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00							0.0
95th Percentile Outflow Volume	hm3/d	1.6	1.6	1.3	1.3	1.1	1.1							3.9
95th Percentile Outflow Load	kg/d	124.7	43.6	103.9	36.6	85.0	30.2							110.4
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Range Check - Mean Depth	-		0.87		0.86		0.78							3
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-	1.10		1.08	0.99		0.68							4
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-													0
Water Balance Error	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%							0.00%
Mass Balance Error	%	0.03%	0.02%	0.02%	0.02%	-0.04%	0.03%							0.02%

Warning or Error Messages: 7

Cell# 1 Flow/Width out of calib. range for EMG_3: 230 vs. 26 - 210 m2/day
Cell# 2 Depth out of calib. range for SAV_3: 54 vs. 62 - 87 cm
Cell# 3 Flow/Width out of calib. range for EMG_3: 227 vs. 26 - 210 m2/day
Cell# 4 Depth out of calib. range for SAV_3: 53 vs. 62 - 87 cm
Cell# 4 Flow/Width out of calib. range for SAV_3: 160 vs. 162 - 374 m2/day
Cell# 6 Depth out of calib. range for SAV_3: 48 vs. 62 - 87 cm
Cell# 6 Flow/Width out of calib. range for SAV_3: 109 vs. 162 - 374 m2/day

STA-5 With Emergent Vegetation in All Cells

DMSTA2- Inputs & Outputs **Project: STA 5 EIS** Model Release: 07/05/07 Current Date: 10/19/2007

Input Variable	Units	Value
Design Case Name	-	EIS Alt1 EMG
Input Series Name		TS_EIS_Alt1
Starting Date for Simulation	-	05/01/94
Ending Date for Simulation	-	04/30/07
Starting Date for Output	-	05/01/94
Integration Steps Per Day	-	4
Number of Iterations	-	0
Output Averaging Interval	days	365
Inflow Conc Scale Factor	-	1
Rainfall P Conc	ppb	10
Atmospheric P Load (Dry)	mg/m2-yr	20

Case Description: STA-5 Expanded to Include Full Build-out of Compartment C; Downstream cells considered as EMG_3; Inflows are C-139 Basin

Simulation Type: Uncertainty Analysis

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	32.0	46.5	21.7
GM Outflow C (ppb)	30.2	44.3	20.2
Load Reduction %	86%	80%	91%
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	3	0.1%
Warning/Error Messages	0	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	1A	1B	2A	2B	3A	3B	4A	4B	5A	5B		
Vegetation Type	-->	EMG_3	EMG_3	EMG_3	EMG_3	EMG_3	EMG_3	EMG_3	EMG_3	EMG_3	EMG_3		
Inflow Fraction	-	0.190896424		0.1908964		0.1843939		0.1922898		0.2415235			
Downstream Cell Number	-	2		4		6		8		10			
Surface Area	km2	3.38	4.94	3.38	4.94	4.31	3.72	6.52	1.86	7.73	2.79		
Mean Width of Flow Path	km	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56	2.34	2.34		
Number of Tanks in Series	-	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	38.1	60.96	38.1	60.96	38.1	60.96	38.1	60.96	38.1	60.96		
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4	4	4	4	4	4	4	4		
Outflow Coefficient - Intercept	-	1	1	1	1	1	1	1	1	1	1		
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm												
Inflow Seepage Control Elev	cm												
Inflow Seepage Conc	ppb												
Outflow Seepage Rate	(cm/d) / cm	0.0075	0.0075										
Outflow Seepage Control Elev	cm	-46	-38										
Max Outflow Seepage Conc	ppb	20	20										
Seepage Recycle to Cell Number	-	1	2										
Seepage Recycle Fraction	-	1	1										
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	30	30	30	30	30	30	30	30	30	30		
Initial P Storage Per Unit Area	mg/m2	500	500	500	500	500	500	500	500	500	500		
Initial Water Column Depth	cm	200	200	200	200	200	200	200	200	200	200		
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3	3	3	3	3	3	3	3		
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22	22	22	22	22	22	22	22		
C2 = Conc at Half-Max Uptake	ppb	300	300	300	300	300	300	300	300	300	300		
K = Net Settling Rate at Steady State	m/yr	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8		
Z1 = Saturated Uptake Depth	cm	40	40	40	40	40	40	40	40	40	40		
Z2 = Lower Penalty Depth	cm	100	100	100	100	100	100	100	100	100	100		
Z3 = Upper Penalty Depth	cm	200	200	200	200	200	200	200	200	200	200		

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	19.62	20.46	21.31	22.16	22.92	23.77	24.62	25.46	26.31	27.16			27.16
Run Date	-	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07			10/18/07
Starting Date for Simulation	-	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94			05/01/94
Starting Date for Output	-	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94			05/01/94
Ending Date	-	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07			04/30/07
Output Duration	days	4748	4748	4748	4748	4748	4748	4748	4748	4748	4748			4748
Cell Label		1A	1B	2A	2B	3A	3B	4A	4B	5A	5B			Total
Downstream Cell Label		1B	Outflow	2B	Outflow	3B	Outflow	4B	Outflow	5B	Outflow			-
Network Simulation Name	-	none	none	none	none	none	none	none	none	none	none			none
Simulation Type	-	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta			Uncerta
Surface Area	km2	3.38	4.94	3.38	4.94	4.31	3.72	6.52	1.86	7.73	2.79			43.58
Mean Rainfall	cm/yr	127.21	127.21	127.21	127.21	127.21	127.21	127.21	127.21	127.21	127.21			127.2
Mean ET	cm/yr	131.28	131.30	131.23	131.30	131.23	131.30	130.99	131.30	131.02	131.30			131.2
Cell Inflow Volume	hm3/yr	35.3	35.2	35.3	35.2	34.1	34.0	35.6	35.4	44.7	44.4		150124.5	185.2
Cell Inflow Load	kg/yr	8081.3	3096.5	8081.3	3679.6	7806.1	2827.4	8140.3	2026.2	10224.6	2711.2			42334
Cell Inflow Conc	ppb	229	88	229	104	229	83	229	57	229	61			228.6
Treated Outflow Volume	hm3/yr	35.2	35.0	35.2	35.0	34.0	33.8	35.4	35.3	44.4	44.3		148716.7	183.4
Treated Outflow Load	kg/yr	3096.5	945.5	3679.6	1114.1	2827.4	1074.8	2026.2	1227.4	2711.2	1504.1			5866
Treated FWM Outflow Conc	ppb	88	27	104	32	83	32	57	35	61	34			32.0
Upper Confidence Limit	ppb	102.9	37.1	124.9	47.1	104.0	47.2	76.0	50.7	80.2	49.8			46.5
Lower Confidence Limit	ppb	72.8	19.3	83.9	21.3	63.8	21.1	41.8	23.4	44.8	22.8			21.7
Total Outflow Volume + Bypass	hm3/yr	35.2	35.0	35.2	35.0	34.0	33.8	35.4	35.3	44.4	44.3			183.4
Total Outflow Load + Bypass	kg/yr	3096.5	945.5	3679.6	1114.1	2827.4	1074.8	2026.2	1227.4	2711.2	1504.1			5865.9
Total FWM Outflow Conc	ppb	87.9	27.0	104.5	31.8	83.2	31.8	57.3	34.8	61.0	33.9			32.0
Bypass Load	kg/yr	0	0	0	0	0	0	0	0	0	0			0.0
Bypass Load	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			0.0
Maximum Inflow	hm3/d	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.18	0.22	0.22			0.90
Maximum Outflow	hm3/d	0.17	0.17	0.17	0.17	0.17	0.17	0.18	0.18	0.22	0.22			0.91
Surface Load Reduction	kg/yr	5153	2405	4402	2566	4979	1753	6114	799	7513	1207			36468
Load Trapped in Sediments	kg/yr	3956	2133	4514	2727	5121	1874	6328	860	7767	1298			36579
Overall Load Reduction	%	62%	69%	54%	70%	64%	62%	75%	39%	73%	45%			86%
Lower Confidence Limit	%	0.6	0.6	0.5	0.6	0.5	0.5	0.7	0.3	0.7	0.4			80%
Upper Confidence Limit	%	0.7	0.7	0.6	0.7	0.7	0.7	0.8	0.4	0.8	0.5			91%
Daily Geometric Mean	ppb	91.1	22.6	110.0	26.8	84.7	26.6	55.5	29.2	59.7	28.4			#N/A
Outflow Geo Mean - Composites	ppb	82.9	25.6	97.2	30.2	76.8	30.1	52.5	32.6	56.0	31.9			30.2
Upper Confidence Limit	ppb	97.7	35.4	117.4	45.0	96.8	45.1	70.2	47.8	74.2	47.1			44.3
Lower Confidence Limit	ppb	68.0	18.2	77.2	19.9	58.3	19.8	38.0	21.8	40.7	21.2			20.2
Frequency Outflow Conc > 10 ppb	%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%			100%
Frequency Outflow Conc > 20 ppb	%	100%	92%	100%	100%	100%	100%	100%	100%	100%	100%			100%
Frequency Outflow Conc > 50 ppb	%	100%	0%	100%	0%	100%	0%	54%	0%	62%	0%			100%
Freq Outflow Volume > 10 ppb	%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%			100%
95th Percentile Outflow Conc	ppb	115.68	33.33	128.72	39.59	108.26	39.61	76.17	43.65	80.98	42.22			40
Mean Biomass P Storage	mg/m2	3607	1369	4143	1744	3692	1587	3025	1451	3129	1462			2618
Storage Increase / Net Removal	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			0%
Net Storage Turnover Rate	1/yr	4.2	4.1	4.2	4.1	4.2	4.1	4.2	4.1	4.2	4.1			4.2
Unit Area P Load	mg/m2-yr	2391	627	2391	745	1810	759	1249	1088	1322	971			971
Unit Area P Removal	mg/m2-yr	1170	432	1335	552	1188	503	971	462	1004	465			839
Mean Water Load	cm/d	2.9	2.0	2.9	2.0	2.2	2.5	1.5	5.2	1.6	4.4			1.2
Max Water Load	cm/d	5.1	3.5	5.1	3.5	3.9	4.5	2.7	9.4	2.8	7.9			2.1
Mean Depth	cm	42	55	42	55	41	55	41	55	40	55			47
Minimum Depth	cm	1.4	22.8	1.2	22.6	1.2	23.2	1.2	23.7	1.2	23.7			10
Maximum Depth	cm	51.7	62.0	51.7	62.0	51.4	61.9	51.7	62.1	49.9	61.6			56
Frequency Depth < 10 cm	%	7%	0%	7%	0%	7%	0%	7%	0%	7%	0%			4.2%
Flow/Width	m2/day	62	62	62	62	60	60	62	62	52	52			59.3
HRT Days	days	14.5	28.4	14.5	28.4	19.0	22.1	27.6	10.6	25.3	12.6			40.4
Mean Velocity	cm/sec	0.17	0.13	0.17	0.13	0.17	0.12	0.18	0.13	0.15	0.11			0.15
Seepage Outflow / Total Outflow	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			0%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.0
95th Percentile Outflow Volume	hm3/d	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2			0.8
95th Percentile Outflow Load	kg/d	15.4	4.6	18.8	5.6	15.6	5.5	11.8	6.3	15.7	7.7			29.7
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A			#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A			#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A			#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A			#N/A
Range Check - Mean Depth	-													0
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-													0
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-													0
Water Balance Error	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%			0.00%
Mass Balance Error	%	0.00%	0.00%	-0.02%	0.00%	-0.01%	0.00%	-0.01%	0.00%	-0.01%	0.00%			-0.01%
Warning or Error Messages														0

STA-5 With SAV in the Downstream Cells

DMSTA2- Inputs & Outputs Project: STA 5 EIS Model Release: 07/05/07 Current Date: 10/19/2007

Input Variable	Units	Value
Design Case Name	-	EIS Alt1 SAV
Input Series Name		TS_EIS_Alt1
Starting Date for Simulation	-	05/01/94
Ending Date for Simulation	-	04/30/07
Starting Date for Output	-	05/01/94
Integration Steps Per Day	-	4
Number of Iterations	-	0
Output Averaging Interval	days	365
Inflow Conc Scale Factor	-	1
Rainfall P Conc	ppb	10
Atmospheric P Load (Dry)	mg/m2-yr	20

Case Description:
STA-5 Expanded to Include Full Build-out of Compartment C
Downstream cells considered as SAV_3; Inflows are C-139 Basin

Simulation Type: Uncertainty Analysis

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	14.1	19.0	11.0
GM Outflow C (ppb)	12.8	17.3	10.0
Load Reduction %	94%	92%	95%
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	3	0.0%
Warning/Error Messages	13	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	1A	1B	2A	2B	3A	3B	4A	4B	5A	5B		
Vegetation Type	-->	EMG_3	SAV_3	EMG_3	SAV_3	EMG_3	SAV_3	EMG_3	SAV_3	EMG_3	SAV_3		
Inflow Fraction	-	0.190896424		0.1908964		0.1843939		0.1922898		0.2415235			
Downstream Cell Number	-	2		4		6		8		10			
Surface Area	km2	3.38	4.94	3.38	4.94	4.31	3.72	6.52	1.86	7.73	2.79		
Mean Width of Flow Path	km	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56	2.34	2.34		
Number of Tanks in Series	-	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	38.1	60.96	38.1	60.96	38.1	60.96	38.1	60.96	38.1	60.96		
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4	4	4	4	4	4	4	4		
Outflow Coefficient - Intercept	-	1	1	1	1	1	1	1	1	1	1		
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm												
Inflow Seepage Control Elev	cm												
Inflow Seepage Conc	ppb												
Outflow Seepage Rate	(cm/d) / cm	0.0075	0.0075										
Outflow Seepage Control Elev	cm	-46	-38										
Max Outflow Seepage Conc	ppb	20	20										
Seepage Recycle to Cell Number	-	1	2										
Seepage Recycle Fraction	-	1	1										
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	30	30	30	30	30	30	30	30	30	30		
Initial P Storage Per Unit Area	mg/m2	500	500	500	500	500	500	500	500	500	500		
Initial Water Column Depth	cm	200	200	200	200	200	200	200	200	200	200		
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3	3	3	3	3	3	3	3		
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22	22	22	22	22	22	22	22		
C2 = Conc at Half-Max Uptake	ppb	300	300	300	300	300	300	300	300	300	300		
K = Net Settling Rate at Steady State	m/yr	16.8	52.5	16.8	52.5	16.8	52.5	16.8	52.5	16.8	52.5		
Z1 = Saturated Uptake Depth	cm	40	40	40	40	40	40	40	40	40	40		
Z2 = Lower Penalty Depth	cm	100	100	100	100	100	100	100	100	100	100		
Z3 = Upper Penalty Depth	cm	200	200	200	200	200	200	200	200	200	200		

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	104.39	106.39	109.70	113.24	115.93	118.78	122.16	124.39	127.55	133.55			133.55
Run Date	-	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07			10/18/07
Starting Date for Simulation	-	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94			05/01/94
Starting Date for Output	-	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94			05/01/94
Ending Date	-	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07			04/30/07
Output Duration	days	4748	4748	4748	4748	4748	4748	4748	4748	4748	4748			4748
Cell Label		1A	1B	2A	2B	3A	3B	4A	4B	5A	5B			Total
Downstream Cell Label		1B	Outflow	2B	Outflow	3B	Outflow	4B	Outflow	5B	Outflow			-
Network Simulation Name	-	none	none	none	none	none	none	none	none	none	none			none
Simulation Type	-	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta			Uncerta
Surface Area	km2	3.38	4.94	3.38	4.94	4.31	3.72	6.52	1.86	7.73	2.79			43.58
Mean Rainfall	cm/yr	127.21	127.21	127.21	127.21	127.21	127.21	127.21	127.21	127.21	127.21			127.2
Mean ET	cm/yr	131.28	131.30	131.23	131.30	131.23	131.30	130.99	131.30	131.02	131.30			131.2
Cell Inflow Volume	hm3/yr	35.3	35.2	35.3	35.2	34.1	34.0	35.6	35.4	44.7	44.4			185.2
Cell Inflow Load	kg/yr	8081.3	3096.5	8081.3	3679.6	7806.1	2827.4	8140.3	2026.2	10224.6	2711.2			42334
Cell Inflow Conc	ppb	229	88	229	104	229	83	229	57	229	61			228.6
Treated Outflow Volume	hm3/yr	35.2	35.0	35.2	35.0	34.0	33.8	35.4	35.3	44.4	44.3			183.4
Treated Outflow Load	kg/yr	3096.5	389.4	3679.6	415.3	2827.4	434.0	2026.2	626.7	2711.2	723.9			2589
Treated FWM Outflow Conc	ppb	88	11	104	12	83	13	57	18	61	16			14.1
Upper Confidence Limit	ppb	102.9	13.8	124.9	15.1	104.0	16.9	76.0	25.3	80.2	23.0			19.0
Lower Confidence Limit	ppb	72.8	9.3	83.9	9.8	63.8	10.3	41.8	13.0	44.8	12.2			11.0
Total Outflow Volume + Bypass	hm3/yr	35.2	35.0	35.2	35.0	34.0	33.8	35.4	35.3	44.4	44.3			183.4
Total Outflow Load + Bypass	kg/yr	3096.5	389.4	3679.6	415.3	2827.4	434.0	2026.2	626.7	2711.2	723.9			2589.3
Total FWM Outflow Conc	ppb	87.9	11.1	104.5	11.9	83.2	12.8	57.3	17.8	61.0	16.3			14.1
Bypass Load	kg/yr	0	0	0	0	0	0	0	0	0	0			0.0
Bypass Load	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			0.0
Maximum Inflow	hm3/d	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.18	0.22	0.22			0.90
Maximum Outflow	hm3/d	0.17	0.17	0.17	0.17	0.17	0.17	0.18	0.18	0.22	0.22			0.91
Surface Load Reduction	kg/yr	5153	2872	4402	3264	4979	2393	6114	1399	7513	1987			39744
Load Trapped in Sediments	kg/yr	3956	2832	4514	3426	5121	2515	6328	1460	7767	2079			39998
Overall Load Reduction	%	62%	87%	54%	89%	64%	85%	75%	69%	73%	73%			94%
Lower Confidence Limit	%	0.6	0.9	0.5	0.9	0.5	0.8	0.7	0.7	0.7	0.7			92%
Upper Confidence Limit	%	0.7	0.9	0.6	0.9	0.7	0.8	0.8	0.7	0.8	0.7			95%
Daily Geometric Mean	ppb	91.1	6.2	110.0	6.3	84.7	7.0	55.5	10.9	59.7	9.7			#N/A
Outflow Geo Mean - Composites	ppb	82.9	10.2	97.2	10.8	76.8	11.7	52.5	16.0	56.0	14.8			12.8
Upper Confidence Limit	ppb	97.7	12.7	117.4	13.8	96.8	15.4	70.2	22.8	74.2	20.8			17.3
Lower Confidence Limit	ppb	68.0	8.6	77.2	8.9	58.3	9.3	38.0	11.8	40.7	11.1			10.0
Frequency Outflow Conc > 10 ppb	%	100%	62%	100%	69%	100%	77%	100%	92%	100%	85%			85%
Frequency Outflow Conc > 20 ppb	%	100%	0%	100%	0%	100%	0%	100%	15%	100%	15%			15%
Frequency Outflow Conc > 50 ppb	%	100%	0%	100%	0%	100%	0%	54%	0%	62%	0%			0%
Freq Outflow Volume > 10 ppb	%	100%	54%	100%	60%	100%	66%	100%	88%	100%	84%			75%
95th Percentile Outflow Conc	ppb	115.68	13.65	128.72	14.97	108.26	16.63	76.17	24.09	80.98	21.99			19
Mean Biomass P Storage	mg/m2	3607	570	4143	687	3692	668	3025	773	3129	734			2254
Storage Increase / Net Removal	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			0%
Net Storage Turnover Rate	1/yr	4.2	13.1	4.2	13.1	4.2	13.1	4.2	13.2	4.2	13.2			5.3
Unit Area P Load	mg/m2-yr	2391	627	2391	745	1810	759	1249	1088	1322	971			971
Unit Area P Removal	mg/m2-yr	1170	573	1335	694	1188	675	971	784	1004	744			918
Mean Water Load	cm/d	2.9	2.0	2.9	2.0	2.2	2.5	1.5	5.2	1.6	4.4			1.2
Max Water Load	cm/d	5.1	3.5	5.1	3.5	3.9	4.5	2.7	9.4	2.8	7.9			2.1
Mean Depth	cm	42	55	42	55	41	55	41	55	40	55			47
Minimum Depth	cm	1.4	22.8	1.2	22.6	1.2	23.2	1.2	23.7	1.2	23.7			10
Maximum Depth	cm	51.7	62.0	51.7	62.0	51.4	61.9	51.7	62.1	49.9	61.6			56
Frequency Depth < 10 cm	%	7%	0%	7%	0%	7%	0%	7%	0%	7%	0%			4.2%
Flow/Width	m2/day	62	62	62	62	60	60	62	62	52	52			59.3
HRT Days	days	14.5	28.4	14.5	28.4	19.0	22.1	27.6	10.6	25.3	12.6			40.4
Mean Velocity	cm/sec	0.17	0.13	0.17	0.13	0.17	0.12	0.18	0.13	0.15	0.11			0.15
Seepage Outflow / Total Outflow	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			0%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.0
95th Percentile Outflow Volume	hm3/d	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2			0.8
95th Percentile Outflow Load	kg/d	15.4	1.9	18.8	2.1	15.6	2.3	11.8	3.5	15.7	4.0			13.8
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A			#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A			#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A			#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A			#N/A
Range Check - Mean Depth	-		0.89		0.89		0.89		0.89		0.88			5
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-		0.38		0.38		0.37		0.38		0.32			5
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-		0.75		0.80		0.86							3
Water Balance Error	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%			0.00%
Mass Balance Error	%	0.00%	0.00%	-0.02%	0.00%	-0.01%	0.00%	-0.01%	0.00%	-0.01%	0.00%			-0.01%
Warning or Error Messages		Cell# 2 Depth out of calib. range for SAV_3: 55 vs. 62 - 87 cm Cell# 2 Flow/Width out of calib. range for SAV_3: 62 vs. 162 - 374 m2/day Cell# 2 Outflow Conc out of calib. range for SAV_3: 11 vs. 15 - 153 ppb Cell# 4 Depth out of calib. range for SAV_3: 55 vs. 62 - 87 cm Cell# 4 Flow/Width out of calib. range for SAV_3: 62 vs. 162 - 374 m2/day Cell# 4 Outflow Conc out of calib. range for SAV_3: 12 vs. 15 - 153 ppb Cell# 6 Depth out of calib. range for SAV_3: 55 vs. 62 - 87 cm Cell# 6 Flow/Width out of calib. range for SAV_3: 60 vs. 162 - 374 m2/day Cell# 6 Outflow Conc out of calib. range for SAV_3: 13 vs. 15 - 153 ppb Cell# 8 Depth out of calib. range for SAV_3: 55 vs. 62 - 87 cm							Cell# 8 Flow/Width out of calib. range for SAV_3: 62 vs. 162 - 374 m2/day Cell# 10 Depth out of calib. range for SAV_3: 55 vs. 62 - 87 cm Cell# 10 Flow/Width out of calib. range for SAV_3: 52 vs. 162 - 374 m2/day			13

STA-6

DMSTA2- Inputs & Outputs Project: STA 6 EIS Model Release: 07/05/07 Current Date: 10/18/2007

Input Variable	Units	Value	Case Description:
Design Case Name	-	EIS Alt1	STA-6 3 flow-ways
Input Series Name		TS_EIS_Alt1	Inflows are a mixture of C-139 Basin and C-139 Annex (USSO)
Starting Date for Simulation	-	05/01/94	
Ending Date for Simulation	-	04/30/07	
Starting Date for Output	-	05/01/94	
Integration Steps Per Day	-	4	Simulation Type: Uncertainty Analysis
Number of Iterations	-	0	Output Variable / Mean / Lower CL / Upper CL
Output Averaging Interval	days	365	FWM Outflow C (ppb) 12.9 16.9 10.2
Inflow Conc Scale Factor	-	1	GM Outflow C (ppb) 12.4 16.3 9.8
Rainfall P Conc	ppb	10	Load Reduction % 91% 88% 93%
Atmospheric P Load (Dry)	mg/m2-yr	20	Bypass Load (%) 0.0%

Diagnostics

H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	3	0.0%
Warning/Error Messages	8	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	3	5	2	4								
Vegetation Type	-->	PEW_3	PEW_3	EMG_3	SAV_3								
Inflow Fraction	-	0.0865	0.2301	0.6835									
Downstream Cell Number	-			4									
Surface Area	km2	0.99	2.64	2.23	5.62								
Mean Width of Flow Path	km	0.61	1.31	1.14	2.39								
Number of Tanks in Series	-	3.0	3.0	3.0	3.0								
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	28.3464	35.3568	38.1	48.8								
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4	4								
Outflow Coefficient - Intercept	-	1	1	1	1								
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm												
Inflow Seepage Control Elev	cm												
Inflow Seepage Conc	ppb												
Outflow Seepage Rate	(cm/d) / cm												
Outflow Seepage Control Elev	cm												
Max Outflow Seepage Conc	ppb												
Seepage Recycle to Cell Number	-												
Seepage Recycle Fraction	-												
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	30	30	30	30								
Initial P Storage Per Unit Area	mg/m2	500	500	500	500								
Initial Water Column Depth	cm	200	200	200	200								
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3	3								
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22	22								
C2 = Conc at Half-Max Uptake	ppb	300	300	300	300								
K = Net Settling Rate at Steady Stat	m/yr	34.9	34.9	16.8	52.5								
Z1 = Saturated Uptake Depth	cm	40	40	40	40								
Z2 = Lower Penalty Depth	cm	100	100	100	100								
Z3 = Upper Penalty Depth	cm	200	200	200	200								

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	9.15	9.92	10.69	11.46									11.46
Run Date	-	10/18/07	10/18/07	10/18/07	10/18/07									10/18/07
Starting Date for Simulation	-	05/01/94	05/01/94	05/01/94	05/01/94									05/01/94
Starting Date for Output	-	05/01/94	05/01/94	05/01/94	05/01/94									05/01/94
Ending Date	-	04/30/07	04/30/07	04/30/07	04/30/07									04/30/07
Output Duration	days	4748	4748	4748	4748									4748
Cell Label		3	5	2	4									Total
Downstream Cell Label		Outflow	Outflow	4	Outflow									-
Network Simulation Name	-	none	none	none	none									none
Simulation Type	-	Uncerta	Uncerta	Uncerta	Uncerta									Uncerta
Surface Area	km2	0.99	2.64	2.23	5.62									11.47
Mean Rainfall	cm/yr	129.55	129.55	129.55	129.55									129.5
Mean ET	cm/yr	130.68	130.68	130.68	130.68									130.7
Cell Inflow Volume	hm3/yr	6.6	17.5	51.9	51.9									76.0
Cell Inflow Load	kg/yr	921.5	2451.2	7281.1	4779.1									10654
Cell Inflow Conc	ppb	140	140	140	92									140.2
Treated Outflow Volume	hm3/yr	6.6	17.5	51.9	51.8									75.9
Treated Outflow Load	kg/yr	108.5	282.5	4779.1	586.0									977
Treated FWM Outflow Conc	ppb	17	16	92	11									12.9
Upper Confidence Limit	ppb	22.6	22.1	101.4	14.4									16.9
Lower Confidence Limit	ppb	12.4	12.2	81.5	9.2									10.2
Total Outflow Volume + Bypass	hm3/yr	6.6	17.5	51.9	51.8									75.9
Total Outflow Load + Bypass	kg/yr	108.5	282.5	4779.1	586.0									977.1
Total FWM Outflow Conc	ppb	16.5	16.2	92.1	11.3									12.9
Bypass Load	kg/yr	0	0	0	0									0.0
Bypass Load	%	0%	0%	0%	0%									0.0
Maximum Inflow	hm3/d	0.03	0.08	0.23	0.23									0.34
Maximum Outflow	hm3/d	0.03	0.08	0.23	0.23									0.34
Surface Load Reduction	kg/yr	813	2169	2502	4193									9677
Load Trapped in Sediments	kg/yr	846	2256	2575	4378									10055
Overall Load Reduction	%	88%	88%	34%	88%									91%
Lower Confidence Limit	%	0.8	0.8	0.3	0.9									88%
Upper Confidence Limit	%	0.9	0.9	0.4	0.9									93%
Daily Geometric Mean	ppb	15.5	13.5	88.5	7.4									#N/A
Outflow Geo Mean - Composites	ppb	16.0	15.6	89.9	10.8									12.4
Upper Confidence Limit	ppb	22.0	21.4	99.5	13.8									16.3
Lower Confidence Limit	ppb	12.0	11.8	79.1	8.8									9.8
Frequency Outflow Conc > 10 ppb	%	100%	100%	100%	62%									92%
Frequency Outflow Conc > 20 ppb	%	8%	8%	100%	0%									8%
Frequency Outflow Conc > 50 ppb	%	0%	0%	100%	0%									0%
Freq Outflow Volume > 10 ppb	%	98%	95%	100%	53%									72%
95th Percentile Outflow Conc	ppb	20.11	19.54	107.88	13.59									15
Mean Biomass P Storage	mg/m2	1279	1282	3616	775									1487
Storage Increase / Net Removal	%	0%	0%	0%	0%									0%
Net Storage Turnover Rate	1/yr	8.7	8.7	4.2	13.1									7.7
Unit Area P Load	mg/m2-yr	929	928	3269	851									929
Unit Area P Removal	mg/m2-yr	852	854	1156	780									876
Mean Water Load	cm/d	1.8	1.8	6.4	2.5									1.8
Max Water Load	cm/d	3.0	3.0	10.5	4.2									3.0
Mean Depth	cm	36	40	52	51									47
Minimum Depth	cm	12.3	19.3	23.2	33.8									27
Maximum Depth	cm	43.2	46.7	62.7	56.1									54
Frequency Depth < 10 cm	%	0%	0%	0%	0%									0.0%
Flow/Width	m2/day	29	37	125	59									64.3
HRT Days	days	20.0	22.3	8.2	20.1									26.2
Mean Velocity	cm/sec	0.09	0.10	0.28	0.14									0.15
Seepage Outflow / Total Outflow	%	0%	0%	0%	0%									0%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00									0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00									0.0
95th Percentile Outflow Volume	hm3/d	0.0	0.1	0.2	0.2									0.3
95th Percentile Outflow Load	kg/d	0.5	1.2	19.8	2.6									4.2
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A	#N/A									#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A	#N/A									#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A	#N/A									#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A	#N/A									#N/A
Range Check - Mean Depth	-	0.97			0.82									2
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-	0.43	0.53		0.37									3
Range Check - Inflow Conc	-	1.28	1.28											2
Range Check - Outflow Conc	-				0.76									1
Water Balance Error	%	0.00%	0.00%	0.00%	0.00%									0.00%
Mass Balance Error	%	0.00%	0.00%	0.00%	0.00%									0.00%
Warning or Error Messages		Cell# 1 Depth out of calib. range for PEW_3: 36 vs. 38 - 66 cm Cell# 1 Flow/Width out of calib. range for PEW_3: 29 vs. 69 - 276 m2/day Cell# 1 Inflow Conc out of calib. range for PEW_3: 140 vs. 8 - 110 ppb Cell# 2 Flow/Width out of calib. range for PEW_3: 37 vs. 69 - 276 m2/day Cell# 2 Inflow Conc out of calib. range for PEW_3: 140 vs. 8 - 110 ppb Cell# 4 Depth out of calib. range for SAV_3: 51 vs. 62 - 87 cm Cell# 4 Flow/Width out of calib. range for SAV_3: 59 vs. 162 - 374 m2/day Cell# 4 Outflow Conc out of calib. range for SAV_3: 11 vs. 15 - 153 ppb												8

STA Phosphorus Modeling For the 2010 Planning Period: Alternative D

Work Order No. CN040902-WO03R2

Prepared for

US Army Corps of Engineers®

South Florida Water Management District

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FINAL REPORT

December 23, 2007

December 23, 2007

Ms. Kelly Gracie
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Boynton Beach, FL 33426

U.S. Army Corps of Engineers
South Florida Water Management District
Tetra Tech Contract No. CN040902-WO03R2
STA Phosphorus Modeling for the 2010 Period: Alternative D

Dear Ms. Gracie:

I am pleased to submit this final report titled "STA Phosphorus Modeling for the 2010 Planning Period: Alternative D". This document constitutes the final deliverable for Alternative D under Tetra Tech EC Purchase Order 1025202 dated October 19, 2007.

I gratefully acknowledge the valuable contributions of the staff of the South Florida Water Management District, and the technical review by yourself, staff of the District and of the U. S. Army Corps of Engineers, in the development of the information contained in this report.

Certification

I hereby certify, as a Professional Engineer in the State of Florida, that the information in this document was assembled under my direct personal charge. This report is not intended or represented to be suitable for reuse without specific verification or adaptation by the Engineer. This certification is made in accordance with the provisions of the Laws and Rules of the Florida Board of Professional Engineers under Chapter 61G15-29, Florida Administrative Code.

_____
Gary F. Goforth, P.E. Florida P.E. # 35525

Date: 12/23/07
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1. Introduction

As part of the evaluation of alternatives for the Environmental Impact Statement (EIS) associated with the full build-out of Compartments B and C, the phosphorus removal performance of the Stormwater Treatment Areas (STAs) were projected using the DMSTA model (Walker and Kadlec 2005). Four alternatives were simulated for the EIS, and this report presents the results of the STA simulations for Alternative D. Daily flow data from the South Florida Water Management Model (SFWMM) for this alternative were combined with phosphorus data to create the input time series for the DMSTA model, following the method utilized in the recently updated STA performance projections (Goforth 2007b). For STA-5 and STA-6, historic basin flow and phosphorus data were utilized in lieu of the SFWMM output. Additional details of the input data set and model setup are provided in Sections 2-9 of this report.

1.1. Scope of Work

This work constitutes Task 7 of CN040902-WO03.Ta18 - Preparation of an Environmental Impact Statement for Everglades Agricultural Area Conveyance and Regional Treatment Project Plus Compartments B and C - between the District and Tetra Tech EC, Inc. This work is being performed under Purchase Order No. 1025202, which was issued on October 19, 2007, between Tetra Tech EC, Inc., and Gary Goforth, Inc.

The scope of work for this Purchase Order consists of conducting DMSTA modeling for the four alternatives being evaluated for the Environmental Impact Statement associated with the full build-out of Compartments B and C. To expedite the preparation of the EIS, separate reports were generated for each alternative summarizing the phosphorus performance projections. This report presents the results of the simulation of Alternative D; other reports address the other alternatives.

1.2. Regional Conditions for the 2010 Planning Period

This present analysis focuses on the regional conditions that are anticipated to be present in the 2010 time frame, including the full build-out of Compartments B and C. The anticipated status of the water resources projects within the basins tributary to the STAs (shown in **Figure 1-1**) is provided in the **Table 1-1**. These regional hydrologic conditions were simulated using the 2010A8 Alternative D simulation of the SFWMM, also referred to as "EAALINE + Alt 3". In this alternative, EAA runoff is first delivered to Compartment B and the remaining runoff sent to the EAA Storage Reservoir, freeing additional capacity in the EAASR for Lake Okeechobee regulatory releases. Appendix A contains a more complete summary of the key modeling assumptions used in this simulation throughout the South Florida area.

Figure 1-1: Overview of EAA And Surrounding Basins.

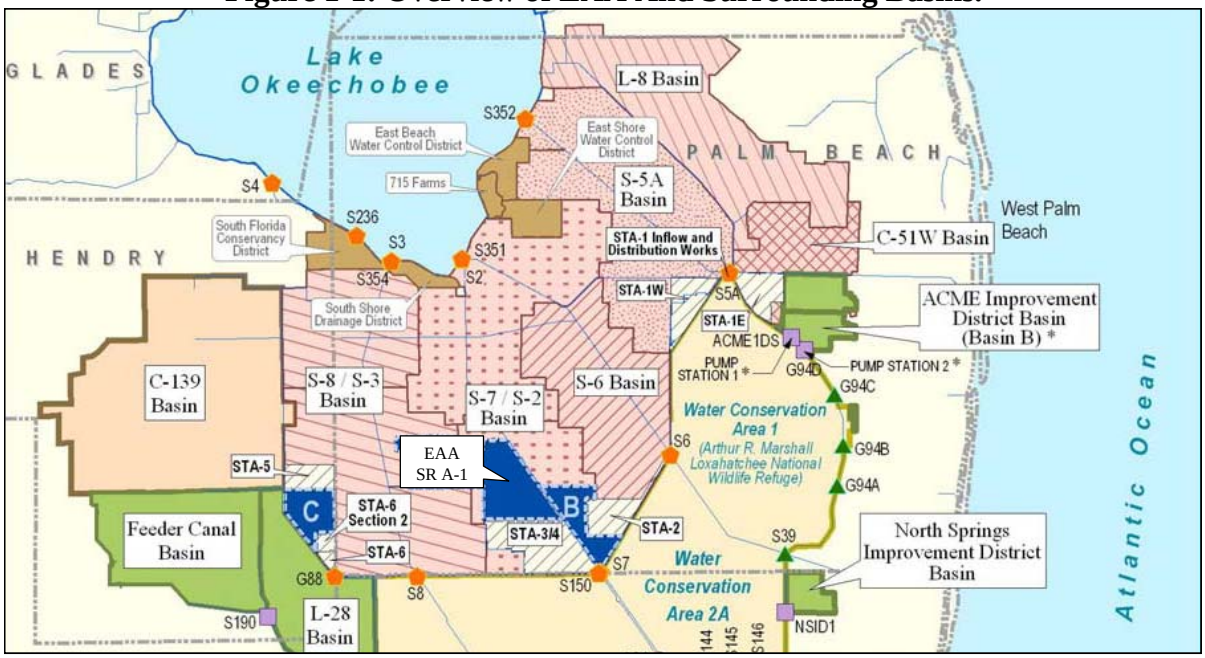


Table 1-1: Anticipated Status of Regional Water Resource Projects in the 2010 Period.

Project	Status During the 2010 Period
Original Everglades Construction Project	All 6 STAs are fully operational, including STA-6 Section 2. Approximately 20% of the S-5A Basin runoff diverted to the Hillsboro Canal through existing facilities. Ch. 298 District and 715 Farms diversions in place. No EAA runoff reduction adjustment necessary to account for Best Management Practices.
Compartment B	The full area of Compartment B is operational as effective treatment area.
Compartment C	The full area of Compartment C is operational as effective treatment area.
EAA Storage Reservoir A-1	16,000-acre reservoir operable with a 12-ft depth
Acme Basin B	Runoff directed away from WCA-1 and discharged to C-51W, and then to STA-1E
L-8 Reservoir	Partially completed: 870 acres, depth 44 ft. Facilities not completed for diversion away from S-5A/C-51W.
Everglades Agricultural Area Conveyance and Regional Treatment Project (ECART)	Not completed

1.3. Phosphorus Modeling

The phosphorus removal performance of the STAs, EAA Storage Reservoir and treatment areas of Compartments B and C were estimated using the July 5, 2007 release of the Dynamic Model for Stormwater Treatment Areas, Model Version 2 (DMSTA, 09/30/2005), developed for the U.S. Department of the Interior and the U.S. Army Corps of Engineers by W. Walker and R. Kadlec. Outflow phosphorus concentrations are calculated based on:

- daily input data, consisting of flow, phosphorus concentrations, rainfall evapotranspiration (ET), depth (optional) and releases (optional);
- mass and water balances calculated for each time step for each treatment cell or reservoir compartment,
- treatment area configuration, cell size, flow path width, vegetation type, estimates of hydraulic mixing, outflow hydraulics, seepage estimates;
- phosphorus removal rates that can be either user-defined or available within DMSTA based on calibration data sets extracted from numerous vegetation types, phosphorus characteristics and hydraulic regimes of many south Florida wetland treatment systems through early 2005.

DMSTA was used to predict annual and long-term average flow-weighted mean concentrations, with a 365-day averaging period. In addition, STA performance uncertainty analyses were conducted, using the 10%, mean and 90% values of the settling rates for the specific vegetation types. These projections are subject to the assumptions, constraints and limitations of DMSTA modeling and STA operations, including the following.

- DMSTA calibrations are based upon data from fully functional treatment cells with viable vegetation communities that have near optimal performance. The range of treatment characteristics for each vegetation type is summarized in **Table 1-2**.
- In addition to consideration of the range of calibration treatment characteristics, other important factors not yet incorporated into the model include calcium requirements, antecedent soils, and assumed intensive management, particularly for the enhanced vegetation types.
- DMSTA generates error/warning notices if simulated conditions exceed the range of the calibration characteristics presented in **Table 1-3**.
- The use of the DMSTA calibration vegetation types, e.g., SAV, assumes that the vegetation will be maintained in the long-term. This assumption may produce overly optimistic long-term performance projections for treatment areas subject to periodic disturbance such as hurricanes, droughts and other extreme conditions.
- DMSTA does not allow a treatment cell to dry out, and hence does not reproduce the vegetative responses and phosphorus dynamics (e.g., post-dry-out spikes) observed in treatment cells that periodically go dry. Hence the phosphorus removal performance simulated for large wetland systems with limited water availability, such as Compartment C, may be overly optimistic. Other methods should be used to estimate

the supplemental water required to either avoid dryout or to estimate the phosphorus performance for these large systems that experience periodic dryout.

- STA performance projections are subject to the complete set of DMSTA assumptions, which can be found at http://www.wwwalker.net/DMSTA/index.htm.
- Additional uncertainty exists in flow estimates and regional water management.

Table 1-2: Calibration Dataset Ranges (Draft, from www.wwwalker.net/dmsta/).

Variable	Units	EMERG		PEW		SAV		PSTA		RESERV	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Calib Period	days	641	4017	693	4017	693	1522	245	1062	1460	5843
Calib K	m/yr	12	23	27	49	46	64	18	34	1	8
Mean Depth	cm	35	76	38	66	62	87	13	52	90	304
Max Depth	cm	47	131	71	123	75	132	22	65	187	457
Freq Z < 10 cm	%	0%	9%	0%	13%	0%	0%	0%	38%	0%	0%
Hydraulic Load	cm/day	1.1	6.5	3.0	6.9	5.1	12.7	2.8	14.6	0.4	17.6
Residence Time	days	8	66	7	22	5	17	1	19	8	714
Velocity	cm/sec	0.04	0.45	0.16	0.48	0.30	0.64	0.01	1.12	0.05	1.32
Flow/Width	md/2	26	210	69	276	162	374	3	132	68	1135
Areal Load	mg/m2-yr	382	2908	222	1919	1649	5279	142	1447	212	11781
Storage	mg/m2	921	4299	171	1494	903	2959	96	911	200	4994
Inflow Conc	ppb	39	283	17	110	36	153	7	56	78	1144
FWM Outflow Conc	ppb	20	150	8	28	15	57	6	15	50	767
Outflow GeoMean	ppb	19	125	8	21	15	55	5	15	39	725
Marsh GeoMean	ppb	19	128	8	20	16	56	5	15	38	725

Table 1-3: Variable Ranges for Model Applications - Used to Trigger Warning Messages (Draft, from www.wwwalker.net/dmsta/).

Calibration	K (m/yr)	CV(K)	Depth (cm)		Q/W (m2/d)		Conc (ppb)		Freq Z < 10 cm (%)	
			Min	Max	Min	Max	Min	Max	Min	Max
EMERG_3	16.8	0.20	35	76	26	210	19.5	800	0%	9%
PEW_3	34.9	0.21	38	66	69	276	8.0	110	0%	13%
SAV_3	52.5	0.16	62	87	162	374	14.9	153	0%	0%
PSTA_3	23.6	0.22	13	60	3	132	5.9	56	0%	38%
RES_3	5.0	0.45	90	304	68	1135	50.3	1144	0%	0%

When evaluating DMSTA results, particular attention needs to be given to the simulated outflow concentration, in that DMSTA does not constrain the reported values to minimum levels observed in the calibration data sets reported in Table 1-2. In other words, the model may forecast outflow concentrations lower than have been observed in the field. Forecast error is inherent when using any simulation model. These errors result from limitations of the calibration datasets (measurement error, short duration, etc.) and other sources that are difficult to quantify. Based on information from the DMSTA website (http://www.wwwalker.net/DMSTA/index.htm) and Walker (personal communication), the DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. In addition, the following disclaimer is offered by the authors of DMSTA:

DMSTA2 is a modeling tool with a constrained range of applicability. It has been developed and calibrated to information specific to South Florida. It is intended for use in evaluating Everglades Protection Project by individuals with experience in hydrologic & water quality

modeling. It should not be exercised in any situation without careful examination of all features, assumptions and calibrations, as they relate to a given application and to the supporting research upon which the calibrations are based. When properly calibrated by the user, the hydraulics portion of DMSTA2 is thought to generate predictions that are adequate for the purpose of simulating phosphorus dynamics. The hydraulic simulations should not be relied upon for designing flood control measures, designing levees, for any other purposes in which life and/or property may be at risk. The user assumes all risks associated with using the model for designing treatment areas or any other purpose.

Proper use of DMSTA2 requires thorough understanding of calibration results & limitations & further documentation provided below. Sample input files are for demonstration purposes. None reflect actual designs. Atmospheric deposition, hydraulic, or seepage input values should not be interpreted as defaults or recommended values. While P cycling parameters are suggested for various situations and within well-defined calibration boundaries, users must decide which calibration is appropriate in any situation.

Additional information on the development, calibration and application of DMSTA can be found at: **www.wwwalker.net/dmsta.**

The general method used for development of the daily flow and phosphorus input data sets was described in *Updated STA Inflow Data Sets for the 2010 Period* (Goforth 2007b); STA-specific variations to this general method are described in Sections 2-9. Daily rainfall and ET for all the treatment areas except STA-5 and STA-6 were provided by the District as part of the SFWMM modeling. For STA-5 and STA-6, actual rainfall and ET were used based on local gauges. Treatment cell dimensions, hydraulic characteristics and vegetation types were consistent with values used in the 2005 EAA Regional Feasibility Study (ADA/Burns & McDonnell 2005), modified for consistency with updated information obtained from the on-going Compartments B and C design (Brown & Caldwell 2007, URS 2007). All STA enhancements described in the Everglades *Long-Term Plan* scheduled for completion by the end of 2010 are assumed to be completed (Burns & McDonnell 2003, as amended).

2. STA-1E

Working in concert with STA-1W, STA-1E will capture and treat runoff from the C-51 Basin, Acme Basin B, L-8 Basin, S-5A Basin and the East Beach Water Control District (EBWCD). A schematic of STA-1E is presented in **Figure 2-1**. The daily flow terms from the SFWMM simulation were utilized for the DMSTA modeling with the following modifications:

- ***For all alternatives***, 25% of the L-8 Basin runoff passing through S-5AE is assumed to be captured and treated in STA-1E, compared to the complete diversion of L-8 Basin runoff assumed in the SFWMM.
- ***For all alternatives,*** the SFWMM flow term for the transfer of water from the STA-1 Inflow Basin to STA-1E was modified to balance the phosphorus loading rate among STA-1E and STA-1W, yielding a PLR of approximately 2 $g/m^2/yr$ for both STAs, including re-directed flows from STA-1W that exceed the inflow capacity of 3,250 cfs.
- ***For all alternatives,*** runoff from the EBWCD was re-directed to STA-1E at the same percentage as the S-5A Basin runoff diversion to STA-1E. The estimate of runoff from the EBWCD and the remaining Ch. 298 Districts and Closter Farms was based on historic runoff volumes from these basins to the maximum extent practicable, as the SFWMM simulations do not well represent either the total discharges or the distribution of these discharges from these basins. Runoff volumes for the period May 1, 1994 through April 30, 2000 are available for direct use, while the runoff volumes for the remainder of the 35-year period (May 1, 1965 through April 30, 1994) were estimated by indirect methods. Consistent with the approach utilized in the *Updated STA Inflow Data Sets for the 2010 Period*, daily runoff volumes were estimated as a fixed percentage of the daily runoff from the adjacent primary basin of the EAA (Goforth 2007b). That fixed percentage was derived as the ratio of the overall runoff from each Ch. 298 District basin to the overall runoff from the adjacent EAA basin over the WY1995-2007 period. In recognition of the changes in EAA basin contributing area over the WY1995-2007 period due to conversion of agriculture lands to STAs, the EAA runoff was normalized to the effective basin areas reflected in the SFWMM simulation.

The long-term average annual inflow to STA-1E by source is summarized in **Table 2-1** for Alternative D. Although the long-term goal is to treat less inflow in STA-1E than shown in Table 2-1, it is recognized that during the interim period before ECART and the L-8 Basin projects are complete, STA-1E inflows will be higher than the long-term goals. With complete diversion of the L-8 Basin runoff and without implementation of ECART, the long-term average annual inflows to STA-1E will be lower than presented in Table 2-1. It should also be noted that significantly higher phosphorus loads to STA-1E are estimated in the present analysis than in the 2005 EAA Regional Feasibility Study (ADA/Burns & McDonnell 2006), due principally to higher phosphorus concentrations during the updated period of record, observed following the 2004 hurricanes. A longer period of record will be

utilized in the 2009 update of the STA data sets, and it is likely that lower concentrations will be applied to future STA-1E inflows at that time.

Figure 2-1: Schematic of STA-1E (Not to Scale).

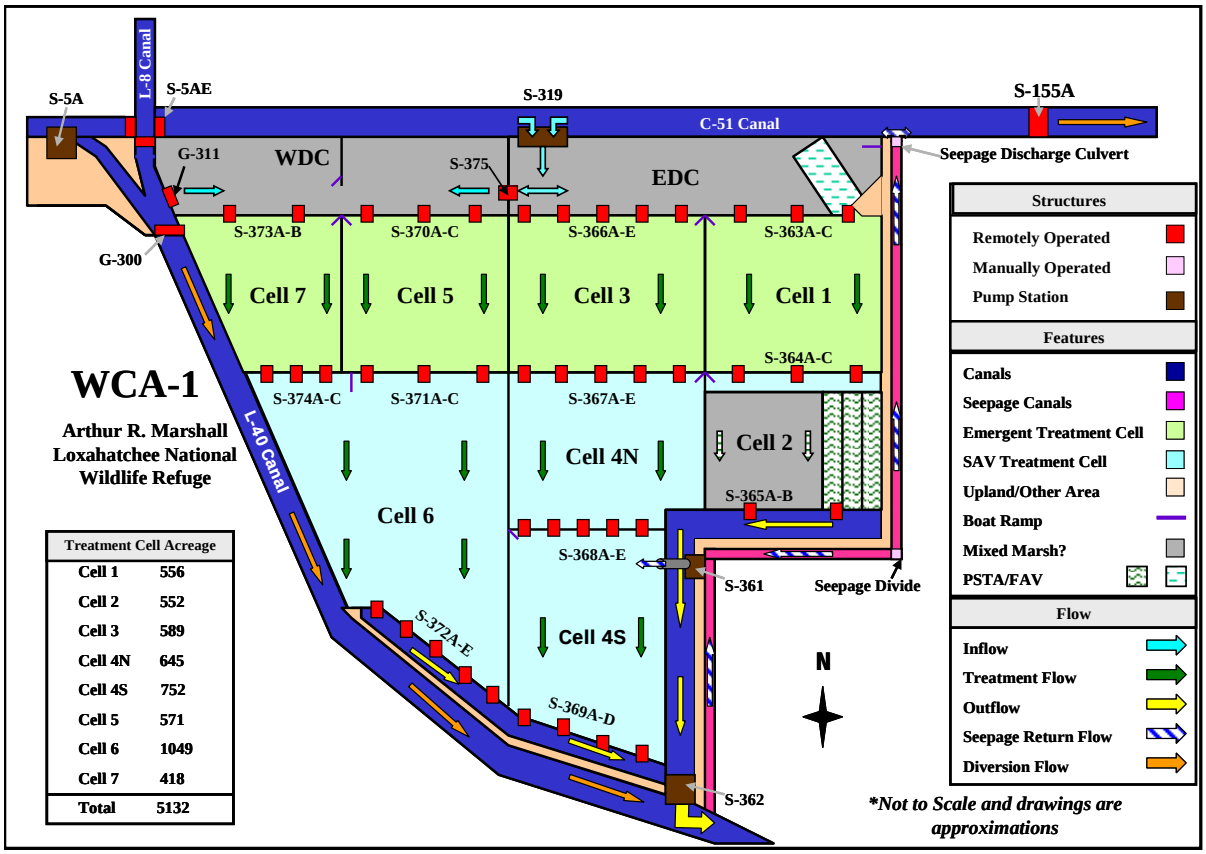


Table 2-1: Summary of Long-term Average Annual Inflow to STA-1E.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
C-51W Basin	131,048	31,738	196
Acme Basin B	35,052	4,913	114
L-8 Basin	8,123	964	96
S-5A Basin	18,131	3,776	356
EBWCD	982	567	468
Total	**193,336**	**41,959**	**176**

Prior to construction, the existing ground elevation at STA-1E exhibited a slope from the northeast to the southwest of more than 7 feet. When constructed by the U. S. Army Corps of Engineers, the majority of the treatment cells were leveled to minimize hydraulic short-circuiting and areas of deep depths. However, the East and West Distribution Cells were not leveled and still retain the relatively steep slope that existed prior to the STA construction. As a result, the cells are characterized by areas of high ground without wetland vegetation,

areas of deep ponds, and an irregular inundation/dry out cycle. Unlike the Buffer Cell of the prototype STA (the Everglades Nutrient Removal Project), phosphorus removal within the East and West Distribution Cells is not anticipated to be reliable. Hence, these cells are not considered as part of the effective treatment area of STA-1E, and were modeled with an effective settling rate of 0.01 m/yr.

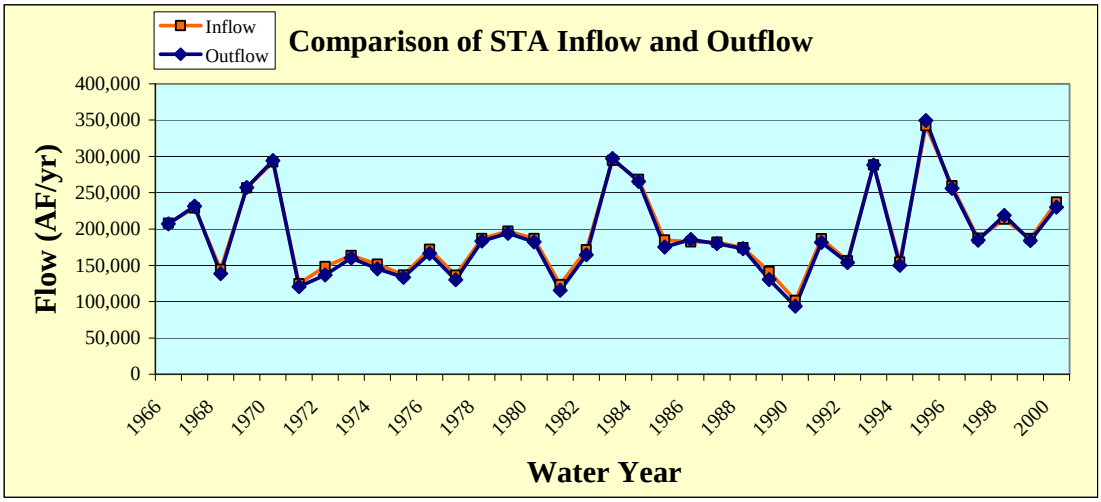
A summary of STA-1E phosphorus performance for Alternative D is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix B. A long-term flow-weighted mean outflow concentration range of 20-35 ppb was forecast, however this includes years when DMSTA forecast levels that fell below the calibration range of 15 ppb for an SAV system, and hence may be optimistic. DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix B. For Cells 2, 4S and 4S, the mean depths were slightly lower than the SAV calibration range. Also for Cell 2, the mean flow/width was slightly lower than the range in the SAV calibration data sets. For all alternatives, a portion of the L-8 Basin runoff was simulated as being diverted to the eastern C-51 Basin.

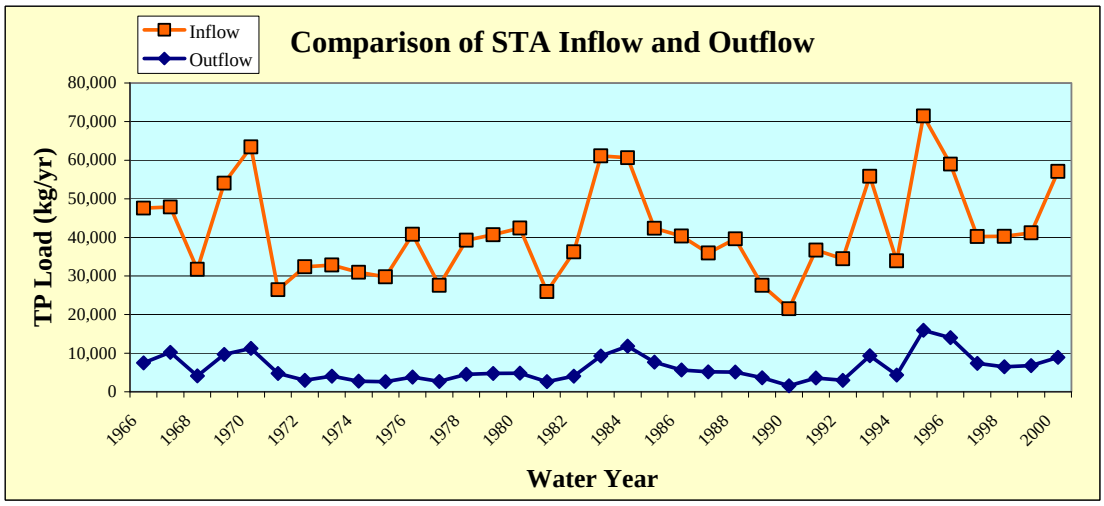
Table 2-2: Summary of DMSTA Results for STA-1E.

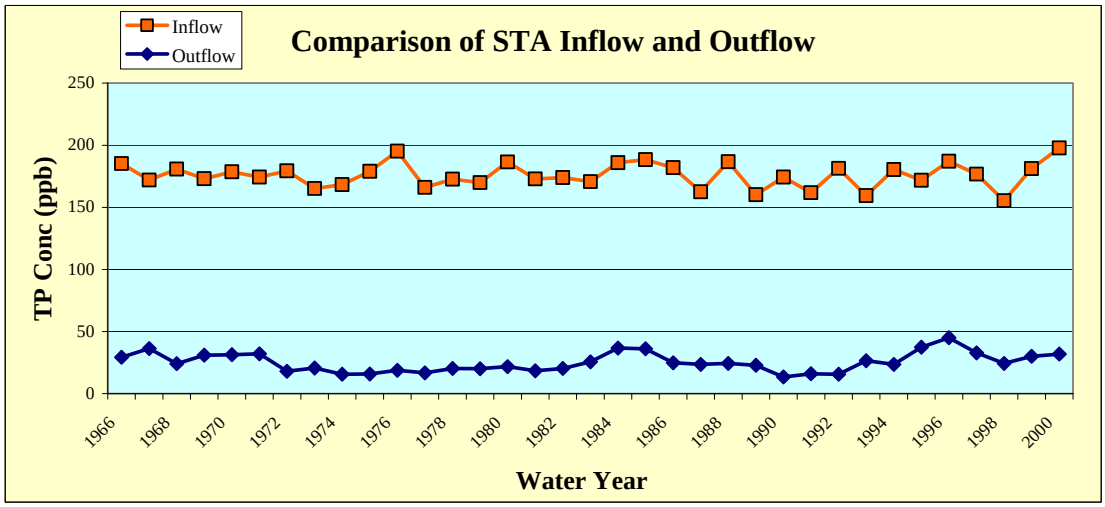
Parameter	Unit	STA-1E
Effective Treatment Area	acres	5,132
Average Annual Inflow		
Volume	AF/yr	193,336
TP Load	kg/yr	41,959
TP Concentration	ppb	176
Average Annual Outflow		
Volume	AF/yr	190,151
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	20.0 (10)
Mean Estimate of Settling Rate	ppb	26.7 (1)
Lower Conf. Limit for Settling Rate	ppb	35.2
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	17.9
Mean Estimate of Settling Rate	ppb	24.2
Lower Conf. Limit for Settling Rate	ppb	32.3
TP Load (Using Mean TP Conc.)	kg/yr	6,269
Diversion Volumes and Loads		
Volume	AF/yr	24,369
TP Load	kg/yr	2,892
TP Concentration	ppb	96

Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.
2. Outflow values highlighted in yellow had one or more years of the 35 years simulated below the low end of the calibration data set (enumerated by the number in parentheses).
3. Diversions related to STA-1E are directed to eastern C-51.

Figure 2-2: Comparison of Inflows and Outflows for STA-1E.







3. STA-1W

Working in concert with STA-1E, STA-1W will capture and treat runoff from the S-5A Basin, East Beach Water Control District (EBWCD), L-8 Basin and a portion of C-51 Basin, Acme Basin B when re-directed from STA-1E. A schematic of STA-1W is presented in **Figure 3-1**. The daily flow terms from the SFWMM simulation were utilized for the DMSTA modeling with the following modifications:

- ***For all alternatives,*** the SFWMM flow term for the transfer of water from the STA-1 Inflow Basin to STA-1E was modified to balance the phosphorus loading rate among STA-1E and STA-1W, yielding a PLR of approximately 2 $g/m^2/yr$ for both STAs, including re-directed flows from STA-1W that exceed the inflow capacity of 3,250 cfs.
- ***For all alternatives,*** the estimate of runoff from the EBWCD and the remaining Ch. 298 Districts and Closter Farms was based on historic runoff volumes from these basins to the maximum extent practicable, as the SFWMM simulations do not well represent either the total discharges or the distribution of these discharges from these basins. Runoff volumes for the period May 1, 1994 through April 30, 2000 are available for direct use, while the runoff volumes for the remainder of the 35-year period (May 1, 1965 through April 30, 1994) were estimated by indirect methods. Consistent with the approach utilized in the *Updated STA Inflow Data Sets for the 2010 Period*, daily runoff volumes were estimated as a fixed percentage of the daily runoff from the adjacent primary basin of the EAA (Goforth 2007b). That fixed percentage was derived as the ratio of the overall runoff from each Ch. 298 District basin to the overall runoff from the adjacent EAA basin over the WY1995-2007 period. In recognition of the changes in EAA basin contributing area over the WY1995-2007 period due to conversion of agriculture lands to STAs, the EAA runoff was normalized to the effective basin areas reflected in the SFWMM simulation.
- ***For all alternatives,*** a small amount of S-5A Basin Runoff was simulated in SFWMM as being diverted untreated to WCA-1 (4,544 AF/yr; 912 kg/yr and 163 ppb). For the purpose of estimating phosphorus removal performance, these diversions were simulated by DMSTA as being captured in STA-1W. Actual diversion may occur based on the daily hydraulic and treatment capacity of the treatment areas.

The long-term average annual inflow to STA-1W by source is summarized in **Table 3-1**. Although the long-term goal is to treat less inflow in STA-1W than shown in **Table 3-1**, it is recognized that during the interim period before ECART and the L-8 Basin projects are complete, STA-1W inflows will be higher than the long-term goals.

Figure 3-1: Schematic of STA-1W (Not to Scale).

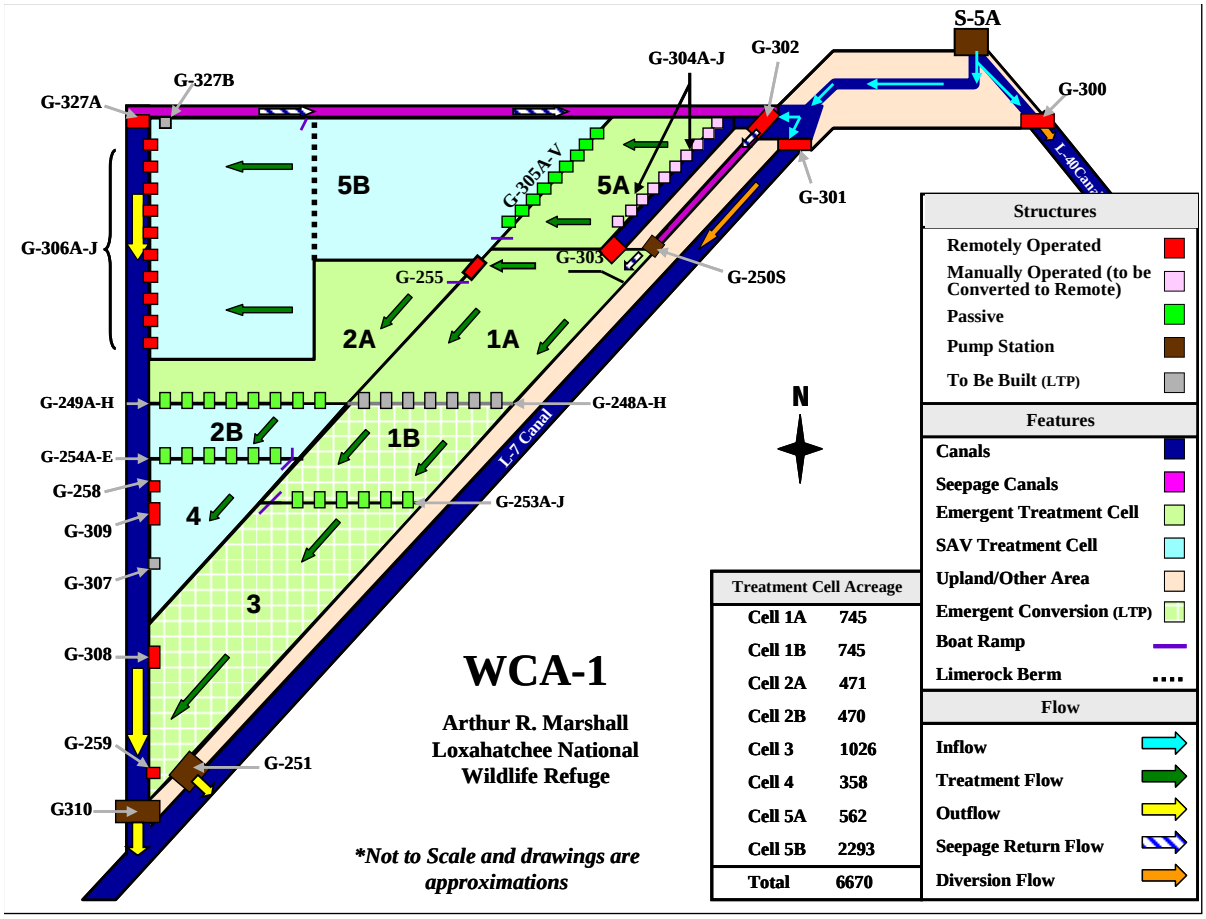


Table 3-1: Summary of Long-term Average Annual Inflow to STA-1W.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
S-5A Basin	228,425	45,807	163
EBWCD	15,117	8,721	468
Total	**243,563**	**54,532**	**182**

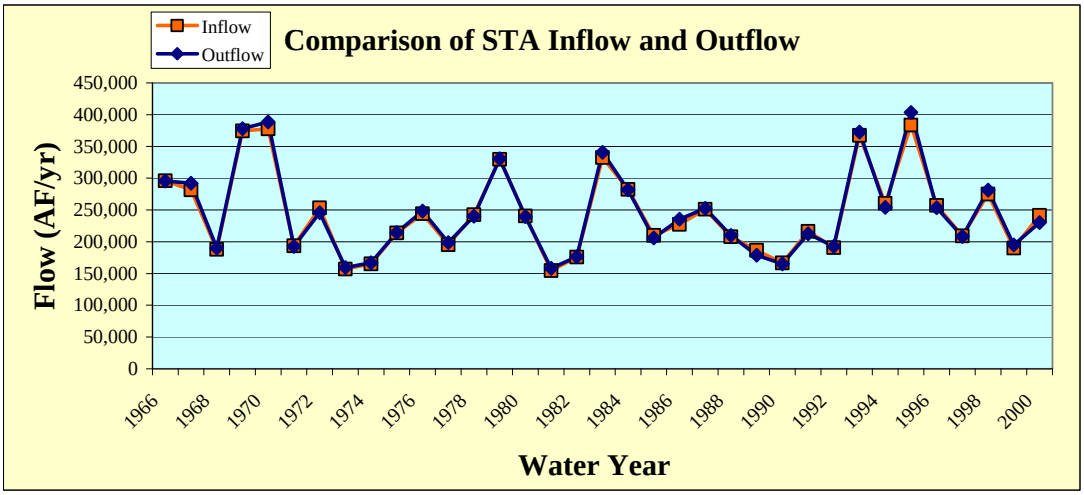
A summary of STA-1W phosphorus performance for Alternative D is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix B. A long-term flow-weighted mean outflow concentration range of 21-35 ppb was forecast, however this includes years when DMSTA forecast levels that fell below the calibration range of 15 ppb for an SAV system, and hence may be optimistic. DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix B. For Cells 2B, 4 and 5B the mean depths and flow/width were slightly below the range of the SAV calibration data sets. For Cell 1A, the flow/width was about 30% above the range of the emergent calibration data sets.

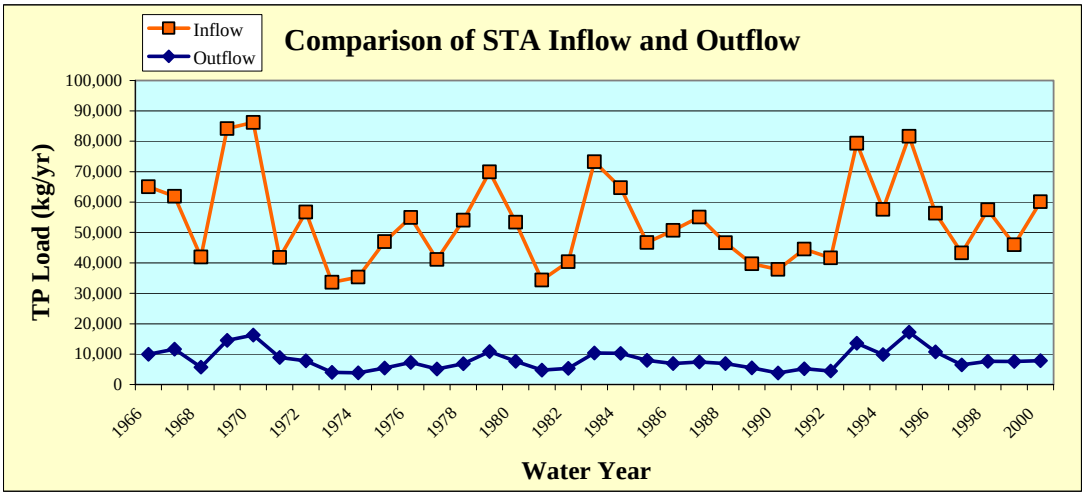
Table 3-2: Summary of DMSTA Results for STA-1W.

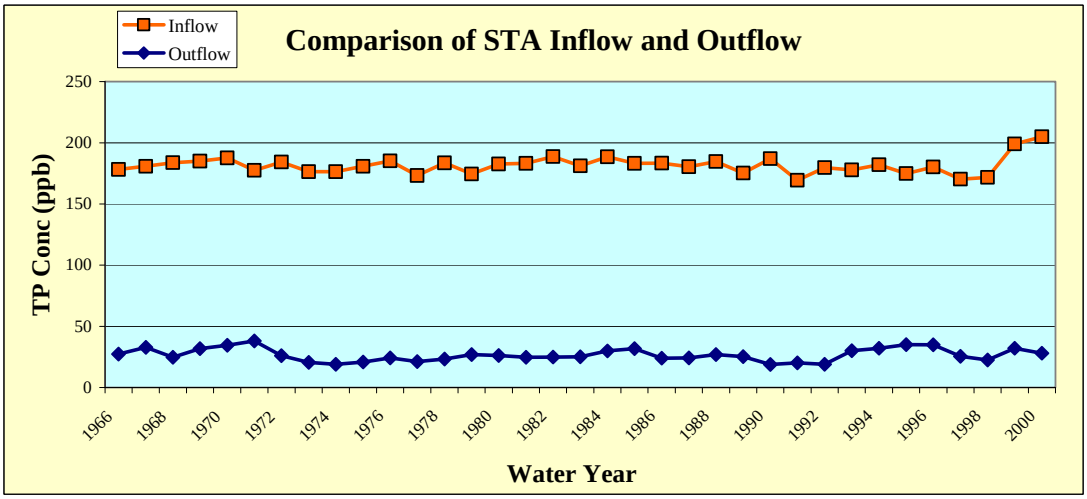
Parameter	Unit	STA-1W
Effective Treatment Area	acres	6,670
Average Annual Inflow		
Volume	AF/yr	243,563
TP Load	kg/yr	54,532
TP Concentration	ppb	182
Average Annual Outflow		
Volume	AF/yr	245,330
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	21.3 (4)
Mean Estimate of Settling Rate	ppb	27.3
Lower Conf. Limit for Settling Rate	ppb	34.8
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	20.2
Mean Estimate of Settling Rate	ppb	26.0
Lower Conf. Limit for Settling Rate	ppb	33.3
TP Load (Using Mean TP Conc.)	kg/yr	8,269
Diversion Volumes and Loads		
Volume	AF/yr	0
TP Load	kg/yr	0
TP Concentration	ppb	-

Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.
2. Outflow values highlighted in yellow had one or more years of the 35 years simulated below the low end of the calibration data set (enumerated by the number in parentheses).

Figure 3-2: Comparison of Inflows and Outflows for STA-1W.







4. STA-2

A schematic of STA-2 is presented in **Figure 4-1**. The daily flow terms from the SFWMM simulation were utilized for the DMSTA modeling with the following modifications:

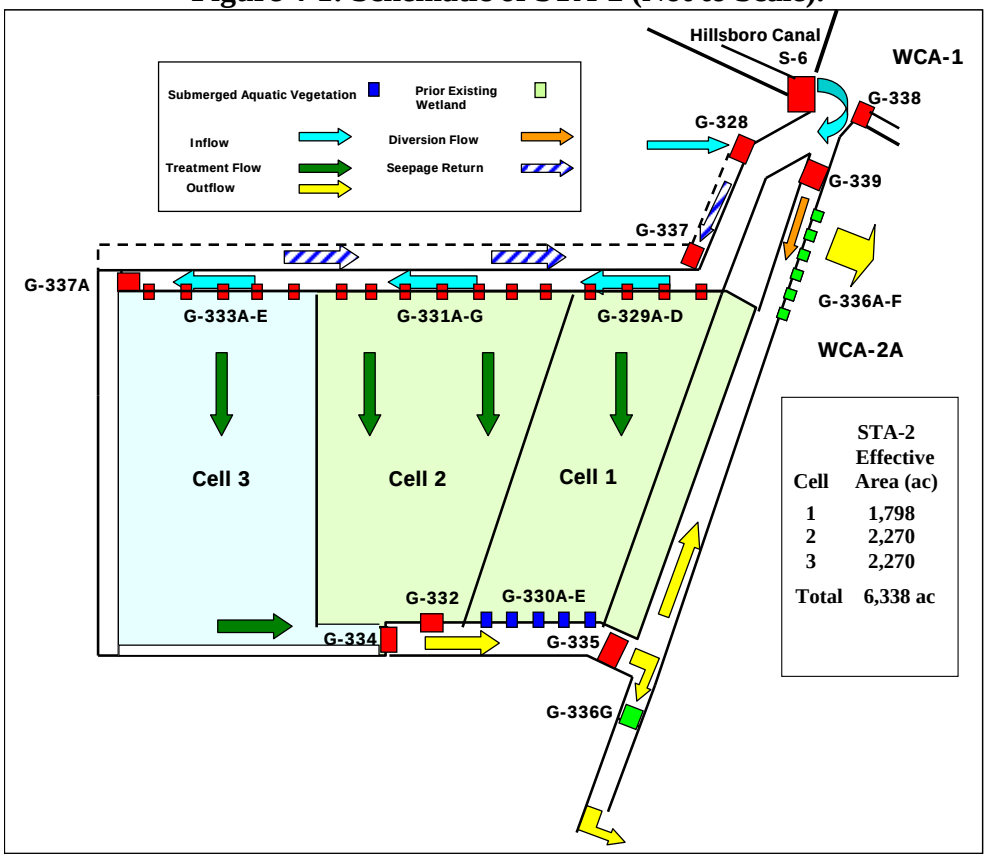
- ***For all alternatives,*** an additional inflow to the STA-2 Supply Canal equal to 38 cfs was added to the runoff inflow to represent the seepage from the adjacent WCA-2A into the adjacent Supply Canal for STA-2, which extends approximately 18,500 feet from the S-6 pump station to the northeast corner of Cell 1. A phosphorus concentration of 15 ppb was used to estimate the phosphorus contribution of this seepage.
- ***For all alternatives,*** the estimate of runoff from the ESWCD and Closter Farms was based on historic runoff volumes from these basins to the maximum extent practicable, as the SFWMM simulations do not well represent either the total discharges or the distribution of these discharges from these basins. Runoff volumes for the period May 1, 1994 through April 30, 2000 are available for direct use, while the runoff volumes for the remainder of the 35-year period (May 1, 1965 through April 30, 1994) were estimated by indirect methods. Consistent with the approach utilized in the *Updated STA Inflow Data Sets for the 2010 Period*, daily runoff volumes were estimated as a fixed percentage of the daily runoff from the adjacent primary basin of the EAA (Goforth 2007b). That fixed percentage was derived as the ratio of the overall runoff from each Ch. 298 District basin to the overall runoff from the adjacent EAA basin over the WY1995-2007 period. In recognition of the changes in EAA basin contributing area over the WY1995-2007 period due to conversion of agriculture lands to STAs, the EAA runoff was normalized to the effective basin areas reflected in the SFWMM simulation.

The long-term average annual inflow to STA-2 by source is summarized in **Table 4-1**. Although the long-term goal is to treat less inflow in STA-2 than shown in **Table 4-1**, it is recognized that during the interim period before ECART is implemented, STA-2 inflows will be higher than the long-term goals.

Table 4-1: Long-term Average Annual Inflow to STA-2.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
WCA-2A Seepage	27,530	509	15
S-5A Basin	62,756	12,613	163
ESWCD & 715 Farms	31,993	5,215	132
S-6/S-2 Basin	180,701	23,550	106
Inflow Prior to Re-direction	302,980	41,887	112
Re-direct to Compartment B	0	0	-
Net Inflow	**302,980**	**41,887**	**112**

Figure 4-1: Schematic of STA-2 (Not to Scale).



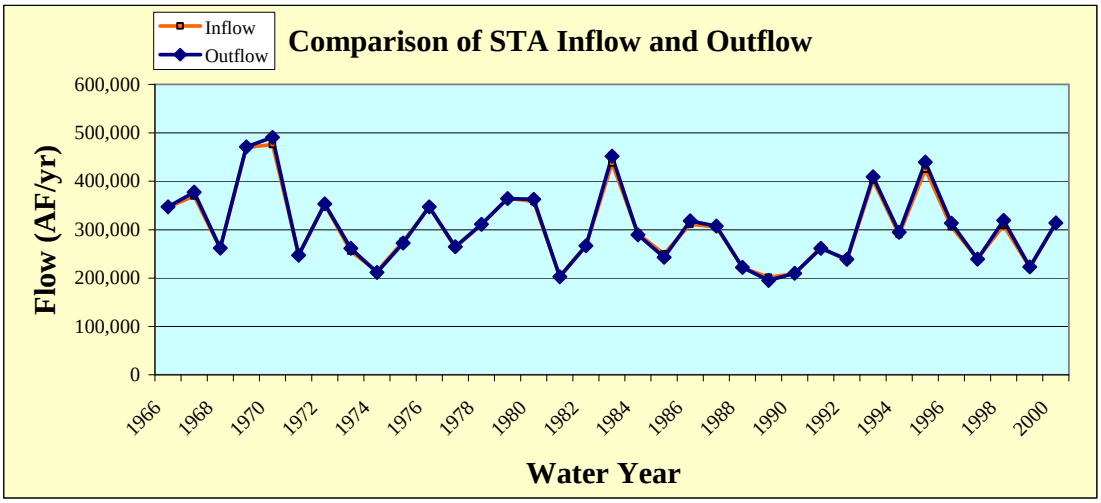
A summary of STA-2 phosphorus performance for Alternative D is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix B. A long-term flow-weighted mean outflow concentration range of 22-34 ppb was forecast. DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix B. For Cells 1 and 2, the long-term average inflow concentration was <2% above the range of the prior existing wetland (PEW) calibration data sets. For Cell 3 the mean depth was slightly above the range of the SAV calibration data sets.

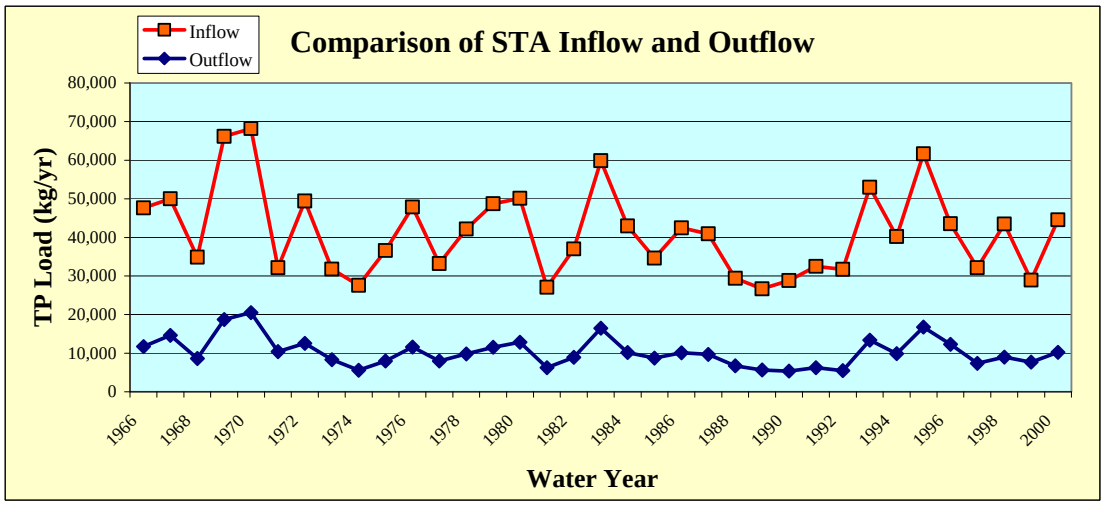
Table 4-2: Summary of DMSTA Results for STA-2.

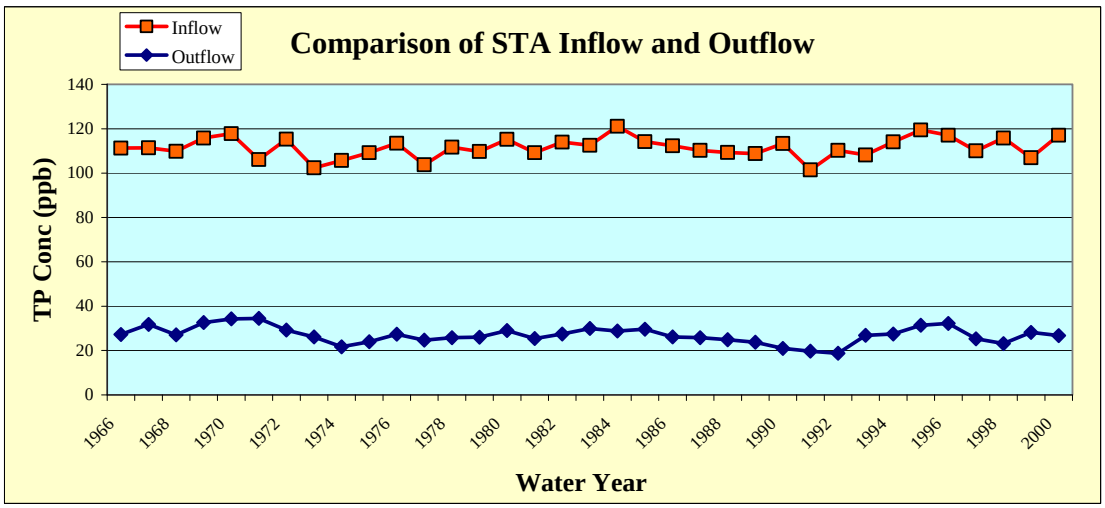
Parameter	Unit	STA-2
Effective Treatment Area	acres	6,338
Average Annual Inflow		
Volume	AF/yr	302,980
TP Load	kg/yr	41,887
TP Concentration	ppb	112
Average Annual Outflow		
Volume	AF/yr	305,643
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	22.0
Mean Estimate of Settling Rate	ppb	27.6
Lower Conf. Limit for Settling Rate	ppb	34.1
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	21.0
Mean Estimate of Settling Rate	ppb	26.5
Lower Conf. Limit for Settling Rate	ppb	33.0
TP Load (Using Mean TP Conc.)	kg/yr	10,387
Diversion Volumes and Loads		
Volume	AF/yr	0
TP Load	kg/yr	0
TP Concentration	ppb	-

Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.

Figure 4-2: Comparison of Inflows and Outflows for STA-2.



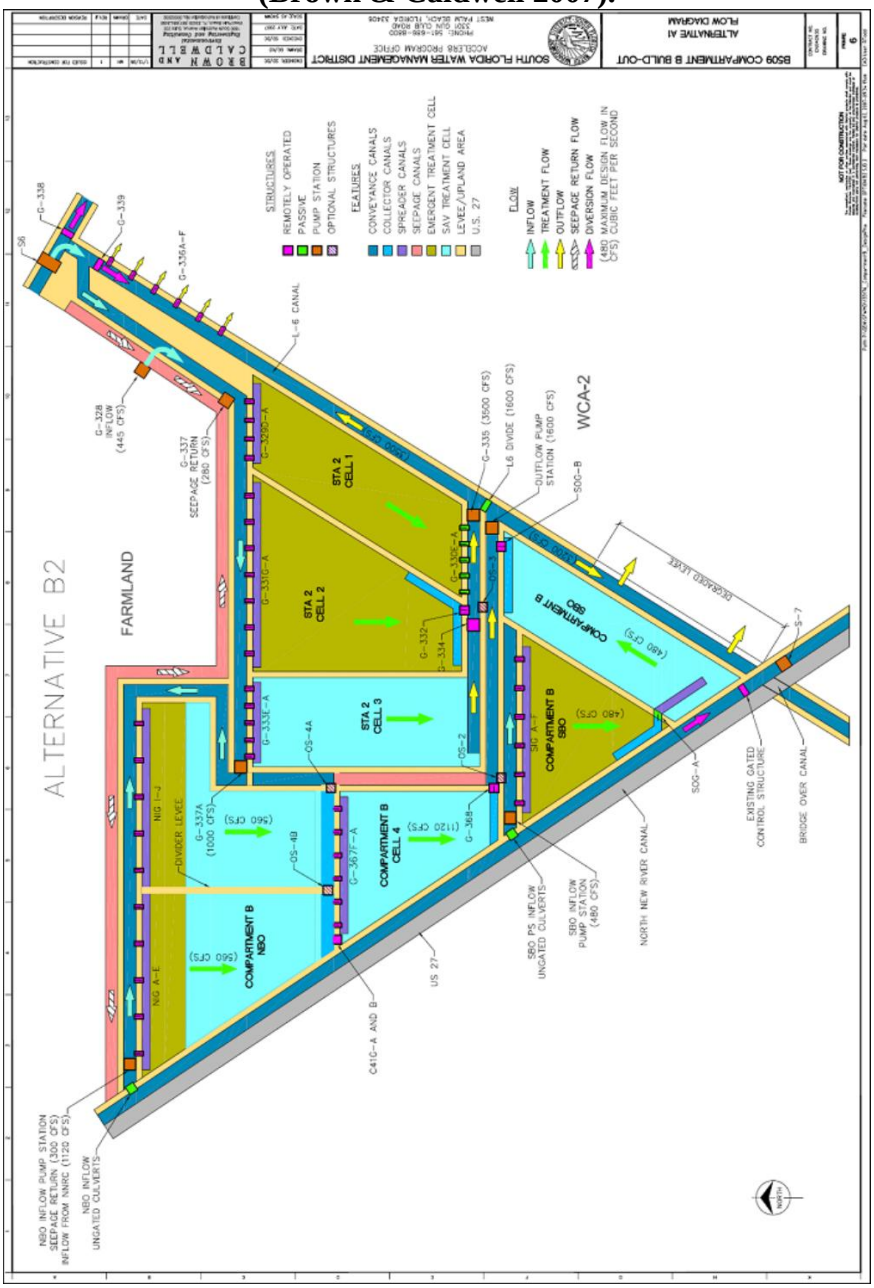




5. Compartment B

A preliminary schematic of the Compartment B Build-out is presented in **Figure 5-1** (Brown & Caldwell 2007).

Figure 5-1: Preliminary Schematic of Compartment B Build-out, Subject to Revision (Brown & Caldwell 2007).



Compartment B will consist of two independent treatment areas (Brown and Caldwell 2007). The North Build-out will consist of three cells, with the initial cells containing approximately 3,922 acres of effective treatment area followed by the existing Cell 4 of STA-2. While the Build-out is still under preliminary design, the present configuration includes a north-south interior levee that will divide the upper area into two parallel cells. Inflows will come from the North New River Canal and inflows re-directed from STA-2, and will be limited to a total of 1,120 cfs. After passing through the North Build-out, treated discharges will be conveyed to a new 1,600-cfs outflow pump station located directly south of the STA-2 outflow pump station G-335 (Brown and Caldwell 2007). The South Build-out will consist of two cells in series, with the initial cell containing approximately 1,477 acres of effective treatment area followed by an additional 1,319 acres. Inflows will come from the North New River Canal and will be limited to 480 cfs. Treated discharges will be conveyed to the new 1,600-cfs outflow pump station located directly south of the STA-2 outflow pump station G-335 (Brown and Caldwell 2007).

For the purpose of phosphorus removal performance modeling, Compartment B was simulated as two distinct treatment areas. The daily flow terms from the SFWMM simulation were utilized for the DMSTA modeling with the following distribution among the North Build-out and South Build-out:

- ***For all alternatives,*** all inflows re-directed from STA-2 were captured and treated in the North Build-out. The South Build-out received the initial 480 cfs of all inflows from the North New River Canal, and the North Build-out received the balance of North New River inflows.

The resulting long-term average annual inflow to Compartment B by source is summarized in **Table 5-1**, showing the inflows before and after the re-direction.

Table 5-1: Long-term Average Annual Inflow to Compartment B.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
S-7/S-2 Basin	131,657	15,403	95
Re-direction from STA-2			
WCA-2A Seepage	0	0	-
S-6/S-2 Basin	0	0	-
S-5 Basin	0	0	-
ESWCD & 715 Farms	0	0	-
Total	**131,657**	**15,438**	**95**

A summary of Compartment B phosphorus performance for Alternative D is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix B. The long-term average phosphorus loading rate to Compartment B for this alternative was 0.4 $g/m^2/yr$, reflecting substantial excess treatment capacity. DMSTA forecast long-term average annual phosphorus concentrations below the minimum of the calibration data sets for

SAV (15 ppb), and those forecasts were replaced in Table 5-2 by 15 ppb. The adjusted outflow phosphorus levels in Table 5-2 may still portray optimistic results in that the best performing STA (STA-3/4) is presently averaging about 19 ppb, with a 5 ppb standard deviation on annual values. DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix B. For the North and South Build-out cells, the mean depth and flow/width were below the range of the SAV calibration data sets. For the North Build-out, the simulated inflow concentration (15 ppb) was below the SAV calibration data sets.

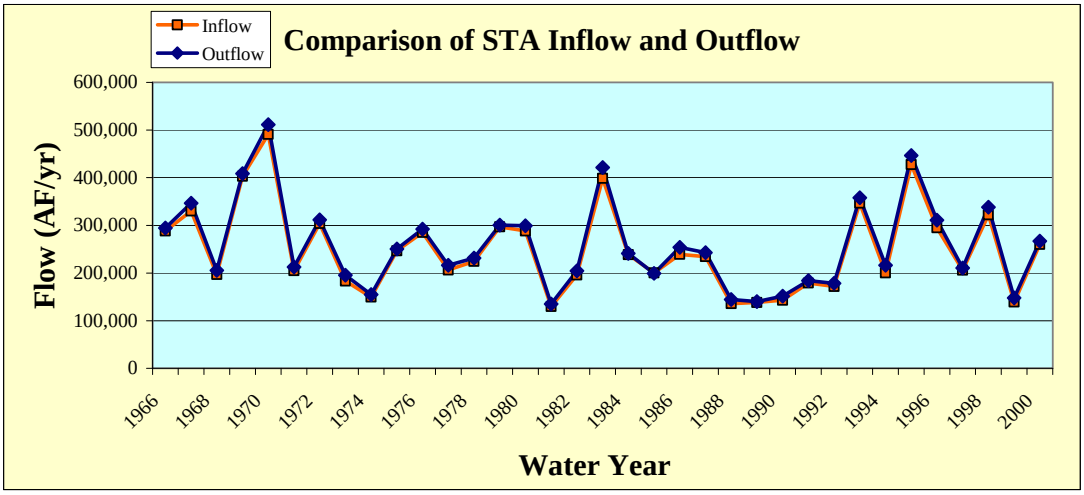
Table 5-2: DMSTA Results for Compartment B.

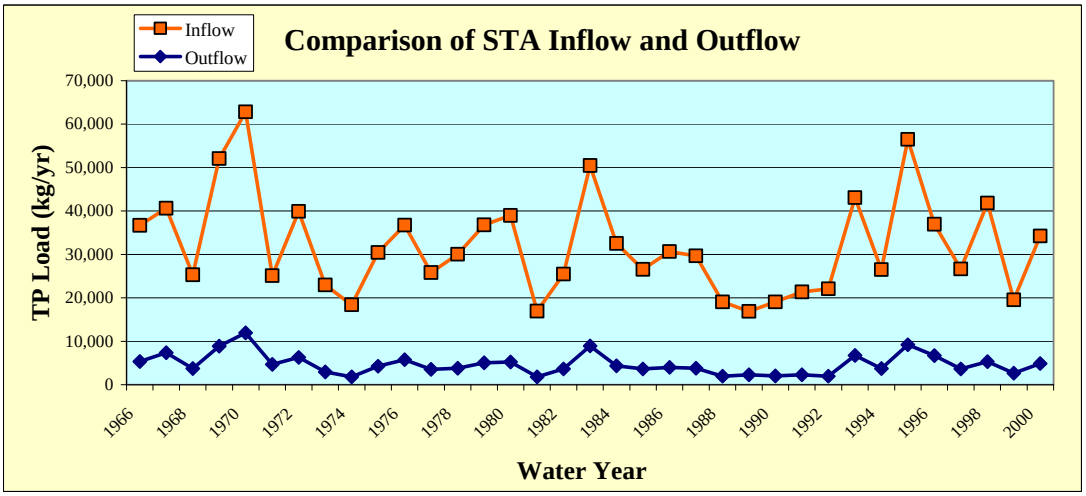
Parameter	Unit	Comp. B North	Comp. B South	Comp. B Combined
Effective Treatment Area	acres	5,824	2,796	8,620
Average Annual Inflow				
Volume	AF/yr	69,117	62,540	131,657
TP Load	kg/yr	8,159	7,279	15,438
TP Concentration	ppb	96	94	95
Average Annual Outflow				
Volume	AF/yr	76,588	66,966	143,554
Flow-weighted Mean TP Concentration				
Upper Conf. Limit for Settling Rate	ppb	15.0 (35)	15 (35)	15.0 (35)
Mean Estimate of Settling Rate	ppb	15.0 (35)	15 (31)	15.0 (35)
Lower Conf. Limit for Settling Rate	ppb	15.0 (35)	15.8 (20)	15.0 (34)
Geometric Mean TP Concentration				
Upper Conf. Limit for Settling Rate	ppb	15.0	15.0	15.0
Mean Estimate of Settling Rate	ppb	15.0	15.0	15.0
Lower Conf. Limit for Settling Rate	ppb	15.0	15.0	15.0
TP Load (Using Mean TP Conc.)	kg/yr	1,417	1,239	2,656
Diversion Volumes and Loads				
Volume	AF/yr	0	0	0
TP Load	kg/yr	0	0	0
TP Concentration	ppb	-	-	-

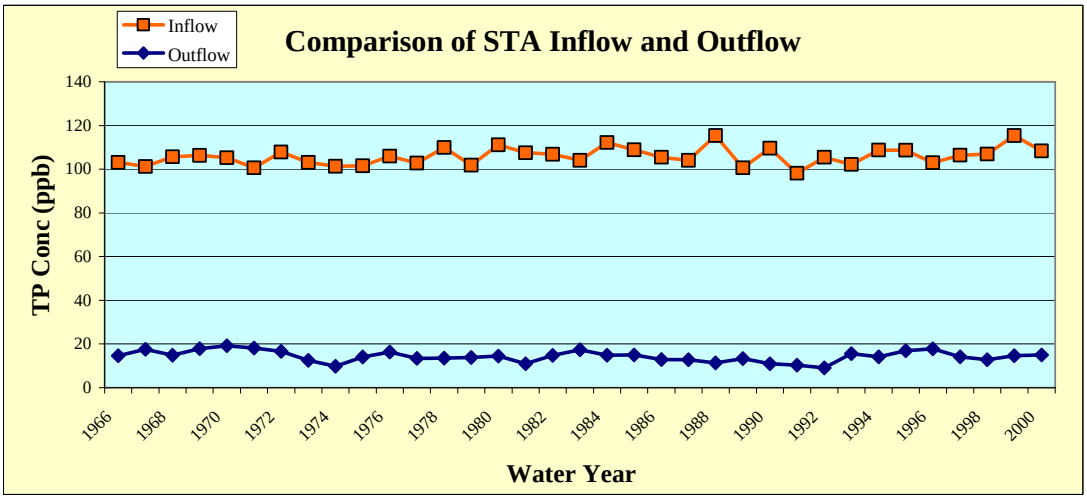
Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.

2. Outflow values highlighted in yellow had one or more years of the 35 year simulated below the low end of the calibration data set (enumerated by the number in parentheses). The lowest sustainable STA outflow phosphorus concentration is 19 ppb (STA-3/4), with a standard deviation of 5 ppb.

Figure 5-2: Comparison of Inflows and Outflows for Compartment B.







Note: TP concentrations below 15 ppb have not been sustained.

6. EAA Storage Reservoir A-1

Alternative D differs from the 2010A8 Base Condition in two principal operations:

1. a reduced inflow capacity to EAA A-1 reservoir from North New River Basin from 2775 cfs to 800 cfs, and
2. EAA runoff is first delivered to Compartment B and the remaining runoff sent to the EAA Storage Reservoir, freeing capacity in the EAASR for additional Lake Okeechobee regulatory releases averaging approximately 60,000 AF/yr.

The network feature of DMSTA was used to model the combined EAA Storage Reservoir A-1 (EAASR A-1) and STA-3/4 system. This simulation generated a daily time series of flow and phosphorus levels from the reservoir back to the EAA for irrigation releases and to STA-3/4 for subsequent treatment. Upon review of the outflow time series to STA-3/4, it was observed that DMSTA was simulating releases during the dry season when the SFWMM results indicated no releases from the reservoir to STA-3/4. Further, the phosphorus concentrations associated with these dry season releases were quite high. For the purpose of the STA-3/4 inflow, the DMSTA-generated time series was replaced by the daily flows from the SFWMM results and the phosphorus concentrations from DMSTA. Although this didn't resolve all of the high concentrations during the dry seasons, it reduced the frequency of their occurrence. This new time series was then used in combination with basin runoff flows for an independent DMSTA simulation of STA-3/4 that allowed an uncertainty analysis of the STA performance, using the 10%, mean and 90% values of the effective settling rates for the specific vegetation types within STA-3/4.

For all alternatives, several assumptions were incorporated in the DMSTA modeling of the EAASR A-1:

- The SFWMM models the EAASR as two reservoir compartments, EARSN and EARSS. These were simulated in DMSTA as a single reservoir cell.
- Many reservoir characteristics were identical to those evaluated during the Basis of Design Report for the EAASR A-1 (Black and Veatch 2006):
  - The effective treatment area of the EAASR A-1 is 15,200 acres
  - The minimum depth for releases is 15.2 cm
  - The outflow weir depth for bypass is 12.5 ft
  - Seepage characteristics
- Other reservoir characteristics include:
  - The average flow width is 4.5 miles which is the average of the east-west width at the north end of EAASR and the width at the south end
  - The mean settling rate for the reservoir calibration data sets (5 m/yr) was used to simulate phosphorus removal in the reservoir.
- Daily rainfall and evapotranspiration from the SFWMM scenario were used in the DMSTA simulation.

- Reservoir depths from the SFWMM scenario were used in the DMSTA simulation. The depth time series provides an appropriate range of depths in the reservoir, based on model assumptions of footprint and volume, but is not intended as a true estimate of reservoir depth. Reservoir depth time series are not recommended for calculations outside the 2x2, however, the depth time series can be used as a reference for feasibility-level work such as the present analysis.
- The daily flow time series from the SFWMM simulation quantifying the flow from the EAASR to STA-3/4 (WCS4S and EVBLSS) were used as outflow time series within the DMSTA simulation of the reservoir.

Using the recent phosphorus concentration of Lake Okeechobee releases as 100 ppb, the long-term average annual inflow to the EAASR A-1 by source is summarized in **Table 6-1**.

Table 6-1: Summary of Long-term Average Annual Inflow to EAASR A-1.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
S-7/S-2 Basin	84,445	9,860	95
S-8/S-3 Basin	108,251	11,135	83
Lake Okee.	378,697	46,515	100
Total	**571,393**	**67,510**	**96**

A summary of EAASR A-1 phosphorus performance for Alternative D is presented in the table and figures below. For WY1982, the simulated flow-weighted mean outflow concentration exceeded the inflow concentration, although the outflow loads were only 6% of the inflow loads. A copy of the DMSTA output is presented in Appendix B. No warning or error messages were generated during the DMSTA simulation for the EAASR A-1. However, the minimum simulated depth was 1 cm, indicating that DMSTA numerically prevented dry-out by reducing the rates of ET, seepage, etc. In reality the reservoir would have dried out and phosphorus levels may temporarily increase upon rewetting; depending on how much time passes between rewetting and discharge to the STA, the impact of this temporary increase in phosphorus levels could vary, however, the long-term concentration shown in Table 6-2 may be optimistic.

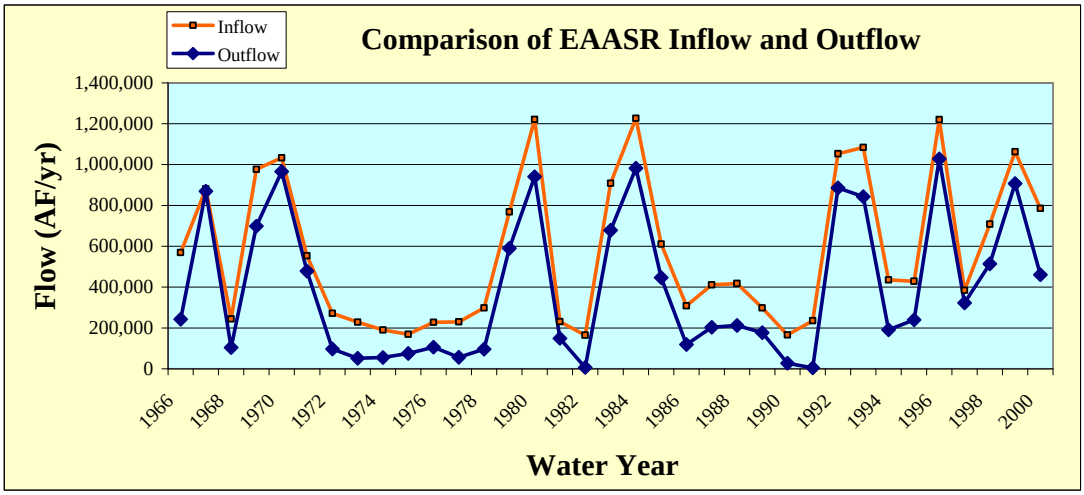
Table 6-2: Summary of DMSTA Results for EAASR A-1 (Lake TP Conc. of 100 ppb).

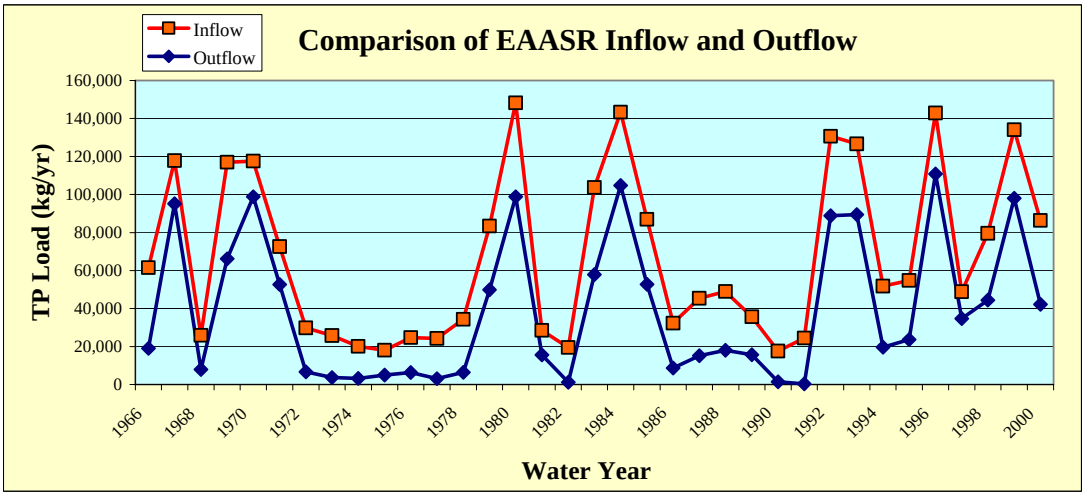
Parameter	Unit	EAASR A-1 Note 2
Effective Treatment Area	acres	15,200
Average Annual Inflow		
Volume	AF/yr	571,393
TP Load	kg/yr	67,510
TP Concentration	ppb	96
Average Annual Outflow		
Volume	AF/yr	395,010
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	-
Mean Estimate of Settling Rate	ppb	80.1
Lower Conf. Limit for Settling Rate	ppb	-
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	-
Mean Estimate of Settling Rate	ppb	94.0
Lower Conf. Limit for Settling Rate	ppb	-
TP Load (Using Mean TP Conc.)	kg/yr	39,024
Diversion Volumes and Loads		
Volume	AF/yr	0
TP Load	kg/yr	0
TP Concentration	ppb	-

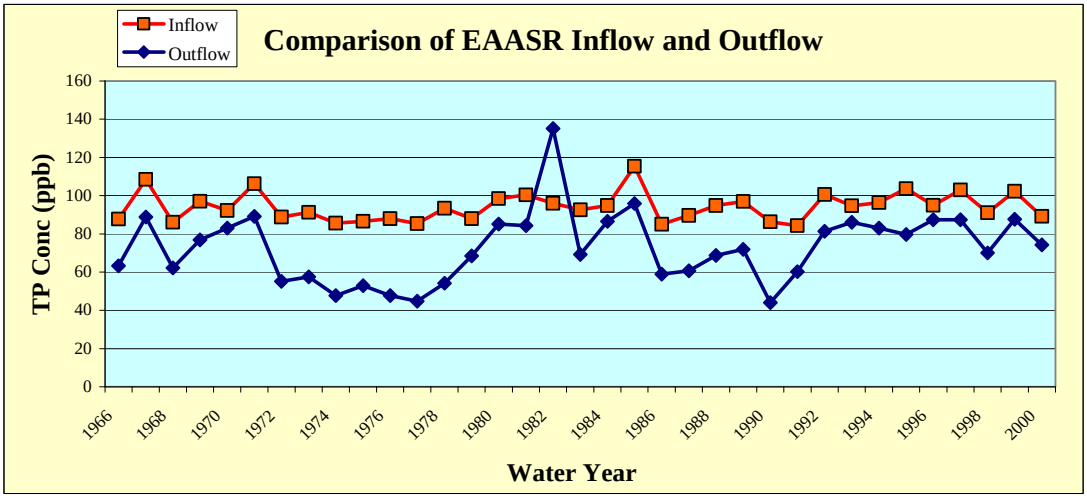
Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.

2. Shown are outflows to STA-3/4 after adjustment (see text); total outflows, including irrigation releases, were 546,113 AF/yr and 52,202 kg/yr at 77 ppb.

Figure 6-1: Comparison of Inflows and Outflows for EAASR A-1 (Lake TP Concentration of 100 ppb).







6.1. Sensitivity Analysis: Lake Okeechobee TP Concentration of 150 ppb

As an analysis of the sensitivity of the EAA reservoir and STA-3/4 performance to the phosphorus concentration of Lake Okeechobee releases, this section describes the performance of EAASR A-1 if the phosphorus concentration of Lake releases is 150 ppb at the inflow to the reservoir. With this assumption, the long-term average annual inflow to the EAASR A-1 by source is summarized in **Table 6-3**.

Table 6-3: Summary of Long-term Average Annual Inflow to EAASR.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
S-7/S-2 Basin	84,445	9,860	95
S-8/S-3 Basin	108,251	11,135	83
Lake Okee.	378,697	69,780	149
Total	**571,393**	**90,775**	**129**

A summary of EAASR A-1 phosphorus performance for Alternative D is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix B. **The net effect of assuming a Lake Okeechobee phosphorus concentration of 150 ppb appears to be about 29 ppb at the outflow of the reservoir to STA-3/4, resulting in a long-term average additional 14.3 metric tons/yr of phosphorus to STA-3/4.**

For WY1982, the simulated flow-weighted mean outflow concentration exceeded the inflow concentration, although the outflow loads were only 7% of the inflow loads. No warning or error messages were generated during the DMSTA simulation for the EAASR A-1. However, the minimum simulated depth was 1 cm, indicating that DMSTA numerically prevented dry-out by reducing the rates of ET, seepage, etc. In reality the reservoir would have dried out and phosphorus levels would likely increase upon rewetting; thus the long-term concentration shown in Table 6-4 may be optimistic.

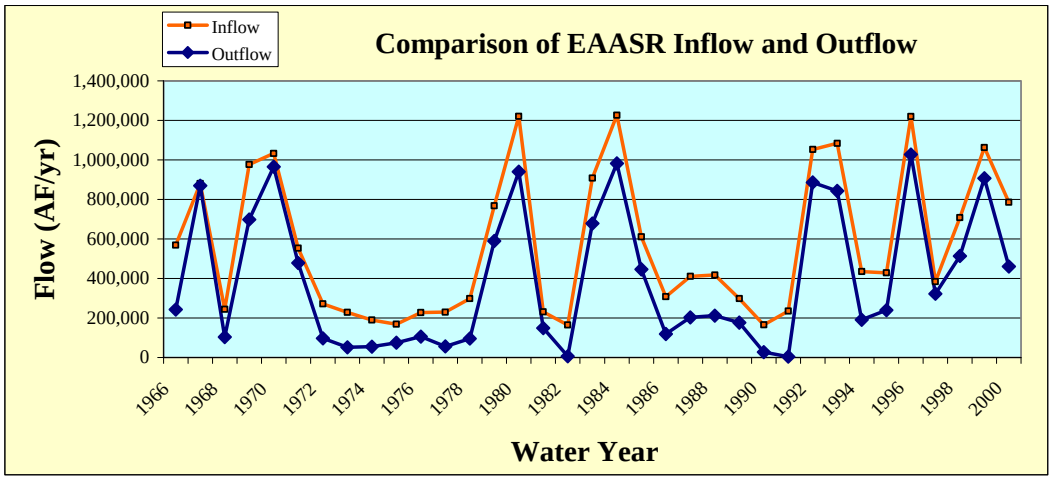
Table 6-4: Summary of DMSTA Results for EAASR A-1 (Lake TP Conc. of 150 ppb).

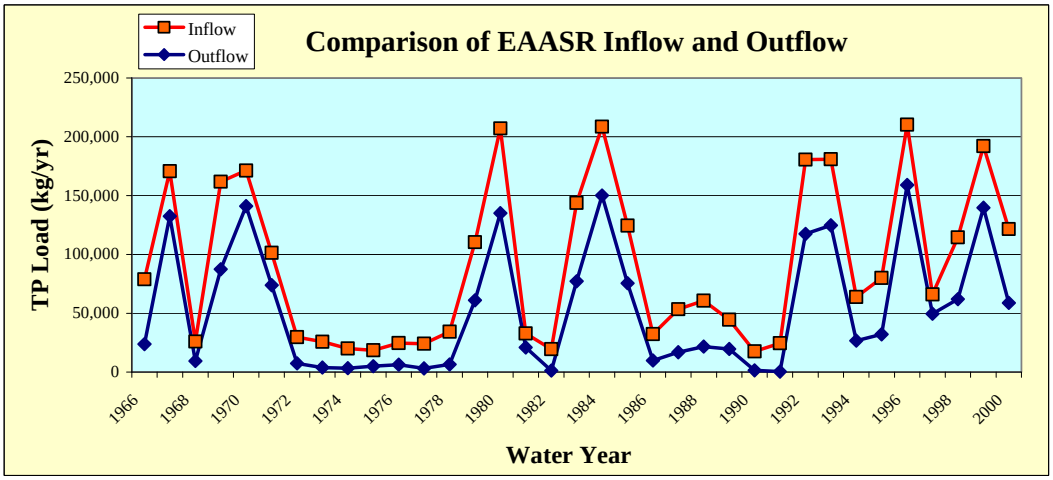
Parameter	Unit	EAASR A-1 Note 2
Effective Treatment Area	acres	15,200
Average Annual Inflow		
Volume	AF/yr	571,393
TP Load	kg/yr	90,775
TP Concentration	ppb	129
Average Annual Outflow		
Volume	AF/yr	395,010
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	-
Mean Estimate of Settling Rate	ppb	109.0
Lower Conf. Limit for Settling Rate	ppb	-
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	.-
Mean Estimate of Settling Rate	ppb	119.0
Lower Conf. Limit for Settling Rate	ppb	-
TP Load (Using Mean TP Conc.)	kg/yr	53,278
Diversion Volumes and Loads		
Volume	AF/yr	0
TP Load	kg/yr	0
TP Concentration	ppb	-

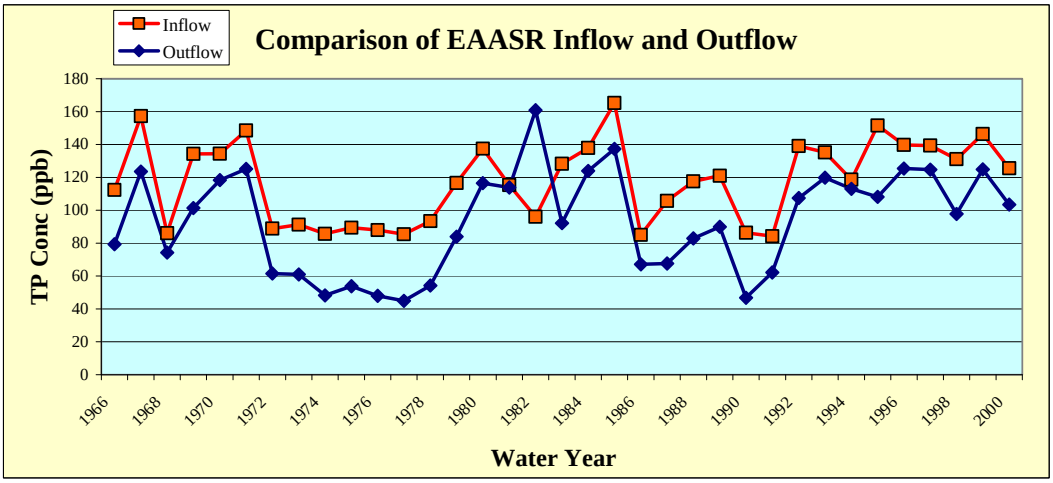
Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.

2. Shown are outflows to STA-3/4 after adjustment (see text); total outflows, including irrigation releases, were 546,113 AF/yr and 70,496 kg/yr at 105 ppb.

Figure 6-2: Comparison of Inflows and Outflows for EAASR A-1 (Lake TP Concentration of 150 ppb).



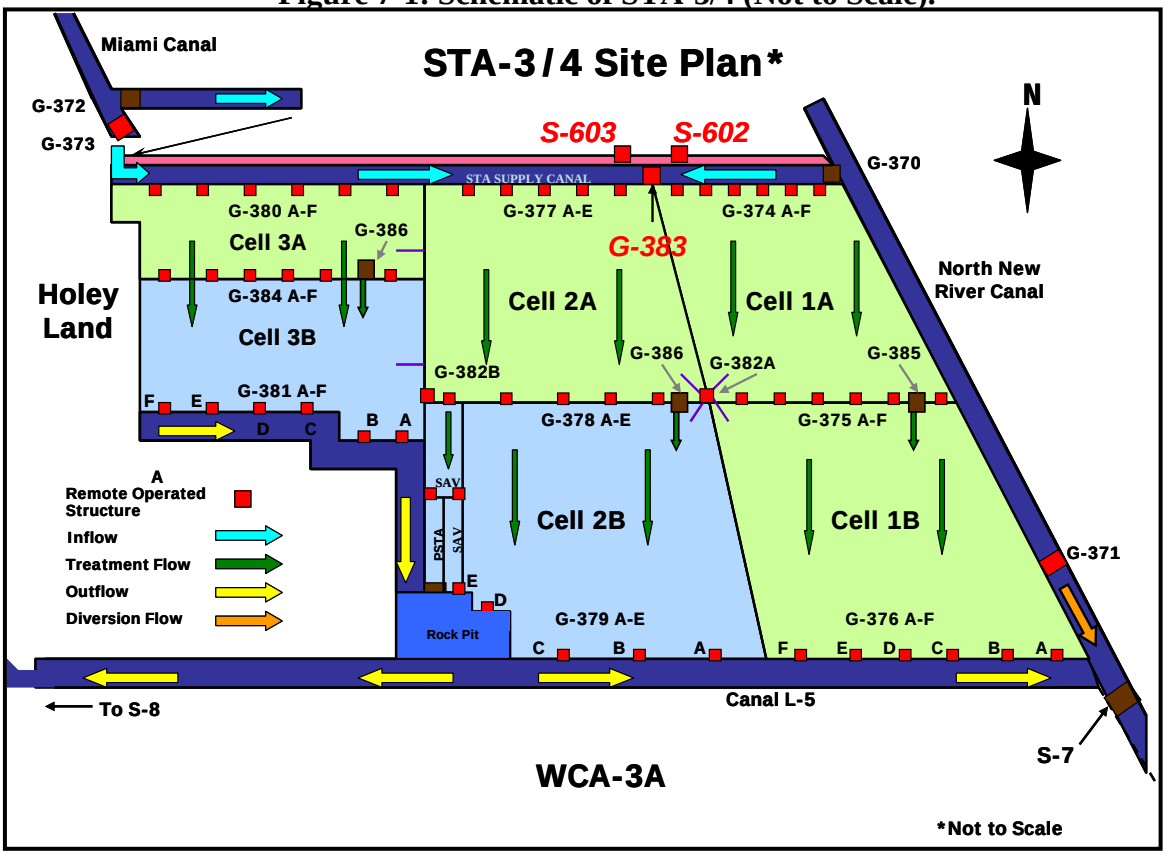




7. STA-3/4

A schematic of STA-3/4 is presented in **Figure 7-1B**, showing the two proposed structures (S-602 and S-603) that will allow transfer of water from the EAA Storage Reservoir to the STA.

Figure 7-1: Schematic of STA-3/4 (Not to Scale).



The simulated inflows to STA-3/4 are summarized in **Table 7-1**. The daily flow terms from the SFWMM simulation were utilized for the DMSTA modeling with the following modifications:

- ***For all alternatives,*** the estimate of runoff from the South Shore Drainage District and the South Florida Conservancy District was based on historic runoff volumes from these basins to the maximum extent practicable, as the SFWMM simulations do not well represent either the total discharges or the distribution of these discharges from these basins. Runoff volumes for the period May 1, 1994 through April 30, 2000 are available for direct use, while the runoff volumes for the remainder of the 35-year period (May 1, 1965 through April 30, 1994) were estimated by indirect methods. Consistent with the approach utilized in the *Updated STA Inflow Data Sets for the 2010 Period*, daily runoff volumes were estimated as a fixed percentage of the

daily runoff from the adjacent primary basin of the EAA (Goforth 2007b). That fixed percentage was derived as the ratio of the overall runoff from each Ch. 298 District basin to the overall runoff from the adjacent EAA basin over the WY1995-2007 period. In recognition of the changes in EAA basin contributing area over the WY1995-2007 period due to conversion of agriculture lands to STAs, the EAA runoff was normalized to the effective basin areas reflected in the SFWMM simulation.

- ***For all alternatives,*** a small amount of Miami Canal Runoff was simulated in SFWMM as being diverted untreated to the Water Conservation Area 3A. For the purpose of estimating phosphorus removal performance, these diversions were simulated by DMSTA as being captured in STA-3/4. Actual diversion may occur based on the daily hydraulic and treatment capacity of the treatment areas.

Table 7-1: Summary of Long-term Average Annual Inflow to STA-3/4 (Lake TP Conc of 100 ppb).

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
S-7/S-2 Basin	42,014	5,080	98
S-8/S-3 Basin	121,678	12,279	82
C-139 Basin	13,208	3,407	209
SSDD	10,539	1,324	102
SFCD	24,110	3,363	113
EAA SR	395,010	39,054	80
Total	**610,905**	**64,352**	**85**

Totals are less than the sum of the components due to daily net negative values within the basin.

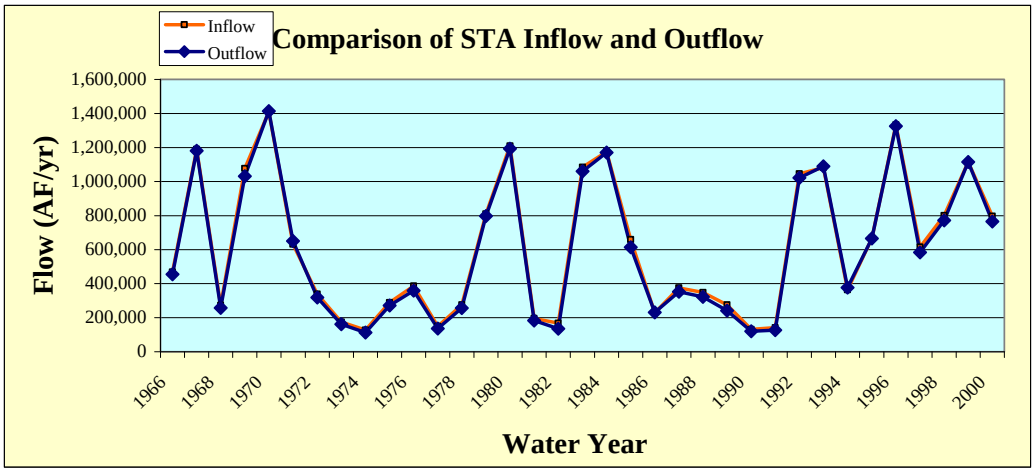
A summary of STA-3/4 phosphorus performance for Alternative D is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix B. A long-term flow-weighted mean outflow concentration range of 17-25 ppb was forecast, however this includes years when DMSTA forecast levels that fell below the calibration range of 15 ppb for an SAV system, and hence may be optimistic. DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix B. For Cells 1A and 2A, the mean flow/width was about 25% above the range of the emergent calibration data sets. For Cell 3B, the mean flow/width was about 25% below the range of the SAV calibration data sets. For the three SAV cells, the simulated mean depths were slightly below the range of the SAV calibration data sets, although the simulated minimum depths were above 30 cm. Diversion around the STA was simulated to provide water supply to downstream users, including the Big Cypress Basin Seminole Indian Reservation.

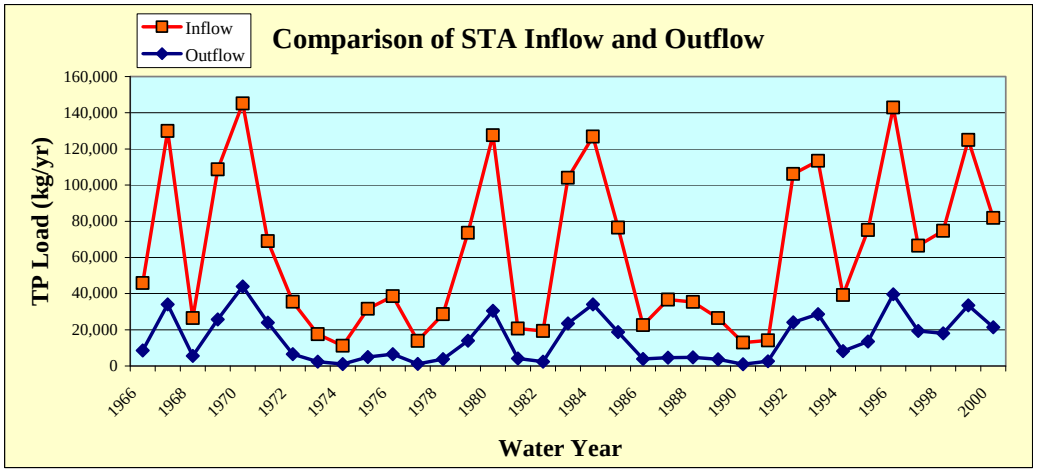
Table 7-2: Summary of DMSTA Results for STA-3/4 (Lake TP Conc. of 100 ppb).

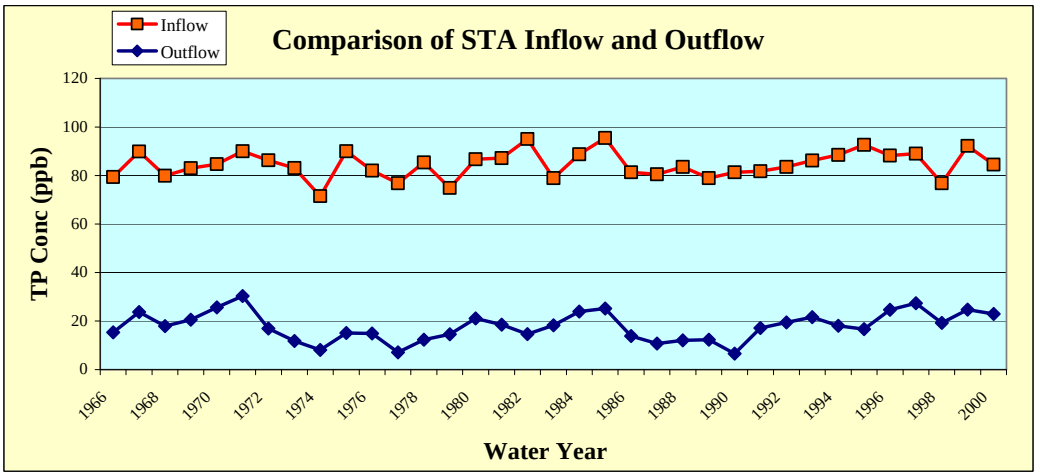
Parameter	Unit	STA-3/4
Effective Treatment Area	acres	16,543
Average Annual Inflow		
Volume	AF/yr	610,905
TP Load	kg/yr	64,352
TP Concentration	ppb	85
Average Annual Outflow		
Volume	AF/yr	595,892
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	17.1 (19)
Mean Estimate of Settling Rate	ppb	20.6 (12)
Lower Conf. Limit for Settling Rate	ppb	24.7 (7)
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	14.0
Mean Estimate of Settling Rate	ppb	16.8
Lower Conf. Limit for Settling Rate	ppb	20.2
TP Load (Using Mean TP Conc.)	kg/yr	15,144
Diversion Volumes and Loads		
Volume	AF/yr	82,605
TP Load	kg/yr	10,347
TP Concentration	ppb	102

Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.
2. Outflow values highlighted in yellow had one or more years of the 35 years simulated below the low end of the calibration data set (enumerated by the number in parentheses). The lowest sustainable STA outflow phosphorus concentration is 19 ppb (STA-3/4), with a standard deviation of 5 ppb.
3. Diversion is primarily for downstream water supply users.

Figure 7-2: Comparison of Inflows and Outflows for STA-3/4 (Lake TP Concentration of 100 ppb).







Note: TP concentrations below 15 ppb have not been sustained.

7.1. Sensitivity Analysis: Lake Okeechobee TP Concentration of 150 ppb

As an analysis of the sensitivity of STA performance to the phosphorus concentration of Lake Okeechobee releases, this section describes the performance of STA-3/4 if the phosphorus concentration of Lake releases is 150 ppb at the inflow to the EAASR. With this assumption, the inflows to STA-3/4 are summarized in **Table 7-3**. With the assumed higher concentration in the Lake releases, the estimated total annual average inflow to STA-3/4 increased approximately 19 ppb, or about 14.3 metric tons/yr.

Table 7-3: Summary of Long-term Average Annual Inflow to STA-3/4 (Lake TP Conc of 150 ppb).

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
S-7/S-2 Basin	42,014	5,080	98
S-8/S-3 Basin	121,678	12,279	82
C-139 Basin	13,208	3,407	209
SSDD	10,539	1,324	102
SFCD	24,110	3,363	113
EAA SR	395,010	53,278	109
Total	**610,905**	**78,607**	**104**

A summary of STA-3/4 phosphorus performance for Alternative D is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix B. A long-term flow-weighted mean outflow concentration range of 20-30 ppb was forecast, however this includes years when DMSTA forecast levels that fell below the calibration range of 15 ppb for an SAV system, and hence may be optimistic. These results compare to a simulated range of 17-25 ppb with a concentrations of Lake releases averaging 100 ppb. **The net effect of assuming a Lake Okeechobee phosphorus concentration of 150 ppb appears to be about 4 ppb at the outflow of STA-3/4, resulting in a long-term average annual increase of 2.8 metric tons of phosphorus to the Everglades compared to an average Lake release concentration of 100 ppb.** In addition to the STA discharge, it is estimated that an additional 4.75 metric tons per year of phosphorus will enter the Everglades in Lake Okeechobee deliveries for downstream water supply, including the Big Cypress Basin Seminole Indian Reservation.

DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix B. For Cells 1A and 2A, the mean flow/width was about 25% above the range of the emergent calibration data sets. For Cell 3B, the mean flow/width was about 25% below the range of the SAV calibration data sets. For the three SAV cells, the simulated mean depths were slightly below the range of the SAV calibration data sets, although the simulated minimum depths were above 30 cm. Diversion around the STA was simulated to provide

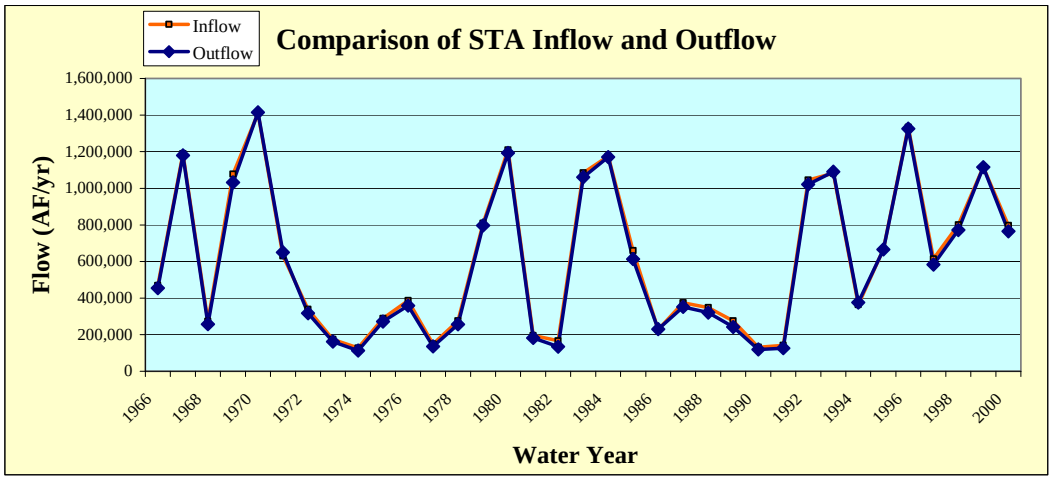
water supply to downstream users, including the Big Cypress Basin Seminole Indian Reservation.

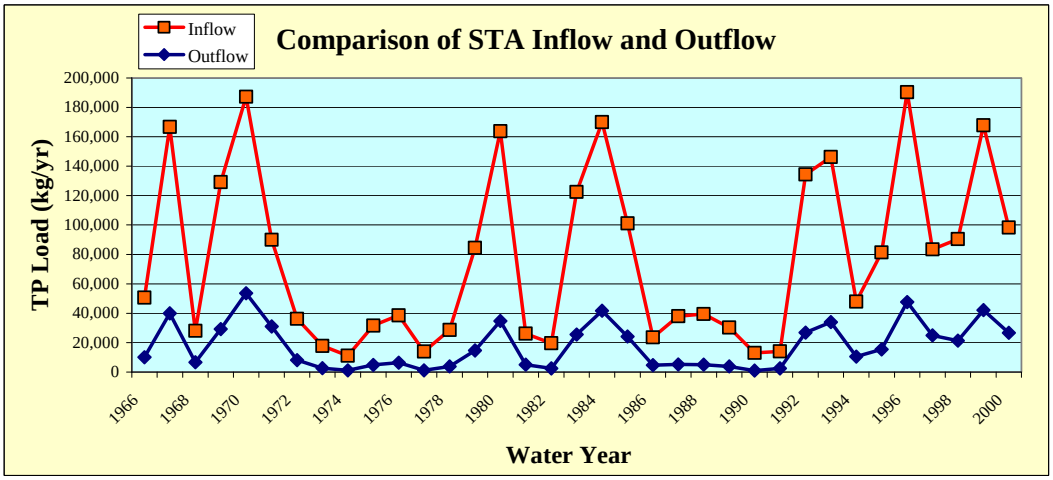
Table 7-4: Summary of DMSTA Results for STA-3/4 (Lake Conc. of 150 ppb).

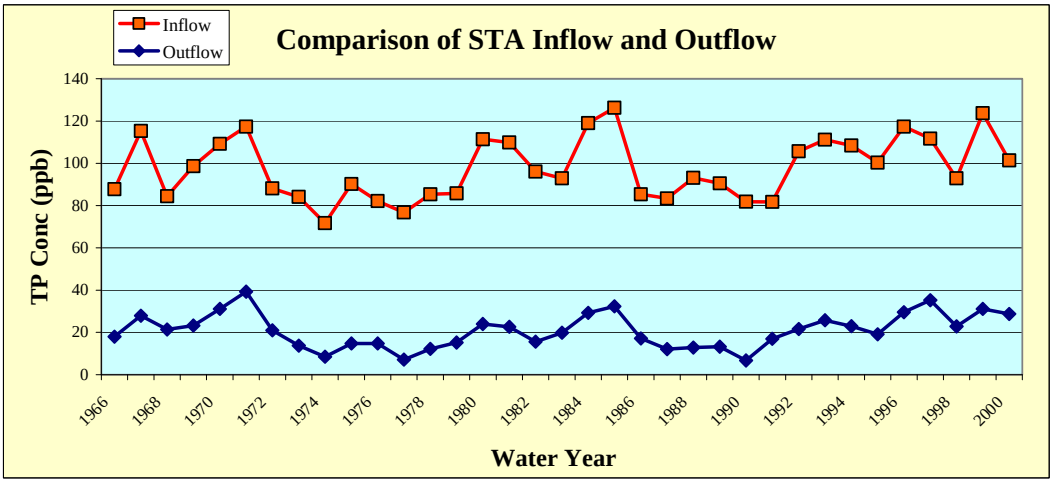
Parameter	Unit	STA-3/4
Effective Treatment Area	acres	16,543
Average Annual Inflow		
Volume	AF/yr	610,905
TP Load	kg/yr	78,607
TP Concentration	ppb	104
Average Annual Outflow		
Volume	AF/yr	595,892
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	19.9 (14)
Mean Estimate of Settling Rate	ppb	24.4 (10)
Lower Conf. Limit for Settling Rate	ppb	29.7 (4)
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	15.7
Mean Estimate of Settling Rate	ppb	19.2
Lower Conf. Limit for Settling Rate	ppb	23.5
TP Load (Using Mean TP Conc.)	kg/yr	17,942
Diversion Volumes and Loads		
Volume	AF/yr	82,605
TP Load	kg/yr	15,096
TP Concentration	ppb	148

Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.
2. Outflow values highlighted in yellow had one or more years of the 35 years simulated below the low end of the calibration data set (enumerated by the number in parentheses). The lowest sustainable STA outflow phosphorus concentration is 19 ppb (STA-3/4), with a standard deviation of 5 ppb.
3. Diversion is primarily for downstream water supply users.

Figure 7-3: Comparison of Inflows and Outflows for STA-3/4 (Lake TP Concentration of 150 ppb).







Note: TP concentrations below 15 ppb have not been sustained.

8. STA-5

Inflow data sets for STA-5 and STA-6 utilized the historic flows and phosphorus loads for the WY1995-2007 period. For the purpose of developing the STA-5 inflow data set, STA-5 was assumed to be comprised of the existing 3 flow-ways of STA-5, along with the 4th and 5th flow-ways of Compartment C that are soon to be constructed (see **Figure 8-1**; URS 2007). The combined C-139 Basin and C-139 Annex runoff will likely be distributed to STA-5 and STA-6 in an attempt to balance the phosphorus loading rate among the flow-ways of the STAs (see **Table 8-1**). A summary of inflows to STA-5 is presented in **Table 8-2**.

Table 8-1: Estimate of Inflow Distribution to Balance the PLR to STA-5 and STA-6.

Flow-way	Area	TP inflow	Flow at PLR	Load	PLR
STA-5 1	2,055	229	28,177	7,945	0.96
STA-5 2	2,055	229	28,177	7,945	0.96
STA-5 3	1,985	229	27,217	7,674	0.96
STA-5 4	2,176	229	29,836	8,413	0.96
STA-5 5	2,669	229	36,595	10,319	0.96
STA-6 3	1,857	178	32,692	7,180	0.96
STA-6 5	652	97	20,970	2,521	0.96
STA-6 2	245	97	7,880	947	0.96
Total	13,694	203	211,544	52,944	0.96

At this time, it is extremely difficult to forecast the phosphorus removal performance of STA-5. Since the first full water year of operation (2001), the annual inflow concentrations have ranged from 165 ppb to 299 ppb, with a 7-yr average of 235 ppb (Pietro et al. 2007). The phosphorus loading rate has been considerably higher than the other STAs, ranging from 0.94 g/m^2/yr to 4.01 g/m^2/yr with a 7-yr average of 2.1 g/m^2/yr. The long-term outflow concentration has ranged from 82-192 ppb, with a 7-yr average of 105 ppb. These characteristics are more similar to the DMSTA emergent vegetation calibration data set than to the SAV data set, which may be related to different soil type than in the EAA STAs (more mineral content) and less calcium in the inflow waters than the EAA STAs. In consideration of the anticipated reduced phosphorus loading rate when the additional treatment cells within Compartment C begin operation, the 2005 Study estimated the performance of STA-5 using the average performance of two DMSTA simulations:

1. Assuming the phosphorus removal downstream cell in each flow-way performs similar to the emergent calibration data set; and
2. Assuming the phosphorus removal downstream cell in each flow-way performs similar to the SAV calibration data set.

For comparison purposes, a similar set of simulations were conducted during the present analysis, ***however, until such time that the STA-5 performance improves, and until performance data for the newly constructed Flow-way 3 is available, the forecast performance will be based on assuming the phosphorus removal of the downstream cell in each flow-way performs similar to the emergent calibration data set.***

Figure 8-1: Preliminary Layout of Compartment C Build-out; Subject to Revision (modified from URS 2007).

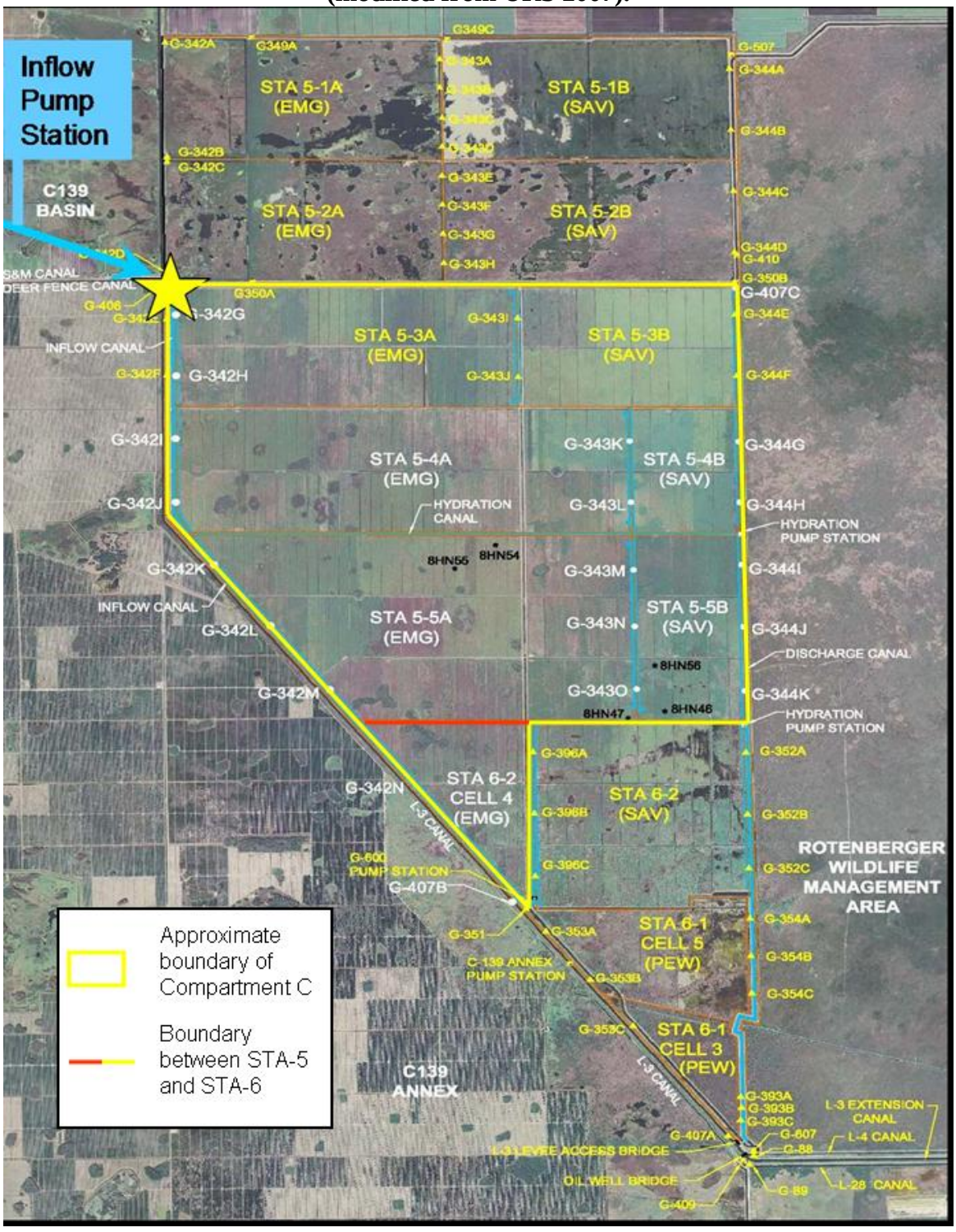


Table 8-2: Summary of Long-term Average Annual Inflow to STA-5, Including Compartment C Build-out.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
C-139 Basin	150,001	42,300	229

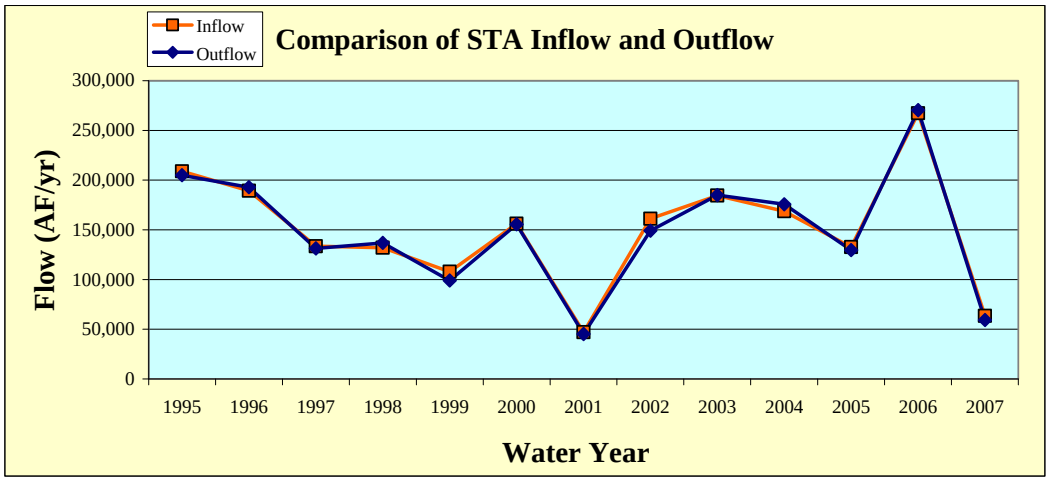
A summary of STA-5 phosphorus performance for Alternative D is presented in the tables and figures below. Copies of the DMSTA output are presented in Appendix B. For the emergent vegetation scenario, a long-term flow-weighted mean outflow concentration range of 22-47 ppb was forecast, however this includes six of the thirteen years when DMSTA forecast levels that fell below the calibration range of 20 ppb for an emergent system; hence this range may be optimistic, particularly in light of STA-5 performance history. Based on the historic performance of STA-5 and the high degree of uncertainty as to whether these DMSTA forecasts accurately represent actual phosphorus removal within the STAs in Compartment C, it is premature to conclude that there is excess treatment capacity in Compartment C. For the SAV scenario, ***presented only for comparison and not as a forecast of STA-5 performance***, DMSTA forecast long-term outflow concentrations below the low end of the SAV calibration data set (15 ppb) and these were set to the low end value; hence this range is overly optimistic particularly in light of STA-5 performance history. DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix B. For the emergent vegetation scenario no warnings messages were generated. However, DMSTA forecast 7% of the time the depth in the upstream cells was less than 10 cm, indicating the potential for insufficient water availability to maintain the minimum desirable water depth of 15 cm. For the SAV scenario, thirteen messages were generated, identifying that mean depths, flow/widths and outflow phosphorus concentrations were below the range of the SAV calibration data sets. In addition, DMSTA forecast 7% of the time the depth in the upstream cells was less than 10 cm, indicating the potential for insufficient water availability to maintain the minimum desirable water depth of 15 cm.

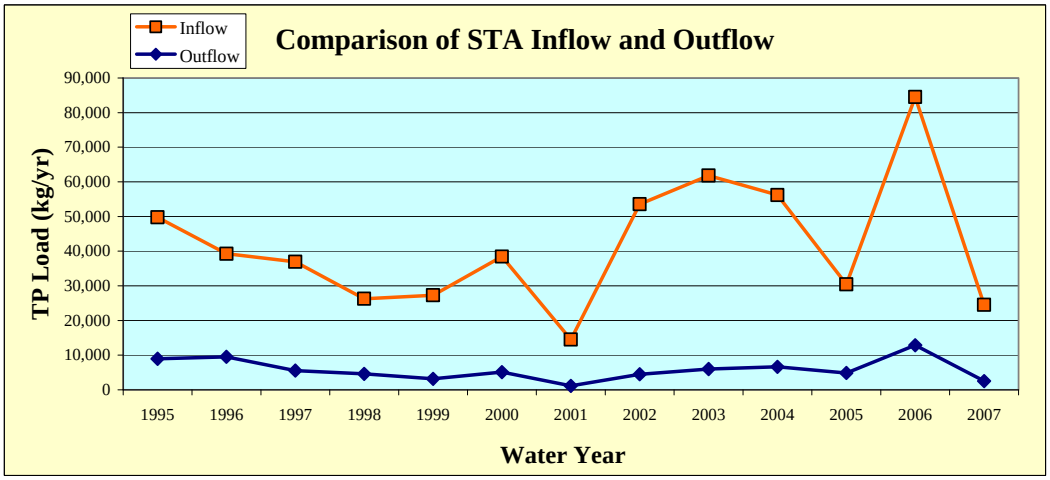
Table 8-3: Summary of DMSTA Results for STA-5, Including Comp. C Build-out.

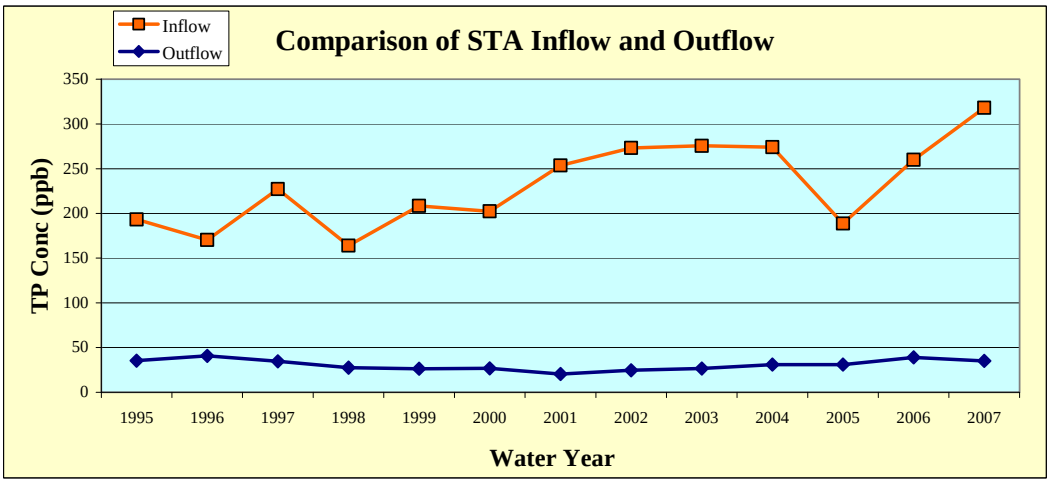
Parameter	Unit	STA-5 - Emergent	STA-5 - SAV
Effective Treatment Area	acres	10,940	10,940
Average Annual Inflow			
Volume	AF/yr	150,001	150,001
TP Load	kg/yr	42,300	42,300
TP Concentration	ppb	229	229
Average Annual Outflow			
Volume	AF/yr	148,717	148,717
Flow-weighted Mean TP Concentration			
Upper Conf. Limit for Settling Rate	ppb	21.7(6)	15.0 (13)
Mean Estimate of Settling Rate	ppb	32.0	15.0 (13)
Lower Conf. Limit for Settling Rate	ppb	46.5	19.0 (11)
Geometric Mean TP Concentration			
Upper Conf. Limit for Settling Rate	ppb	20.2	15.0
Mean Estimate of Settling Rate	ppb	30.2	15.0
Lower Conf. Limit for Settling Rate	ppb	44.3	17.3
TP Load (Using Mean TP Conc.)	kg/yr	5,870	2,752
Diversion Volumes and Loads			
Volume	AF/yr	0	0
TP Load	kg/yr	0	0
TP Concentration	ppb	-	-

Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value.
There is associated uncertainty in these predictions and actual performance will vary.
2. Outflow values highlighted in yellow had one or more years of the 13 years simulated below the low end of the calibration data set (enumerated by the number in parentheses).
3. Results for SAV in the downstream cells are presented for comparison only; the emergent vegetation scenario is currently used as a forecast for STA-5

Figure 8-2: Comparison of Inflows and Outflows for STA-5 With Emergent Vegetation in All Cells, Including Compartment C Build-out.

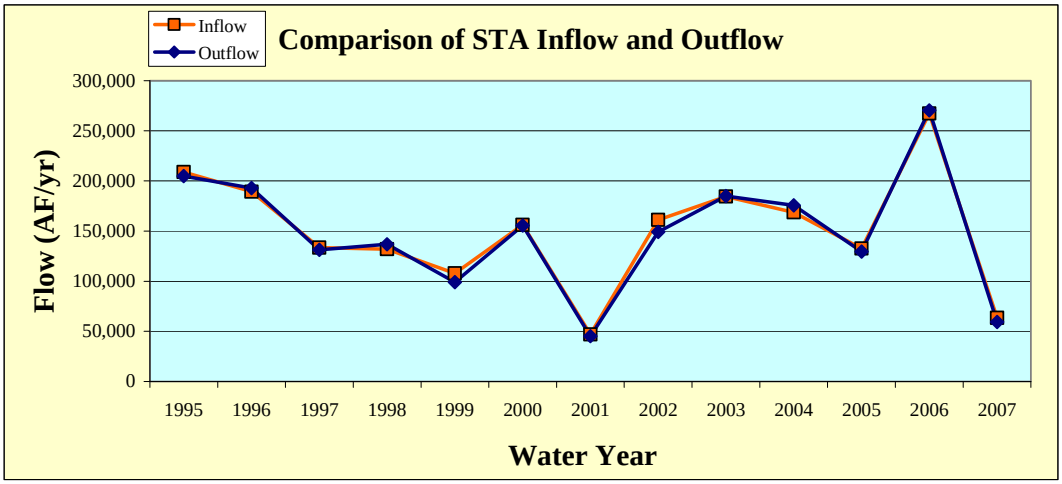


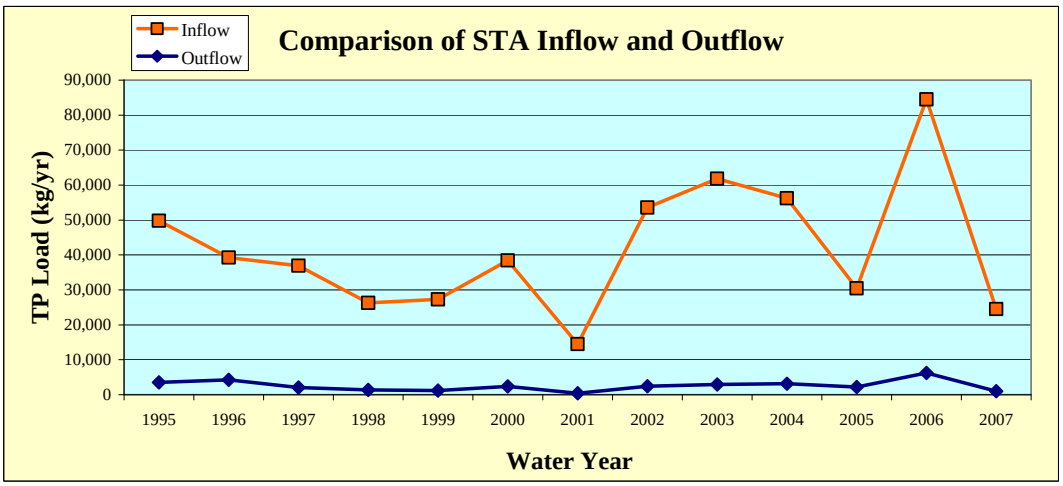


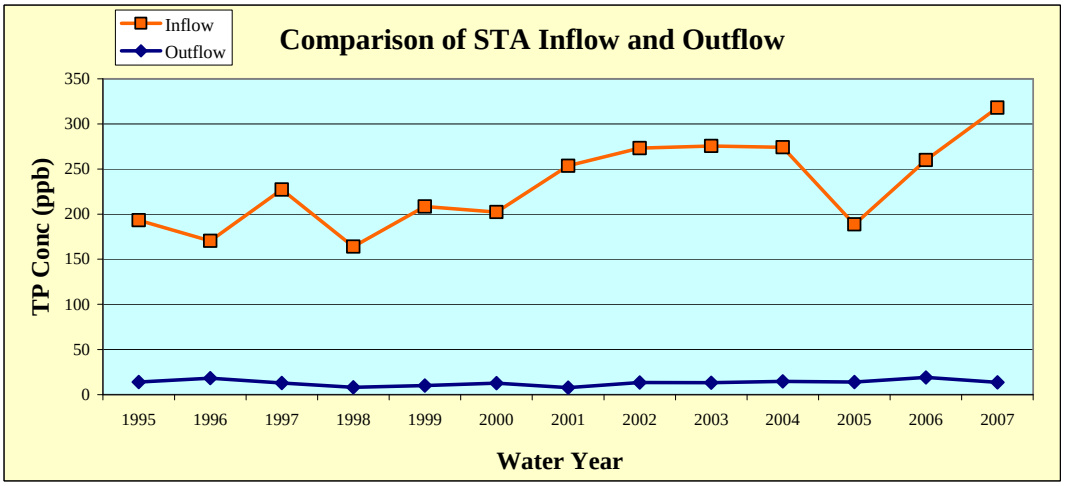


Note: TP concentrations below 15 ppb have not been sustained.

Figure 8-3: Summary of DMSTA Results for STA-5 With SAV in Downstream Cells.







Note: TP concentrations below 15 ppb have not been sustained.

9. STA-6

The combined C-139 Basin and C-139 Annex runoff will be distributed to STA-5 and STA-6 to balance the phosphorus loading rate among the flow-ways of the STAs (see **Table 8-1** above). A summary of the long-term average inflows to STA-6 is presented in **Table 9-1.**

Table 9-1: Summary of Long-term Average Annual Inflow to STA-6, Including Compartment C Build-out.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
C-139 Basin	20,062	5,657	229
C-139 Annex	41,480	4,987	97
Total	**61,542**	**10,644**	**140**

A summary of STA-6 phosphorus performance for Alternative D is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix B. DMSTA forecast a best case scenario long-term flow-weighted mean phosphorus concentration of 10 ppb which is below the minimum of the calibration data sets for the vegetation in the treatment cells, and that forecast was replaced in Table 9-2 by 13 ppb[1]. The adjusted outflow phosphorus levels in Table 9-2 may still portray optimistic results in that the best performing STA (STA-3/4) is presently averaging about 19 ppb, with a 5 ppb standard deviation on annual values. Although the simulated performance appears to suggest additional treatment capacity may available in the 2,754 acres of STA-6, based on the historic performance of STA-5 and the high degree of uncertainty as to whether these DMSTA forecasts accurately represent actual phosphorus removal within the STAs in Compartment C, it is premature to conclude that there is excess treatment capacity in Compartment C. DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix B. Eight messages were generated, identifying that mean depths, flow/widths and outflow phosphorus concentrations were below the range of the calibration data sets. In addition, the mean inflow concentration (140 ppb) was above the calibration range for the Prior Existing Wetland (PEW) data sets, further suggesting that the forecast outflow concentration may be optimistic.

[1] For STA-6, two flow-ways have SAV in the downstream cell which has a minimum calibration concentration of 15 ppb, and one has Prior Existing Wetlands (PEW) which has a minimum calibration concentration of 8 ppb. The flow-weighted minimum concentration for the three flow-ways is 13 ppb.

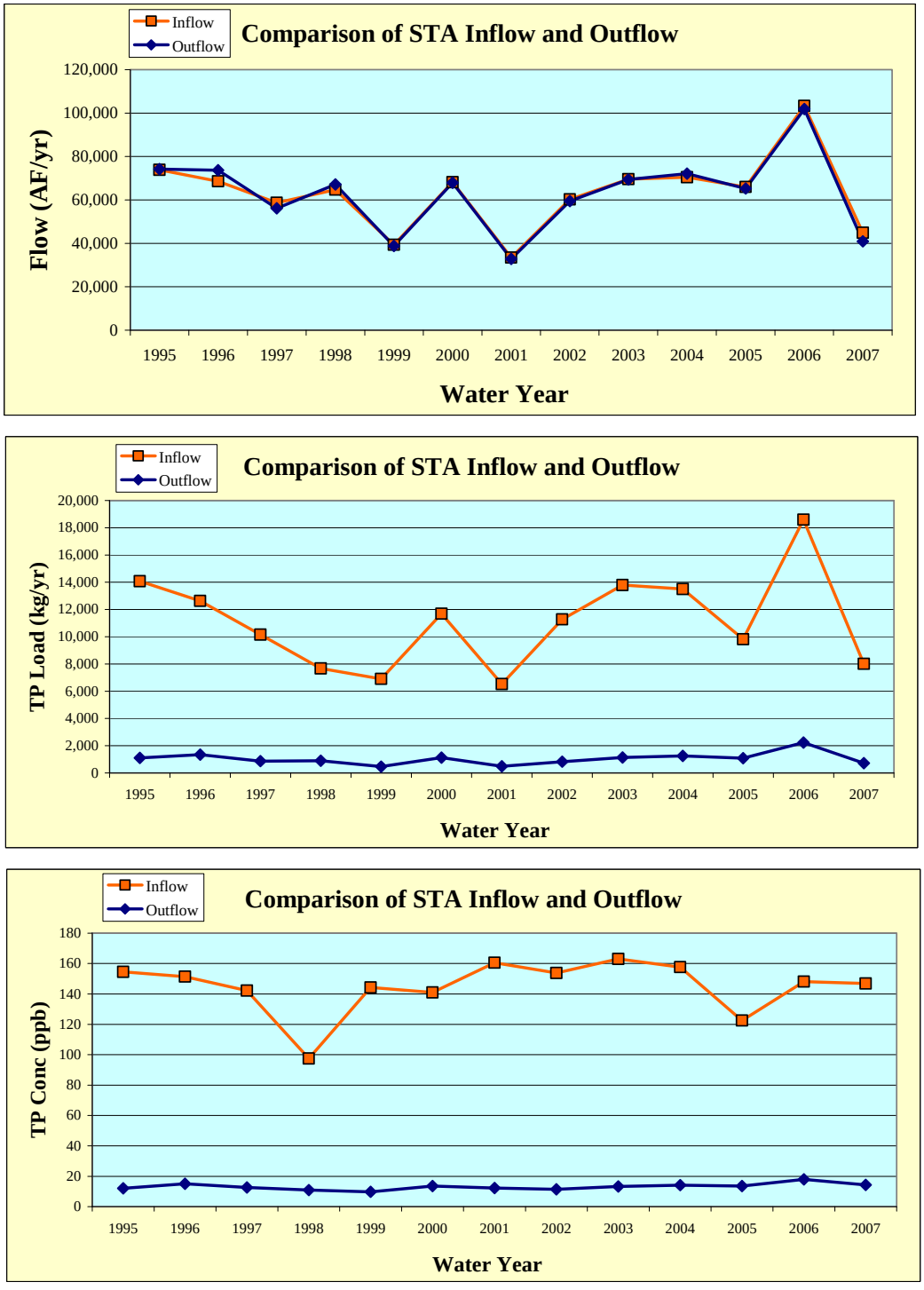
Table 9-2: Summary of DMSTA Results for STA-6, Including Comp. C Build-out.

Parameter	Unit	STA-6
Effective Treatment Area	acres	2,754
Average Annual Inflow		
Volume	AF/yr	61,542
TP Load	kg/yr	10,644
TP Concentration	ppb	140
Average Annual Outflow		
Volume	AF/yr	61,494
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	13.0 (11)
Mean Estimate of Settling Rate	ppb	13.0 (7)
Lower Conf. Limit for Settling Rate	ppb	16.9 (1)
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	13.0
Mean Estimate of Settling Rate	ppb	13.0
Lower Conf. Limit for Settling Rate	ppb	16.3
TP Load (Using Mean TP Conc.)	kg/yr	986
Diversion Volumes and Loads		
Volume	AF/yr	0
TP Load	kg/yr	0
TP Concentration	ppb	-

Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.

2. Outflow values highlighted in yellow had one or more years of the 13 years simulated below the low end of the calibration data set (enumerated by the number in parentheses). The lowest sustainable STA outflow phosphorus concentration is 19 ppb (STA-3/4), with a standard deviation of 5 ppb.

Figure 9-1: Comparison of Inflows and Outflows for STA-6.



Note: TP concentrations below 15 ppb have not been sustained.

10. Summary

A summary of the simulated phosphorus removal performance in the STAs, the EAASR A-1 and the full build-out of the treatment areas in Compartments B and C is presented in **Table 10-1** below[2]. For Compartment B, DMSTA forecast long-term flow-weighted mean phosphorus concentrations below the minimum of the calibration data sets for the vegetation in the treatment cells, and those forecasts were replaced in Table 10-1 by 15 ppb. For STA-6, DMSTA forecast a best case scenario long-term flow-weighted mean phosphorus concentration below the minimum of the calibration data sets for the vegetation in the treatment cells, and that forecast was replaced in Table 10-1 by 13 ppb[3]. The adjusted outflow phosphorus levels in Table 10-1 may still portray optimistic results in that the best performing STA (STA-3/4) is presently averaging about 19 ppb, with a 5 ppb standard deviation on annual values. Simulated long-term average annual flow-weighted mean outflow concentrations from the individual STAs ranged from 13-47 ppb. On a cumulative basis, the simulated long-term average annual concentration ranged from 20-31 ppb. In consideration of the forecast error of ±23%, this suggests a potential long-term range of 15-38 ppb for the cumulative long-term average annual outflow concentration.

The estimated allocation of discharges to the Water Conservation Areas is summarized in **Table 10-2**.

Phosphorus Concentrations for Lake Okeechobee Releases. Table 10-1 presents DMSTA modeling results for the EAASR A-1 and STA-3/4 using an average phosphorus concentration for Lake Okeechobee releases of 100 ppb, which corresponds to recent levels. An alternative simulation was conducted assuming an average phosphorus concentration for Lake Okeechobee releases of 150 ppb. While this assumed 50% increase in concentration increased the simulated phosphorus load to the EAASR A-1 by a long-term average of 23.3 metric tons/yr, the simulated net increase to STA-3/4 was 14.3 metric tons/yr. The 9 metric ton/yr balance either accumulated in the reservoir soil storage or was discharged to the EAA to satisfy irrigation demand. DMSTA simulated an increase in the long-term STA-3/4 outflow concentration of about 4 ppb, resulting in a predicted long-term average annual increase of about 2.8 metric tons/yr of phosphorus to the Everglades compared to the simulations that used an average Lake release concentration of 100 ppb. In addition to the STA discharge, it is estimated that an additional 4.75 metric tons per year of phosphorus will enter the Everglades in Lake Okeechobee deliveries for downstream water supply, including the Big Cypress Basin Seminole Indian Reservation.

[2] These simulated forecasts of STA performance are made for the comparison of alternatives and not for the development of effluent limits. Effluent limits are determined through the State of Florida's issuance of permits for these facilities.

[3] For STA-6, two flow-ways have SAV in the downstream cell which has a minimum calibration concentration of 15 ppb, and one has Prior Existing Wetlands (PEW) which has a minimum calibration concentration of 15 ppb. The flow-weighted minimum concentration for the three flow-ways is 13 ppb.

Table 10-1: Summary of DMSTA Modeling Results.

Parameter	Unit	STA-1E	STA-1W	STA-2	Comp. B North	Comp. B South	Comp. B Combined	EAASR A-1 Note 3	STA-3/4	STA-5 - Emergent	STA-6	All
Effective Treatment Area	acres	5,132	6,670	6,338	5,824	2,796	8,620	15,200	16,543	10,940	2,754	56,997
Average Annual Inflow												
Volume	AF/yr	193,336	243,563	302,980	69,117	62,540	131,657	571,393	610,905	150,001	61,542	1,693,984
TP Load	kg/yr	41,959	54,532	41,887	8,159	7,279	15,438	67,510	64,352	42,300	10,644	271,112
TP Concentration	ppb	176	182	112	96	94	95	96	85	229	140	130
Phosphorus Loading Rate	g/m^2/yr	2.0	2.0	1.6	0.3	0.6	0.4	1.1	1.0	1.0	1.0	1.2
Average Annual Outflow												
Volume	AF/yr	190,151	245,330	305,643	76,588	66,966	143,554	395,010	595,892	148,717	61,494	1,690,781
Flow-weighted Mean TP Concentration												
Upper Conf. Limit for Settling Rate	ppb	20.0 (10)	21.3 (4)	22.0	15.0 (35)	15 (35)	15.0 (35)	-	17.1 (19)	21.7(6)	13.0 (11)	20.2
Mean Estimate of Settling Rate	ppb	26.7 (1)	27.3	27.6	15.0 (35)	15 (31)	15.0 (35)	80.1	20.6 (12)	32.0	13.0 (7)	23.8
Lower Conf. Limit for Settling Rate	ppb	35.2	34.8	34.1	15.0 (35)	15.8 (20)	15.0 (34)	-	24.7 (7)	46.5	16.9 (1)	31.3
Geometric Mean TP Concentration												
Upper Conf. Limit for Settling Rate	ppb	17.9	20.2	21.0	15.0	15.0	15.0	-	14.0	20.2	13.0	-
Mean Estimate of Settling Rate	ppb	24.2	26.0	26.5	15.0	15.0	15.0	94.0	16.8	30.2	13.0	-
Lower Conf. Limit for Settling Rate	ppb	32.3	33.3	33.0	15.0	15.0	15.0	-	20.2	44.3	16.3	-
TP Load (Using Mean TP Conc.)	kg/yr	6,269	8,269	10,387	1,417	1,239	2,656	39,024	15,144	5,870	986	49,581
Receiving Water	WCA	1	1	2A	2A	2A	2A	EAA/STA-3/4	2A & 3A	Rot. & 3A	3A	
Diversion Volumes and Loads (See Note 4)												
Volume	AF/yr	24,369	0	0	0	0	0	0	82,605	0	0	106,974
TP Load	kg/yr	2,892	0	0	0	0	0	0	10,347	0	0	13,239
TP Concentration	ppb	96	-	-	-	-	-	-	102	-	-	100

Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value.
There is associated uncertainty in these predictions and actual performance will vary.
2. Outflow values highlighted in yellow had one or more years below the low end of the calibration data set (enumerated by the number in parentheses).
For all areas except STA-5 and STA-6, a total of 35 water years (WY66-00) were simulated; for STA-5 and STA-6 a total of 13 water years (WY95-07) were simulated.
The lowest sustainable STA outflow phosphorus concentration is 19 ppb (STA-3/4), with a standard deviation of 5 ppb.
3. Outflows shown from EAASR are outflows to STA-3/4; total outflows, including irrigation releases, were 546,113 AF/yr and 52,232 kg/yr at 78 ppb.
4. Diversion around STA-1E is directed to C-51E. Diversion around STA-3/4 is for downstream water supply users. While the SFWMM simulated small diversion volumes of EAA runoff, for the purpose of estimating phosphorus removal performance, these were simulated by DMSTA as being captured in the STAs.
Diversions may occur based on the daily hydraulic and treatment capacity of the treatment areas.

Table 10-2: Estimated Allocation of Discharges to Receiving Waters.

Parameter	Unit	WCA-1	WCA-2A	WCA-3A	Other	Total
Volume	**AF/yr**	435,481	584,464	679,082	98,728	1,797,755
TP Load (at mean settling rate)	**kg/yr**	14,538	16,481	25,378	5,231	61,627
TP Concentration	**ppb**	27	23	30	43	28

"Other" includes discharges to C-51 East and Rotenberger, assumed to receive 50% of STA-5 discharges.

11. References

ADA Engineering, Inc. and Burns and McDonnell Engineering Inc. 2005. Everglades Agricultural Area Regional Feasibility Study, prepared for SFWMD. October 2005.

Black and Veatch 2006. EAA Storage Reservoir A1 Basis of Design Report. Prepared for the South Florida Water Management District. January 2006.

Brown and Caldwell 2007. Compartment B Build-out Basis of Design Report, prepared for the South Florida Water Management District. July 2007.

Brown and Caldwell 2007. Compartment B Build-out Preliminary Design Report Stormwater Treatment Area, prepared for the South Florida Water Management District. Oct. 2007.

Burns & McDonnell, 2003. Final Report, Everglades Protection Area Tributary Basins, Long-Term Plan for Achieving Water Quality Goals; prepared for the South Florida Water Management District, October 2003.

Goforth G. 2007a. Updated Flow and Phosphorus Data Sets for the ECP Basins Covering the Period May 1, 1994 – April 30, 2007. Prepared for the U.S. Army Corps of Engineers and South Florida Water Management District. August 2007.

Goforth G. 2007b. Updated STA Inflow Data Sets for the 2010 Period. Prepared for the U.S. Army Corps of Engineers and South Florida Water Management District. October 2007.

Pietro, K., R. Bearzotti, M. Chimney, G. Germain and N. Iricanin. 2007. Draft – STA Performance, Compliance and Optimization; Chapter 5 in the SFER. August 2007.

URS Corporation 2007. Graphic presented at 8/23/07 Long-Term Plan Quarterly Meeting.

Walker, W. and R. Kadlec 2005. Dynamic Model for Stormwater Treatment Areas, prepared for the U. S. Department of Interior and the U. S. Army Corps of Engineers.

Appendix A. 2010A8 Simulation Model Assumptions

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
Regional Input Data				
Climate	• The climatic period of record is from 1965 to 2000. • Rainfall estimates have been revised and updated for 1965-2000. • Revised evapotranspiration methods have been used for 1965-2000.	• Same as Base	• Same as Base	• Same as Base
Topography	Updated November 2001 and September 2003 using latest available information (in NGVD 29 datum). Nov 2001 update (Documented in November 2001 SFWMD memorandum from M. Hinton to K. Tarboton) includes: • USGS High Accuracy Elevation data from helicopter surveys collected 1999-2000 for Everglades National Park and Water Conservation Area (WCA) 3 south of Alligator Alley • USGS Lidar data (May 1999) for WCA-3A north of Alligator Alley • Lindahl, Browning, Ferrari & Helstrom 1999 survey for Rotenberger Wildlife Management	• Same as Base	• Same as Base	• Same as Base

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
	Area. • Stormwater Treatment Area surveys from 1990s • Aerometric Corp. 1986 survey of the 8-1/2 square mile area • Includes estimate of Everglades Agricultural Area subsidence • Other data as in SFWMM v3.7 • FWC survey 1992 for the Holey Land Wildlife Management Area. September 2003 update includes: • Reverting to FWC 1992 survey data for Rotenberger Wildlife Management Area. • DHI gridded data from Kimley –Horn contracted survey of EAA, 2002-2003. Regridded to 2x2 scale for EAA outside of STAs and WMAs.			
Sea Level	• Sea level data from six long-term NOAA stations were used to generate a historic record to use as sea level boundary conditions for the 1965 to 2000 evaluation period.	• Same as Base	• Same as Base	• Same as Base
Land Use	• The land use coverage is intermediate between 2000B2 and 2050B2	• Same as Base	• Same as Base	• Same as Base
Natural Area Land Cover	Vegetation classes and their spatial distribution in the natural areas comes from the following data:	• Same as Base	• Same as Base	• Same as Base

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
(Vegetation)	• Walsh 1995 aerial photography in Everglades National Park • Rutchey 1995 classification in WCA-3B, WCA-3A north of Alligator Alley and the Miami Canal, WCA-2A & 2B • Richardson 1990 data for Loxahatchee National Wildlife Refuge • FLUCCS 1995 for Big Cypress National Preserve, Holey Land & Rotenberger Wildlife Management Areas & WCA-3A south of Alligator Alley and Miami Canal. (Documented in August 2003 SFWMD memorandum from J. Barnes and K. Tarboton to J. Obeysekera).			
Lake Okeechobee Service Area				
LOSA Basins	• Southern Indian Prairie Basin, S-4, North Lake Shore and Northeast Lake Shore demands and runoff based on AFSIRS (Agricultural Field-Scale Irrigation Requirement Simulation) modeling using 2010 LU projections.	• Same as Base	• Same as Base	• Same as Base
Lake Okeechobee	• Lake Okeechobee Regulation Schedule WSE according to WSE decision trees, with pulse releases in Zone D modeled as Level III pulse in upper third of the zone, Level II pulse in middle third of the zone, and Level I pulse in the lower	Same as Base, plus: • Lowered EAA Storage Injection Line as compares to	• Same as Base	Same as Base, plus: • Lowered EAA Storage Injection Line

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
	third of the zone, when the decision tree calls for regulatory releases to the estuaries in that zone. • WSE thresholds derived from the Class Limit Adjustment (CLA) WSE modification: Increase the frequency of Pulse Releases in Zone D of WSE. • Modified WSE thresholds for zone D1 to improve utilization of EAA reservoir. • Lake Okeechobee Supply Side Management guidelines are used to implement Lake Okeechobee Service Area water restriction cutbacks as per rule 40E-21 and 40E-22. The Lake Okeechobee service area water shortage triggering line is the line starting at 13.0 ft on October 1 and ending at 10.5 ft on May 31, with additional breakpoints defined in between. • Emergency flood control backpumping to Lake Okeechobee from the Everglades Agricultural Area. • Kissimmee River Restoration and Headwaters Revitalization Project are complete. • Lake Okeechobee environmental releases to supplement reservoir deliveries to Caloosahatchee and St. Lucie Estuaries. • Environmental deliveries to WCA-3A according to Rainfall Driven Operations as means of operating the EAA Reservoirs.	Base, by an average of 0.28 ft		as compares to Base, by an average of 0.28 ft

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
	• Lake Okeechobee BMP makeup water deliveries to WCAs are not made. • Adaptive protocols are included. • Flood control releases South through STA-3/4 and WCAs are not performed in this simulation.			

Acceler8 Projects	Acceler8 Projects On Line by 2010 – See A8 Website.
	• C44 Reservoirs: 9315 acres, depth 5 .ft.
	• C43 Reservoirs: 11000 acres, depth 15 ft.
	• EAA Reservoirs- A-1 Reservoir
	A-1 Reservoir simulated as two interconnected compartments.
	Compartment 1: irrigation, 9600 acres, depth 12 ft.
	Compartment 2: environment 6400 acres, depth 12 ft.
	• WPA's
	  • Site 1 Impoundment: 1660 acres; depth 8 ft.
	  • C-9 Impoundment: 1739 acres; depth 4 ft.
	  • C-11 Impoundment: 1730 acres; depth 4 ft.
	  • Acme Basin B discharge to C51W and then to STA1E
	  • WCA-3A/3B Seepage Management Area
		Same as Base, plus:
		• Decreased inflow capacity to A-1 Res from NNR Basin from 2775 cfs to 800 cfs
			• Same as Base	Same as Base, plus:
				• Decreased inflow capacity to A-1 Res from NNR Basin from 2775 cfs to 800 cfs

Caloosahatchee River Basin	• Caloosahatchee River Basin irrigation demands and runoff were estimated using the AFSIRS method based on projected 2010 land use. • Public water supply daily intake from the river	• Same as Base	• Same as Base	• Same as Base

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
	is included in the analysis. • C43 reservoir supplements basin irrigation needs and estuarine environmental needs.			
St. Lucie Canal Basin	• St. Lucie Canal Basin demands estimated using the AFSIRS method based on projected 2010 land use. • Basin demands include the Florida Power & Light reservoir at Indiantown. • C44 reservoir supplements basin irrigation needs and estuarine environmental needs.	• Same as Base	• Same as Base	• Same as Base
Seminole Brighton Reservation	• Brighton reservation demands were estimated using AFSIRS method based on existing planted acreage in a manner consistent with that applied to other basins not in the distributed mesh of the SFWMM. • The 2 in 10 demand set forth in the Seminole Compact Work plan equals 2,262 MGM (million gallons/month). AFSIRS modeled 2 in 10 demands equaled 2,383 MGM. • While estimated demands, and therefore deliveries, for every month of simulation do not equate to monthly entitlement quantities as per Table 7, Agreement 41-21 (Nov. 1992), tribal rights to these quantities are preserved. • Lake Okeechobee low stage management	• Same as Base	• Same as Base	• Same as Base

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
	applies to this agreement.			
Seminole Big Cypress Reservation	• Big Cypress Reservation irrigation demands and runoff were estimated using the AFSIRS method based on existing planted acreage in a manner consistent with that applied to other basins not in the distributed mesh of the SFWMM. • The 2 in 10 demand set forth in the Seminole Compact Work Plan equals 2,606 MGM. AFSIRS modeled 2 in 10 demands equaled 2,659 MGM. • While estimated demands, and therefore deliveries, for every month of simulation do not equate to monthly entitlement quantities as per the District's Final Order and Tribe's Resolution establishing the Big Cypress Reservation entitlement, tribal rights to these quantities are preserved. • Lake Okeechobee low stage management applies to this agreement.	• Same as Base	• Same as Base	• Same as Base
Seminole Hollywood Reservation	• Hollywood Reservation demands are set forth under VI. C of the Tribal Rights Compact. • Tribal sources of water supply include various bulk sale agreements with municipal service suppliers.	• Same as Base	• Same as Base	• Same as Base

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
Everglades Agricultural Area	• Everglades Agricultural Area irrigation demands are simulated using climatic data for the 36 year period of record and a soil moisture accounting algorithm, with parameters calibrated to match historical regional supplemental deliveries from Lake Okeechobee. • SFWMM EAA runoff and irrigation demand response to rainfall was calibrated for 1984-95 and verified for 1979-1983/1996-2000. No runoff reduction adjustment was necessary to account for Best Management Practices (BMPs). • Minimum elevation at which farmers can pump water out of the major canals for supplemental irrigation is 8.0 ft. • EAA Reservoirs A1 16,000 acres o Compartment 1: 9600 acres o Compartment 2: 6400 acres • Rain Driven Operation applied to operate the EAA reservoirs for the Everglades Restoration Project	Same as Base, plus: • Reduced inflow capacity to EAA A-1 reservoir from North New River Basin from 2775 cfs to 800 cfs	• Same as Base	Same as Base, plus: • Reduced inflow capacity to EAA A-1 reservoir from North New River Basin from 2775 cfs to 800 cfs
Everglades Construction Project Stormwater	• STA-1E: 5132 acres total treatment area • STA-1W: 6670 acres total treatment area • STA-2 : 6430 acres total treatment area	Same as Base, plus: • Buildout STA B: 6,722 acres total treatment	Same as Base, plus: • Buildout STA B: 6,722 acres total treatment	Same as Base, plus: • Buildout STA B: 6,722 acres

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
Treatment Areas	• STA 2-Cell 4: 1902 acres total treatment area • STA-3/4: 16543 acres total treatment area • STA-5: 6095 acres total treatment • STA-6: 2257 acres total treatment • Operation of STAs assumes maintenance of a 6" minimum depth.	area. Source: North New River runoff and STA-2 flow • Buildout STA C: 6,230 acres total treatment areas. Source 139 Basin and Annex	area. Source: North New River runoff • Buildout STA C: 6,230 acres total treatment areas. Source 139 Basin and Annex	total treatment area. Source: North New River runoff • Buildout STA C: 6,230 acres total treatment areas. Source 139 Basin and Annex
Holey Land Wildlife WMA	• As per Memorandum of Agreement between the FWC and the District.	• Same as Base	• Same as Base	• Same as Base
Rotenberger Wildlife WMA	• Interim Operational Schedule as defined in the Operation Plan for Rotenberger (SFWMD Jan 2002).	• Same as Base	• Same as Base	• Same as Base
Water Conservation Areas				
Water Conservation Area 1 (ARM Loxahatchee National Wildlife Refuge)	• Current C&SF Regulation Schedule. Includes regulatory releases to tide through LEC canals. • No net outflow to maintain minimum stages in the LEC Service Area canals (salinity control), if water levels are less than minimum operating criteria of 14 ft. The bottom floor of the schedule (Zone C) is the area below 14 ft. Any water supply releases below the floor will be matched by an equivalent volume of inflow from Lake Okeechobee.	• Same as Base	• Same as Base	• Same as Base

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
Water Conservation Area 2 A&B	• Current C&SF regulation schedule. Includes regulatory releases to tide through LEC canals. • No net outflow to maintain minimum stages in the LEC Service Area canals (salinity control), if water levels in WCA-2A are less than minimum operating criteria of 10.5 ft. Any water supply releases below the floor will be matched by an equivalent volume of inflow from Lake Okeechobee.	• Same as Base	• Same as Base	• Same as Base
Water Conservation Area 3 A&B	• Rainfall driven operational criteria for determining timing of deliveries to and discharges from WCA-3A and WCA-3B. • No net outflow to maintain minimum stages in the LEC Service Area canals (salinity control), if water levels are less than minimum operating criteria of 7.5 ft in WCA-3A. Any water supply releases below the floor will be matched by an equivalent volume of inflow from Lake Okeechobee. • Structural and operational modifications for L-67 canal conveyance and S-355 structures as in the federally authorized Modified Water Deliver Project. •	• Same as Base	• Same as Base	• Same as Base
Lower East Coast Service Areas				

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
Public Water Supply and Irrigation	• 2010 projections based upon permitted allocation to utilities by 2005, with 2010 well field distribution and inclusion of utility ASR. • Irrigation demands are based upon existing land use (updated through 2010) and calculated using AFSIRS, reduced to account for landscape and golf course areas irrigated using reuse water and landscape areas irrigated using public water supply.	• Same as Base	• Same as Base	• Same as Base
Other Natural Areas	• For the Northwest Fork of the Loxahatchee River, the District operates the G-92 structure and associated structures to provide approximately 50 cfs over Lainhart Dam to the Northwest Fork, when sufficient water is available in C-18 Canal. • Flows to Pond Apple Slough through S-13A are adjusted in the model to approximate measured flows at the structure. • Flows to Biscayne Bay are simulated through Snake Creek, North Bay, the Miami River, Central Bay and South Bay.	• Same as Base	• Same as Base	• Same as Base

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
Coastal Basin Canal Facilities and Operations	• C-4 Flood Mitigation Project • C-11 Water Quality Treatment Critical Project (S-381 and S-9A) • Releases from WCA-3A to ENP and the South Dade Conveyance System (SDCS) will follow the Interim Operational Plan (2002 IOP EIS): o Decreased S-12 flood control discharges & increased flood control discharges to SDCS o Structures S-343A, S-343B, S-344 and S-12A are closed Nov. 1 to July 15 o Structure S-12B is closed Jan. 1 to July 15. o Structure S-12C is closed Feb. 1 to July 15. South Dade Conveyance System operations will follow IOP for protection of the Cape Sable	• Same as Base	• Same as Base	• Same as Base
Lower East Coast	• C-4 Impoundment – 843.5 acres	• Same as Base	• Same as Base	• Same as Base
Upper East Coast Operational CERP	• L-8 Reservoir: 870 acres, depth 44 ft.	• Same as Base	• Same as Base	• Same as Base
Western Basins and Big Cypress National Preserve				
Western Basins	• Estimated and updated historical inflows from western basins at two locations: G-136 and G-406. The G-406 location represents potential inflow from the C-139 Basin into STA 5. Data for the period 1978 - 2000 is the same as the	• Same as Base	• Same as Base	• Same as Base

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
	data used for the C-139 Basin Rule development. (Documented in June 2002 SFWMD memorandum from L. Cadavid and L. Brion to J. Obeysekera).			
Big Cypress National Preserve	• Tamiami Trail culverts are not modeled in SFWMM due to the coarse (2x2 mile) model resolution.	• Same as Base	• Same as Base	• Same as Base
Everglades National Park and Florida Bay				
Everglades National Park & Lower East Coast	• Water deliveries to Everglades National Park are based upon Everglades Rain-driven operations. (WCA3A, 3B, ENP) • L29 constraint set to 9.2' per Tamiami Trail GRR Nov 2001 • 8.5 SMA as per the federally authorized Alternative 6D of the 8.5 SMA project. • Northern C111 project (2002 IOP EIS) • Southern C111 project modeled per C-111 Project 1994 GRR • IOP (partial implementation): o South Dade Structures modeled per 2002 IOP EIS o S12 and S343's operation under IOP schedules 2002 IOP EIS	• Same as Base	• Same as Base	• Same as Base
Region-wide Water Management and Related Operations				

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
Water Shortage Rules	• The existing condition reflects the existing water shortage policies in 2005 as reflected in South Florida Water Management District Chapters 40E-21 and 40E-22, FAC	• Same as Base	• Same as Base	• Same as Base

Appendix B. DMSTA Output

STA-1E

DMSTA2- Inputs & Outputs Project: STA 1E EIS Model Release: 07/05/07 Current Date: 11/17/2007

Input Variable	Units	Value
Design Case Name	-	All EIS AltD
Input Series Name		TS_All_EIS_AltD
Starting Date for Simulation	-	05/01/65
Ending Date for Simulation	-	04/30/00
Starting Date for Output	-	05/01/65
Integration Steps Per Day	-	4
Number of Iterations	-	0
Output Averaging Interval	days	365
Inflow Conc Scale Factor	-	1
Rainfall P Conc	ppb	10
Atmospheric P Load (Dry)	mg/m2-yr	20

Case Description:
All cells
East Distribution Cell modeled as two cells in parallel; minimal treatment in EDC (K=0.01 m/yr)
West Distribution Cell modeled as two cells in parallel; minimal treatment in WDC (K=0.01 m/yr)

Simulation Type: Uncertainty Analysis

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	27	35	20
GM Outflow C (ppb)	24	32	18
Load Reduction %	85%	80%	89%
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	3	0.1%
Warning/Error Messages	4	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	EDCE	1	2	EDCW	3	4N	4S	WDCW	7	WDCE	5	6
Vegetation Type	-->	none	EMG_3	SAV_3	none	EMG_3	SAV_3	SAV_3	none	EMG_3	none	EMG_3	SAV_3
Inflow Fraction	-	0.215903431			0.386989363				0.167819		0.229288		
Downstream Cell Number	-	2	3		5	6	7		9	12	11.00	12.00	
Surface Area	km2	0.95	2.25	2.23	0.95	2.38	2.61	3.04	1.17	1.69	1.17	2.31	4.25
Mean Width of Flow Path	km	0.66	1.55	1.55	0.66	1.55	1.55	1.55	0.75	1.61	0.75	1.18	0.75
Number of Tanks in Series	-	0.5	3.0	3.0	0.5	3.0	3.0	3.0	0.5	3.0	0.5	3.0	3.0
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	38.1	38.1	38.1	91.44	38.1	38.1	38.1	99.06	38.1	38.1	38.1	38.1
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4	4	4	4	4	4	4	4	4	4
Outflow Coefficient - Intercept	-	1	1	1	1	1	1	1	1	1	1	1	1
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm									0.0054			0.0057
Inflow Seepage Control Elev	cm									69			94
Inflow Seepage Conc	ppb									20			20
Outflow Seepage Rate	(cm/d) / cm	0.0095	0.0042	0.0042	0.0095			0.0054	0.01		0.01		
Outflow Seepage Control Elev	cm	-137	-137	-99	-87			-38	-15		-76		
Max Outflow Seepage Conc	ppb	20	20	20	20			20	20		20		
Seepage Recycle to Cell Number	-	1	1	1	4			7					
Seepage Recycle Fraction	-	1	1	1	1			1					
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	30	30	30	30	30	30	30	30	30	30	30	30
Initial P Storage Per Unit Area	mg/m2	500	500	500	500	500	500	500	500	500	500	500	500
Initial Water Column Depth	cm	50	50	50	50	50	50	50	50	50	50	50	50
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3	3	3	3	3	3	3	3	3	3
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22	22	22	22	22	22	22	22	22	22
C2 = Conc at Half-Max Uptake	ppb	300	300	300	300	300	300	300	300	300	300	300	300
K = Net Settling Rate at Steady State	m/yr	0.0	16.8	52.5	0.0	16.8	52.5	52.5	0.0	16.8	0.0	16.8	52.5
Z1 = Saturated Uptake Depth	cm	40	40	40	40	40	40	40	40	40	40	40	40
Z2 = Lower Penalty Depth	cm	100	100	100	100	100	100	100	100	100	100	100	100
Z3 = Upper Penalty Depth	cm	200	200	200	200	200	200	200	200	200	200	200	200

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	18.80	19.69	20.57	21.14	22.03	22.91	23.83	24.37	25.26	25.80	26.63	27.49	27.49
Run Date	-	11/16/07	11/16/07	11/16/07	11/16/07	11/16/07	11/16/07	11/16/07	11/16/07	11/16/07	11/16/07	11/16/07	11/16/07	11/16/07
Starting Date for Simulation	-	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65
Starting Date for Output	-	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65
Ending Date	-	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00
Output Duration	days	12784	12784	12784	12784	12784	12784	12784	12784	12784	12784	12784	12784	12784
Cell Label	-	EDCE	1	2	EDCW	3	4N	4S	WDCW	7	WDCE	5	6	Total
Downstream Cell Label		1	2	Outflow	3	4N	4S	Outflow	7	6	5	6	Outflow	-
Network Simulation Name	-	none	none	none	none	none	none	none	none	none	none	none	none	none
Simulation Type	-	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta
Surface Area	km2	0.95	2.25	2.23	0.95	2.38	2.61	3.04	1.17	1.69	1.17	2.31	4.25	25.02
Mean Rainfall	cm/yr	142.94	142.94	142.94	142.94	142.94	142.94	142.94	142.94	142.94	142.94	142.94	142.94	142.9
Mean ET	cm/yr	128.86	128.86	128.51	128.86	128.86	128.86	128.86	128.86	128.86	128.57	128.66	128.86	128.8
Cell Inflow Volume	hm3/yr	51.5	63.3	57.0	92.4	92.5	92.8	93.2	40.1	35.4	54.7	49.2	85.9	238.7
Cell Inflow Load	kg/yr	9065.8	8685.1	5390.6	16249.7	15500.1	12030.6	5153.8	7046.7	6245.0	9627.8	8690.4	9534.8	41990
Cell Inflow Conc	ppb	176	137	95	176	168	130	55	176	176	176	177	111	175.9
Treated Outflow Volume	hm3/yr	63.3	57.0	52.2	92.5	92.8	93.2	93.6	35.4	36.4	49.2	49.5	88.9	234.7
Treated Outflow Load	kg/yr	8685.1	5390.6	1554.1	15500.1	12030.6	5153.8	2079.0	6245.0	3988.8	8690.4	5546.0	2636	6269
Treated FWM Outflow Conc	ppb	137	95	30	168	130	55	22	176	110	177	112	30	26.7
Upper Confidence Limit	ppb	137.3	103.0	38.0	167.6	137.4	67.5	29.9	176.4	121.4	176.7	124.0	39.1	35.2
Lower Confidence Limit	ppb	137.2	84.8	22.7	167.6	120.3	43.9	16.4	176.4	96.5	176.7	98.5	22.2	20.0
Total Outflow Volume + Bypass	hm3/yr	63.3	57.0	52.2	92.5	92.8	93.2	93.6	35.4	36.4	49.2	49.5	88.9	234.7
Total Outflow Load + Bypass	kg/yr	8685.1	5390.6	1554.1	15500.1	12030.6	5153.8	2079.0	6245.0	3988.8	8690.4	5546.0	2635.8	6268.9
Total FWM Outflow Conc	ppb	137.3	94.5	29.8	167.6	129.6	55.3	22.2	176.4	109.7	176.7	112.0	29.7	26.7
Bypass Load	kg/yr	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Bypass Load	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.0
Maximum Inflow	hm3/d	0.25	0.28	0.27	0.45	0.45	0.45	0.46	0.19	0.18	0.26	0.25	0.44	1.16
Maximum Outflow	hm3/d	0.28	0.27	0.26	0.45	0.45	0.46	0.46	0.18	0.19	0.25	0.25	0.46	1.18
Surface Load Reduction	kg/yr	745	3295	3836	869	3470	6877	3179	802	2256	937	3144	6899	35721
Load Trapped in Sediments	kg/yr	0	2695	3656	0	3549	6965	3133	0	2328	0	3223	7092	32642
Overall Load Reduction	%	4%	38%	71%	5%	22%	57%	60%	11%	36%	10%	36%	72%	85%
Lower Confidence Limit	%	0.0	0.3	0.7	0.0	0.2	0.5	0.6	0.1	0.3	0.1	0.3	0.7	80%
Upper Confidence Limit	%	0.0	0.4	0.8	0.0	0.3	0.6	0.6	0.1	0.4	0.1	0.4	0.8	89%
Daily Geometric Mean	ppb	102.8	88.7	24.0	141.9	122.8	46.8	16.5	166.9	102.9	163.3	109.2	22.2	#N/A
Outflow Geo Mean - Composites	ppb	135.2	92.0	27.2	166.5	127.0	51.3	20.0	175.7	106.4	176.1	108.9	26.8	24.2
Upper Confidence Limit	ppb	135.2	100.7	35.2	166.5	135.1	63.6	27.4	175.7	118.6	176.1	121.4	35.8	32.3
Lower Confidence Limit	ppb	135.1	82.1	20.6	166.5	117.3	40.0	14.6	175.7	92.8	176.1	95.0	19.7	17.9
Frequency Outflow Conc > 10 ppb	%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Frequency Outflow Conc > 20 ppb	%	100%	100%	81%	100%	100%	100%	50%	100%	100%	100%	100%	83%	97%
Frequency Outflow Conc > 50 ppb	%	100%	100%	0%	100%	100%	53%	0%	100%	100%	100%	100%	0%	75%
Freq Outflow Volume > 10 ppb	%	100%	100%	100%	100%	100%	100%	96%	100%	100%	100%	100%	100%	100%
95th Percentile Outflow Conc	ppb	153.49	109.62	40.33	181.58	146.64	75.18	30.94	193.32	125.80	192.81	127.90	40.99	37
Mean Biomass P Storage	mg/m2	737	3767	1646	938	4679	2683	1037	1003	4329	814	4386	1684	2471
Storage Increase / Net Removal	%	2066%	0%	0%	2689%	0%	0%	0%	2894%	0%	2807%	0%	0%	0%
Net Storage Turnover Rate	1/yr	0.0	11.1	34.8	0.0	11.1	34.8	34.7	0.0	11.1	0.0	11.1	34.7	18.5
Unit Area P Load	mg/m2-yr	9533	3858	2412	17087	6500	4607	1693	6023	3691	8229	3759	2245	1678
Unit Area P Removal	mg/m2-yr	0	1197	1636	0	1488	2667	1029	0	1376	0	1394	1670	1305
Mean Water Load	cm/d	14.8	7.7	7.0	26.6	10.6	9.7	8.4	9.4	5.7	12.8	5.8	5.5	2.6
Max Water Load	cm/d	26.2	12.7	12.1	47.0	18.8	17.4	15.1	16.6	10.8	22.6	10.8	10.4	4.6
Mean Depth	cm	68	53	51	94	59	59	58	98	47	58	53	68	61
Minimum Depth	cm	60.0	46.5	43.3	92.8	50.6	50.1	49.9	85.0	42.1	43.3	41.7	57.0	52
Maximum Depth	cm	76.1	60.1	59.6	97.9	67.9	68.1	69.0	100.7	54.1	69.5	62.6	82.1	71
Frequency Depth < 10 cm	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.0%
Flow/Width	m2/day	214	112	101	383	163	164	165	146	60	200	114	314	178.5
HRT Days	days	4.6	6.9	7.3	3.6	5.5	6.0	7.0	10.5	8.2	4.5	9.1	12.3	23.5
Mean Velocity	cm/sec	0.37	0.24	0.23	0.47	0.32	0.32	0.33	0.17	0.15	0.40	0.25	0.53	0.33
Seepage Outflow / Total Outflow	%	0%	0%	0%	0%	0%	0%	0%	12%	0%	10%	0%	0%	4%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
95th Percentile Outflow Volume	hm3/d	0.2	0.2	0.2	0.4	0.4	0.4	0.4	0.2	0.2	0.2	0.2	0.4	1.0
95th Percentile Outflow Load	kg/d	35.6	23.9	8.3	64.1	53.2	26.9	11.5	26.6	18.5	36.6	25.5	14.6	34.4
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Range Check - Mean Depth	-			0.82			0.94	0.94						3
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-			0.62										1
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-													0
Water Balance Error	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%
Mass Balance Error	%	0.00%	0.01%	0.01%	0.00%	0.01%	0.01%	0.01%	0.00%	0.01%	0.00%	0.01%	0.01%	0.02%
Warning or Error Messages		Cell# 3 Depth out of calib. range for SAV_3: 51 vs. 62 - 87 cm Cell# 3 Flow/Width out of calib. range for SAV_3: 101 vs. 162 - 374 m2/day						Cell# 6 Depth out of calib. range for SAV_3: 59 vs. 62 - 87 cm Cell# 7 Depth out of calib. range for SAV_3: 58 vs. 62 - 87 cm						4

STA-1W

DMSTA2- Inputs & Outputs **Project: STA 1W EIS** Model Release: 07/05/07 Current Date: 11/12/2007

Input Variable	Units	Value
Design Case Name	-	EIS AltD
Input Series Name		TS_EIS_AltD
Starting Date for Simulation	-	05/01/65
Ending Date for Simulation	-	04/30/00
Starting Date for Output	-	05/01/65
Integration Steps Per Day	-	4
Number of Iterations	-	0
Output Averaging Interval	days	365
Inflow Conc Scale Factor	-	1
Rainfall P Conc	ppb	10
Atmospheric P Load (Dry)	mg/m2-yr	20

Case Description:
STA-1W with Long Term Plan Enhancements
Include all S-5A Basin and EBWCD Runoff
Balanced loading rate among STA-1E and STA-1W

Simulation Type: Uncertainty Analysis

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	27	35	21
GM Outflow C (ppb)	26	33	20
Load Reduction %	85%	81%	88%
Bypass Load (%)	0.0%		

Diagnostics

H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	-0.2%	0.4%
Iterations & Convergence	3	0.1%
Warning/Error Messages	7	

Cell Number -->	1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	1A	1B	3	2A	2B	4	5A	5B				
Vegetation Type	EMG_3	SAV_3	SAV_3	EMG_3	SAV_3	SAV_3	EMG_3	SAV_3				
Inflow Fraction	0.377211394			0.194752624			0.428036					
Downstream Cell Number	2	3		5	6		8					
Surface Area km2	3.02	3.02	4.15	1.91	1.90	1.45	2.28	9.28				
Mean Width of Flow Path km	1.10	1.10	1.10	2.40	2.00	1.30	1.78	2.34				
Number of Tanks in Series	2.0	2.0	2.0	2.0	2.0	2.0	2.0	3.0				
Minimum Depth for Releases cm												
Release 1 Series Name												
Release 2 Series Name												
Outflow Series Name												
Depth Series Name												
Outflow Control Depth cm	38.1	38.1	38.1	38.1	38.1	38.1	38.1	38.1				
Outflow Weir Depth cm												
Outflow Coefficient - Exponent	4	4	4	4	4	4	4	4				
Outflow Coefficient - Intercept	1	1	1	1	1	1	1	1				
Bypass Depth cm												
Maximum Inflow hm3/day												
Maximum Outflow hm3/day												
Inflow Seepage Rate (cm/d) / cm	0.0035	0.0018	0.0023									
Inflow Seepage Control Elev cm	172	172	185									
Inflow Seepage Conc ppb	20	20	20									
Outflow Seepage Rate (cm/d) / cm			0.0014	0.0016	0.0016	0.0021	0.0156	0.0049				
Outflow Seepage Control Elev cm			-60	-46	-46	-46	-46	-46				
Max Outflow Seepage Conc ppb			20	20	20	20	20	20				
Seepage Recycle to Cell Number -							1	1				
Seepage Recycle Fraction -							0.91	0.8				
Seepage Discharge Fraction -												
Initial Water Column Conc ppb	30	30	30	30	30	30	30	30				
Initial P Storage Per Unit Area mg/m2	500	500	500	500	500	500	500	500				
Initial Water Column Depth cm	200	200	200	200	200	200	200	200				
C0 = Conc at 0 g/m2 P Storage ppb	3	3	3	3	3	3	3	3				
C1 = Conc at 1 g/m2 P storage ppb	22	22	22	22	22	22	22	22				
C2 = Conc at Half-Max Uptake ppb	300	300	300	300	300	300	300	300				
K = Net Settling Rate at Steady State m/yr	16.8	52.5	52.5	16.8	52.5	52.5	16.8	52.5				
Z1 = Saturated Uptake Depth cm	40	40	40	40	40	40	40	40				
Z2 = Lower Penalty Depth cm	100	100	100	100	100	100	100	100				
Z3 = Upper Penalty Depth cm	200	200	200	200	200	200	200	200				

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	10.69	11.23	11.80	12.37	12.94	13.51	14.09	14.80					14.80
Run Date	-	11/12/07	11/12/07	11/12/07	11/12/07	11/12/07	11/12/07	11/12/07	11/12/07					11/12/07
Starting Date for Simulation	-	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65					05/01/65
Starting Date for Output	-	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65					05/01/65
Ending Date	-	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00					04/30/00
Output Duration	days	12784	12784	12784	12784	12784	12784	12784	12784					12784
Cell Label		1A	1B	3	2A	2B	4	5A	5B					Total
Downstream Cell Label		1B	3	Outflow	2B	4	Outflow	5B	Outflow					-
Network Simulation Name	-	none	none	none	none	none	none	none	none					none
Simulation Type	-	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta					Uncerta
Surface Area	km2	3.02	3.02	4.15	1.91	1.90	1.45	2.28	9.28					27.00
Mean Rainfall	cm/yr	134.86	134.86	134.86	134.86	134.86	134.86	134.86	134.86					134.9
Mean ET	cm/yr	129.91	129.91	129.91	129.80	129.72	129.59	123.03	127.25					128.4
Cell Inflow Volume	hm3/yr	113.4	140.2	142.4	58.6	57.6	56.7	128.7	117.3					300.7
Cell Inflow Load	kg/yr	20585.2	17188.8	9169.2	10628.0	7725.9	3200.9	23358.8	16305.8					54572
Cell Inflow Conc	ppb	182	123	64	182	134	56	182	139					181.5
Treated Outflow Volume	hm3/yr	140.2	142.4	143.9	57.6	56.7	55.8	117.3	103.0					302.6
Treated Outflow Load	kg/yr	17188.8	9169.2	4119.3	7725.9	3200.9	1659.1	16305.8	2490.8					8269
Treated FWM Outflow Conc	ppb	123	64	29	134	56	30	139	24					27.3
Upper Confidence Limit	ppb	128.6	74.9	36.8	143.2	68.5	38.6	145.3	30.0					34.8
Lower Confidence Limit	ppb	115.3	53.9	21.9	123.3	45.4	22.9	131.9	19.6					21.3
Total Outflow Volume + Bypass	hm3/yr	140.2	142.4	143.9	57.6	56.7	55.8	117.3	103.0					302.6
Total Outflow Load + Bypass	kg/yr	17188.8	9169.2	4119.3	7725.9	3200.9	1659.1	16305.8	2490.8					8269.2
Total FWM Outflow Conc	ppb	122.6	64.4	28.6	134.0	56.4	29.8	139.0	24.2					27.3
Bypass Load	kg/yr	0	0	0	0	0	0	0	0					0.0
Bypass Load	%	0%	0%	0%	0%	0%	0%	0%	0%					0.0
Maximum Inflow	hm3/d	0.49	0.58	0.59	0.25	0.25	0.26	0.56	0.53					1.30
Maximum Outflow	hm3/d	0.58	0.59	0.61	0.25	0.26	0.26	0.53	0.50					1.36
Surface Load Reduction	kg/yr	3837	8020	5050	2902	4525	1542	7053	13815					46303
Load Trapped in Sediments	kg/yr	4015	8160	5185	2768	4492	1549	2895	12697					41761
Overall Load Reduction	%	16%	47%	55%	27%	59%	48%	30%	85%					85%
Lower Confidence Limit	%	0.1	0.4	0.5	0.2	0.5	0.4	0.3	0.8					81%
Upper Confidence Limit	%	0.2	0.5	0.6	0.3	0.6	0.5	0.3	0.9					88%
Daily Geometric Mean	ppb	109.7	54.7	22.4	140.2	50.4	23.0	158.5	19.6					#N/A
Outflow Geo Mean - Composites	ppb	120.9	62.1	27.2	132.0	53.7	28.1	136.1	22.9					26.0
Upper Confidence Limit	ppb	127.1	72.7	35.3	141.5	65.7	36.6	142.7	28.5					33.3
Lower Confidence Limit	ppb	113.5	51.6	20.7	121.0	42.9	21.6	128.7	18.5					20.2
Frequency Outflow Conc > 10 ppb	%	100%	100%	100%	100%	100%	100%	100%	100%					100%
Frequency Outflow Conc > 20 ppb	%	100%	100%	94%	100%	100%	94%	100%	75%					100%
Frequency Outflow Conc > 50 ppb	%	100%	92%	0%	100%	69%	0%	100%	0%					92%
Freq Outflow Volume > 10 ppb	%	100%	100%	100%	100%	100%	100%	100%	99%					100%
95th Percentile Outflow Conc	ppb	132.83	78.01	37.10	144.92	69.46	38.16	153.81	31.31					35
Mean Biomass P Storage	mg/m2	4186	2711	1248	4554	2358	1067	3981	1363					2312
Storage Increase / Net Removal	%	0%	0%	0%	0%	0%	0%	0%	0%					0%
Net Storage Turnover Rate	1/yr	11.1	34.9	35.0	11.2	35.1	35.1	11.2	35.1					23.4
Unit Area P Load	mg/m2-yr	6825	5699	2207	5574	4060	2208	10266	1756					2021
Unit Area P Removal	mg/m2-yr	1331	2705	1248	1452	2361	1069	1272	1368					1546
Mean Water Load	cm/d	10.3	12.7	9.4	8.4	8.3	10.7	15.5	3.5					3.0
Max Water Load	cm/d	16.2	19.3	14.3	13.2	13.4	17.7	24.4	5.7					4.8
Mean Depth	cm	67	69	70	44	45	48	46	46					55
Minimum Depth	cm	59.6	60.8	61.7	37.1	37.2	36.6	32.8	28.4					43
Maximum Depth	cm	77.1	78.7	80.1	51.3	53.6	59.1	61.1	60.1					66
Frequency Depth < 10 cm	%	0%	0%	0%	0%	0%	0%	0%	0%					0.0%
Flow/Width	m2/day	282	349	354	67	79	119	198	137					205.6
HRT Days	days	6.5	5.4	7.5	5.2	5.4	4.5	3.0	13.3					17.9
Mean Velocity	cm/sec	0.48	0.59	0.59	0.18	0.20	0.29	0.49	0.35					0.41
Seepage Outflow / Total Outflow	%	0%	0%	2%	2%	2%	2%	1%	3%					3%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					0.0
95th Percentile Outflow Volume	hm3/d	0.6	0.6	0.6	0.2	0.2	0.2	0.5	0.5					1.3
95th Percentile Outflow Load	kg/d	74.2	43.0	20.1	34.7	15.9	8.5	75.8	13.1					41.6
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A					#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A					#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A					#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A					#N/A
Range Check - Mean Depth	-					0.72	0.77		0.74					3
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-	1.34				0.49	0.74		0.85					4
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-													0
Water Balance Error	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%					0.00%
Mass Balance Error	%	0.01%	0.01%	0.01%	0.01%	0.02%	0.01%	-0.41%	-0.01%					-0.16%
Warning or Error Messages		Cell# 1 Flow/Width out of calib. range for EMG_3: 282 vs. 26 - 210 m2/day Cell# 5 Depth out of calib. range for SAV_3: 45 vs. 62 - 87 cm Cell# 5 Flow/Width out of calib. range for SAV_3: 79 vs. 162 - 374 m2/day Cell# 6 Depth out of calib. range for SAV_3: 48 vs. 62 - 87 cm						Cell# 6 Flow/Width out of calib. range for SAV_3: 119 vs. 162 - 374 m2/day Cell# 8 Depth out of calib. range for SAV_3: 46 vs. 62 - 87 cm Cell# 8 Flow/Width out of calib. range for SAV_3: 137 vs. 162 - 374 m2/day					7

STA-2

DMSTA2- Inputs & Outputs — **Project: STA 2 EIS** — Model Release: 07/05/07 — Current Date: 11/8/2007

Input Variable	Units	Value	Case Description:
Design Case Name	-	EIS AltD	Analysis for WY 1966-2000
Input Series Name		TS_EIS_AltD	Inflow time series includes allowance of 38 cfs (27,500 ac-ft/yr) seepage from WCA-2A to Supply Canal
Starting Date for Simulation	-	05/01/65	Cells 1-3
Ending Date for Simulation	-	04/30/00	
Starting Date for Output	-	05/01/65	
Integration Steps Per Day	-	4	Simulation Type: Uncertainty Analysis
Number of Iterations	-	0	Output Variable — Mean — Lower CL — Upper CL
Output Averaging Interval	days	365	FWM Outflow C (ppb) — 28 — 34 — 22
Inflow Conc Scale Factor	-	1	GM Outflow C (ppb) — 26 — 33 — 21
Rainfall P Conc	ppb	10	Load Reduction % — 75% — 69% — 80%
Atmospheric P Load (Dry)	mg/m2-yr	20	Bypass Load (%) — 0.0%

Diagnostics

H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.1%	0.1%
Iterations & Convergence	3	0.0%
Warning/Error Messages	3	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	1	2	3									
Vegetation Type	-->	PEW_3	PEW_3	SAV_3									
Inflow Fraction	-	0.283710055	0.358144973	0.358144973									
Downstream Cell Number	-												
Surface Area	km2	7.28	9.19	9.19									
Mean Width of Flow Path	km	1.58	2.00	2.00									
Number of Tanks in Series	-	3.0	3.0	6.0									
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	52.73	29.26	29.87									
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4									
Outflow Coefficient - Intercept	-	1	1	1									
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm	0.008											
Inflow Seepage Control Elev	cm	76											
Inflow Seepage Conc	ppb	20											
Outflow Seepage Rate	(cm/d) / cm	0.004	0.006	0.00337									
Outflow Seepage Control Elev	cm	-61	-61	-30									
Max Outflow Seepage Conc	ppb	20	20	20									
Seepage Recycle to Cell Number	-	1	2	3									
Seepage Recycle Fraction	-	1	1	1									
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	30	30	30									
Initial P Storage Per Unit Area	mg/m2	500	500	500									
Initial Water Column Depth	cm	200	200	200									
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3									
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22									
C2 = Conc at Half-Max Uptake	ppb	300	300	300									
K = Net Settling Rate at Steady State	m/yr	34.9	34.9	52.5									
Z1 = Saturated Uptake Depth	cm	40	40	40									
Z2 = Lower Penalty Depth	cm	100	100	100									
Z3 = Upper Penalty Depth	cm	200	200	200									

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	6.17	6.89	8.03										8.03
Run Date	-	11/07/07	11/07/07	11/07/07										11/07/07
Starting Date for Simulation	-	05/01/65	05/01/65	05/01/65										05/01/65
Starting Date for Output	-	05/01/65	05/01/65	05/01/65										05/01/65
Ending Date	-	04/30/00	04/30/00	04/30/00										04/30/00
Output Duration	days	12784	12784	12784										12784
Cell Label		1	2	3										Total
Downstream Cell Label		Outflow	Outflow	Outflow										-
Network Simulation Name	-	none	none	none										none
Simulation Type	-	Uncerta	Uncerta	Uncerta										Uncerta
Surface Area	km2	7.28	9.19	9.19										25.66
Mean Rainfall	cm/yr	128.59	128.59	128.59										128.6
Mean ET	cm/yr	129.34	129.34	129.34										129.3
Cell Inflow Volume	hm3/yr	106.1	133.9	133.9										374.0
Cell Inflow Load	kg/yr	11892.5	15012.6	15012.6										41918
Cell Inflow Conc	ppb	112	112	112										112.1
Treated Outflow Volume	hm3/yr	109.3	133.9	133.9										377.0
Treated Outflow Load	kg/yr	3538.4	4333.5	2515.1										10387
Treated FWM Outflow Conc	ppb	32	32	19										27.6
Upper Confidence Limit	ppb	40.1	40.1	23.3										34.1
Lower Confidence Limit	ppb	25.6	25.6	15.3										22.0
Total Outflow Volume + Bypass	hm3/yr	109.3	133.9	133.9										377.0
Total Outflow Load + Bypass	kg/yr	3538.4	4333.5	2515.1										10387.1
Total FWM Outflow Conc	ppb	32.4	32.4	18.8										27.6
Bypass Load	kg/yr	0	0	0										0.0
Bypass Load	%	0%	0%	0%										0.0
Maximum Inflow	hm3/d	0.46	0.58	0.58										1.61
Maximum Outflow	hm3/d	0.47	0.59	0.59										1.66
Surface Load Reduction	kg/yr	8617	11153	12677										31531
Load Trapped in Sediments	kg/yr	8361	10436	12612										31409
Overall Load Reduction	%	70%	71%	83%										75%
Lower Confidence Limit	%	0.6	0.6	0.8										69%
Upper Confidence Limit	%	0.8	0.8	0.9										80%
Daily Geometric Mean	ppb	25.1	25.8	12.3										#N/A
Outflow Geo Mean - Composites	ppb	31.2	31.2	17.8										26.5
Upper Confidence Limit	ppb	39.0	38.9	22.2										33.0
Lower Confidence Limit	ppb	24.6	24.6	14.5										21.0
Frequency Outflow Conc > 10 ppb	%	100%	100%	100%										100%
Frequency Outflow Conc > 20 ppb	%	100%	100%	22%										100%
Frequency Outflow Conc > 50 ppb	%	0%	0%	0%										92%
Freq Outflow Volume > 10 ppb	%	100%	100%	92%										100%
95th Percentile Outflow Conc	ppb	38.43	38.33	23.54										33
Mean Biomass P Storage	mg/m2	1728	1708	1372										1593
Storage Increase / Net Removal	%	0%	0%	0%										0%
Net Storage Turnover Rate	1/yr	23.3	23.3	35.0										26.9
Unit Area P Load	mg/m2-yr	1634	1634	1634										1634
Unit Area P Removal	mg/m2-yr	1148	1136	1372										1224
Mean Water Load	cm/d	4.0	4.0	4.0										4.0
Max Water Load	cm/d	6.3	6.3	6.3										6.3
Mean Depth	cm	63	57	57										59
Minimum Depth	cm	57.4	48.3	48.3										51
Maximum Depth	cm	69.2	67.3	67.3										68
Frequency Depth < 10 cm	%	0%	0%	0%										0.0%
Flow/Width	m2/day	184	183	183										183.5
HRT Days	days	15.8	14.3	14.3										14.7
Mean Velocity	cm/sec	0.34	0.37	0.37										0.36
Seepage Outflow / Total Outflow	%	0%	0%	0%										0%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00										0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00										0.0
95th Percentile Outflow Volume	hm3/d	0.4	0.5	0.5										1.5
95th Percentile Outflow Load	kg/d	16.0	19.9	12.0										47.9
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A										#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A										#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A										#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A										#N/A
Range Check - Mean Depth	-			0.92										1
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-													0
Range Check - Inflow Conc	-	1.02	1.02											2
Range Check - Outflow Conc	-													0
Water Balance Error	%	0.00%	0.00%	0.00%										0.00%
Mass Balance Error	%	0.02%	0.02%	0.13%										0.06%
Warning or Error Messages		Cell# 1 Inflow Conc out of calib. range for PEW_3: 112 vs. 8 - 110 ppb						Cell# 3 Depth out of calib. range for SAV_3: 57 vs. 62 - 87 cm						3
		Cell# 2 Inflow Conc out of calib. range for PEW_3: 112 vs. 8 - 110 ppb												

Compartment B – North Build-out

DMSTA2- Inputs & Outputs **Project: COMP B EIS** Model Release: 07/05/07 Current Date: 11/8/2007

Input Variable	Units	Value	Case Description:
Design Case Name	-	NBO EIS AltD	Analysis for WY 1966-2000
Input Series Name		TS_NBO_EIS_AltD	
Starting Date for Simulation	-	05/01/65	
Ending Date for Simulation	-	04/30/00	
Starting Date for Output	-	05/01/65	
Integration Steps Per Day	-	4	
Number of Iterations	-	0	
Output Averaging Interval	days	365	
Inflow Conc Scale Factor	-	1	
Rainfall P Conc	ppb	10	
Atmospheric P Load (Dry)	mg/m2-yr	20	

Simulation Type: Uncertainty Analysis

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	9	10	8
GM Outflow C (ppb)	8	9	8
Load Reduction %	90%	88%	91%
Bypass Load (%)	0.0%		

Diagnostics

H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.2%	0.2%
Iterations & Convergence	2	0.9%
Warning/Error Messages	7	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	NBO1	NBO2	Cell 4									
Vegetation Type	-->	EMG_3	SAV_3	SAV_3									
Inflow Fraction	-	1											
Downstream Cell Number	-	2	3										
Surface Area	km2	4.35	11.53	7.70									
Mean Width of Flow Path	km	6.50	5.00	2.50									
Number of Tanks in Series	-	3.0	3.0	3.0									
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	38.1	38.1	42.7									
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4									
Outflow Coefficient - Intercept	-	1	1	1									
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm	0.033	0.0124	0.0064									
Inflow Seepage Control Elev	cm	48	48	60									
Inflow Seepage Conc	ppb	75	75	75									
Outflow Seepage Rate	(cm/d) / cm	0.0045	0.0017										
Outflow Seepage Control Elev	cm	42	42										
Max Outflow Seepage Conc	ppb	20	20										
Seepage Recycle to Cell Number	-	1	1										
Seepage Recycle Fraction	-	0.75	0.75										
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	30	30	30									
Initial P Storage Per Unit Area	mg/m2	500	500	500									
Initial Water Column Depth	cm	200	200	200									
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3									
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22									
C2 = Conc at Half-Max Uptake	ppb	300	300	300									
K = Net Settling Rate at Steady State	m/yr	16.8	52.5	52.5									
Z1 = Saturated Uptake Depth	cm	40	40	40									
Z2 = Lower Penalty Depth	cm	100	100	100									
Z3 = Upper Penalty Depth	cm	200	200	200									

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	3.17	3.86	4.54										4.54
Run Date	-	11/08/07	11/08/07	11/08/07										11/08/07
Starting Date for Simulation	-	05/01/65	05/01/65	05/01/65										05/01/65
Starting Date for Output	-	05/01/65	05/01/65	05/01/65										05/01/65
Ending Date	-	04/30/00	04/30/00	04/30/00										04/30/00
Output Duration	days	12784	12784	12784										12784
Cell Label		NBO1	NBO2	Cell 4										Total
Downstream Cell Label		NBO2	Cell 4	Outflow										-
Network Simulation Name	-	none	none	none										none
Simulation Type	-	Uncerta	Uncerta	Uncerta										Uncerta
Surface Area	km2	4.35	11.53	7.70										23.58
Mean Rainfall	cm/yr	128.59	128.59	128.59										128.6
Mean ET	cm/yr	134.53	134.53	134.53										134.5
Cell Inflow Volume	hm3/yr	85.3	89.5	92.6									69169	85.3
Cell Inflow Load	kg/yr	8129.8	5626.9	1375.4										8130
Cell Inflow Conc	ppb	95	63	15										95.3
Treated Outflow Volume	hm3/yr	89.5	92.6	94.5									76588	94.5
Treated Outflow Load	kg/yr	5626.9	1375.4	839.9										840
Treated FWM Outflow Conc	ppb	63	15	9										8.9
Upper Confidence Limit	ppb	68.0	16.9	9.9										9.9
Lower Confidence Limit	ppb	57.3	13.2	8.1										8.1
Total Outflow Volume + Bypass	hm3/yr	89.5	92.6	94.5										94.5
Total Outflow Load + Bypass	kg/yr	5626.9	1375.4	839.9										839.9
Total FWM Outflow Conc	ppb	62.9	14.8	8.9										8.9
Bypass Load	kg/yr	0	0	0										0.0
Bypass Load	%	0%	0%	0%										0.0
Maximum Inflow	hm3/d	0.58	0.60	0.62										0.58
Maximum Outflow	hm3/d	0.60	0.62	0.63										0.63
Surface Load Reduction	kg/yr	2512	4251	535										7290
Load Trapped in Sediments	kg/yr	2940	4931	960										8832
Overall Load Reduction	%	31%	76%	39%										90%
Lower Confidence Limit	%	0.3	0.7	0.4										88%
Upper Confidence Limit	%	0.4	0.8	0.4										91%
Daily Geometric Mean	ppb	44.7	6.7	4.8										#N/A
Outflow Geo Mean - Composites	ppb	61.1	13.8	8.3										8.3
Upper Confidence Limit	ppb	66.4	15.6	9.2										9.2
Lower Confidence Limit	ppb	55.4	12.3	7.6										7.6
Frequency Outflow Conc > 10 ppb	%	100%	89%	14%										14%
Frequency Outflow Conc > 20 ppb	%	100%	0%	0%										0%
Frequency Outflow Conc > 50 ppb	%	91%	0%	0%										0%
Freq Outflow Volume > 10 ppb	%	100%	69%	35%										35%
95th Percentile Outflow Conc	ppb	69.61	18.11	11.64										12
Mean Biomass P Storage	mg/m2	2125	428	125										642
Storage Increase / Net Removal	%	0%	0%	0%										0%
Net Storage Turnover Rate	1/yr	11.1	34.9	34.9										20.4
Unit Area P Load	mg/m2-yr	1869	488	179										345
Unit Area P Removal	mg/m2-yr	676	428	125										375
Mean Water Load	cm/d	5.4	2.1	3.3										1.0
Max Water Load	cm/d	13.4	5.2	8.0										2.5
Mean Depth	cm	42	43	51										46
Minimum Depth	cm	37.5	38.2	41.9										39
Maximum Depth	cm	49.3	53.4	64.7										56
Frequency Depth < 10 cm	%	0%	0%	0%										0.0%
Flow/Width	m2/day	36	49	101										63.7
HRT Days	days	7.9	20.4	15.4										46.1
Mean Velocity	cm/sec	0.10	0.13	0.23										0.16
Seepage Outflow / Total Outflow	%	0%	0%	0%										0%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00										0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00										0.0
95th Percentile Outflow Volume	hm3/d	0.5	0.5	0.5										0.5
95th Percentile Outflow Load	kg/d	31.0	8.1	5.1										5.1
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A										#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A										#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A										#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A										#N/A
Range Check - Mean Depth	-		0.70	0.82										2
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-		0.30	0.63										2
Range Check - Inflow Conc	-			1.00										1
Range Check - Outflow Conc	-		1.00	0.60										2
Water Balance Error	%	0.00%	0.00%	0.00%										0.00%
Mass Balance Error	%	0.17%	0.04%	0.05%										0.18%
Warning or Error Messages		Cell# 2 Depth out of calib. range for SAV_3: 43 vs. 62 - 87 cm Cell# 2 Flow/Width out of calib. range for SAV_3: 49 vs. 162 - 374 m2/day Cell# 2 Outflow Conc out of calib. range for SAV_3: 15 vs. 15 - 153 ppb Cell# 3 Depth out of calib. range for SAV_3: 51 vs. 62 - 87 cm						Cell# 3 Flow/Width out of calib. range for SAV_3: 101 vs. 162 - 374 m2/day Cell# 3 Inflow Conc out of calib. range for SAV_3: 15 vs. 15 - 153 ppb Cell# 3 Outflow Conc out of calib. range for SAV_3: 9 vs. 15 - 153 ppb					7

Compartment B – South Build-out

DMSTA2- Inputs & Outputs **Project: COMP B EIS** Model Release: 07/05/07 Current Date: 11/8/2007

Input Variable	Units	Value	Case Description:
Design Case Name	-	SBO EIS AltD	Analysis for WY 1966-2000
Input Series Name		TS_SBO_EIS_A	Receives inflow from S-7/S-2 Basin
Starting Date for Simulation	-	05/01/65	
Ending Date for Simulation	-	04/30/00	
Starting Date for Output	-	05/01/65	
Integration Steps Per Day	-	4	Simulation Type: Uncertainty Analysis
Number of Iterations	-	0	Output Variable / Mean / Lower CL / Upper CL
Output Averaging Interval	days	365	FWM Outflow C (ppb) 13 16 11
Inflow Conc Scale Factor	-	1	GM Outflow C (ppb) 12 15 10
Rainfall P Conc	ppb	10	Load Reduction % 86% 82% 88%
Atmospheric P Load (Dry)	mg/m2-yr	20	Bypass Load (%) 0.0%

Diagnostics

H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	3	0.0%
Warning/Error Messages	3	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	SBO1	SBO2										
Vegetation Type	-->	EMG_3	SAV_3										
Inflow Fraction	-	1											
Downstream Cell Number	-	2											
Surface Area	km2	5.98	5.34										
Mean Width of Flow Path	km	2.00	1.50										
Number of Tanks in Series	-	3.0	3.0										
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	38.1	38.1										
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4										
Outflow Coefficient - Intercept	-	1	1										
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm	0.0133	0.0164										
Inflow Seepage Control Elev	cm	53	63										
Inflow Seepage Conc	ppb	75	15										
Outflow Seepage Rate	(cm/d) / cm												
Outflow Seepage Control Elev	cm												
Max Outflow Seepage Conc	ppb												
Seepage Recycle to Cell Number	-												
Seepage Recycle Fraction	-												
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	30	30										
Initial P Storage Per Unit Area	mg/m2	500	500										
Initial Water Column Depth	cm	200	200										
C0 = Conc at 0 g/m2 P Storage	ppb	3	3										
C1 = Conc at 1 g/m2 P storage	ppb	22	22										
C2 = Conc at Half-Max Uptake	ppb	300	300										
K = Net Settling Rate at Steady State	m/yr	16.8	52.5										
Z1 = Saturated Uptake Depth	cm	40	40										
Z2 = Lower Penalty Depth	cm	100	100										
Z3 = Upper Penalty Depth	cm	200	200										

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	3.86	4.54											4.54
Run Date	-	11/08/07	11/08/07											11/08/07
Starting Date for Simulation	-	05/01/65	05/01/65											05/01/65
Starting Date for Output	-	05/01/65	05/01/65											05/01/65
Ending Date	-	04/30/00	04/30/00											04/30/00
Output Duration	days	12784	12784											12784
Cell Label		SBO1	SBO2											Total
Downstream Cell Label		SBO2	Outflow											-
Network Simulation Name	-	none	none											none
Simulation Type	-	Uncerta	Uncerta											Uncerta
Surface Area	km2	5.98	5.34											11.32
Mean Rainfall	cm/yr	128.59	128.59											128.6
Mean ET	cm/yr	134.53	134.53											134.5
Cell Inflow Volume	hm3/yr	77.2	79.2										62587	77.2
Cell Inflow Load	kg/yr	7284.2	3635.5											7284
Cell Inflow Conc	ppb	94	46											94.4
Treated Outflow Volume	hm3/yr	79.2	82.6										66966	82.6
Treated Outflow Load	kg/yr	3635.5	1054.9											1055
Treated FWM Outflow Conc	ppb	46	13											12.8
Upper Confidence Limit	ppb	53.1	15.8											15.8
Lower Confidence Limit	ppb	38.7	10.6											10.6
Total Outflow Volume + Bypass	hm3/yr	79.2	82.6											82.6
Total Outflow Load + Bypass	kg/yr	3635.5	1054.9											1054.9
Total FWM Outflow Conc	ppb	45.9	12.8											12.8
Bypass Load	kg/yr	0	0											0.0
Bypass Load	%	0%	0%											0.0
Maximum Inflow	hm3/d	0.42	0.44											0.42
Maximum Outflow	hm3/d	0.44	0.45											0.45
Surface Load Reduction	kg/yr	3649	2581											6229
Load Trapped in Sediments	kg/yr	4021	2811											6832
Overall Load Reduction	%	50%	71%											86%
Lower Confidence Limit	%	0.4	0.7											82%
Upper Confidence Limit	%	0.6	0.7											88%
Daily Geometric Mean	ppb	39.7	7.7											#N/A
Outflow Geo Mean - Composites	ppb	44.5	11.8											11.8
Upper Confidence Limit	ppb	51.8	14.7											14.7
Lower Confidence Limit	ppb	37.2	9.8											9.8
Frequency Outflow Conc > 10 ppb	%	100%	83%											83%
Frequency Outflow Conc > 20 ppb	%	100%	0%											11%
Frequency Outflow Conc > 50 ppb	%	14%	0%											0%
Freq Outflow Volume > 10 ppb	%	100%	67%											67%
95th Percentile Outflow Conc	ppb	52.20	15.77											16
Mean Biomass P Storage	mg/m2	2111	526											1364
Storage Increase / Net Removal	%	0%	0%											0%
Net Storage Turnover Rate	1/yr	11.1	35.0											15.5
Unit Area P Load	mg/m2-yr	1218	681											643
Unit Area P Removal	mg/m2-yr	672	526											604
Mean Water Load	cm/d	3.5	4.1											1.9
Max Water Load	cm/d	7.0	8.2											3.7
Mean Depth	cm	51	56											53
Minimum Depth	cm	44.2	47.6											46
Maximum Depth	cm	62.1	68.7											65
Frequency Depth < 10 cm	%	0%	0%											0.0%
Flow/Width	m2/day	106	145											124.0
HRT Days	days	14.3	13.7											28.4
Mean Velocity	cm/sec	0.24	0.30											0.27
Seepage Outflow / Total Outflow	%	0%	0%											0%
Release 1 Outflow Volume	hm3/yr	0.00	0.00											0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00											0.0
95th Percentile Outflow Volume	hm3/d	0.4	0.4											0.4
95th Percentile Outflow Load	kg/d	17.1	5.2											5.2
Simulated / Specified Mean Depth	%	#N/A	#N/A											#N/A
Release 1 Demand Met	%	#N/A	#N/A											#N/A
Release 2 Demand Met	%	#N/A	#N/A											#N/A
Outflow Demand Met	%	#N/A	#N/A											#N/A
Range Check - Mean Depth	-		0.90											1
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-		0.89											1
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-		0.86											1
Water Balance Error	%	0.00%	0.00%											0.00%
Mass Balance Error	%	0.03%	0.01%											0.03%
Warning or Error Messages		Cell# 2 Depth out of calib. range for SAV_3: 56 vs. 62 - 87 cm Cell# 2 Flow/Width out of calib. range for SAV_3: 145 vs. 162 - 374 m2/day						Cell# 2 Outflow Conc out of calib. range for SAV_3: 13 vs. 15 - 153 ppb						3

EAASR With Lake Okeechobee TP=100 ppb

DMSTA2- Inputs & Outputs Project: PROJECT_EAASR_STA34_NETWORK_EIS_ALTD Model Release: 07/05/07 Current Date: 11/7/2007

Input Variable	Units	Value
Design Case Name	-	A1
Input Series Name		TS_A1
Starting Date for Simulation	-	01/01/65
Ending Date for Simulation	-	04/30/00
Starting Date for Output	-	05/01/65
Integration Steps Per Day	-	4
Number of Iterations	-	0
Output Averaging Interval	days	1
Inflow Conc Scale Factor	-	1
Rainfall P Conc	ppb	10
Atmospheric P Load (Dry)	mg/m2-yr	20
Cell Number -->		**1**
Cell Label	-	1
Vegetation Type	-->	none
Inflow Fraction	-	1
Downstream Cell Number	-	
Surface Area	km2	61.54
Mean Width of Flow P	km	6.70
Number of Tanks in Series	-	1.0
Minimum Depth for Releases	cm	15
Release 1 Series Name		IRRIG
Release 2 Series Name		
Outflow Series Name		TO_STA
Depth Series Name		A1_DEPTH
Outflow Control Depth	cm	
Outflow Weir Depth	cm	
Outflow Coefficient - Exponent	-	1.5
Outflow Coefficient - Intercept	-	8
Bypass Depth	cm	
Maximum Inflow	hm3/day	
Maximum Outflow	hm3/day	9.05233
Inflow Seepage Rate	(cm/d) / cm	
Inflow Seepage Control Elev	cm	
Inflow Seepage Conc	ppb	
Outflow Seepage Rate	(cm/d) / cm	0.00081
Outflow Seepage Control Elev	cm	6
Max Outflow Seepage Conc	ppb	100
Seepage Recycle to Cell Number	-	1
Seepage Recycle Fraction	-	0.75
Seepage Discharge Fraction	-	
Initial Water Column Conc	ppb	105
Initial P Storage Per Unit Area	mg/m2	525
Initial Water Column Depth	cm	150
C0 = Conc at 0 g/m2 P Storage	ppb	3
C1 = Conc at 1 g/m2 P storage	ppb	150
C2 = Conc at Half-Max Uptake	ppb	
K = Net Settling Rate at Steady State	m/yr	5.0
Z1 = Saturated Uptake Depth	cm	40
Z2 = Lower Penalty Depth	cm	100
Z3 = Upper Penalty Depth	cm	400

Case Description:
- Compartment A-1
- 15,200 acres (from A8)
- Inflow volumes, outflow volumes, and depths from SFWMM simulation
- Reservoir settling rate = 5.0 m/yr
- Lake Okeechobee deliveries at 100 ppb

Simulation Type:

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	85.0	#N/A	#N/A
GM Outflow C (ppb)	93.5	#N/A	#N/A
Load Reduction %	16%	#N/A	#N/A
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	2	0.5%
Warning/Error Messages	0	

Output Variables	Units	1	12	Overall
Execution Time	sec/yr	1.44		1.44
Run Date	-	11/07/07		11/07/07
Starting Date for Simulation	-	01/01/65		01/01/65
Starting Date for Output	-	05/01/65		05/01/65
Ending Date	-	04/30/00		04/30/00
Output Duration	days	12784		12784
Cell Label		1		Total
Downstream Cell Label		Outflow		
Network Simulation Name	-	EAASR_NET		EAASR_NET
Simulation Type	-	Base		Base
Surface Area	km2	61.54		61.54
Mean Rainfall	cm/yr	130.73		130.7
Mean ET	cm/yr	125.65		125.6
Cell Inflow Volume	hm3/yr	705.3	571821	705.3
Cell Inflow Load	kg/yr	67559.6		67560
Cell Inflow Conc	ppb	96		95.8
Treated Outflow Volume	hm3/yr	509.0	412654	509.0
Treated Outflow Load	kg/yr	43252.8		43253
Treated FWM Outflow Conc	ppb	85		85.0
Upper Confidence Limit	ppb	#N/A		#N/A
Lower Confidence Limit	ppb	#N/A		#N/A
Total Outflow Volume + Bypass	hm3/yr	695.4	563757	695.4
Total Outflow Load + Bypass	kg/yr	56430.6		56430.6
Total FWM Outflow Conc	ppb	81.2		81.2
Bypass Load	kg/yr	0		0.0
Bypass Load	%	0%		0.0
Maximum Inflow	hm3/d	9.92		9.92
Maximum Outflow	hm3/d	10.20		10.20
Surface Load Reduction	kg/yr	26170		24307
Load Trapped in Sediments	kg/yr	11953		11953
Overall Load Reduction	%	16%		16%
Lower Confidence Limit	%	#N/A		#N/A
Upper Confidence Limit	%	#N/A		#N/A
Daily Geometric Mean	ppb	68.5		#N/A
Outflow Geo Mean - Composites	ppb	93.5		93.5
Upper Confidence Limit	ppb	#N/A		#N/A
Lower Confidence Limit	ppb	#N/A		#N/A
Frequency Outflow Conc > 10 ppb	%	100%		100%
Frequency Outflow Conc > 20 ppb	%	100%		100%
Frequency Outflow Conc > 50 ppb	%	90%		100%
Freq Outflow Volume > 10 ppb	%	73%		73%
95th Percentile Outflow Conc	ppb	654.58		655
Mean Biomass P Storage	mg/m2	405		405
Storage Increase / Net Removal	%	2%		2%
Net Storage Turnover Rate	1/yr	16.8		16.8
Unit Area P Load	mg/m2-yr	1098		1098
Unit Area P Removal	mg/m2-yr	194		194
Mean Water Load	cm/d	3.1		3.1
Max Water Load	cm/d	16.1		16.1
Mean Depth	cm	197		197
Minimum Depth	cm	1.0		1
Maximum Depth	cm	390.5		391
Frequency Depth < 10 cm	%	13%		13.0%
Flow/Width	m2/day	288		288.2
HRT Days	days	62.6		62.6
Mean Velocity	cm/sec	0.17		0.17
Seepage Outflow / Total Outflow	%	1%		2%
Release 1 Outflow Volume	hm3/yr	186.38		186.4
Release 2 Outflow Volume	hm3/yr	0.00		0.0
95th Percentile Outflow Volume	hm3/d	9.1		9.1
95th Percentile Outflow Load	kg/d	755.5		755.5
Simulated / Specified Mean Depth	%	100%		1.0
Release 1 Demand Met	%	90%		0.9
Release 2 Demand Met	%	#N/A		#N/A
Outflow Demand Met	%	104%		1.0
Range Check - Mean Depth	-			0
Range Check - Freq Depth < 10 cm	-			0
Range Check - Flow/Width	-			0
Range Check - Inflow Conc	-			0
Range Check - Outflow Conc	-			0
Water Balance Error	%	0.00%		0.00%
Mass Balance Error	%	0.00%		0.00%
Warning or Error Messages				0

EAASR With Lake Okeechobee TP=150 ppb

DMSTA2- Inputs & Outputs **Project: PROJECT_EAASR_STA34_NETWORK_EIS_ALTD** Model Release: 07/05/07 Current Date: 11/14/2007

Input Variable	Units	Value
Design Case Name	-	A1 150
Input Series Name		TS_A1_150
Starting Date for Simulation	-	01/01/65
Ending Date for Simulation	-	04/30/00
Starting Date for Output	-	05/01/65
Integration Steps Per Day	-	4
Number of Iterations	-	0
Output Averaging Interval	days	1
Inflow Conc Scale Factor	-	1
Rainfall P Conc	ppb	10
Atmospheric P Load (Dry)	mg/m2-yr	20
Cell Number -->		**1**
Cell Label	-	1
Vegetation Type	-->	none
Inflow Fraction	-	1
Downstream Cell Number	-	
Surface Area	km2	61.54
Mean Width of Flow Pt	km	6.70
Number of Tanks in Series	-	1.0
Minimum Depth for Releases	cm	15
Release 1 Series Name		IRRIG
Release 2 Series Name		
Outflow Series Name		TO_STA
Depth Series Name		A1_DEPTH
Outflow Control Depth	cm	
Outflow Weir Depth	cm	
Outflow Coefficient - Exponent	-	1.5
Outflow Coefficient - Intercept	-	8
Bypass Depth	cm	
Maximum Inflow	hm3/day	
Maximum Outflow	hm3/day	9.05233
Inflow Seepage Rate	(cm/d) / cm	
Inflow Seepage Control Elev	cm	
Inflow Seepage Conc	ppb	
Outflow Seepage Rate	(cm/d) / cm	0.00081
Outflow Seepage Control Elev	cm	6
Max Outflow Seepage Conc	ppb	100
Seepage Recycle to Cell Number	-	1
Seepage Recycle Fraction	-	0.75
Seepage Discharge Fraction	-	
Initial Water Column Conc	ppb	105
Initial P Storage Per Unit Area	mg/m2	525
Initial Water Column Depth	cm	150
C0 = Conc at 0 g/m2 P Storage	ppb	3
C1 = Conc at 1 g/m2 P storage	ppb	150
C2 = Conc at Half-Max Uptake	ppb	
K = Net Settling Rate at Steady State	m/yr	5.0
Z1 = Saturated Uptake Depth	cm	40
Z2 = Lower Penalty Depth	cm	100
Z3 = Upper Penalty Depth	cm	400

Case Description:

Compartment A-1
15,200 acres (from A8)
Inflow volumes, outflow volumes, and depths from SFWMM simulation
Reservoir settling rate = 5.0 m/yr
Lake inflow = 150 ppb

Simulation Type:

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	115	#N/A	#N/A
GM Outflow C (ppb)	118	#N/A	#N/A
Load Reduction %	17%	#N/A	#N/A
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	2	0.9%
Warning/Error Messages	0	

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	1.47												1.47
Run Date	-	11/14/07												11/14/07
Starting Date for Simulation	-	01/01/65												01/01/65
Starting Date for Output	-	05/01/65												05/01/65
Ending Date	-	04/30/00												04/30/00
Output Duration	days	12784												12784
Cell Label		1												Total
Downstream Cell Label		Outflow												-
Network Simulation Name	-	AASR_NET 150												EAASR_NET 1
Simulation Type	-	Base												Base
Surface Area	km2	61.54												61.54
Mean Rainfall	cm/yr	130.73												130.7
Mean ET	cm/yr	125.65												125.6
Cell Inflow Volume	hm3/yr	705.3											571821	705.3
Cell Inflow Load	kg/yr	90841.5												90841
Cell Inflow Conc	ppb	129												128.8
Treated Outflow Volume	hm3/yr	509.0											412654	509.0
Treated Outflow Load	kg/yr	58624.3												58624
Treated FWM Outflow Conc	ppb	115												115.2
Upper Confidence Limit	ppb	#N/A												#N/A
Lower Confidence Limit	ppb	#N/A												#N/A
Total Outflow Volume + Bypass	hm3/yr	695.4											563757	695.4
Total Outflow Load + Bypass	kg/yr	75842.4												75842.4
Total FWM Outflow Conc	ppb	109.1												109.1
Bypass Load	kg/yr	0												0.0
Bypass Load	%	0%												0.0
Maximum Inflow	hm3/d	9.92												9.92
Maximum Outflow	hm3/d	10.20												10.20
Surface Load Reduction	kg/yr	34422												32217
Load Trapped in Sediments	kg/yr	15136												15136
Overall Load Reduction	%	17%												17%
Lower Confidence Limit	%	#N/A												#N/A
Upper Confidence Limit	%	#N/A												#N/A
Daily Geometric Mean	ppb	84.3												#N/A
Outflow Geo Mean - Composites	ppb	117.8												117.8
Upper Confidence Limit	ppb	#N/A												#N/A
Lower Confidence Limit	ppb	#N/A												#N/A
Frequency Outflow Conc > 10 ppb	%	100%												100%
Frequency Outflow Conc > 20 ppb	%	100%												100%
Frequency Outflow Conc > 50 ppb	%	91%												100%
Freq Outflow Volume > 10 ppb	%	73%												73%
95th Percentile Outflow Conc	ppb	780.27												780
Mean Biomass P Storage	mg/m2	523												523
Storage Increase / Net Removal	%	3%												3%
Net Storage Turnover Rate	1/yr	16.5												16.5
Unit Area P Load	mg/m2-yr	1476												1476
Unit Area P Removal	mg/m2-yr	246												246
Mean Water Load	cm/d	3.1												3.1
Max Water Load	cm/d	16.1												16.1
Mean Depth	cm	197												197
Minimum Depth	cm	1.0												1
Maximum Depth	cm	390.5												391
Frequency Depth < 10 cm	%	13%												13.0%
Flow/Width	m2/day	288												288.2
HRT Days	days	62.6												62.6
Mean Velocity	cm/sec	0.17												0.17
Seepage Outflow / Total Outflow	%	1%												2%
Release 1 Outflow Volume	hm3/yr	186.38												186.4
Release 2 Outflow Volume	hm3/yr	0.00												0.0
95th Percentile Outflow Volume	hm3/d	9.1												9.1
95th Percentile Outflow Load	kg/d	1056.0												1056.0
Simulated / Specified Mean Depth	%	100%												1.0
Release 1 Demand Met	%	90%												0.9
Release 2 Demand Met	%	#N/A												#N/A
Outflow Demand Met	%	104%												1.0
Range Check - Mean Depth														0
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-													0
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-													0
Water Balance Error	%	0.00%												0.00%
Mass Balance Error	%	0.00%												0.00%
Warning or Error Messages														0

STA-3/4 With Lake Okeechobee TP=100 ppb

DMSTA2- Inputs & Outputs Project: PROJECT_EAASR_STA34_NETWORK_EIS_ALTD Model Release: 07/05/07 Current Date: 11/7/2007

Input Variable	Units	Value	Case Description:
Design Case Name	-	STA34 ind	STA-3/4 stand alone
Input Series Name		TS_STA34_in	Inflows distributed uniformly based on area
Starting Date for Simulation	-	01/01/65	Lake Okeechobee deliveries at 100 ppb
Ending Date for Simulation	-	04/30/00	PSTA Demo in Cell 2B modeled as SAV_3
Starting Date for Output	-	05/01/65	Used EAASR inflows from network simulation to run uncertainty analysis
Integration Steps Per Day	-	4	
Number of Iterations	-	0	
Output Averaging Interval	days	365	
Inflow Conc Scale Factor	-	1	
Rainfall P Conc	ppb	10	
Atmospheric P Load (Dry)	mg/m2-yr	20	

Simulation Type: Uncertainty Analysis

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	20.6	24.7	17.1
GM Outflow C (ppb)	16.8	20.2	14.0
Load Reduction %	76%	72%	80%
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	2	0.3%
Warning/Error Messages	6	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	1A	1B	2A	2B	3A	3B						
Vegetation Type	-->	EMG_3	SAV_3	EMG_3	SAV_3	EMG_3	SAV_3						
Inflow Fraction	-	0.394547543		0.328598199		0.276854							
Downstream Cell Number	-	2		4		6							
Surface Area	km2	12.30	14.12	10.29	11.72	8.72	9.83						
Mean Width of Flow Path	km	3.42	4.50	2.89	4.02	4.88	4.88						
Number of Tanks in Series	-	3.0	3.0	3.0	3.0	3.0	3.0						
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	38.1	38.1	38.1	38.1	38.1	38.1						
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4	4	4	4						
Outflow Coefficient - Intercept	-	1	1	1	1	1	1						
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm												
Inflow Seepage Control Elev	cm												
Inflow Seepage Conc	ppb												
Outflow Seepage Rate	(cm/d) / cm	0.0058	0.0029	0.0014		0.0038							
Outflow Seepage Control Elev	cm	16	40	-67		-64							
Max Outflow Seepage Conc	ppb	20	20	20	20	20	20						
Seepage Recycle to Cell Number	-	1		3		5							
Seepage Recycle Fraction	-	0.5	0.5	0.5	0.5	0.5	0.5						
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	52	12	55	15	55	15						
Initial P Storage Per Unit Area	mg/m2	2400	615	2400	615	2400	615						
Initial Water Column Depth	cm	60	60	60	60	60	60						
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3	3	3	3						
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22	22	22	22						
C2 = Conc at Half-Max Uptake	ppb	300	300	300	300	300	300						
K = Net Settling Rate at Steady State	m/yr	16.8	52.5	16.8	52.5	16.8	52.5						
Z1 = Saturated Uptake Depth	cm	40	40	40	40	40	40						
Z2 = Lower Penalty Depth	cm	100	100	100	100	100	100						
Z3 = Upper Penalty Depth	cm	200	200	200	200	200	200						

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	5.55	6.28	7.02	7.73	8.43	9.17							9.17
Run Date	-	11/07/07	11/07/07	11/07/07	11/07/07	11/07/07	11/07/07							11/07/07
Starting Date for Simulation	-	01/01/65	01/01/65	01/01/65	01/01/65	01/01/65	01/01/65							01/01/65
Starting Date for Output	-	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65							05/01/65
Ending Date	-	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00							04/30/00
Output Duration	days	12784	12784	12784	12784	12784	12784							12784
Cell Label		1A	1B	2A	2B	3A	3B							Total
Downstream Cell Label		1B	Outflow	2B	Outflow	3B	Outflow							-
Network Simulation Name	-	none	none	none	none	none	none							none
Simulation Type	-	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta							Uncerta
Surface Area	km2	12.30	14.12	10.29	11.72	8.72	9.83							66.98
Mean Rainfall	cm/yr	129.99	129.99	129.99	129.99	129.99	129.99							130.0
Mean ET	cm/yr	134.44	134.08	134.18	134.03	133.03	133.82							134.0
Cell Inflow Volume	hm3/yr	297.5	291.7	247.8	244.1	208.8	201.8						611362	754.1
Cell Inflow Load	kg/yr	25408.8	16620.1	21161.6	13888.1	17829.3	11390.4							64400
Cell Inflow Conc	ppb	85	57	85	57	85	56							85.4
Treated Outflow Volume	hm3/yr	291.7	289.9	244.1	243.7	201.8	201.5						595892	735.0
Treated Outflow Load	kg/yr	16620.1	5926.7	13888.1	5017.9	11390.4	4198.9							15144
Treated FWM Outflow Conc	ppb	57	20	57	21	56	21							20.6
Upper Confidence Limit	ppb	61.7	24.6	61.6	24.7	60.9	24.8							24.7
Lower Confidence Limit	ppb	51.7	16.9	51.7	17.0	51.5	17.4							17.1
Total Outflow Volume + Bypass	hm3/yr	291.7	289.9	244.1	243.7	201.8	201.5							735.0
Total Outflow Load + Bypass	kg/yr	16620.1	5926.7	13888.1	5017.9	11390.4	4198.9							15143.5
Total FWM Outflow Conc	ppb	57.0	20.4	56.9	20.6	56.4	20.8							20.6
Bypass Load	kg/yr	0	0	0	0	0	0							0.0
Bypass Load	%	0%	0%	0%	0%	0%	0%							0.0
Maximum Inflow	hm3/d	1.88	1.88	1.57	1.57	1.32	1.31							4.76
Maximum Outflow	hm3/d	1.88	1.88	1.57	1.58	1.31	1.32							4.78
Surface Load Reduction	kg/yr	8894	10717	7338	8870	6572	7192							49256
Load Trapped in Sediments	kg/yr	8611	11005	7137	9166	5726	7440							49086
Overall Load Reduction	%	35%	64%	34%	64%	36%	63%							76%
Lower Confidence Limit	%	0.3	0.6	0.3	0.6	0.3	0.6							72%
Upper Confidence Limit	%	0.4	0.7	0.4	0.7	0.4	0.7							80%
Daily Geometric Mean	ppb	48.4	11.8	48.3	11.9	49.1	12.0							#N/A
Outflow Geo Mean - Composites	ppb	51.6	16.5	51.4	16.6	51.1	17.3							16.8
Upper Confidence Limit	ppb	57.0	20.0	56.8	20.1	56.1	20.6							20.2
Lower Confidence Limit	ppb	45.8	13.7	45.7	13.8	45.8	14.5							14.0
Frequency Outflow Conc > 10 ppb	%	100%	92%	100%	92%	100%	92%							92%
Frequency Outflow Conc > 20 ppb	%	100%	33%	100%	33%	100%	33%							67%
Frequency Outflow Conc > 50 ppb	%	61%	0%	61%	0%	58%	0%							33%
Freq Outflow Volume > 10 ppb	%	100%	91%	100%	91%	100%	92%							91%
95th Percentile Outflow Conc	ppb	66.95	25.94	67.04	26.19	66.68	25.94							26
Mean Biomass P Storage	mg/m2	2208	792	2189	795	2076	770							1431
Storage Increase / Net Removal	%	1%	1%	1%	1%	1%	1%							1%
Net Storage Turnover Rate	1/yr	11.1	34.4	11.1	34.4	11.1	34.4							17.9
Unit Area P Load	mg/m2-yr	2065	1177	2056	1185	2045	1159							962
Unit Area P Removal	mg/m2-yr	700	779	694	782	657	757							733
Mean Water Load	cm/d	6.6	5.7	6.6	5.7	6.6	5.6							3.1
Max Water Load	cm/d	15.3	13.3	15.2	13.4	15.1	13.3							7.1
Mean Depth	cm	56	54	56	54	47	49							53
Minimum Depth	cm	36.6	31.1	35.3	30.3	29.0	27.8							32
Maximum Depth	cm	78.9	76.4	78.8	75.1	65.4	68.0							74
Frequency Depth < 10 cm	%	0%	0%	0%	0%	0%	0%							0.0%
Flow/Width	m2/day	238	178	235	166	117	113							178.3
HRT Days	days	8.5	9.6	8.5	9.4	7.1	8.6							17.2
Mean Velocity	cm/sec	0.49	0.38	0.49	0.36	0.29	0.27							0.38
Seepage Outflow / Total Outflow	%	2%	0%	1%	0%	3%	0%							2%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00							0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00							0.0
95th Percentile Outflow Volume	hm3/d	1.6	1.6	1.4	1.4	1.1	1.1							4.1
95th Percentile Outflow Load	kg/d	102.4	38.9	85.9	32.8	70.9	27.3							98.6
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Range Check - Mean Depth	-		0.88		0.86		0.78							3
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-	1.13		1.12			0.70							3
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-													0
Water Balance Error	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%							0.00%
Mass Balance Error	%	0.03%	0.02%	0.02%	0.02%	-0.01%	0.03%							0.03%
Warning or Error Messages		Cell# 1 Flow/Width out of calib. range for EMG_3: 238 vs. 26 - 210 m2/day					Cell# 4 Depth out of calib. range for SAV_3: 54 vs. 62 - 87 cm							6
		Cell# 2 Depth out of calib. range for SAV_3: 54 vs. 62 - 87 cm					Cell# 6 Depth out of calib. range for SAV_3: 49 vs. 62 - 87 cm							
		Cell# 3 Flow/Width out of calib. range for EMG_3: 235 vs. 26 - 210 m2/day					Cell# 6 Flow/Width out of calib. range for SAV_3: 113 vs. 162 - 374 m2/day							

STA-3/4 With Lake Okeechobee TP=150 ppb

DMSTA2- Inputs & Outputs **Project: PROJECT_EAASR_STA34_NETWORK_EIS_ALTD** Model Release: 07/05/07
Current Date: 11/14/2007

Input Variable	Units	Value	Case Description:
Design Case Name	-	STA34 ind 150	STA-3/4 stand alone
Input Series Name		TS_STA34_ind_1	Inflows distributed uniformly based on area
Starting Date for Simulation	-	01/01/65	Lake Okeechobee deliveries at 150 ppb
Ending Date for Simulation	-	04/30/00	PSTA Demo in Cell 2B modeled as SAV_3
Starting Date for Output	-	05/01/65	Used EAASR inflows from network simulation to run uncertainty analysis
Integration Steps Per Day	-	4	Simulation Type: Uncertainty Analysis
Number of Iterations	-	0	Output Variable / Mean / Lower CL / Upper CL
Output Averaging Interval	days	365	FWM Outflow C (ppb) 24.4 29.7 19.9
Inflow Conc Scale Factor	-	1	GM Outflow C (ppb) 19.2 23.5 15.7
Rainfall P Conc	ppb	10	Load Reduction % 77% 72% 81%
Atmospheric P Load (Dry)	mg/m2-yr	20	Bypass Load (%) 0.0%

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	2	0.9%
Warning/Error Messages	6	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	1A	1B	2A	2B	3A	3B						
Vegetation Type	-->	EMG_3	SAV_3	EMG_3	SAV_3	EMG_3	SAV_3						
Inflow Fraction	-	0.394547543		0.328598199		0.276854							
Downstream Cell Number	-	2		4		6							
Surface Area	km2	12.30	14.12	10.29	11.72	8.72	9.83						
Mean Width of Flow Path	km	3.42	4.50	2.89	4.02	4.88	4.88						
Number of Tanks in Series	-	3.0	3.0	3.0	3.0	3.0	3.0						
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	38.1	38.1	38.1	38.1	38.1	38.1						
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4	4	4	4						
Outflow Coefficient - Intercept	-	1	1	1	1	1	1						
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm												
Inflow Seepage Control Elev	cm												
Inflow Seepage Conc	ppb												
Outflow Seepage Rate	(cm/d) / cm	0.0058	0.0029	0.0014		0.0038							
Outflow Seepage Control Elev	cm	16	40	-67		-64							
Max Outflow Seepage Conc	ppb	20	20	20	20	20	20						
Seepage Recycle to Cell Number	-	1		3		5							
Seepage Recycle Fraction	-	0.5	0.5	0.5	0.5	0.5	0.5						
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	52	12	55	15	55	15						
Initial P Storage Per Unit Area	mg/m2	2400	615	2400	615	2400	615						
Initial Water Column Depth	cm	60	60	60	60	60	60						
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3	3	3	3						
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22	22	22	22						
C2 = Conc at Half-Max Uptake	ppb	300	300	300	300	300	300						
K = Net Settling Rate at Steady State	m/yr	16.8	52.5	16.8	52.5	16.8	52.5						
Z1 = Saturated Uptake Depth	cm	40	40	40	40	40	40						
Z2 = Lower Penalty Depth	cm	100	100	100	100	100	100						
Z3 = Upper Penalty Depth	cm	200	200	200	200	200	200						

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	7.98	8.80	9.51	10.70	11.77	12.57							12.57
Run Date	-	11/14/07	11/14/07	11/14/07	11/14/07	11/14/07	11/14/07							11/14/07
Starting Date for Simulation	-	01/01/65	01/01/65	01/01/65	01/01/65	01/01/65	01/01/65							01/01/65
Starting Date for Output	-	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65							05/01/65
Ending Date	-	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00							04/30/00
Output Duration	days	12784	12784	12784	12784	12784	12784							12784
Cell Label		1A	1B	2A	2B	3A	3B							Total
Downstream Cell Label		1B	Outflow	2B	Outflow	3B	Outflow							-
Network Simulation Name	-	none	none	none	none	none	none							none
Simulation Type	-	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta							Uncerta
Surface Area	km2	12.30	14.12	10.29	11.72	8.72	9.83							66.98
Mean Rainfall	cm/yr	129.99	129.99	129.99	129.99	129.99	129.99							130.0
Mean ET	cm/yr	134.44	134.08	134.18	134.03	133.03	133.82							134.0
Cell Inflow Volume	hm3/yr	297.5	291.7	247.8	244.1	208.8	201.8						611362	754.1
Cell Inflow Load	kg/yr	31036.9	20529.5	25849.0	17151.0	21778.6	14019.4							78664
Cell Inflow Conc	ppb	104	70	104	70	104	69							104.3
Treated Outflow Volume	hm3/yr	291.7	289.9	244.1	243.7	201.8	201.5						595892	735.0
Treated Outflow Load	kg/yr	20529.5	7032.9	17151.0	5955.9	14019.4	4953.5							17942
Treated FWM Outflow Conc	ppb	70	24	70	24	69	25							24.4
Upper Confidence Limit	ppb	76.2	29.5	76.0	29.7	74.9	29.7							29.7
Lower Confidence Limit	ppb	64.0	19.7	63.9	19.9	63.4	20.2							19.9
Total Outflow Volume + Bypass	hm3/yr	291.7	289.9	244.1	243.7	201.8	201.5						595892	735.0
Total Outflow Load + Bypass	kg/yr	20529.5	7032.9	17151.0	5955.9	14019.4	4953.5							17942.4
Total FWM Outflow Conc	ppb	70.4	24.3	70.2	24.4	69.5	24.6							24.4
Bypass Load	kg/yr	0	0	0	0	0	0							0.0
Bypass Load	%	0%	0%	0%	0%	0%	0%							0.0
Maximum Inflow	hm3/d	1.88	1.88	1.57	1.57	1.32	1.31							4.76
Maximum Outflow	hm3/d	1.88	1.88	1.57	1.58	1.31	1.32							4.78
Surface Load Reduction	kg/yr	10613	13520	8763	11195	7893	9066							60722
Load Trapped in Sediments	kg/yr	10160	13760	8411	11463	6734	9291							59820
Overall Load Reduction	%	34%	66%	34%	65%	36%	65%							77%
Lower Confidence Limit	%	0.3	0.6	0.3	0.6	0.3	0.6							72%
Upper Confidence Limit	%	0.4	0.7	0.4	0.7	0.4	0.7							81%
Daily Geometric Mean	ppb	59.2	14.0	58.9	14.1	59.7	14.2							#N/A
Outflow Geo Mean - Composites	ppb	61.6	19.0	61.4	19.1	60.5	19.7							19.2
Upper Confidence Limit	ppb	68.2	23.3	67.8	23.4	66.4	23.8							23.5
Lower Confidence Limit	ppb	54.6	15.5	54.4	15.6	54.1	16.3							15.7
Frequency Outflow Conc > 10 ppb	%	100%	92%	100%	92%	100%	92%							92%
Frequency Outflow Conc > 20 ppb	%	100%	53%	100%	53%	100%	53%							72%
Frequency Outflow Conc > 50 ppb	%	78%	0%	78%	0%	75%	0%							53%
Freq Outflow Volume > 10 ppb	%	100%	92%	100%	92%	100%	93%							93%
95th Percentile Outflow Conc	ppb	88.27	33.06	88.49	33.23	87.85	32.97							33
Mean Biomass P Storage	mg/m2	2609	992	2583	996	2445	963							1719
Storage Increase / Net Removal	%	1%	1%	1%	1%	1%	1%							1%
Net Storage Turnover Rate	1/yr	11.1	34.4	11.1	34.4	11.1	34.4							18.2
Unit Area P Load	mg/m2-yr	2523	1454	2512	1464	2499	1427							1175
Unit Area P Removal	mg/m2-yr	826	974	817	978	773	946							893
Mean Water Load	cm/d	6.6	5.7	6.6	5.7	6.6	5.6							3.1
Max Water Load	cm/d	15.3	13.3	15.2	13.4	15.1	13.3							7.1
Mean Depth	cm	56	54	56	54	47	49							53
Minimum Depth	cm	36.6	31.1	35.3	30.3	29.0	27.8							32
Maximum Depth	cm	78.9	76.4	78.8	75.1	65.4	68.0							74
Frequency Depth < 10 cm	%	0%	0%	0%	0%	0%	0%							0.0%
Flow/Width	m2/day	238	178	235	166	117	113							178.3
HRT Days	days	8.5	9.6	8.5	9.4	7.1	8.6							17.2
Mean Velocity	cm/sec	0.49	0.38	0.49	0.36	0.29	0.27							0.38
Seepage Outflow / Total Outflow	%	2%	0%	1%	0%	3%	0%							2%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00							0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00							0.0
95th Percentile Outflow Volume	hm3/d	1.6	1.6	1.4	1.4	1.1	1.1							4.1
95th Percentile Outflow Load	kg/d	132.2	47.4	110.0	40.3	90.2	33.2							120.9
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Range Check - Mean Depth	-		0.88		0.86		0.78							3
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-	1.13		1.12			0.70							3
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-													0
Water Balance Error	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%							0.00%
Mass Balance Error	%	0.03%	0.02%	0.03%	0.02%	0.00%	0.03%							0.03%
Warning or Error Messages		Cell# 1 Flow/Width out of calib. range for EMG_3: 238 vs. 26 - 210 m2/day					Cell# 4 Depth out of calib. range for SAV_3: 54 vs. 62 - 87 cm							6
		Cell# 2 Depth out of calib. range for SAV_3: 54 vs. 62 - 87 cm					Cell# 6 Depth out of calib. range for SAV_3: 49 vs. 62 - 87 cm							
		Cell# 3 Flow/Width out of calib. range for EMG_3: 235 vs. 26 - 210 m2/day					Cell# 6 Flow/Width out of calib. range for SAV_3: 113 vs. 162 - 374 m2/day							

STA-5 With Emergent Vegetation in All Cells

DMSTA2- Inputs & Outputs **Project: STA 5 EIS** Model Release: 07/05/07 Current Date: 10/19/2007

Input Variable	Units	Value
Design Case Name	-	EIS Alt1 EMG
Input Series Name		TS_EIS_Alt1
Starting Date for Simulation	-	05/01/94
Ending Date for Simulation	-	04/30/07
Starting Date for Output	-	05/01/94
Integration Steps Per Day	-	4
Number of Iterations	-	0
Output Averaging Interval	days	365
Inflow Conc Scale Factor	-	1
Rainfall P Conc	ppb	10
Atmospheric P Load (Dry)	mg/m2-yr	20

Case Description: STA-5 Expanded to Include Full Build-out of Compartment C; Downstream cells considered as EMG_3; Inflows are C-139 Basin

Simulation Type: Uncertainty Analysis

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	32.0	46.5	21.7
GM Outflow C (ppb)	30.2	44.3	20.2
Load Reduction %	86%	80%	91%
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	3	0.1%
Warning/Error Messages	0	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	1A	1B	2A	2B	3A	3B	4A	4B	5A	5B		
Vegetation Type	-->	EMG_3	EMG_3	EMG_3	EMG_3	EMG_3	EMG_3	EMG_3	EMG_3	EMG_3	EMG_3		
Inflow Fraction	-	0.190896424		0.1908964		0.1843939		0.1922898		0.2415235			
Downstream Cell Number	-	2		4		6		8		10			
Surface Area	km2	3.38	4.94	3.38	4.94	4.31	3.72	6.52	1.86	7.73	2.79		
Mean Width of Flow Path	km	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56	2.34	2.34		
Number of Tanks in Series	-	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	38.1	60.96	38.1	60.96	38.1	60.96	38.1	60.96	38.1	60.96		
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4	4	4	4	4	4	4	4		
Outflow Coefficient - Intercept	-	1	1	1	1	1	1	1	1	1	1		
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm												
Inflow Seepage Control Elev	cm												
Inflow Seepage Conc	ppb												
Outflow Seepage Rate	(cm/d) / cm	0.0075	0.0075										
Outflow Seepage Control Elev	cm	-46	-38										
Max Outflow Seepage Conc	ppb	20	20										
Seepage Recycle to Cell Number	-	1	2										
Seepage Recycle Fraction	-	1	1										
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	30	30	30	30	30	30	30	30	30	30		
Initial P Storage Per Unit Area	mg/m2	500	500	500	500	500	500	500	500	500	500		
Initial Water Column Depth	cm	200	200	200	200	200	200	200	200	200	200		
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3	3	3	3	3	3	3	3		
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22	22	22	22	22	22	22	22		
C2 = Conc at Half-Max Uptake	ppb	300	300	300	300	300	300	300	300	300	300		
K = Net Settling Rate at Steady State	m/yr	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8		
Z1 = Saturated Uptake Depth	cm	40	40	40	40	40	40	40	40	40	40		
Z2 = Lower Penalty Depth	cm	100	100	100	100	100	100	100	100	100	100		
Z3 = Upper Penalty Depth	cm	200	200	200	200	200	200	200	200	200	200		

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	19.62	20.46	21.31	22.16	22.92	23.77	24.62	25.46	26.31	27.16			27.16
Run Date	-	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07			10/18/07
Starting Date for Simulation	-	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94			05/01/94
Starting Date for Output	-	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94			05/01/94
Ending Date	-	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07			04/30/07
Output Duration	days	4748	4748	4748	4748	4748	4748	4748	4748	4748	4748			4748
Cell Label		1A	1B	2A	2B	3A	3B	4A	4B	5A	5B			Total
Downstream Cell Label		1B	Outflow	2B	Outflow	3B	Outflow	4B	Outflow	5B	Outflow			-
Network Simulation Name	-	none	none	none	none	none	none	none	none	none	none			none
Simulation Type	-	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta			Uncerta
Surface Area	km2	3.38	4.94	3.38	4.94	4.31	3.72	6.52	1.86	7.73	2.79			43.58
Mean Rainfall	cm/yr	127.21	127.21	127.21	127.21	127.21	127.21	127.21	127.21	127.21	127.21			127.2
Mean ET	cm/yr	131.28	131.30	131.23	131.30	131.23	131.30	130.99	131.30	131.02	131.30			131.2
Cell Inflow Volume	hm3/yr	35.3	35.2	35.3	35.2	34.1	34.0	35.6	35.4	44.7	44.4		150124.5	185.2
Cell Inflow Load	kg/yr	8081.3	3096.5	8081.3	3679.6	7806.1	2827.4	8140.3	2026.2	10224.6	2711.2			42334
Cell Inflow Conc	ppb	229	88	229	104	229	83	229	57	229	61			228.6
Treated Outflow Volume	hm3/yr	35.2	35.0	35.2	35.0	34.0	33.8	35.4	35.3	44.4	44.3		148716.7	183.4
Treated Outflow Load	kg/yr	3096.5	945.5	3679.6	1114.1	2827.4	1074.8	2026.2	1227.4	2711.2	1504.1			5866
Treated FWM Outflow Conc	ppb	88	27	104	32	83	32	57	35	61	34			32.0
Upper Confidence Limit	ppb	102.9	37.1	124.9	47.1	104.0	47.2	76.0	50.7	80.2	49.8			46.5
Lower Confidence Limit	ppb	72.8	19.3	83.9	21.3	63.8	21.1	41.8	23.4	44.8	22.8			21.7
Total Outflow Volume + Bypass	hm3/yr	35.2	35.0	35.2	35.0	34.0	33.8	35.4	35.3	44.4	44.3			183.4
Total Outflow Load + Bypass	kg/yr	3096.5	945.5	3679.6	1114.1	2827.4	1074.8	2026.2	1227.4	2711.2	1504.1			5865.9
Total FWM Outflow Conc	ppb	87.9	27.0	104.5	31.8	83.2	31.8	57.3	34.8	61.0	33.9			32.0
Bypass Load	kg/yr	0	0	0	0	0	0	0	0	0	0			0.0
Bypass Load	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			0.0
Maximum Inflow	hm3/d	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.18	0.22	0.22			0.90
Maximum Outflow	hm3/d	0.17	0.17	0.17	0.17	0.17	0.17	0.18	0.18	0.22	0.22			0.91
Surface Load Reduction	kg/yr	5153	2405	4402	2566	4979	1753	6114	799	7513	1207			36468
Load Trapped in Sediments	kg/yr	3956	2133	4514	2727	5121	1874	6328	860	7767	1298			36579
Overall Load Reduction	%	62%	69%	54%	70%	64%	62%	75%	39%	73%	45%			86%
Lower Confidence Limit	%	0.6	0.6	0.5	0.6	0.5	0.5	0.7	0.3	0.7	0.4			80%
Upper Confidence Limit	%	0.7	0.7	0.6	0.7	0.7	0.7	0.8	0.4	0.8	0.5			91%
Daily Geometric Mean	ppb	91.1	22.6	110.0	26.8	84.7	26.6	55.5	29.2	59.7	28.4			#N/A
Outflow Geo Mean - Composites	ppb	82.9	25.6	97.2	30.2	76.8	30.1	52.5	32.6	56.0	31.9			30.2
Upper Confidence Limit	ppb	97.7	35.4	117.4	45.0	96.8	45.1	70.2	47.8	74.2	47.1			44.3
Lower Confidence Limit	ppb	68.0	18.2	77.2	19.9	58.3	19.8	38.0	21.8	40.7	21.2			20.2
Frequency Outflow Conc > 10 ppb	%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%			100%
Frequency Outflow Conc > 20 ppb	%	100%	92%	100%	100%	100%	100%	100%	100%	100%	100%			100%
Frequency Outflow Conc > 50 ppb	%	100%	0%	100%	0%	100%	0%	54%	0%	62%	0%			100%
Freq Outflow Volume > 10 ppb	%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%			100%
95th Percentile Outflow Conc	ppb	115.68	33.33	128.72	39.59	108.26	39.61	76.17	43.65	80.98	42.22			40
Mean Biomass P Storage	mg/m2	3607	1369	4143	1744	3692	1587	3025	1451	3129	1462			2618
Storage Increase / Net Removal	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			0%
Net Storage Turnover Rate	1/yr	4.2	4.1	4.2	4.1	4.2	4.1	4.2	4.1	4.2	4.1			4.2
Unit Area P Load	mg/m2-yr	2391	627	2391	745	1810	759	1249	1088	1322	971			971
Unit Area P Removal	mg/m2-yr	1170	432	1335	552	1188	503	971	462	1004	465			839
Mean Water Load	cm/d	2.9	2.0	2.9	2.0	2.2	2.5	1.5	5.2	1.6	4.4			1.2
Max Water Load	cm/d	5.1	3.5	5.1	3.5	3.9	4.5	2.7	9.4	2.8	7.9			2.1
Mean Depth	cm	42	55	42	55	41	55	41	55	40	55			47
Minimum Depth	cm	1.4	22.8	1.2	22.6	1.2	23.2	1.2	23.7	1.2	23.7			10
Maximum Depth	cm	51.7	62.0	51.7	62.0	51.4	61.9	51.7	62.1	49.9	61.6			56
Frequency Depth < 10 cm	%	7%	0%	7%	0%	7%	0%	7%	0%	7%	0%			4.2%
Flow/Width	m2/day	62	62	62	62	60	60	62	62	52	52			59.3
HRT Days	days	14.5	28.4	14.5	28.4	19.0	22.1	27.6	10.6	25.3	12.6			40.4
Mean Velocity	cm/sec	0.17	0.13	0.17	0.13	0.17	0.12	0.18	0.13	0.15	0.11			0.15
Seepage Outflow / Total Outflow	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			0%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.0
95th Percentile Outflow Volume	hm3/d	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2			0.8
95th Percentile Outflow Load	kg/d	15.4	4.6	18.8	5.6	15.6	5.5	11.8	6.3	15.7	7.7			29.7
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A			#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A			#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A			#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A			#N/A
Range Check - Mean Depth	-													0
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-													0
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-													0
Water Balance Error	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%			0.00%
Mass Balance Error	%	0.00%	0.00%	-0.02%	0.00%	-0.01%	0.00%	-0.01%	0.00%	-0.01%	0.00%			-0.01%
Warning or Error Messages														0

STA-5 With SAV in the Downstream Cells

DMSTA2- Inputs & Outputs Project: STA 5 EIS Model Release: 07/05/07 Current Date: 10/19/2007

Input Variable	Units	Value
Design Case Name	-	EIS Alt1 SAV
Input Series Name		TS_EIS_Alt1
Starting Date for Simulation	-	05/01/94
Ending Date for Simulation	-	04/30/07
Starting Date for Output	-	05/01/94
Integration Steps Per Day	-	4
Number of Iterations	-	0
Output Averaging Interval	days	365
Inflow Conc Scale Factor	-	1
Rainfall P Conc	ppb	10
Atmospheric P Load (Dry)	mg/m2-yr	20

Case Description: STA-5 Expanded to Include Full Build-out of Compartment C; Downstream cells considered as SAV_3; Inflows are C-139 Basin

Simulation Type: Uncertainty Analysis

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	14.1	19.0	11.0
GM Outflow C (ppb)	12.8	17.3	10.0
Load Reduction %	94%	92%	95%
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	3	0.0%
Warning/Error Messages	13	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	1A	1B	2A	2B	3A	3B	4A	4B	5A	5B		
Vegetation Type	-->	EMG_3	SAV_3	EMG_3	SAV_3	EMG_3	SAV_3	EMG_3	SAV_3	EMG_3	SAV_3		
Inflow Fraction	-	0.190896424		0.1908964		0.1843939		0.1922898		0.2415235			
Downstream Cell Number	-	2		4		6		8		10			
Surface Area	km2	3.38	4.94	3.38	4.94	4.31	3.72	6.52	1.86	7.73	2.79		
Mean Width of Flow Path	km	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56	2.34	2.34		
Number of Tanks in Series	-	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	38.1	60.96	38.1	60.96	38.1	60.96	38.1	60.96	38.1	60.96		
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4	4	4	4	4	4	4	4		
Outflow Coefficient - Intercept	-	1	1	1	1	1	1	1	1	1	1		
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm												
Inflow Seepage Control Elev	cm												
Inflow Seepage Conc	ppb												
Outflow Seepage Rate	(cm/d) / cm	0.0075	0.0075										
Outflow Seepage Control Elev	cm	-46	-38										
Max Outflow Seepage Conc	ppb	20	20										
Seepage Recycle to Cell Number	-	1	2										
Seepage Recycle Fraction	-	1	1										
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	30	30	30	30	30	30	30	30	30	30		
Initial P Storage Per Unit Area	mg/m2	500	500	500	500	500	500	500	500	500	500		
Initial Water Column Depth	cm	200	200	200	200	200	200	200	200	200	200		
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3	3	3	3	3	3	3	3		
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22	22	22	22	22	22	22	22		
C2 = Conc at Half-Max Uptake	ppb	300	300	300	300	300	300	300	300	300	300		
K = Net Settling Rate at Steady State	m/yr	16.8	52.5	16.8	52.5	16.8	52.5	16.8	52.5	16.8	52.5		
Z1 = Saturated Uptake Depth	cm	40	40	40	40	40	40	40	40	40	40		
Z2 = Lower Penalty Depth	cm	100	100	100	100	100	100	100	100	100	100		
Z3 = Upper Penalty Depth	cm	200	200	200	200	200	200	200	200	200	200		

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	104.39	106.39	109.70	113.24	115.93	118.78	122.16	124.39	127.55	133.55			133.55
Run Date	-	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07			10/18/07
Starting Date for Simulation	-	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94			05/01/94
Starting Date for Output	-	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94			05/01/94
Ending Date	-	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07			04/30/07
Output Duration	days	4748	4748	4748	4748	4748	4748	4748	4748	4748	4748			4748
Cell Label		1A	1B	2A	2B	3A	3B	4A	4B	5A	5B			Total
Downstream Cell Label		1B	Outflow	2B	Outflow	3B	Outflow	4B	Outflow	5B	Outflow			-
Network Simulation Name	-	none	none	none	none	none	none	none	none	none	none			none
Simulation Type	-	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta			Uncerta
Surface Area	km2	3.38	4.94	3.38	4.94	4.31	3.72	6.52	1.86	7.73	2.79			43.58
Mean Rainfall	cm/yr	127.21	127.21	127.21	127.21	127.21	127.21	127.21	127.21	127.21	127.21			127.2
Mean ET	cm/yr	131.28	131.30	131.23	131.30	131.23	131.30	130.99	131.30	131.02	131.30			131.2
Cell Inflow Volume	hm3/yr	35.3	35.2	35.3	35.2	34.1	34.0	35.6	35.4	44.7	44.4			185.2
Cell Inflow Load	kg/yr	8081.3	3096.5	8081.3	3679.6	7806.1	2827.4	8140.3	2026.2	10224.6	2711.2			42334
Cell Inflow Conc	ppb	229	88	229	104	229	83	229	57	229	61			228.6
Treated Outflow Volume	hm3/yr	35.2	35.0	35.2	35.0	34.0	33.8	35.4	35.3	44.4	44.3			183.4
Treated Outflow Load	kg/yr	3096.5	389.4	3679.6	415.3	2827.4	434.0	2026.2	626.7	2711.2	723.9			2589
Treated FWM Outflow Conc	ppb	88	11	104	12	83	13	57	18	61	16			14.1
Upper Confidence Limit	ppb	102.9	13.8	124.9	15.1	104.0	16.9	76.0	25.3	80.2	23.0			19.0
Lower Confidence Limit	ppb	72.8	9.3	83.9	9.8	63.8	10.3	41.8	13.0	44.8	12.2			11.0
Total Outflow Volume + Bypass	hm3/yr	35.2	35.0	35.2	35.0	34.0	33.8	35.4	35.3	44.4	44.3			183.4
Total Outflow Load + Bypass	kg/yr	3096.5	389.4	3679.6	415.3	2827.4	434.0	2026.2	626.7	2711.2	723.9			2589.3
Total FWM Outflow Conc	ppb	87.9	11.1	104.5	11.9	83.2	12.8	57.3	17.8	61.0	16.3			14.1
Bypass Load	kg/yr	0	0	0	0	0	0	0	0	0	0			0.0
Bypass Load	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			0.0
Maximum Inflow	hm3/d	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.18	0.22	0.22			0.90
Maximum Outflow	hm3/d	0.17	0.17	0.17	0.17	0.17	0.17	0.18	0.18	0.22	0.22			0.91
Surface Load Reduction	kg/yr	5153	2872	4402	3264	4979	2393	6114	1399	7513	1987			39744
Load Trapped in Sediments	kg/yr	3956	2832	4514	3426	5121	2515	6328	1460	7767	2079			39998
Overall Load Reduction	%	62%	87%	54%	89%	64%	85%	75%	69%	73%	73%			94%
Lower Confidence Limit	%	0.6	0.9	0.5	0.9	0.5	0.8	0.7	0.7	0.7	0.7			92%
Upper Confidence Limit	%	0.7	0.9	0.6	0.9	0.7	0.8	0.8	0.7	0.8	0.7			95%
Daily Geometric Mean	ppb	91.1	6.2	110.0	6.3	84.7	7.0	55.5	10.9	59.7	9.7			#N/A
Outflow Geo Mean - Composites	ppb	82.9	10.2	97.2	10.8	76.8	11.7	52.5	16.0	56.0	14.8			12.8
Upper Confidence Limit	ppb	97.7	12.7	117.4	13.8	96.8	15.4	70.2	22.8	74.2	20.8			17.3
Lower Confidence Limit	ppb	68.0	8.6	77.2	8.9	58.3	9.3	38.0	11.8	40.7	11.1			10.0
Frequency Outflow Conc > 10 ppb	%	100%	62%	100%	69%	100%	77%	100%	92%	100%	85%			85%
Frequency Outflow Conc > 20 ppb	%	100%	0%	100%	0%	100%	0%	100%	15%	100%	15%			15%
Frequency Outflow Conc > 50 ppb	%	100%	0%	100%	0%	100%	0%	54%	0%	62%	0%			0%
Freq Outflow Volume > 10 ppb	%	100%	54%	100%	60%	100%	66%	100%	88%	100%	84%			75%
95th Percentile Outflow Conc	ppb	115.68	13.65	128.72	14.97	108.26	16.63	76.17	24.09	80.98	21.99			19
Mean Biomass P Storage	mg/m2	3607	570	4143	687	3692	668	3025	773	3129	734			2254
Storage Increase / Net Removal	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			0%
Net Storage Turnover Rate	1/yr	4.2	13.1	4.2	13.1	4.2	13.1	4.2	13.2	4.2	13.2			5.3
Unit Area P Load	mg/m2-yr	2391	627	2391	745	1810	759	1249	1088	1322	971			971
Unit Area P Removal	mg/m2-yr	1170	573	1335	694	1188	675	971	784	1004	744			918
Mean Water Load	cm/d	2.9	2.0	2.9	2.0	2.2	2.5	1.5	5.2	1.6	4.4			1.2
Max Water Load	cm/d	5.1	3.5	5.1	3.5	3.9	4.5	2.7	9.4	2.8	7.9			2.1
Mean Depth	cm	42	55	42	55	41	55	41	55	40	55			47
Minimum Depth	cm	1.4	22.8	1.2	22.6	1.2	23.2	1.2	23.7	1.2	23.7			10
Maximum Depth	cm	51.7	62.0	51.7	62.0	51.4	61.9	51.7	62.1	49.9	61.6			56
Frequency Depth < 10 cm	%	7%	0%	7%	0%	7%	0%	7%	0%	7%	0%			4.2%
Flow/Width	m2/day	62	62	62	62	60	60	62	62	52	52			59.3
HRT Days	days	14.5	28.4	14.5	28.4	19.0	22.1	27.6	10.6	25.3	12.6			40.4
Mean Velocity	cm/sec	0.17	0.13	0.17	0.13	0.17	0.12	0.18	0.13	0.15	0.11			0.15
Seepage Outflow / Total Outflow	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			0%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.0
95th Percentile Outflow Volume	hm3/d	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2			0.8
95th Percentile Outflow Load	kg/d	15.4	1.9	18.8	2.1	15.6	2.3	11.8	3.5	15.7	4.0			13.8
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A			#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A			#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A			#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A			#N/A
Range Check - Mean Depth	-		0.89		0.89		0.89		0.89		0.88			5
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-		0.38		0.38		0.37		0.38		0.32			5
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-		0.75		0.80		0.86							3
Water Balance Error	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%			0.00%
Mass Balance Error	%	0.00%	0.00%	-0.02%	0.00%	-0.01%	0.00%	-0.01%	0.00%	-0.01%	0.00%			-0.01%
Warning or Error Messages		Cell# 2 Depth out of calib. range for SAV_3: 55 vs. 62 - 87 cm Cell# 2 Flow/Width out of calib. range for SAV_3: 62 vs. 162 - 374 m2/day Cell# 2 Outflow Conc out of calib. range for SAV_3: 11 vs. 15 - 153 ppb Cell# 4 Depth out of calib. range for SAV_3: 55 vs. 62 - 87 cm Cell# 4 Flow/Width out of calib. range for SAV_3: 62 vs. 162 - 374 m2/day Cell# 4 Outflow Conc out of calib. range for SAV_3: 12 vs. 15 - 153 ppb Cell# 6 Depth out of calib. range for SAV_3: 55 vs. 62 - 87 cm Cell# 6 Flow/Width out of calib. range for SAV_3: 60 vs. 162 - 374 m2/day Cell# 6 Outflow Conc out of calib. range for SAV_3: 13 vs. 15 - 153 ppb Cell# 8 Depth out of calib. range for SAV_3: 55 vs. 62 - 87 cm							Cell# 8 Flow/Width out of calib. range for SAV_3: 62 vs. 162 - 374 m2/day Cell# 10 Depth out of calib. range for SAV_3: 55 vs. 62 - 87 cm Cell# 10 Flow/Width out of calib. range for SAV_3: 52 vs. 162 - 374 m2/day			13

STA-6

DMSTA2- Inputs & Outputs Project: STA 6 EIS Model Release: 07/05/07 Current Date: 10/18/2007

Input Variable	Units	Value	Case Description:
Design Case Name	-	EIS Alt1	STA-6 3 flow-ways
Input Series Name		TS_EIS_Alt1	Inflows are a mixture of C-139 Basin and C-139 Annex (USSO)
Starting Date for Simulation	-	05/01/94	
Ending Date for Simulation	-	04/30/07	
Starting Date for Output	-	05/01/94	
Integration Steps Per Day	-	4	
Number of Iterations	-	0	
Output Averaging Interval	days	365	
Inflow Conc Scale Factor	-	1	
Rainfall P Conc	ppb	10	
Atmospheric P Load (Dry)	mg/m2-yr	20	

Simulation Type: Uncertainty Analysis

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	12.9	16.9	10.2
GM Outflow C (ppb)	12.4	16.3	9.8
Load Reduction %	91%	88%	93%
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	3	0.0%
Warning/Error Messages	8	

Cell Number -->	1	2	3	4	5	6	7	8	9	10	11	12
Cell Label -	3	5	2	4								
Vegetation Type -->	PEW_3	PEW_3	EMG_3	SAV_3								
Inflow Fraction -	0.0865	0.2301	0.6835									
Downstream Cell Number -			4									
Surface Area km2	0.99	2.64	2.23	5.62								
Mean Width of Flow Path km	0.61	1.31	1.14	2.39								
Number of Tanks in Series -	3.0	3.0	3.0	3.0								
Minimum Depth for Releases cm												
Release 1 Series Name												
Release 2 Series Name												
Outflow Series Name												
Depth Series Name												
Outflow Control Depth cm	28.3464	35.3568	38.1	48.8								
Outflow Weir Depth cm												
Outflow Coefficient - Exponent -	4	4	4	4								
Outflow Coefficient - Intercept -	1	1	1	1								
Bypass Depth cm												
Maximum Inflow hm3/day												
Maximum Outflow hm3/day												
Inflow Seepage Rate (cm/d) / cm												
Inflow Seepage Control Elev cm												
Inflow Seepage Conc ppb												
Outflow Seepage Rate (cm/d) / cm												
Outflow Seepage Control Elev cm												
Max Outflow Seepage Conc ppb												
Seepage Recycle to Cell Number -												
Seepage Recycle Fraction -												
Seepage Discharge Fraction -												
Initial Water Column Conc ppb	30	30	30	30								
Initial P Storage Per Unit Area mg/m2	500	500	500	500								
Initial Water Column Depth cm	200	200	200	200								
C0 = Conc at 0 g/m2 P Storage ppb	3	3	3	3								
C1 = Conc at 1 g/m2 P storage ppb	22	22	22	22								
C2 = Conc at Half-Max Uptake ppb	300	300	300	300								
K = Net Settling Rate at Steady Stat¢ m/yr	34.9	34.9	16.8	52.5								
Z1 = Saturated Uptake Depth cm	40	40	40	40								
Z2 = Lower Penalty Depth cm	100	100	100	100								
Z3 = Upper Penalty Depth cm	200	200	200	200								

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	9.15	9.92	10.69	11.46									11.46
Run Date	-	10/18/07	10/18/07	10/18/07	10/18/07									10/18/07
Starting Date for Simulation	-	05/01/94	05/01/94	05/01/94	05/01/94									05/01/94
Starting Date for Output	-	05/01/94	05/01/94	05/01/94	05/01/94									05/01/94
Ending Date	-	04/30/07	04/30/07	04/30/07	04/30/07									04/30/07
Output Duration	days	4748	4748	4748	4748									4748
Cell Label		3	5	2	4									Total
Downstream Cell Label		Outflow	Outflow	4	Outflow									-
Network Simulation Name	-	none	none	none	none									none
Simulation Type	-	Uncerta	Uncerta	Uncerta	Uncerta									Uncerta
Surface Area	km2	0.99	2.64	2.23	5.62									11.47
Mean Rainfall	cm/yr	129.55	129.55	129.55	129.55									129.5
Mean ET	cm/yr	130.68	130.68	130.68	130.68									130.7
Cell Inflow Volume	hm3/yr	6.6	17.5	51.9	51.9									76.0
Cell Inflow Load	kg/yr	921.5	2451.2	7281.1	4779.1									10654
Cell Inflow Conc	ppb	140	140	140	92									140.2
Treated Outflow Volume	hm3/yr	6.6	17.5	51.9	51.8									75.9
Treated Outflow Load	kg/yr	108.5	282.5	4779.1	586.0									977
Treated FWM Outflow Conc	ppb	17	16	92	11									12.9
Upper Confidence Limit	ppb	22.6	22.1	101.4	14.4									16.9
Lower Confidence Limit	ppb	12.4	12.2	81.5	9.2									10.2
Total Outflow Volume + Bypass	hm3/yr	6.6	17.5	51.9	51.8									75.9
Total Outflow Load + Bypass	kg/yr	108.5	282.5	4779.1	586.0									977.1
Total FWM Outflow Conc	ppb	16.5	16.2	92.1	11.3									12.9
Bypass Load	kg/yr	0	0	0	0									0.0
Bypass Load	%	0%	0%	0%	0%									0.0
Maximum Inflow	hm3/d	0.03	0.08	0.23	0.23									0.34
Maximum Outflow	hm3/d	0.03	0.08	0.23	0.23									0.34
Surface Load Reduction	kg/yr	813	2169	2502	4193									9677
Load Trapped in Sediments	kg/yr	846	2256	2575	4378									10055
Overall Load Reduction	%	88%	88%	34%	88%									91%
Lower Confidence Limit	%	0.8	0.8	0.3	0.9									88%
Upper Confidence Limit	%	0.9	0.9	0.4	0.9									93%
Daily Geometric Mean	ppb	15.5	13.5	88.5	7.4									#N/A
Outflow Geo Mean - Composites	ppb	16.0	15.6	89.9	10.8									12.4
Upper Confidence Limit	ppb	22.0	21.4	99.5	13.8									16.3
Lower Confidence Limit	ppb	12.0	11.8	79.1	8.8									9.8
Frequency Outflow Conc > 10 ppb	%	100%	100%	100%	62%									92%
Frequency Outflow Conc > 20 ppb	%	8%	8%	100%	0%									8%
Frequency Outflow Conc > 50 ppb	%	0%	0%	100%	0%									0%
Freq Outflow Volume > 10 ppb	%	98%	95%	100%	53%									72%
95th Percentile Outflow Conc	ppb	20.11	19.54	107.88	13.59									15
Mean Biomass P Storage	mg/m2	1279	1282	3616	775									1487
Storage Increase / Net Removal	%	0%	0%	0%	0%									0%
Net Storage Turnover Rate	1/yr	8.7	8.7	4.2	13.1									7.7
Unit Area P Load	mg/m2-yr	929	928	3269	851									929
Unit Area P Removal	mg/m2-yr	852	854	1156	780									876
Mean Water Load	cm/d	1.8	1.8	6.4	2.5									1.8
Max Water Load	cm/d	3.0	3.0	10.5	4.2									3.0
Mean Depth	cm	36	40	52	51									47
Minimum Depth	cm	12.3	19.3	23.2	33.8									27
Maximum Depth	cm	43.2	46.7	62.7	56.1									54
Frequency Depth < 10 cm	%	0%	0%	0%	0%									0.0%
Flow/Width	m2/day	29	37	125	59									64.3
HRT Days	days	20.0	22.3	8.2	20.1									26.2
Mean Velocity	cm/sec	0.09	0.10	0.28	0.14									0.15
Seepage Outflow / Total Outflow	%	0%	0%	0%	0%									0%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00									0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00									0.0
95th Percentile Outflow Volume	hm3/d	0.0	0.1	0.2	0.2									0.3
95th Percentile Outflow Load	kg/d	0.5	1.2	19.8	2.6									4.2
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A	#N/A									#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A	#N/A									#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A	#N/A									#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A	#N/A									#N/A
Range Check - Mean Depth	-	0.97			0.82									2
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-	0.43	0.53		0.37									3
Range Check - Inflow Conc	-	1.28	1.28											2
Range Check - Outflow Conc	-				0.76									1
Water Balance Error	%	0.00%	0.00%	0.00%	0.00%									0.00%
Mass Balance Error	%	0.00%	0.00%	0.00%	0.00%									0.00%
Warning or Error Messages		Cell# 1 Depth out of calib. range for PEW_3: 36 vs. 38 - 66 cm Cell# 1 Flow/Width out of calib. range for PEW_3: 29 vs. 69 - 276 m2/day Cell# 1 Inflow Conc out of calib. range for PEW_3: 140 vs. 8 - 110 ppb Cell# 2 Flow/Width out of calib. range for PEW_3: 37 vs. 69 - 276 m2/day Cell# 2 Inflow Conc out of calib. range for PEW_3: 140 vs. 8 - 110 ppb Cell# 4 Depth out of calib. range for SAV_3: 51 vs. 62 - 87 cm Cell# 4 Flow/Width out of calib. range for SAV_3: 59 vs. 162 - 374 m2/day Cell# 4 Outflow Conc out of calib. range for SAV_3: 11 vs. 15 - 153 ppb												8

STA Phosphorus Modeling For the 2010 Planning Period: Alternative E

Work Order No. CN040902-WO03R2

Prepared for

US Army Corps of Engineers®

South Florida Water Management District

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FINAL REPORT

December 23, 2007

December 23, 2007

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U.S. Army Corps of Engineers
South Florida Water Management District
Tetra Tech Contract No. CN040902-WO03R2
STA Phosphorus Modeling for the 2010 Period: Alternative E

Dear Ms. Gracie:

I am pleased to submit this final report titled "STA Phosphorus Modeling for the 2010 Planning Period: Alternative E". This document constitutes the final deliverable for the Tetra Tech EC Purchase Order 1027531 dated December 17, 2007.

I gratefully acknowledge the valuable technical review by Tetra Tech EC and by staff of the U. S. Army Corps of Engineers, in the development of the information contained in this report.

Certification

I hereby certify, as a Professional Engineer in the State of Florida, that the information in this document was assembled under my direct personal charge. This report is not intended or represented to be suitable for reuse without specific verification or adaptation by the Engineer. This certification is made in accordance with the provisions of the Laws and Rules of the Florida Board of Professional Engineers under Chapter 61G15-29, Florida Administrative Code.

_____
Gary F. Goforth, P.E. Florida P.E. # 35525

Date: 12/23/07
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1. Introduction

As part of the evaluation of alternatives for the Environmental Impact Statement (EIS) associated with the full build-out of Compartments B and C, the phosphorus removal performance of the Stormwater Treatment Areas (STAs) were projected for the 2010 planning period. Alternatives A-D were simulated for the EIS using the DMSTA model (Walker and Kadlec 2005), and Alternative E was projected using a steady-state design model (Burns & McDonnell 2005). The steady-state design model utilizes long-term average annual inflow volumes and input loads, as well as and adjusted settling rate calibrated from similar DMSTA simulations. Long-term average annual flows and phosphorus loads from Alternative A (the No Action Alternative) were used for the input data for Alternative E. This report presents the results of the STA performance projections for Alternative E. Additional details of the input data set and model setup are provided in Sections 2-9 of this report.

1.1. Scope of Work

This work constitutes Task 7 of CN040902-WO03.Ta18 - Preparation of an Environmental Impact Statement for Everglades Agricultural Area Conveyance and Regional Treatment Project Plus Compartments B and C - between the District and Tetra Tech EC, Inc. This work is being performed under Purchase Order No. 1027531, which was issued on December 17, 2007, between Tetra Tech EC, Inc., and Gary Goforth, Inc.

The scope of work for this Purchase Order consists of conducting DMSTA modeling for the five alternatives being evaluated for the Environmental Impact Statement associated with the full build-out of Compartments B and C. To expedite the preparation of the EIS, separate reports were generated for each alternative summarizing the phosphorus performance projections. This report presents the results of the performance projections for Alternative E; other reports address the other alternatives.

1.2. Regional Conditions for the 2010 Planning Period

This present analysis focuses on the regional conditions that are anticipated to be present in the 2010 time frame, excluding the full build-out of Compartments B and C. In lieu of utilizing the available area within Compartments B and C, this alternative evaluates treatment wetlands (STAs) on additional parcels of land. The acreage of additional treatment area was determined by calculating the area necessary to achieve an overall average phosphorus loading rate (PLR) of 1.17 g/m^2/yr, equal to the average PLR for Alternatives B, C and D. Phosphorus load rates were balanced among the existing STAs to achieve this target PLR, and an estimate of additional treatment area required to treat the remaining phosphorus loads was calculated. No specific locations, canal improvements or other capital improvements were identified in this work effort. A sensitivity analysis of the PLR on the phosphorus

performance was conducted, utilizing a PLR range of 1.0 – 1.5 g/m^2/yr. The anticipated status of the water resources projects within the basins tributary to the STAs (shown in **Figure 1-1**) is provided in the **Table 1-1**. Appendix A contains a complete summary of the key modeling assumptions used in the simulations for the EIS.

Figure 1-1: Overview of EAA And Surrounding Basins.

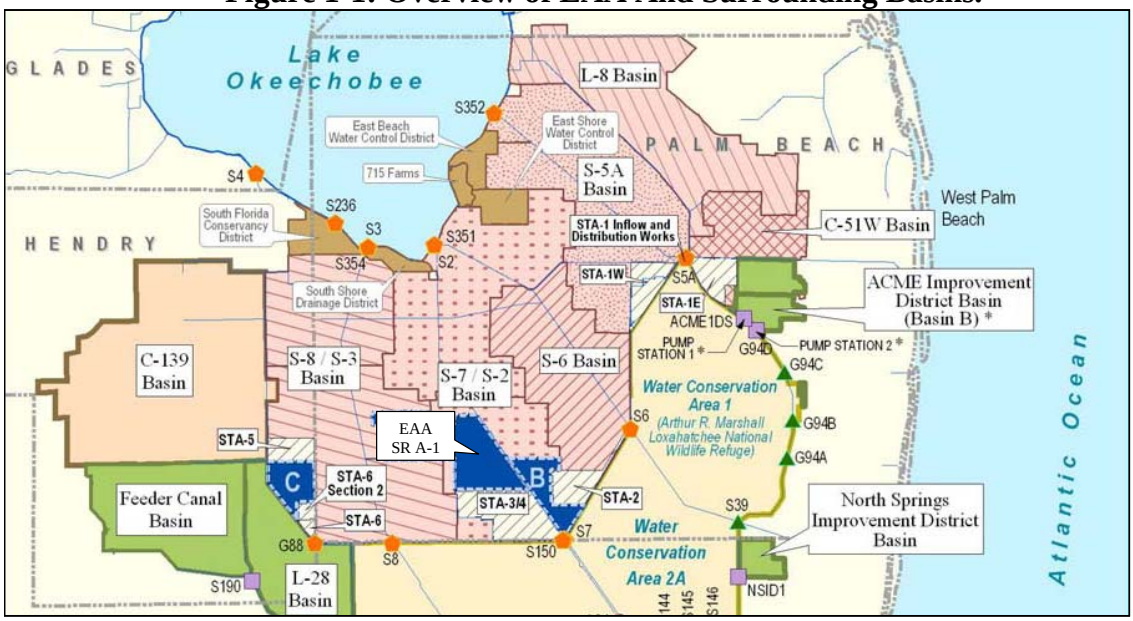


Table 1-1: Anticipated Status of Regional Water Resource Projects in the 2010 Period.

Project	Status During the 2010 Period
Original Everglades Construction Project	All 6 STAs are fully operational, including STA-6 Section 2. Approximately 20% of the S-5A Basin runoff diverted to the Hillsboro Canal through existing facilities. Ch. 298 District and 715 Farms diversions in place. No EAA runoff reduction adjustment necessary to account for Best Management Practices.
Compartment B	Cell 4 of STA-2 is fully operational, and is the only operational component of Compartment B.
Compartment C	Flow-way 3 of STA-5 is fully operational, and is the only operational component of Compartment C.
EAA Storage Reservoir A-1	16,000-acre reservoir operable with a 12-ft depth
Acme Basin B	Runoff directed away from WCA-1 and discharged to C-51W, and then to STA-1E
L-8 Reservoir	Partially completed: 870 acres, depth 44 ft. Facilities not completed for diversion away from S-5A/C-51W.
Everglades Agricultural Area Conveyance and Regional Treatment Project (ECART)	Not completed

1.3. Phosphorus Modeling

Projections of phosphorus removal for Alternative E were performed using the Steady-State Design Model (SSDM) (Kadlec and Knight 1996). The phosphorus reduction equations of the SSDM are described below.

$$\frac{(C_o - C^*)}{(C_i - C^*)} = \left[\frac{1}{\left(1 + \frac{K}{Qn}\right)}\right]^n \qquad (1)$$

Where

C_o = flow weighted mean outflow concentration (mg/l of total phosphorus)
C_i = flow weighted mean inflow concentration (mg/l of total phosphorus)
C* = probable lowest water column concentration in a steady state system
Q = hydraulic loading rate (m/yr)
K = net first-order removal rate in a steady state system (m/yr)
n = number of continuously stirred tank reactors (CSTRs) in series

with $Q=V/A$ (2)

where V = long-term average annual inflow volume
A = effective treatment area

Solving for A yields

$$A = \frac{Vn}{K}\left\{\left[\frac{(C_i - C^*)}{(C_o - C^*)}\right]^{1/n} - 1\right\} \qquad (3)$$

Calibration of the settling rate, K, is facilitated by adjusting K until the treatment area and projected outflow concentration matches the values from in the DMSTA results for the previous alternatives (see **Table 1-2**). Using Equation (3) with K values derived from STA performance may yield overly optimistic performance forecasts relative to DMSTA, a reflection of DMSTA's ability to consider pulsed flows and atmospheric deposition, which become more important as the outflow concentrations decrease. When evaluating the DMSTA results, and any SSDM result that is calibrated from DMSTA projections, particular attention needs to be given to the projected outflow concentration, in that DMSTA does not constrain the reported values to minimum levels observed in full-scale systems. In other words, the models may forecast outflow concentrations lower than have been observed in the field. In addition, forecast error is inherent when using any forecasting model. These errors result from limitations of the calibration datasets (measurement error, short duration, etc.) and other sources that are difficult to quantify. Based on information from the DMSTA

website (http://www.wwwalker.net/DMSTA/index.htm) and Walker (personal communication), the DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. Since the DMSTA forecasts were the basis of the calibration for SSDM, the SSDM forecast error is at least as great as +/-23% of the expected value.

Table 1-2: Results of the Adjusted Settling Rate Calibrations.

DMSTA Results	STA	V AF/yr	TP Load kg/yr	n	K_{adj} m/yr	C_i ppb	C_o ppb	C* ppb	A ac	PLR g/m2/yr	Reported ac	Difference %
AltA	STA-1E	193,812	42,021	6	33.50	175.8	20.0	4	5,132	2.02	5,132	0%
	STA-1E	193,812	42,021	6	27.65	175.8	26.8	4	5,128	2.02	5,132	0%
	STA-1E	193,812	42,021	6	22.65	175.8	35.3	4	5,132	2.02	5,132	0%
AltA	STA-1W	243,799	54,580	6	31.65	181.5	21.3	4	6,676	2.02	6,670	0%
	STA-1W	243,799	54,580	6	26.90	181.5	27.3	4	6,668	2.02	6,670	0%
	STA-1W	243,799	54,580	6	22.60	181.5	34.9	4	6,670	2.02	6,670	0%
AltB	STA-2	186,096	24,881	6	25.35	108.4	14.2	4	6,354	0.97	6,338	0%
	STA-2	186,096	24,881	6	21.75	108.4	17.5	4	6,354	0.97	6,338	0%
	STA-2	186,096	24,881	6	18.35	108.4	21.8	4	6,357	0.97	6,338	0%
AltA	STA-2	309,734	42,788	6	29.45	112.0	16.7	4	8,242	1.28	8,240	0%
	STA-2	309,734	42,788	6	24.90	112.0	20.9	4	8,237	1.28	8,240	0%
	STA-2	309,734	42,788	6	20.80	112.0	26.1	4	8,239	1.28	8,240	0%
AltC	STA-2	302,390	41,822	6	30.50	112.1	21.9	4	6,335	1.63	6,338	0%
	STA-2	302,390	41,822	6	25.25	112.1	27.5	4	6,341	1.63	6,338	0%
	STA-2	302,390	41,822	6	20.78	112.1	34.0	4	6,337	1.63	6,338	0%
AltB	STA-3/4	610,797	64,343	6	23.95	85.4	17.1	4	16,592	0.96	16,543	0%
LO=100	STA-3/4	610,797	64,343	6	20.40	85.4	20.6	4	16,608	0.96	16,543	0%
	STA-3/4	610,797	64,343	6	17.23	85.4	24.7	4	16,612	0.96	16,543	0%
AltA	STA-3/4	672,549	71,638	6	26.65	86.4	17.1	4	16,540	1.07	16,543	0%
	STA-3/4	672,549	71,638	6	22.73	86.4	20.6	4	16,549	1.07	16,543	0%
	STA-3/4	672,549	71,638	6	19.23	86.4	24.7	4	16,545	1.07	16,543	0%
AltC	STA-3/4	589,905	62,012	6	23.75	85.2	16.6	4	16,537	0.93	16,543	0%
	STA-3/4	589,905	62,012	6	20.27	85.2	20.0	4	16,544	0.93	16,543	0%
	STA-3/4	589,905	62,012	6	17.15	85.2	24.0	4	16,544	0.93	16,543	0%
AltA	STA-3/4	672,549	82,860	6	25.43	99.9	20.4	4	16,544	1.24	16,543	0%
LO=150	STA-3/4	672,549	82,860	6	21.40	99.9	25.0	4	16,546	1.24	16,543	0%
	STA-3/4	672,549	82,860	6	17.88	99.9	30.3	4	16,543	1.24	16,543	0%
AltB	STA-3/4	610,797	79,937	6	24.34	106.1	20.1	4	16,537	1.19	16,543	0%
LO=150	STA-3/4	610,797	79,937	6	20.63	106.1	24.6	4	16,548	1.19	16,543	0%
	STA-3/4	610,797	79,937	6	17.33	106.1	29.9	4	16,549	1.19	16,543	0%
AltC	STA-3/4	589,905	74,425	6	23.89	102.3	19.1	4	16,539	1.11	16,543	0%
LO=150	STA-3/4	589,905	74,425	6	20.32	102.3	23.3	4	16,539	1.11	16,543	0%
	STA-3/4	589,905	74,425	6	17.10	102.3	28.3	4	16,538	1.11	16,543	0%

As there was no SFWMM simulation for Alternative E, it was necessary to post-process the Alternative A flows and loads to account for the conversion of lands to additional STAs. For the new STAs serving the STA-1E and STA-1W basins, the flows and loads were reduced in proportion to the combined basins' acreage (183,912 acres) converted for use as an STA, e.g., if an additional 5,000 acres were converted to an STA, the total basins' flows and loads were reduced by (5,000 / 183,912) = 2.7%. For the new STA serving the STA-2 and STA-3/4 basins, there was no reduction in inflows due to: 1) the STA acreage would be very small relative to the combined basins' acreage and 2) much of the inflows are from Lake

Okeechobee releases which would not be affected by the acreage of new STAs. For the new STA serving the STA-5 and STA-6 basins, the C-139 Basin flows and loads were reduced in proportion to the acreage converted for use as an STA, assuming that the new STA would be located in the C-139 Basin, and not the C-139 Annex. Specific adjustments to the Alternative A flows and loads are presented in Sections 2-9.

The sizing and phosphorus removal performance of stormwater treatment areas is highly sensitive to the PLR. To ensure a valid comparison to the other alternatives, a PLR of 1.17 $g/m^2/yr$ was selected as the base condition for Alternative E; this was the average PLR of Alternatives B, C and D. A sensitivity analysis of the PLR on the phosphorus performance was conducted, utilizing a PLR range of 1.0 – 1.5 $g/m^2/yr$. The PLR for each treatment area was achieved either by diverting inflows (e.g., from STA-1E and STA-1W) or increasing inflows (e.g., to STA-3/4) relative to the long-term average annual values from Alternative A. An estimate of the additional treatment area was calculated based on the balance of the total inflow volumes and phosphorus loads according to the following equation

Additional area (acres) = Excess phosphorus loads (kg/yr) / PLR / 4.047 (conversion factor)

In all cases, STA-5 and STA-6 were treated separate due to the different nature of their tributary watershed water quality and treatment characteristics.

In order to forecast phosphorus removal performance of the additional treatment areas, it was necessary to estimate an adjusted settling rate for use in the SSDM. Based on the calibration described above for STA-1E, STA-1W, STA-2 and STA-3/4, a relationship between PLR and the adjusted settling rate was derived (see **Figure 1-2**). This relationship was subsequently utilized for estimating the adjusted settling rate for the new STAs under each of the three PLR scenarios (1.0, 1.17 and 1.5 $g/m^2/yr$). The validity of using this relationship was evaluated by verifying the forecast phosphorus concentrations with those from the DMSTA simulations from the prior alternatives (see **Table 1-3**). For STA-1E and STA-1W the equation in Figure 1-2 was used to establish the adjusted settling rate for the forecasts of phosphorus reduction using the reduced inflows for each PLR scenario. For STA-2 and STA-3/4, the adjusted settling rate from the PLR relationship yielded slightly lower phosphorus concentrations than the DMSTA simulations, and hence the phosphorus removal for each PLR scenario was modeled using the adjusted settling rate of the closest PLR from the previous DMSTA simulations presented in Table 1-2. The performance of STA-5 and STA-6 are considered unique due to site-specific conditions and tributary water quality, and hence were not considered appropriate for establishing a general relationship for new STAs. In recognition that no available land is present south of STA-5, the new treatment areas in the STA-5/6 basin were assumed to have similar phosphorus removal performance as was simulated for STA-5.

Implicit in the use of these adjusted settling rate values is that the new STAs will be constructed and operated similar to the STAs simulated in the other alternatives:

1. multiple flow-ways with two treatment cells in series: the upstream cell dominated by emergent vegetation followed by a treatment cell dominated by submerged aquatic vegetation (SAV), and
2. treatment area hydraulics and associated phosphorus reduction described by six continuously stirred tank reactors (CSTRs) in series.

Figure 1-2: Relationship Between Adjusted K and the PLR.

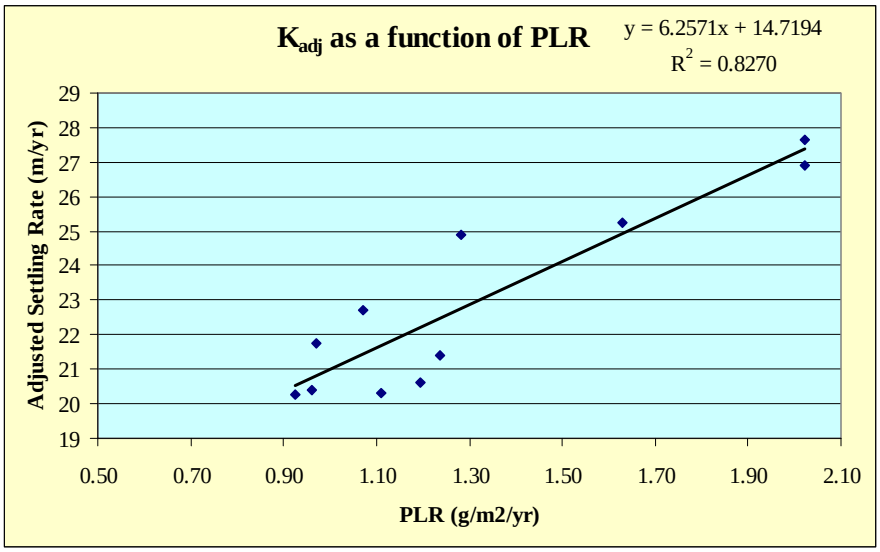


Table 1-3: Results of Verification Analysis.

Alternative Case	STA	TP Load kg/yr	n	PLR g/m2/yr	K_{adj} m/yr	C_i ppb	A ac	C_o ppb	$C_{o\ DMSTA}$ ppb	Result
AltA verification	STA-1E	42,021	6	2.02	32.8	175.8	5,132	21	20	
	STA-1E	42,021	6	2.02	27.4	175.8	5,132	27	27	Good
	STA-1E	42,021	6	2.02	22.7	175.8	5,132	35	35	Use eqn.
AltA verification	STA-1W	54,580	6	2.02	32.8	181.5	6,670	20	21	
	STA-1W	54,580	6	2.02	27.4	181.5	6,670	27	27	Good
	STA-1W	54,580	6	2.02	22.7	181.5	6,670	35	35	Use eqn.
AltA verification	STA-2	42,788	6	1.28	26.9	112.0	8,240	19	17	Not good
	STA-2	42,788	6	1.28	22.7	112.0	8,240	23	21	Use closest
	STA-2	42,788	6	1.28	19.1	112.0	8,240	29	26	DMSTA run
AltA verification	STA-3/4	71,638	6	1.07	25.2	86.4	16,543	18	17	Not good
	STA-3/4	71,638	6	1.07	21.4	86.4	16,543	22	21	Use closest
	STA-3/4	71,638	6	1.07	18.0	86.4	16,543	26	25	DMSTA run

In addition, STA performance uncertainty analyses were conducted, using the 10%, mean and 90% values of the settling rates for the specific vegetation types as utilized in DMSTA. The following relationships between 10%, median and 90% estimated of the adjusted settling rate were derived from the calibration information presented in Table 1-2. These relationships were subsequently utilized for estimating the 10% and 90% adjusted settling rate for the new STAs.

Figure 1-3: Deriving the Relationship for the Lower Confidence Limit of K.

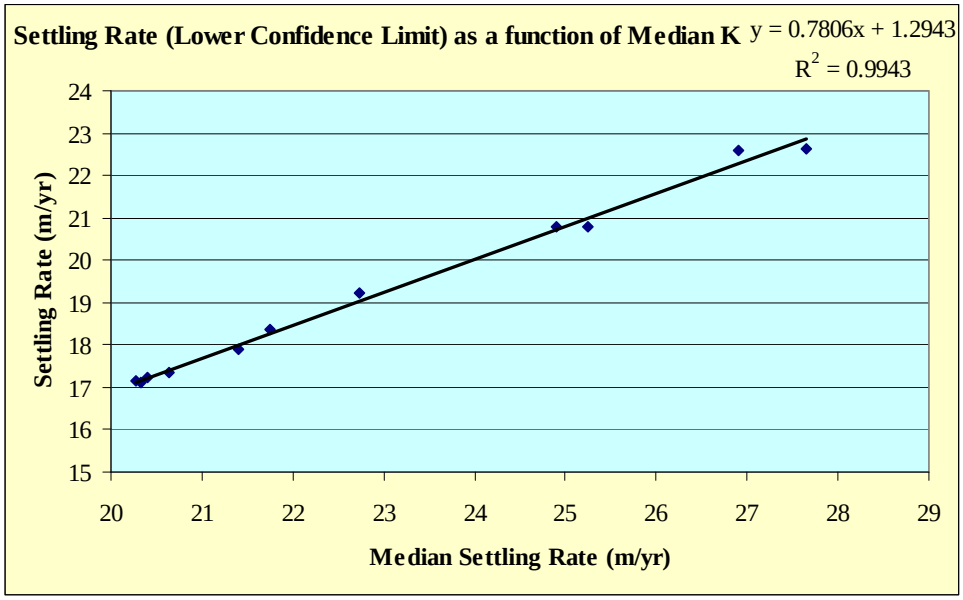
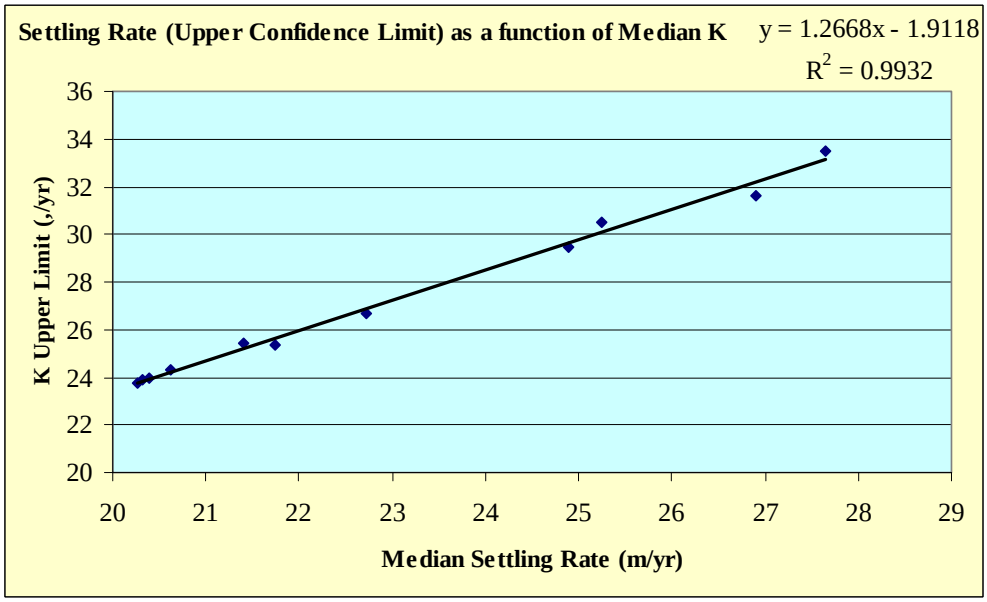


Figure 1-4: Deriving the Relationship for the Upper Confidence Limit of K.

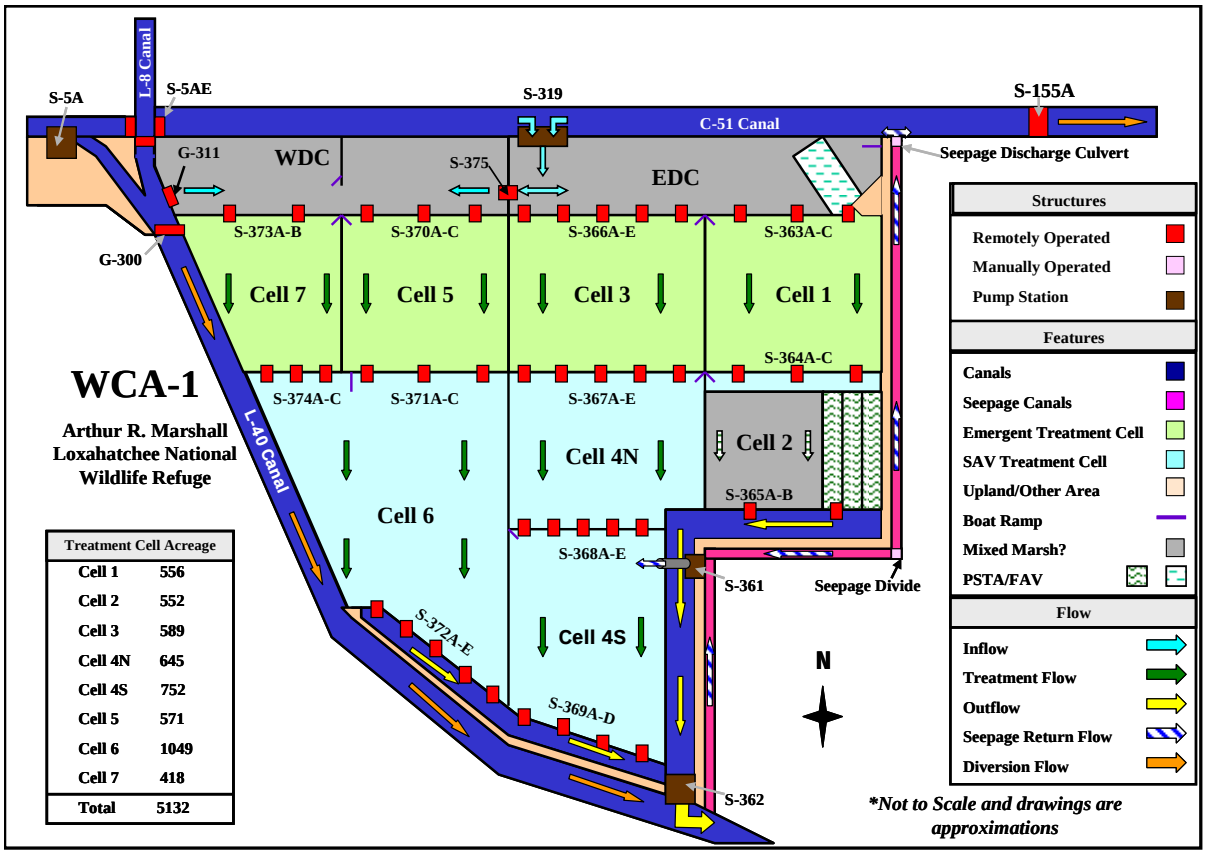


As an analysis of the sensitivity of the STA-3/4 performance to the phosphorus concentration of Lake Okeechobee releases, the base condition (i.e., PLR – 1.17 g/m^2/yr) analyses were repeated for the assumption that the phosphorus concentration of Lake releases is 150 ppb at the inflow to the reservoir.

2. STA-1E

Working in concert with STA-1W, STA-1E will capture and treat runoff from the C-51 Basin, Acme Basin B, L-8 Basin, S-5A Basin and the East Beach Water Control District (EBWCD). A schematic of STA-1E is presented in **Figure 2-1**.

Figure 2-1: Schematic of STA-1E (Not to Scale).



A description of the existing STA was provided in the report for Alternative A and will not be repeated here. The long-term average annual flows and loads for the No Action Alternative (i.e., Alternative A) were utilized for use in the SSDM, adjusted for each PLR scenario, and are summarized in the table below.

Table 2-1: Summary of Long-term Average Annual Inflow to STA-1E.

Alternative	Parameter	Unit	STA-1E
AltA	Treat. Area	acres	5,132
	Volume	AF/yr	193,812
	TP Load	kg/yr	42,021
	TP Conc	ppb	176
	PLR	g/m2/yr	2.0
	HLR	cm/d	3.2
Phosphorus Loading Rate =		1.0	
AltE-1	Treat. Area	acres	5,132
	Volume	AF/yr	95,794
	TP Load	kg/yr	20,769
	TP Conc	ppb	176
	PLR	g/m2/yr	1.0
	HLR	cm/d	1.6
Phosphorus Loading Rate =		1.17	
AltE-1.17	Treat. Area	acres	5,132
	Volume	AF/yr	112,079
	TP Load	kg/yr	24,300
	TP Conc	ppb	176
	PLR	g/m2/yr	1.17
	HLR	cm/d	1.8
Phosphorus Loading Rate =		1.5	
AltE-1.5	Treat. Area	acres	5,132
	Volume	AF/yr	143,691
	TP Load	kg/yr	31,154
	TP Conc	ppb	176
	PLR	g/m2/yr	1.5
	HLR	cm/d	2.3

A summary of the estimated STA-1E phosphorus performance for the Alternative E base condition (PLR=1.17 g/m^2/yr) is presented in the table below. A copy of the SSDM output is presented in Appendix B for each PLR scenario. A long-term flow-weighted mean outflow concentration range of 15-22 ppb was forecast, however this may be optimistic, as currently the best performing STA is only achieving 19 ppb, with a standard deviation of 5 ppb on annual values.

Table 2-2: Summary of SSDM Results for STA-1E (PLR=1.17 g/m^2/yr).

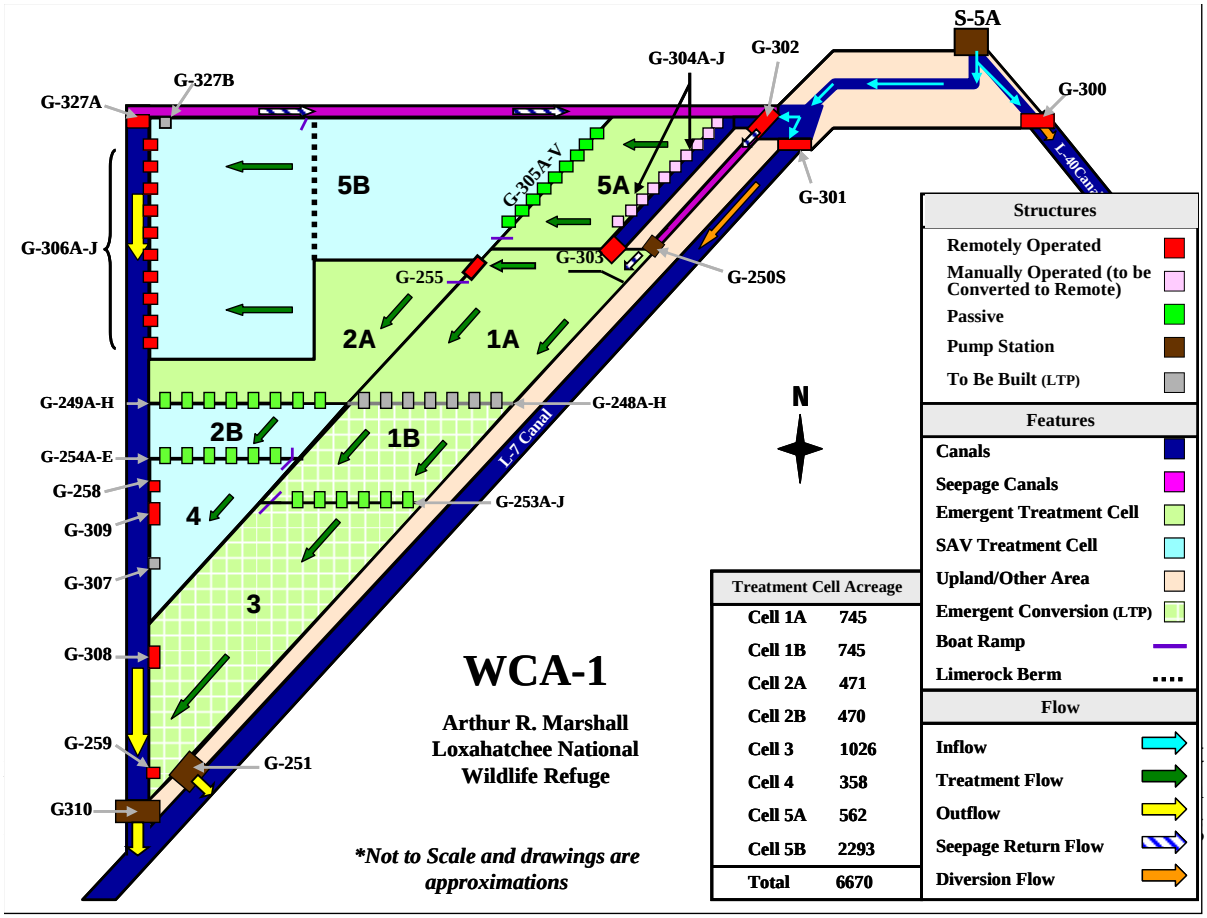
Parameter	Unit	STA-1E
Effective Treatment Area	acres	5,132
Average Annual Inflow		
Volume	AF/yr	112,079
TP Load	kg/yr	24,300
TP Concentration	ppb	176
Average Annual Outflow		
Volume	AF/yr	110,317
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	15.0
Mean Estimate of Settling Rate	ppb	16.3
Lower Conf. Limit for Settling Rate	ppb	21.5
TP Load (Using Mean TP Conc.)	kg/yr	2,216
Diversion Volumes and Loads		
Volume	AF/yr	25,545
TP Load	kg/yr	3,037
TP Concentration	ppb	96

Notes: 1. The SSDM forecast error for flow-weighted mean concentrations is at least +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.
2. Diversions related to STA-1E are directed to eastern C-51.

3. STA-1W

Working in concert with STA-1E, STA-1W will capture and treat runoff from the S-5A Basin, East Beach Water Control District (EBWCD), L-8 Basin and a portion of C-51 Basin, Acme Basin B when re-directed from STA-1E. A schematic of STA-1W is presented in **Figure 3-1**.

Figure 3-1: Schematic of STA-1W (Not to Scale).



A description of the existing STA was provided in the report for Alternative A and will not be repeated here. The long-term average annual flows and loads for the No Action Alternative (i.e., Alternative A) were utilized for use in the SSDM, adjusted for each PLR scenario, and are summarized in the table below.

Table 3-1: Summary of Long-term Average Annual Inflow to STA-1W.

Alternative	Parameter	Unit	STA-1W
AltA	Treat. Area	acres	6,670
	Volume	AF/yr	243,799
	TP Load	kg/yr	54,580
	TP Conc	ppb	181
	PLR	g/m2/yr	2.0
	HLR	cm/d	3.1
Phosphorus Loading Rate =		1.0	
AltE-1	Treat. Area	acres	6,670
	Volume	AF/yr	120,574
	TP Load	kg/yr	26,993
	TP Conc	ppb	181
	PLR	g/m2/yr	1.0
	HLR	cm/d	1.5
Phosphorus Loading Rate =		1.17	
AltE-1.17	Treat. Area	acres	6,670
	Volume	AF/yr	141,072
	TP Load	kg/yr	31,582
	TP Conc	ppb	181
	PLR	g/m2/yr	1.17
	HLR	cm/d	1.8
Phosphorus Loading Rate =		1.5	
AltE-1.5	Treat. Area	acres	6,670
	Volume	AF/yr	180,862
	TP Load	kg/yr	40,490
	TP Conc	ppb	181
	PLR	g/m2/yr	1.5
	HLR	cm/d	2.3

A summary of the estimated STA-1W phosphorus performance for the Alternative E base condition (PLR=1.17 g/m^2/yr) is presented in the table below. A copy of the SSDM output is presented in Appendix B for each PLR scenario. A long-term flow-weighted mean outflow concentration range of 15-21 ppb was forecast, however this may be optimistic, as currently the best performing STA is only achieving 19 ppb, with a standard deviation of 5 ppb on annual values.

Table 3-2: Summary of SSDM Results for STA-1W (PLR=1.17 g/m^2/yr).

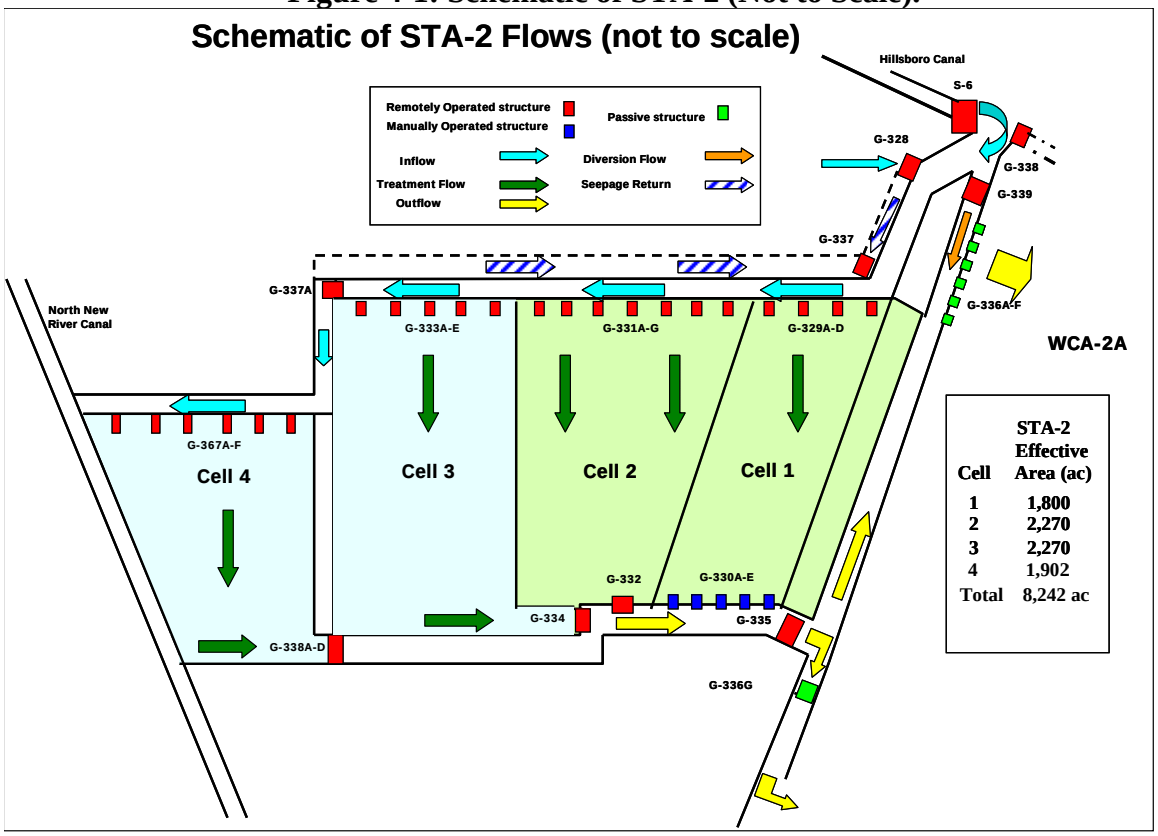
Parameter	Unit	STA-1W
Effective Treatment Area	acres	6,670
Average Annual Inflow		
Volume	AF/yr	141,072
TP Load	kg/yr	31,582
TP Concentration	ppb	181
Average Annual Outflow		
Volume	AF/yr	142,095
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	15.0
Mean Estimate of Settling Rate	ppb	15.8
Lower Conf. Limit for Settling Rate	ppb	21.0
TP Load (Using Mean TP Conc.)	kg/yr	2,778
Diversion Volumes and Loads		
Volume	AF/yr	0
TP Load	kg/yr	0
TP Concentration	ppb	-

Notes: 1. The SSDM forecast error for flow-weighted mean concentrations is at least +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.

4. STA-2

A schematic of STA-2 is presented in **Figure 4-1**.

Figure 4-1: Schematic of STA-2 (Not to Scale).



A description of the existing STA was provided in the report for Alternative A and will not be repeated here. The long-term average annual flows and loads for the No Action Alternative (i.e., Alternative A) were utilized for use in the SSDM, adjusted for each PLR scenario, and are summarized in the table below.

Table 4-1: Summary of Long-term Average Annual Inflow to STA-2.

Alternative	Parameter	Unit	STA-2
AltA	Treat. Area	acres	8,240
	Volume	AF/yr	309,734
	TP Load	kg/yr	42,788
	TP Conc	ppb	112
	PLR	g/m2/yr	1.3
	HLR	cm/d	3.1
Phosphorus Loading Rate =		1.0	
AltE-1	Treat. Area	acres	8,240
	Volume	AF/yr	266,965
	TP Load	kg/yr	33,347
	TP Conc	ppb	101
	PLR	g/m2/yr	1.0
	HLR	cm/d	2.7
Phosphorus Loading Rate =		1.17	
AltE-1.17	Treat. Area	acres	8,240
	Volume	AF/yr	292,647
	TP Load	kg/yr	39,016
	TP Conc	ppb	108
	PLR	g/m2/yr	1.17
	HLR	cm/d	3.0
Phosphorus Loading Rate =		1.5	
AltE-1.5	Treat. Area	acres	8,240
	Volume	AF/yr	362,089
	TP Load	kg/yr	50,021
	TP Conc	ppb	112
	PLR	g/m2/yr	1.5
	HLR	cm/d	3.7

A summary of the estimated STA-2 phosphorus performance for the Alternative E base condition (PLR=1.17 $g/m^2/yr$) is presented in the table below. A copy of the SSDM output is presented in Appendix B for each PLR scenario. A long-term flow-weighted mean outflow concentration range of 15-24 ppb was forecast, however this may be optimistic, as currently the best performing STA is only achieving 19 ppb, with a standard deviation of 5 ppb on annual values.

Table 4-2: Summary of SSDM Results for STA-2 (PLR=1.17 g/m^2/yr).

Parameter	Unit	STA-2
Effective Treatment Area	acres	8,240
Average Annual Inflow		
Volume	AF/yr	292,647
TP Load	kg/yr	39,016
TP Concentration	ppb	108
Average Annual Outflow		
Volume	AF/yr	298,129
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	15.0
Mean Estimate of Settling Rate	ppb	18.8
Lower Conf. Limit for Settling Rate	ppb	23.6
TP Load (Using Mean TP Conc.)	kg/yr	6,928
Diversion Volumes and Loads		
Volume	AF/yr	0
TP Load	kg/yr	0
TP Concentration	ppb	-

Notes: 1. The SSDM forecast error for flow-weighted mean concentrations is at least +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.

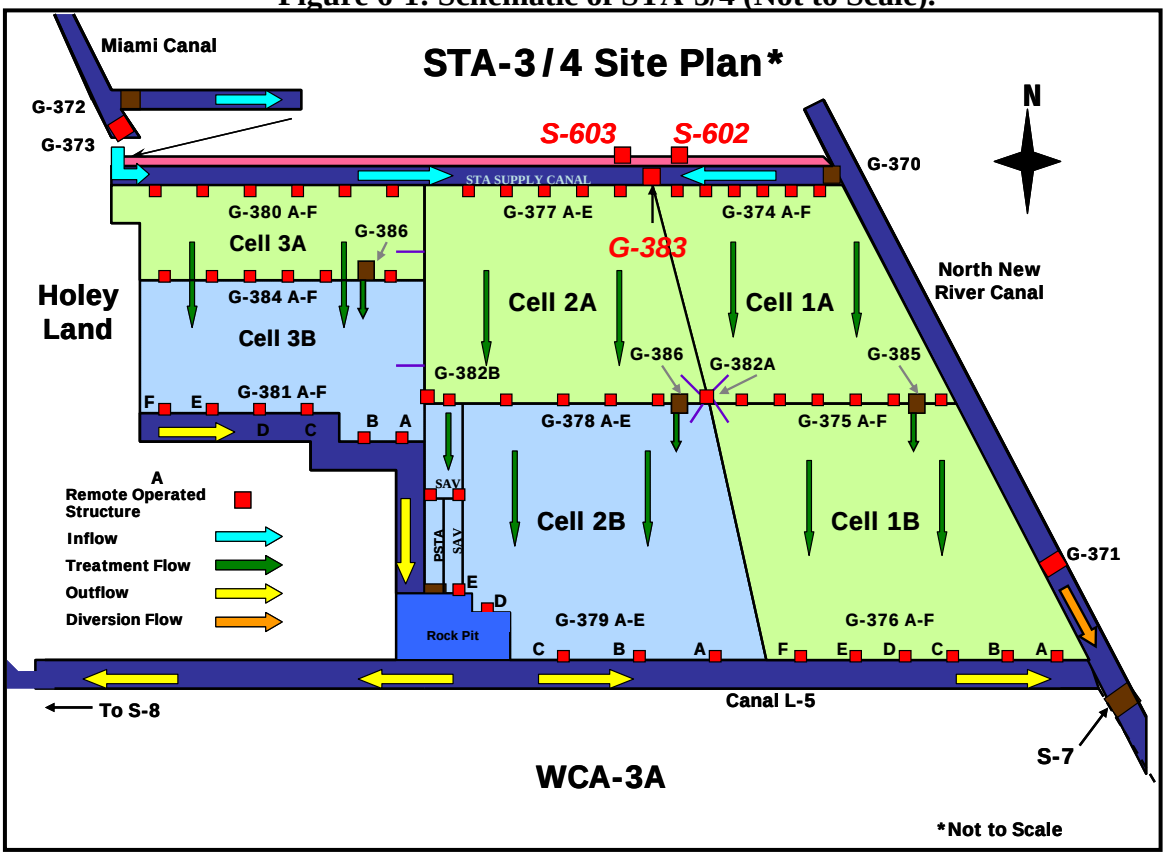
5. EAA Storage Reservoir

In the No Action Alternative, stormwater inflows to the treatment area in Compartment B (i.e., the existing Cell 4 of STA-2) are not pre-treated in the EAASR. Hence, in this alternative, the EAASR inflows and outflows were not modified from the Alternative A values.

6. STA-3/4

A schematic of STA-3/4 is presented in **Figure 6-1**, showing the two proposed structures (S-602 and S-603) that will allow transfer of water from the EAA Storage Reservoir to the STA.

Figure 6-1: Schematic of STA-3/4 (Not to Scale).



A description of the existing STA was provided in the report for Alternative A and will not be repeated here. The long-term average annual flows and loads for the No Action Alternative (i.e., Alternative A) were utilized for use in the SSDM, adjusted for each PLR scenario, and are summarized in the table below. For the Base Condition, a long-term

estimate of approximately 12,232 AF/yr and 2,921 kg/yr was diverted to STA-3/4 to achieve the PLR of 1.17 g/m^2/yr.

Table 6-1: Summary of Long-term Average Annual Inflow to STA-3/4.

Alternative	Parameter	Unit	STA-3/4
AltA	Treat. Area	acres	16,543
	Volume	AF/yr	672,549
	TP Load	kg/yr	71,638
	TP Conc	ppb	86
	PLR	g/m2/yr	1.1
	HLR	cm/d	3.4
Phosphorus Loading Rate =		1.0	
AltE-1	Treat. Area	acres	16,543
	Volume	AF/yr	651,310
	TP Load	kg/yr	66,950
	TP Conc	ppb	83
	PLR	g/m2/yr	1.0
	HLR	cm/d	3.3
Phosphorus Loading Rate =		1.17	
AltE-1.17	Treat. Area	acres	16,543
	Volume	AF/yr	702,869
	TP Load	kg/yr	78,331
	TP Conc	ppb	90
	PLR	g/m2/yr	1.17
	HLR	cm/d	3.5
Phosphorus Loading Rate =		1.5	
AltE-1.5	Treat. Area	acres	16,543
	Volume	AF/yr	733,252
	TP Load	kg/yr	89,362
	TP Conc	ppb	99
	PLR	g/m2/yr	1.33
	HLR	cm/d	3.7

A summary of the estimated STA-3/4 phosphorus performance for the Alternative E base condition (PLR=1.17 g/m^2/yr) is presented in the table below. A copy of the SSDM output is presented in Appendix B for each PLR scenario. A long-term flow-weighted mean outflow concentration range of 20-29 ppb was forecast.

Table 6-2: Summary of SSDM Results for STA-3/4 (PLR=1.17 g/m^2/yr).

Parameter	Unit	STA-3/4
Effective Treatment Area	acres	16,543
Average Annual Inflow		
Volume	AF/yr	702,869
TP Load	kg/yr	78,331
TP Concentration	ppb	90
Average Annual Outflow		
Volume	AF/yr	685,637
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	19.8
Mean Estimate of Settling Rate	ppb	24.0
Lower Conf. Limit for Settling Rate	ppb	28.9
TP Load (Using Mean TP Conc.)	kg/yr	20,340
Diversion Volumes and Loads		
Volume	AF/yr	86,039
TP Load	kg/yr	10,820
TP Concentration	ppb	102

Notes: 1. The SSDM forecast error for flow-weighted mean concentrations is at least +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.
2. Diversion consists primarily of water supply deliveries.

6.1.Sensitivity Analysis: Lake Okeechobee TP Concentration of 150 ppb

As an analysis of the sensitivity of STA performance to the phosphorus concentration of Lake Okeechobee releases, this section describes the performance of STA-3/4 if the phosphorus concentration of Lake releases is 150 ppb at the inflow to the EAASR. With this assumption, and using the simulated EAASR outflows presented in Alternative A, the inflows to STA-3/4 are summarized in the table below.

Table 6-3: Summary of Long-term Average Annual Inflow to STA-3/4 (Lake Okeechobee = 150 ppb).

Alternative	Parameter	Unit	STA-3/4
AltA	Treat. Area	acres	16,543
	Volume	AF/yr	672,549
	TP Load	kg/yr	82,860
	TP Conc	ppb	100
	PLR	g/m2/yr	1.24
	HLR	cm/d	3.4
Phosphorus Loading Rate =		1.17	
AltE-1.17	Treat. Area	acres	16,543
	Volume	AF/yr	702,869
	TP Load	kg/yr	89,553
	TP Conc	ppb	103
	PLR	g/m2/yr	1.34
	HLR	cm/d	3.5

A summary of STA-3/4 phosphorus performance for this scenario is presented in the table below. A copy of the SSDM output is presented in Appendix B. A long-term flow-weighted mean outflow concentration range of 22-33 ppb was forecast. These results compare to a simulated range of 20-29 ppb with a concentrations of Lake releases averaging 100 ppb. **The net effect of assuming a Lake Okeechobee phosphorus concentration of 150 ppb appears to be about 3 ppb at the outflow of STA-3/4, resulting in a long-term average annual increase of 2.5 metric tons of phosphorus to the Everglades compared to an average Lake release concentration of 100 ppb.** In addition to the STA discharge, it is estimated that an additional 4.7 metric tons per year of phosphorus will enter the Everglades in Lake Okeechobee deliveries for downstream water supply, including the Big Cypress Basin Seminole Indian Reservation.

Table 6-4: Summary of SSDM Results for STA-3/4 (Lake Okeechobee = 150 ppb).

Parameter	Unit	STA-3/4
Effective Treatment Area	acres	16,543
Average Annual Inflow		
Volume	AF/yr	702,869
TP Load	kg/yr	89,553
TP Concentration	ppb	103
Average Annual Outflow		
Volume	AF/yr	685,637
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	22.1
Mean Estimate of Settling Rate	ppb	27.1
Lower Conf. Limit for Settling Rate	ppb	32.6
TP Load (Using Mean TP Conc.)	kg/yr	22,881
Diversion Volumes and Loads		
Volume	AF/yr	86,039
TP Load	kg/yr	15,535
TP Concentration	ppb	146

Notes: 1. The SSDM forecast error for flow-weighted mean concentrations is at least +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.

7. STA-5

A schematic of the STA-5/6 system is provided in **Figure 7-1 (**URS 2007). A description of the existing STA-5 flow-ways 1-3 was provided in the report for Alternative A and will not be repeated here. For the purpose of evaluating Alternative E, STA-5 was assumed to be comprised of the existing 3 flow-ways of STA-5, but not the 4th and 5th flow-ways of Compartment C.

At this time, it is extremely difficult to forecast the phosphorus removal performance of STA-5. Since the first full water year of operation (2001), the annual inflow concentrations have ranged from 165 ppb to 299 ppb, with a 7-yr average of 235 ppb (Pietro et al. 2007). The phosphorus loading rate has been considerably higher than the other STAs, ranging from 0.94 g/m^2/yr to 4.01 g/m^2/yr with a 7-yr average of 2.1 g/m^2/yr. The long-term outflow concentration has ranged from 82-192 ppb, with a 7-yr average of 105 ppb. ***Until such time that the STA-5 performance improves, and until performance data for the newly constructed Flow-way 3 is available, the forecast performance will be based on assuming the phosphorus removal of the downstream cell in each flow-way performs similar to the emergent calibration data set.***

The long-term average annual flows and loads for the No Action Alternative (i.e., Alternative A) were utilized for use in the SSDM, adjusted for each PLR scenario, and are summarized in **Table 7-1** below.

A summary of the estimated STA-5 phosphorus performance for the Alternative E base condition (PLR=1.17 g/m^2/yr) is presented in **Table 7-2** below. A copy of the SSDM output is presented in Appendix B for each PLR scenario. A long-term flow-weighted mean outflow concentration range of 30-60 ppb was forecast, however this may be optimistic in light of the current performance of STA-5 (82-192 ppb).

Figure 7-1: Preliminary Layout of Compartment C Build-out; Subject to Revision (modified from URS 2007).

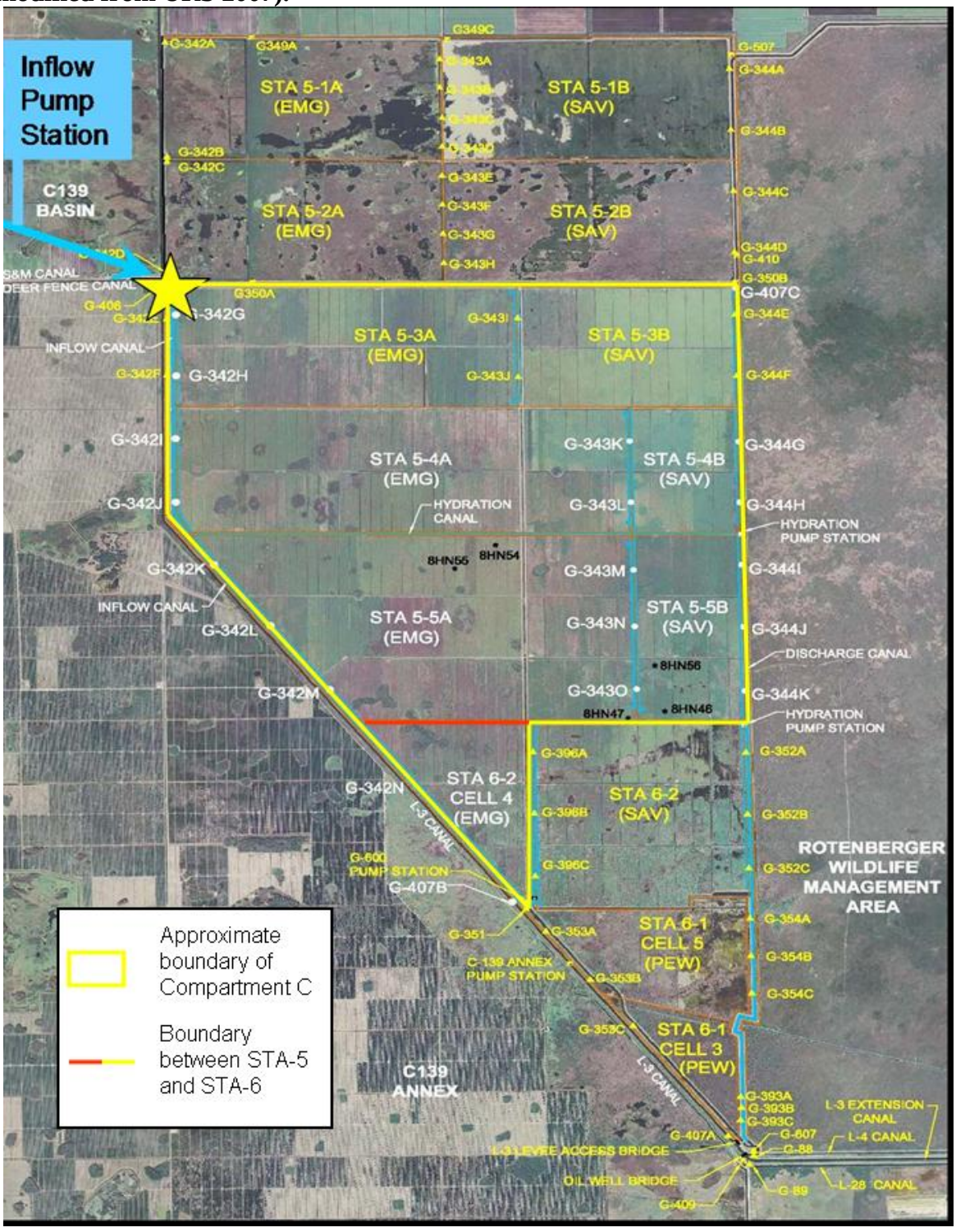


Table 7-1: Summary of Long-term Average Annual Inflow to STA-5.

Alternative	Parameter	Unit	STA-5
AltA	Treat. Area	acres	6,095
	Volume	AF/yr	167,284
	TP Load	kg/yr	46,768
	TP Conc	ppb	227
	PLR	g/m2/yr	1.9
	HLR	cm/d	2.3
Phosphorus Loading Rate =		1.0	
AltE-1	Treat. Area	acres	6,095
	Volume	AF/yr	88,229
	TP Load	kg/yr	24,666
	TP Conc	ppb	227
	PLR	g/m2/yr	1.0
	HLR	cm/d	1.2
Phosphorus Loading Rate =		1.17	
AltE-1.17	Treat. Area	acres	6,095
	Volume	AF/yr	103,227
	TP Load	kg/yr	28,860
	TP Conc	ppb	227
	PLR	g/m2/yr	1.17
	HLR	cm/d	1.4
Phosphorus Loading Rate =		1.5	
AltE-1.5	Treat. Area	acres	6,095
	Volume	AF/yr	132,343
	TP Load	kg/yr	37,000
	TP Conc	ppb	227
	PLR	g/m2/yr	1.5
	HLR	cm/d	1.8

Table 7-2: Summary of SSDM Results for STA-5 (PLR=1.17 g/m^2/yr).

Parameter	Unit	STA-5 - Emergent
Effective Treatment Area	acres	6,095
Average Annual Inflow		
Volume	AF/yr	103,227
TP Load	kg/yr	28,860
TP Concentration	ppb	227
Average Annual Outflow		
Volume	AF/yr	102,807
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	30.4
Mean Estimate of Settling Rate	ppb	43.2
Lower Conf. Limit for Settling Rate	ppb	60.0
TP Load (Using Mean TP Conc.)	kg/yr	5,474
Diversion Volumes and Loads		
Volume	AF/yr	2,779
TP Load	kg/yr	1,188
TP Concentration	ppb	347

Notes: 1. The SSDM forecast error for flow-weighted mean concentrations is at least +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.

8. STA-6

For Alternative E, the performance of the existing STA-6 treatment cells (cells 3, 5 and Section 2) was forecast using the SSDM. Consistent with Alternative A, inflows were modeled as consisting of runoff from the 6,395-acre portion of Compartment C south of the 3rd flow-way of STA-5 and runoff from the 17,845-acre C-139 Annex.

- **Compartment C runoff.** Historic flow and phosphorus data for runoff from the entire 10,395-acre Compartment C are available for the 10-yr period May 1, 1997 through April 30, 2007. For the purpose of simulating a consistent 13-yr period for all the alternatives, data for the period May 1, 1994 to April 30, 1997 were estimated as the monthly average of flows and phosphorus loads for the available 10-yr period of record. The resulting 13-yr flow and phosphorus data set was then reduced by the factor (6395/10395) to reflect the reduced tributary area.
- **C-139 Annex runoff.** Historic flow and phosphorus data for runoff from the C-139 Annex are available for the 11.5-yr period December 1, 1995 through April 30, 2007. For the purpose of simulating a consistent 13-yr period for all the alternatives, data for the period May 1, 1994 to December 30, 1995 were estimated as the monthly average of flows and phosphorus loads for the available 11.5-yr period of record.

A description of the existing STA was provided in the report for Alternative A and will not be repeated here. The long-term average annual flows and loads for the No Action Alternative (i.e., Alternative A) were utilized for use in the SSDM, adjusted for each PLR scenario, and are summarized in **Table 8-1** below.

A summary of the estimated STA-6 phosphorus performance for the Alternative E base condition (PLR=1.17 g/m^2/yr) is presented in **Table 8-2** below. A copy of the SSDM output is presented in Appendix B for each PLR scenario. A long-term flow-weighted mean outflow concentration range of 20-25 ppb was forecast.

Table 8-1: Summary of Long-term Average Annual Inflow to STA-6.

Alternative	Parameter	Unit	STA-6
AltA	Treat. Area	acres	2,284
	Volume	AF/yr	69,588
	TP Load	kg/yr	7,699
	TP Conc	ppb	90
	PLR	g/m2/yr	0.8
	HLR	cm/d	2.5
Phosphorus Loading Rate =		1.0	
AltE-1	Treat. Area	acres	2,284
	Volume	AF/yr	83,551
	TP Load	kg/yr	9,243
	TP Conc	ppb	90
	PLR	g/m2/yr	1.0
	HLR	cm/d	3.1
Phosphorus Loading Rate =		1.17	
AltE-1.17	Treat. Area	acres	2,284
	Volume	AF/yr	80,734
	TP Load	kg/yr	10,815
	TP Conc	ppb	109
	PLR	g/m2/yr	1.17
	HLR	cm/d	3.0
Phosphorus Loading Rate =		1.5	
AltE-1.5	Treat. Area	acres	2,284
	Volume	AF/yr	91,644
	TP Load	kg/yr	13,865
	TP Conc	ppb	123
	PLR	g/m2/yr	1.5
	HLR	cm/d	3.4

Table 8-2: Summary of SSDM Results for STA-6 (PLR=1.17 g/m^2/yr).

Parameter	Unit	STA-6
Effective Treatment Area	acres	2,284
Average Annual Inflow		
Volume	AF/yr	80,734
TP Load	kg/yr	10,815
TP Concentration	ppb	109
Average Annual Outflow		
Volume	AF/yr	80,640
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	20.4
Mean Estimate of Settling Rate	ppb	20.4
Lower Conf. Limit for Settling Rate	ppb	25.3
TP Load (Using Mean TP Conc.)	kg/yr	2,027
Diversion Volumes and Loads		
Volume	AF/yr	0
TP Load	kg/yr	0
TP Concentration	ppb	-

Notes: 1. The SSDM forecast error for flow-weighted mean concentrations is at least +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.

9. Additional Treatment Areas

This present analysis focuses on the regional conditions that are anticipated to be present in the 2010 time frame, excluding the full build-out of Compartments B and C. In lieu of utilizing the available area within Compartments B and C, this alternative evaluates treatment wetlands (STAs) on additional parcels of land. The acreage of additional treatment area was determined by calculating the area necessary to achieve an overall average phosphorus loading rate (PLR) of 1.0, 1.17 and 1.5 $g/m^2/yr$. The base condition (1.17 $g/m^2/yr$) is equal to the average PLR for Alternatives B, C and D. Phosphorus load rates were balanced among the existing STAs to achieve these PLRs, and an estimate of the additional treatment area was calculated according to the following equation

Additional area (acres) = Excess phosphorus loads (kg/yr) / PLR / 4.047 (conversion factor)

No specific locations, canal improvements or other capital improvements were identified in this work effort. A sensitivity analysis of the PLR on the phosphorus performance was conducted, utilizing a PLR range of 1.0 – 1.5 $g/m^2/yr$.

As there was no SFWMM simulation for Alternative E, it was necessary to post-process the Alternative A flows and loads to account for the conversion of lands to additional STAs. For the new STAs serving the STA-1E and STA-1W basins, the flows and loads were reduced in proportion to the combined basins' acreage (183,912 acres) converted for use as an STA, e.g., if an additional 5,000 acres were converted to an STA, the total basins' flows and loads were reduced by (5,000 / 183,912) = 2.7%. For the new STA serving the STA-2 and STA-3/4 basins, there was no reduction in inflows due to: 1) the STA acreage would be very small relative to the combined basins' acreage and 2) much of the inflows are from Lake Okeechobee releases which would not be affected by the acreage of new STAs. For the new STA serving the STA-5 and STA-6 basins, the C-139 Basin flows and loads were reduced in proportion to the acreage converted for use as an STA, assuming that the new STA would be located in the C-139 Basin, and not the C-139 Annex.

The following sections describe the inflows and SSDM modeling results for each of the three PLR scenarios.

9.1 Additional Treatment Area in the STA-1E/STA-1W Basin

After balancing the phosphorus loads to the existing STAs, estimates of additional treatment area in the STA-1E/STA-1W basins were calculated to achieve the three PLRs (1.0, 1.17 and 1.5 $g/m^2/yr$). The total runoff for the STA-1E/STA-1W tributary basins was reduced in proportion to the combined basins' acreage (183,912 acres) converted for use as an STA, which then reduced the size of the STA slightly. Because of this relationship, an iterative approach was required to finalize the estimate of additional treatment area, shown in the table below.

Table 9-1: Summary of Long-term Average Annual Inflow to Additional Treatment Area in the STA-1E/1W Basin.

Parameter	Unit	STA-1E/1W Basin
Phosphorus Loading Rate = 1.0		
Treat. Area	acres	10,681
Volume	AF/yr	195,827
TP Load	kg/yr	43,228
TP Conc	ppb	179
PLR	g/m2/yr	1.00
HLR	cm/d	1.5
Phosphorus Loading Rate = 1.17		
Treat. Area	acres	7,186
Volume	AF/yr	154,131
TP Load	kg/yr	34,024
TP Conc	ppb	179
PLR	g/m2/yr	1.17
HLR	cm/d	1.8
Phosphorus Loading Rate = 1.5		
Treat. Area	acres	0
Volume	AF/yr	0
TP Load	kg/yr	0
TP Conc	ppb	-
PLR	g/m2/yr	0.0
HLR	cm/d	0.0

A summary of the estimated phosphorus performance for the Alternative E base condition (PLR=1.17 $g/m^2/yr$) is presented in the table below. A copy of the SSDM output is presented in Appendix B for each PLR scenario. A long-term flow-weighted mean outflow concentration range of 15-21 ppb was forecast, however this may be optimistic, as currently

the best performing STA is only achieving 19 ppb, with a standard deviation of 5 ppb on annual values.

Table 9-2: Summary of SSDM Results for Additional Treatment Area in the STA-1E/STA-1W Basins (PLR=1.17 g/m^2/yr).

Parameter	Unit	STA-1E/1W
Effective Treatment Area	acres	7,186
Average Annual Inflow		
Volume	AF/yr	154,131
TP Load	kg/yr	34,024
TP Concentration	ppb	179
Average Annual Outflow		
Volume	AF/yr	152,836
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	15.0
Mean Estimate of Settling Rate	ppb	16.0
Lower Conf. Limit for Settling Rate	ppb	21.2
TP Load (Using Mean TP Conc.)	kg/yr	3,024
Diversion Volumes and Loads		
Volume	AF/yr	0
TP Load	kg/yr	0
TP Concentration	ppb	-

Notes: 1. The SSDM forecast error for flow-weighted mean concentrations is at least +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.

9.2 Additional Treatment Area in the STA-2/3/4 Basin

After balancing the phosphorus loads to the existing STAs, estimates of additional treatment area in the STA-2/STA-3/4 basins were calculated to achieve the three PLRs (1.0, 1.17 and 1.5 $g/m^2/yr$). The total runoff for the tributary basins was not reduced in proportion to the combined basins' acreage converted for use as an STA due to: 1) the STA acreage would be very small relative to the combined basins' acreage and 2) much of the inflows are from Lake Okeechobee releases which would not be affected by the acreage of new STAs. An estimate of additional treatment area required to treat the remaining inflows is shown in the table below.

Table 9-3: Summary of Long-term Average Annual Inflow to Additional Treatment Area in the STA-2/ STA-3/4 Basins.

Parameter	Unit	STA-2/3/4 Basin
Phosphorus Loading Rate = 1.0		
Treat. Area	acres	3,491
Volume	AF/yr	55,571
TP Load	kg/yr	14,130
TP Conc	ppb	206
PLR	g/m2/yr	1.00
HLR	cm/d	1.3
Phosphorus Loading Rate = 1.17		
Treat. Area	acres	0
Volume	AF/yr	0
TP Load	kg/yr	0
TP Conc	ppb	-
PLR	g/m2/yr	0.00
HLR	cm/d	0.0
Phosphorus Loading Rate = 1.5		
Treat. Area	acres	0
Volume	AF/yr	0
TP Load	kg/yr	0
TP Conc	ppb	-
PLR	g/m2/yr	0.00
HLR	cm/d	0.0

No additional treatment area in the STA-2/STA-3/4 basins was required for the Alternative E base condition (PLR=1.17 $g/m^2/yr$), and therefore there are no SSDM results to discuss. Results for the scenario using a PLR of 1.0 $g/m^2/yr$ are presented in Appendix B.

9.3 Additional Treatment Area in the STA-5/6 Basin

After balancing the inflow phosphorus loads to the existing STAs, estimates of additional treatment area in the STA-5/6 basins were calculated to achieve the three PLRs (1.0, 1.17 and 1.5 g/m^2/yr). For the new STA serving the STA-5 and STA-6 basins, the C-139 Basin flows and loads were reduced in proportion to the acreage converted for use as an STA, assuming that the new STA would be located in the C-139 Basin, and not the C-139 Annex. The estimate of additional treatment area is shown in the table below.

Table 9-4: Summary of Long-term Average Annual Inflow to Additional Treatment Area in the STA-5/6 Basin.

Parameter	Unit	STA-5/6 Basin
Phosphorus Loading Rate = 1.0		
Treat. Area	acres	4,753
Volume	AF/yr	68,809
TP Load	kg/yr	19,237
TP Conc	ppb	227
PLR	g/m2/yr	1.00
HLR	cm/d	1.2
Phosphorus Loading Rate = 1.17		
Treat. Area	acres	2,951
Volume	AF/yr	49,980
TP Load	kg/yr	13,973
TP Conc	ppb	227
PLR	g/m2/yr	1.17
HLR	cm/d	1.4
Phosphorus Loading Rate = 1.5		
Treat. Area	acres	567
Volume	AF/yr	12,321
TP Load	kg/yr	3,445
TP Conc	ppb	227
PLR	g/m2/yr	1.50
HLR	cm/d	1.8

In recognition that no available land is present south of STA-5, the new treatment area in the STA-5/6 basin was assumed to have similar phosphorus removal performance as was simulated for STA-5. A summary of the estimated phosphorus performance for the Alternative E base condition (PLR=1.17 g/m^2/yr) is presented in the table below. A copy of the SSDM output is presented in Appendix B for each PLR scenario. A long-term flow-

weighted mean outflow concentration range of 30-60 ppb was forecast, however this may be optimistic, in light of the current performance of STA-5 (82-192 ppb).

Table 9-5: Summary of SSDM Results for Additional Treatment Area in the STA-5/6 Basins (PLR=1.17 g/m^2/yr).

Parameter	Unit	STA-5/6 Basin
Effective Treatment Area	acres	2,951
Average Annual Inflow		
Volume	AF/yr	49,980
TP Load	kg/yr	13,973
TP Concentration	ppb	227
Average Annual Outflow		
Volume	AF/yr	49,560
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	30.4
Mean Estimate of Settling Rate	ppb	43.2
Lower Conf. Limit for Settling Rate	ppb	60.0
TP Load (Using Mean TP Conc.)	kg/yr	2,639
Diversion Volumes and Loads		
Volume	AF/yr	0
TP Load	kg/yr	0
TP Concentration	ppb	-

Notes: 1. The SSDM forecast error for flow-weighted mean concentrations is at least +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.

10. Summary

A summary of the projected phosphorus removal performance in the STAs, the EAASR A-1 and additional treatment areas is presented in **Table 10-1** below[1]. The adjusted outflow phosphorus levels in Table 10-1 may portray optimistic results in that the best performing STA (STA-3/4) is presently averaging about 19 ppb, with a 5 ppb standard deviation on annual values. Forecast long-term average annual flow-weighted mean outflow concentrations from the individual STAs ranged from 15-60 ppb. On a cumulative basis, the forecast long-term average annual concentration ranged from 16-25 ppb. In consideration of the forecast error of at least ±23%, this suggests a potential range up to 30 ppb for the cumulative long-term average annual outflow concentration.

The estimated allocation of discharges to the Water Conservation Areas is summarized in **Table 10-2**.

Phosphorus Concentrations for Lake Okeechobee Releases. Table 10-1 presents DMSTA modeling results for the EAASR A-1 and SSDM forecasts for STA-3/4 using an average phosphorus concentration for Lake Okeechobee releases of 100 ppb, which corresponds to recent levels. An alternative scenario was analyzed assuming an average phosphorus concentration for Lake Okeechobee releases of 150 ppb. While this assumed 50% increase in concentration increased the simulated phosphorus load to the EAASR A-1 by a long-term average of 19.6 metric tons/yr, the simulated net increase to STA-3/4 was 11.2 metric tons/yr. The 8.4 metric ton/yr balance either accumulated in the reservoir soil storage or was discharged to the EAA to satisfy irrigation demand. Using the same treatment acreage, SSDM forecast an increase in the long-term STA-3/4 outflow concentration of about 3 ppb, resulting in a predicted long-term average annual increase of about 2.5 metric tons/yr of phosphorus to the Everglades compared to the forecast that used an average Lake release concentration of 100 ppb.

[1] These forecasts of STA performance are made for the comparison of alternatives and not for the development of effluent limits. Effluent limits are determined through the State of Florida's issuance of permits for these facilities.

Table 10-1: Summary of SSDM Modeling Results.

Parameter	Unit	STA-1E	STA-1W	STA-2	Comp. B	EAASR A-1	STA-3/4	STA-5 - Emergent	STA-6	Additional Areas	All
Effective Treatment Area	acres	5,132	6,670	8,240	N/A	15,200	16,543	6,095	2,284	10,137	55,101
Average Annual Inflow											
Volume	AF/yr	112,079	141,072	292,647	N/A	539,290	702,869	103,227	80,734	204,111	1,636,739
TP Load	kg/yr	24,300	31,582	39,016	N/A	63,794	78,331	28,860	10,815	47,997	260,901
TP Concentration	ppb	176	181	108	N/A	96	90	227	109	191	129
Phosphorus Loading Rate	$g/m^2/yr$	1.17	1.17	1.17	N/A	1.04	1.17	1.17	1.17	1.17	1.17
Average Annual Outflow											
Volume	AF/yr	110,317	142,095	298,129	N/A	513,664	685,637	102,807	80,640	202,396	1,622,022
Flow-weighted Mean TP Concentration											
Upper Conf. Limit for Settling Rate	ppb	15.0	15.0	15.0	N/A	-	19.8	30.4	20.4	18.8	16.4
Mean Estimate of Settling Rate	ppb	16.3	15.8	18.8	N/A	76.4	24.0	43.2	20.4	22.7	22.7
Lower Conf. Limit for Settling Rate	ppb	21.5	21.0	23.6	N/A	-	28.9	60.0	25.3	30.7	24.9
TP Load (Using Mean TP Conc.)	kg/yr	2,216	2,778	6,928	N/A	48,417	20,340	5,474	2,027	5,663	45,427
Receiving Water	WCA	1	1	2A	2A	EAA/STA-3/4	2A & 3A	Rot. & 3A	3A		
Diversion Volumes and Loads (See Note 3)											
Volume	AF/yr	25,545	0	0		0	86,039	2,779	0		114,363
TP Load	kg/yr	3,037	0	0		0	10,820	1,188	0		15,045
TP Concentration	ppb	96	-	-		-	102	347	-		107

Notes: 1. The SSDM forecast error for flow-weighted mean concentrations is at least +/-23% of the expected value.
There is associated uncertainty in these predictions and actual performance will vary.
2. The lowest sustainable STA outflow phosphorus concentration is 19 ppb (STA-3/4), with a standard deviation of 5 ppb.
3. Diversion around STA-1E is directed to C-51E. Diversion around STA-3/4 is primarily for downstream water supply users.

Table 10-2: Estimated Allocation of Discharges to Receiving Waters.

Parameter	Unit	WCA-1	WCA-2A	WCA-3A	C-51 East	Rotenberger	Total
Volume	**AF/yr**	405,248	453,768	800,420	25,545	51,404	1,736,385
TP Load (at mean settling rate)	**kg/yr**	8,019	11,546	35,133	3,037	2,737	60,472
TP Concentration	**ppb**	16	21	36	96	43	28

11. References

ADA Engineering, Inc. and Burns and McDonnell Engineering Inc. 2005. Everglades Agricultural Area Regional Feasibility Study, prepared for SFWMD. October 2005.

Burns & McDonnell, 2003. Final Report, Everglades Protection Area Tributary Basins, Long-Term Plan for Achieving Water Quality Goals; prepared for the South Florida Water Management District, October 2003.

Kadlec, R. and R. Knight 1996. Treatment Wetlands. Lewis Publishers CRC Press LLC.

Pietro, K., R. Bearzotti, M. Chimney, G. Germain and N. Iricanin. 2007. Draft – STA Performance, Compliance and Optimization; Chapter 5 in the SFER. August 2007.

URS Corporation 2007. Graphic presented at 8/23/07 Long-Term Plan Quarterly Meeting.

Walker, W. and R. Kadlec 2005. Dynamic Model for Stormwater Treatment Areas, prepared for the U. S. Department of Interior and the U. S. Army Corps of Engineers.

Appendix A. 2010A8 Simulation Model Assumptions

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
Regional Input Data				
Climate	• The climatic period of record is from 1965 to 2000. • Rainfall estimates have been revised and updated for 1965-2000. • Revised evapotranspiration methods have been used for 1965-2000.	• Same as Base	• Same as Base	• Same as Base
Topography	Updated November 2001 and September 2003 using latest available information (in NGVD 29 datum). Nov 2001 update (Documented in November 2001 SFWMD memorandum from M. Hinton to K. Tarboton) includes: • USGS High Accuracy Elevation data from helicopter surveys collected 1999-2000 for Everglades National Park and Water Conservation Area (WCA) 3 south of Alligator Alley • USGS Lidar data (May 1999) for WCA-3A north of Alligator Alley • Lindahl, Browning, Ferrari & Helstrom 1999 survey for Rotenberger Wildlife Management	• Same as Base	• Same as Base	• Same as Base

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
	Area. • Stormwater Treatment Area surveys from 1990s • Aerometric Corp. 1986 survey of the 8-1/2 square mile area • Includes estimate of Everglades Agricultural Area subsidence • Other data as in SFWMM v3.7 • FWC survey 1992 for the Holey Land Wildlife Management Area. September 2003 update includes: • Reverting to FWC 1992 survey data for Rotenberger Wildlife Management Area. • DHI gridded data from Kimley –Horn contracted survey of EAA, 2002-2003. Regridded to 2x2 scale for EAA outside of STAs and WMAs.			
Sea Level	• Sea level data from six long-term NOAA stations were used to generate a historic record to use as sea level boundary conditions for the 1965 to 2000 evaluation period.	• Same as Base	• Same as Base	• Same as Base
Land Use	• The land use coverage is intermediate between 2000B2 and 2050B2	• Same as Base	• Same as Base	• Same as Base
Natural Area Land Cover	Vegetation classes and their spatial distribution in the natural areas comes from the following data:	• Same as Base	• Same as Base	• Same as Base

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
(Vegetation)	• Walsh 1995 aerial photography in Everglades National Park • Rutchey 1995 classification in WCA-3B, WCA-3A north of Alligator Alley and the Miami Canal, WCA-2A & 2B • Richardson 1990 data for Loxahatchee National Wildlife Refuge • FLUCCS 1995 for Big Cypress National Preserve, Holey Land & Rotenberger Wildlife Management Areas & WCA-3A south of Alligator Alley and Miami Canal. (Documented in August 2003 SFWMD memorandum from J. Barnes and K. Tarboton to J. Obeysekera).			
Lake Okeechobee Service Area				
LOSA Basins	• Southern Indian Prairie Basin, S-4, North Lake Shore and Northeast Lake Shore demands and runoff based on AFSIRS (Agricultural Field-Scale Irrigation Requirement Simulation) modeling using 2010 LU projections.	• Same as Base	• Same as Base	• Same as Base
Lake Okeechobee	• Lake Okeechobee Regulation Schedule WSE according to WSE decision trees, with pulse releases in Zone D modeled as Level III pulse in upper third of the zone, Level II pulse in middle third of the zone, and Level I pulse in the lower	Same as Base, plus: • Lowered EAA Storage Injection Line as compares to	• Same as Base	Same as Base, plus: • Lowered EAA Storage Injection Line

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
	third of the zone, when the decision tree calls for regulatory releases to the estuaries in that zone. • WSE thresholds derived from the Class Limit Adjustment (CLA) WSE modification: Increase the frequency of Pulse Releases in Zone D of WSE. • Modified WSE thresholds for zone D1 to improve utilization of EAA reservoir. • Lake Okeechobee Supply Side Management guidelines are used to implement Lake Okeechobee Service Area water restriction cutbacks as per rule 40E-21 and 40E-22. The Lake Okeechobee service area water shortage triggering line is the line starting at 13.0 ft on October 1 and ending at 10.5 ft on May 31, with additional breakpoints defined in between. • Emergency flood control backpumping to Lake Okeechobee from the Everglades Agricultural Area. • Kissimmee River Restoration and Headwaters Revitalization Project are complete. • Lake Okeechobee environmental releases to supplement reservoir deliveries to Caloosahatchee and St. Lucie Estuaries. • Environmental deliveries to WCA-3A according to Rainfall Driven Operations as means of operating the EAA Reservoirs.	Base, by an average of 0.28 ft		as compares to Base, by an average of 0.28 ft

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
	• Lake Okeechobee BMP makeup water deliveries to WCAs are not made. • Adaptive protocols are included. • Flood control releases South through STA-3/4 and WCAs are not performed in this simulation.			

Acceler8 Projects	Acceler8 Projects On Line by 2010 – See A8 Website.
	• C44 Reservoirs: 9315 acres, depth 5 .ft.
	• C43 Reservoirs: 11000 acres, depth 15 ft.
	• EAA Reservoirs- A-1 Reservoir
	A-1 Reservoir simulated as two interconnected compartments.
	Compartment 1: irrigation, 9600 acres, depth 12 ft.
	Compartment 2: environment 6400 acres, depth 12 ft.
	• WPA's
	  • Site 1 Impoundment: 1660 acres; depth 8 ft.
	  • C-9 Impoundment: 1739 acres; depth 4 ft.
	  • C-11 Impoundment: 1730 acres; depth 4 ft.
	  • Acme Basin B discharge to C51W and then to STA1E
	  • WCA-3A/3B Seepage Management Area
		Same as Base, plus:
		• Decreased inflow capacity to A-1 Res from NNR Basin from 2775 cfs to 800 cfs
			• Same as Base	Same as Base, plus:
				• Decreased inflow capacity to A-1 Res from NNR Basin from 2775 cfs to 800 cfs

Caloosahatchee River Basin	• Caloosahatchee River Basin irrigation demands and runoff were estimated using the AFSIRS method based on projected 2010 land use. • Public water supply daily intake from the river	• Same as Base	• Same as Base	• Same as Base

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
	is included in the analysis. • C43 reservoir supplements basin irrigation needs and estuarine environmental needs.			
St. Lucie Canal Basin	• St. Lucie Canal Basin demands estimated using the AFSIRS method based on projected 2010 land use. • Basin demands include the Florida Power & Light reservoir at Indiantown. • C44 reservoir supplements basin irrigation needs and estuarine environmental needs.	• Same as Base	• Same as Base	• Same as Base
Seminole Brighton Reservation	• Brighton reservation demands were estimated using AFSIRS method based on existing planted acreage in a manner consistent with that applied to other basins not in the distributed mesh of the SFWMM. • The 2 in 10 demand set forth in the Seminole Compact Work plan equals 2,262 MGM (million gallons/month). AFSIRS modeled 2 in 10 demands equaled 2,383 MGM. • While estimated demands, and therefore deliveries, for every month of simulation do not equate to monthly entitlement quantities as per Table 7, Agreement 41-21 (Nov. 1992), tribal rights to these quantities are preserved. • Lake Okeechobee low stage management	• Same as Base	• Same as Base	• Same as Base

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
	applies to this agreement.			
Seminole Big Cypress Reservation	• Big Cypress Reservation irrigation demands and runoff were estimated using the AFSIRS method based on existing planted acreage in a manner consistent with that applied to other basins not in the distributed mesh of the SFWMM. • The 2 in 10 demand set forth in the Seminole Compact Work Plan equals 2,606 MGM. AFSIRS modeled 2 in 10 demands equaled 2,659 MGM. • While estimated demands, and therefore deliveries, for every month of simulation do not equate to monthly entitlement quantities as per the District's Final Order and Tribe's Resolution establishing the Big Cypress Reservation entitlement, tribal rights to these quantities are preserved. • Lake Okeechobee low stage management applies to this agreement.	• Same as Base	• Same as Base	• Same as Base
Seminole Hollywood Reservation	• Hollywood Reservation demands are set forth under VI. C of the Tribal Rights Compact. • Tribal sources of water supply include various bulk sale agreements with municipal service suppliers.	• Same as Base	• Same as Base	• Same as Base

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
Everglades Agricultural Area	• Everglades Agricultural Area irrigation demands are simulated using climatic data for the 36 year period of record and a soil moisture accounting algorithm, with parameters calibrated to match historical regional supplemental deliveries from Lake Okeechobee. • SFWMM EAA runoff and irrigation demand response to rainfall was calibrated for 1984-95 and verified for 1979-1983/1996-2000. No runoff reduction adjustment was necessary to account for Best Management Practices (BMPs). • Minimum elevation at which farmers can pump water out of the major canals for supplemental irrigation is 8.0 ft. • EAA Reservoirs A1 16,000 acres o Compartment 1: 9600 acres o Compartment 2: 6400 acres • Rain Driven Operation applied to operate the EAA reservoirs for the Everglades Restoration Project	Same as Base, plus: • Reduced inflow capacity to EAA A-1 reservoir from North New River Basin from 2775 cfs to 800 cfs	• Same as Base	Same as Base, plus: • Reduced inflow capacity to EAA A-1 reservoir from North New River Basin from 2775 cfs to 800 cfs
Everglades Construction Project Stormwater	• STA-1E: 5132 acres total treatment area • STA-1W: 6670 acres total treatment area • STA-2 : 6430 acres total treatment area	Same as Base, plus: • Buildout STA B: 6,722 acres total treatment	Same as Base, plus: • Buildout STA B: 6,722 acres total treatment	Same as Base, plus: • Buildout STA B: 6,722 acres

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
Treatment Areas	• STA 2-Cell 4: 1902 acres total treatment area • STA-3/4: 16543 acres total treatment area • STA-5: 6095 acres total treatment • STA-6: 2257 acres total treatment • Operation of STAs assumes maintenance of a 6" minimum depth.	area. Source: North New River runoff and STA-2 flow • Buildout STA C: 6,230 acres total treatment areas. Source 139 Basin and Annex	area. Source: North New River runoff • Buildout STA C: 6,230 acres total treatment areas. Source 139 Basin and Annex	total treatment area. Source: North New River runoff • Buildout STA C: 6,230 acres total treatment areas. Source 139 Basin and Annex
Holey Land Wildlife WMA	• As per Memorandum of Agreement between the FWC and the District.	• Same as Base	• Same as Base	• Same as Base
Rotenberger Wildlife WMA	• Interim Operational Schedule as defined in the Operation Plan for Rotenberger (SFWMD Jan 2002).	• Same as Base	• Same as Base	• Same as Base
Water Conservation Areas				
Water Conservation Area 1 (ARM Loxahatchee National Wildlife Refuge)	• Current C&SF Regulation Schedule. Includes regulatory releases to tide through LEC canals. • No net outflow to maintain minimum stages in the LEC Service Area canals (salinity control), if water levels are less than minimum operating criteria of 14 ft. The bottom floor of the schedule (Zone C) is the area below 14 ft. Any water supply releases below the floor will be matched by an equivalent volume of inflow from Lake Okeechobee.	• Same as Base	• Same as Base	• Same as Base

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
Water Conservation Area 2 A&B	• Current C&SF regulation schedule. Includes regulatory releases to tide through LEC canals. • No net outflow to maintain minimum stages in the LEC Service Area canals (salinity control), if water levels in WCA-2A are less than minimum operating criteria of 10.5 ft. Any water supply releases below the floor will be matched by an equivalent volume of inflow from Lake Okeechobee.	• Same as Base	• Same as Base	• Same as Base
Water Conservation Area 3 A&B	• Rainfall driven operational criteria for determining timing of deliveries to and discharges from WCA-3A and WCA-3B. • No net outflow to maintain minimum stages in the LEC Service Area canals (salinity control), if water levels are less than minimum operating criteria of 7.5 ft in WCA-3A. Any water supply releases below the floor will be matched by an equivalent volume of inflow from Lake Okeechobee. • Structural and operational modifications for L-67 canal conveyance and S-355 structures as in the federally authorized Modified Water Deliver Project. •	• Same as Base	• Same as Base	• Same as Base
Lower East Coast Service Areas				

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
Public Water Supply and Irrigation	• 2010 projections based upon permitted allocation to utilities by 2005, with 2010 well field distribution and inclusion of utility ASR. • Irrigation demands are based upon existing land use (updated through 2010) and calculated using AFSIRS, reduced to account for landscape and golf course areas irrigated using reuse water and landscape areas irrigated using public water supply.	• Same as Base	• Same as Base	• Same as Base
Other Natural Areas	• For the Northwest Fork of the Loxahatchee River, the District operates the G-92 structure and associated structures to provide approximately 50 cfs over Lainhart Dam to the Northwest Fork, when sufficient water is available in C-18 Canal. • Flows to Pond Apple Slough through S-13A are adjusted in the model to approximate measured flows at the structure. • Flows to Biscayne Bay are simulated through Snake Creek, North Bay, the Miami River, Central Bay and South Bay.	• Same as Base	• Same as Base	• Same as Base

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
Coastal Basin Canal Facilities and Operations	• C-4 Flood Mitigation Project • C-11 Water Quality Treatment Critical Project (S-381 and S-9A) • Releases from WCA-3A to ENP and the South Dade Conveyance System (SDCS) will follow the Interim Operational Plan (2002 IOP EIS): o Decreased S-12 flood control discharges & increased flood control discharges to SDCS o Structures S-343A, S-343B, S-344 and S-12A are closed Nov. 1 to July 15 o Structure S-12B is closed Jan. 1 to July 15. o Structure S-12C is closed Feb. 1 to July 15. South Dade Conveyance System operations will follow IOP for protection of the Cape Sable	• Same as Base	• Same as Base	• Same as Base
Lower East Coast	• C-4 Impoundment – 843.5 acres	• Same as Base	• Same as Base	• Same as Base
Upper East Coast Operational CERP	• L-8 Reservoir: 870 acres, depth 44 ft.	• Same as Base	• Same as Base	• Same as Base
Western Basins and Big Cypress National Preserve				
Western Basins	• Estimated and updated historical inflows from western basins at two locations: G-136 and G-406. The G-406 location represents potential inflow from the C-139 Basin into STA 5. Data for the period 1978 - 2000 is the same as the	• Same as Base	• Same as Base	• Same as Base

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
	data used for the C-139 Basin Rule development. (Documented in June 2002 SFWMD memorandum from L. Cadavid and L. Brion to J. Obeysekera).			
Big Cypress National Preserve	• Tamiami Trail culverts are not modeled in SFWMM due to the coarse (2x2 mile) model resolution.	• Same as Base	• Same as Base	• Same as Base
Everglades National Park and Florida Bay				
Everglades National Park & Lower East Coast	• Water deliveries to Everglades National Park are based upon Everglades Rain-driven operations. (WCA3A, 3B, ENP) • L29 constraint set to 9.2' per Tamiami Trail GRR Nov 2001 • 8.5 SMA as per the federally authorized Alternative 6D of the 8.5 SMA project. • Northern C111 project (2002 IOP EIS) • Southern C111 project modeled per C-111 Project 1994 GRR • IOP (partial implementation): o South Dade Structures modeled per 2002 IOP EIS o S12 and S343's operation under IOP schedules 2002 IOP EIS	• Same as Base	• Same as Base	• Same as Base
Region-wide Water Management and Related Operations				

Feature	2010A8 Base Assumptions (AltA)	AltB (STA2B)	AltC (Alt1)	AltD (EAALINE + ALT3)
Water Shortage Rules	• The existing condition reflects the existing water shortage policies in 2005 as reflected in South Florida Water Management District Chapters 40E-21 and 40E-22, FAC	• Same as Base	• Same as Base	• Same as Base

Appendix B. Steady State Design Model Output

Base Condition - PLR = 1.17 g.m^2/yr

Alternative Case	STA	V AF/yr	TP Load kg/yr	n	PLR g/m2/yr	K_{adj} Type	K_{adj} m/yr	C_i ppb	A ac	C* ppb	C_o ppb	C_o ppb
AltE-1.17	STA-1E	112,079	24,300	6	1.17	10%	26.0	176	5,132	4	12.5	15.0
	STA-1E	112,079	24,300	6	1.17	Median	22.0	176	5,132	4	16.3	16.3
	STA-1E	112,079	24,300	6	1.17	90%	18.5	176	5,132	4	21.5	21.5
	STA-1W	141,072	31,582	6	1.17	10%	26.0	181	6,670	4	12.1	15.0
	STA-1W	141,072	31,582	6	1.17	Median	22.0	181	6,670	4	15.8	15.8
	STA-1W	141,072	31,582	6	1.17	90%	18.5	181	6,670	4	21.0	21.0
	STA-2	292,647	39,016	6	1.17	10%	29.5	108	8,240	4	15.0	15.0
	STA-2	292,647	39,016	6	1.17	Median	24.9	108	8,240	4	18.8	18.8
	STA-2	292,647	39,016	6	1.17	90%	20.8	108	8,240	4	23.6	23.6
	STA-3/4	702,869	78,331	6	1.17	10%	25.43	90	16,543	4	19.8	19.8
	STA-3/4	702,869	78,331	6	1.17	Median	21.40	90	16,543	4	24.0	24.0
	STA-3/4	702,869	78,331	6	1.17	90%	17.88	90	16,543	4	28.9	28.9
	STA-5	103,227	28,860	6	1.17	10%	13.22	227	6,095	4	30.4	30.4
	STA-5	103,227	28,860	6	1.17	Median	10.40	227	6,095	4	43.2	43.2
	STA-5	103,227	28,860	6	1.17	90%	8.01	227	6,095	4	60.0	60.0
	STA-6	80,734	10,815	6	1.17	10%	23.40	109	2,284	4	20.4	20.4
	STA-6	80,734	10,815	6	1.17	Median	23.40	109	2,284	4	20.4	20.4
	STA-6	80,734	10,815	6	1.17	90%	19.65	109	2,284	4	25.3	25.3
STA-1E/1W	Add'l Area	154,131	34,024	6	1.17	10%	26.01	179	7,186	4	12.3	15.0
	Add'l Area	154,131	34,024	6	1.17	Median	22.04	179	7,186	4	16.0	16.0
	Add'l Area	154,131	34,024	6	1.17	90%	18.50	179	7,186	4	21.2	21.2
STA-5/6	Add'l Area	49,980	13,973	6	1.17	10%	13.22	227	2,951	4	30.4	30.4
	Add'l Area	49,980	13,973	6	1.17	Median	10.40	227	2,951	4	43.2	43.2
	Add'l Area	49,980	13,973	6	1.17	90%	8.01	227	2,951	4	60.0	60.0

Sensitivity Analysis - PLR = 1 g.m^2/yr

Alternative Case	STA	V AF/yr	TP Load kg/yr	n	PLR g/m2/yr	K_{adj} Type	K_{adj} m/yr	C_i ppb	A ac	C* ppb	$C_{o\ calc}$ ppb	C_o ppb
AltE-1	STA-1E	95,794	20,769	6	1.0	10%	24.7	176	5,132	4	10.6	15.0
	STA-1E	95,794	20,769	6	1.0	Median	21.0	176	5,132	4	13.7	15.0
	STA-1E	95,794	20,769	6	1.0	90%	17.7	176	5,132	4	18.0	18.0
	STA-1W	120,574	26,993	6	1.0	10%	24.7	181	6,670	4	10.3	15.0
	STA-1W	120,574	26,993	6	1.0	Median	21.0	181	6,670	4	13.3	15.0
	STA-1W	120,574	26,993	6	1.0	90%	17.7	181	6,670	4	17.6	17.6
	STA-2	266,965	33,347	6	1.0	10%	25.4	101	8,240	4	15.5	15.5
	STA-2	266,965	33,347	6	1.0	Median	21.8	101	8,240	4	18.9	18.9
	STA-2	266,965	33,347	6	1.0	90%	18.4	101	8,240	4	23.3	23.3
	STA-3/4	651,310	66,950	6	1.0	10%	24.0	83	16,543	4	18.2	18.2
	STA-3/4	651,310	66,950	6	1.0	Median	20.4	83	16,543	4	21.7	21.7
	STA-3/4	651,310	66,950	6	1.0	90%	17.2	83	16,543	4	25.9	25.9
	STA-5	88,229	24,666	6	1.0	10%	13.22	227	6,095	4	23.6	23.6
	STA-5	88,229	24,666	6	1.0	Median	10.40	227	6,095	4	34.5	34.5
	STA-5	88,229	24,666	6	1.0	90%	8.01	227	6,095	4	49.6	49.6
	STA-6	83,551	9,243	6	1.0	10%	23.4	90	2,284	4	18.2	18.2
	STA-6	83,551	9,243	6	1.0	Median	23.4	90	2,284	4	18.2	18.2
	STA-6	83,551	9,243	6	1.0	90%	19.65	90	2,284	4	22.3	22.3
STA-1E/1W	Add'l Area	195,827	43,228	6	1.0	10%	24.7	179	10,681	4	10.4	15.0
Basins	Add'l Area	195,827	43,228	6	1.0	Median	21.0	179	10,681	4	13.5	15.0
	Add'l Area	195,827	43,228	6	1.0	90%	17.7	179	10,681	4	17.8	17.8
STA-2/3/4	Add'l Area	55,571	14,130	6	1.0	10%	24.7	206	3,491	4	9.1	15.0
Basins	Add'l Area	55,571	14,130	6	1.0	Median	21.0	206	3,491	4	11.8	15.0
	Add'l Area	55,571	14,130	6	1.0	90%	17.7	206	3,491	4	15.7	15.7
STA-5/6	Add'l Area	68,809	19,237	6	1.0	10%	13.2	227	4,753	4	23.6	23.6
Basins	Add'l Area	68,809	19,237	6	1.0	Median	10.4	227	4,753	4	34.5	34.5
	Add'l Area	68,809	19,237	6	1.0	90%	8.0	227	4,753	4	49.6	49.6

Sensitivity Analysis - PLR = 1.5 g.m^2/yr

Alternative Case	STA	V AF/yr	TP Load kg/yr	n	PLR g/m2/yr	K_{adj} Type	K_{adj} m/yr	C_i ppb	A ac	C* ppb	C_o ppb	C_o ppb
AltE-1.5	STA-1E	143,691	31,154	6	1.5	10%	28.6	175.8	5,132	4	16.0	16.0
	STA-1E	143,691	31,154	6	1.5	Median	24.1	175.8	5,132	4	21.0	21.0
	STA-1E	143,691	31,154	6	1.5	90%	20.1	175.8	5,132	4	27.5	27.5
	STA-1W	180,862	40,490	6	1.5	10%	28.6	181.5	6,670	4	15.5	15.5
	STA-1W	180,862	40,490	6	1.5	Median	24.1	181.5	6,670	4	20.5	20.5
	STA-1W	180,862	40,490	6	1.5	90%	20.1	181.5	6,670	4	27.0	27.0
	STA-2	362,089	50,021	6	1.5	10%	29.5	112.0	8,240	4	20.6	20.6
	STA-2	362,089	50,021	6	1.5	Median	24.9	112.0	8,240	4	25.4	25.4
	STA-2	362,089	50,021	6	1.5	90%	20.8	112.0	8,240	4	31.1	31.1
	STA-3/4	733,252	89,362	6	1.3	10%	25.4	98.8	16,543	4	22.4	22.4
	STA-3/4	733,252	89,362	6	1.3	Median	21.4	98.8	16,543	4	27.2	27.2
	STA-3/4	733,252	89,362	6	1.3	90%	17.9	98.8	16,543	4	32.7	32.7
	STA-5	132,343	37,000	6	1.5	10%	13.2	227	6,095	4	43.7	43.7
	STA-5	132,343	37,000	6	1.5	Median	10.4	227	6,095	4	59.1	59.1
	STA-5	132,343	37,000	6	1.5	90%	8.0	227	6,095	4	77.9	77.9
	STA-6	91,644	13,865	6	1.5	10%	23.4	123	2,284	4	26.5	26.5
	STA-6	91,644	13,865	6	1.5	Median	23.4	123	2,284	4	26.5	26.5
	STA-6	91,644	13,865	6	1.5	90%	19.7	123	2,284	4	32.6	32.6
STA-5/6	Add'l Area	12,321	3,445	6	1.5	10%	13.2	226.7	567	4	43.7	43.7
Basins	Add'l Area	12,321	3,445	6	1.5	Median	10.4	226.7	567	4	59.1	59.1
	Add'l Area	12,321	3,445	6	1.5	90%	8.0	226.7	567	4	77.9	77.9

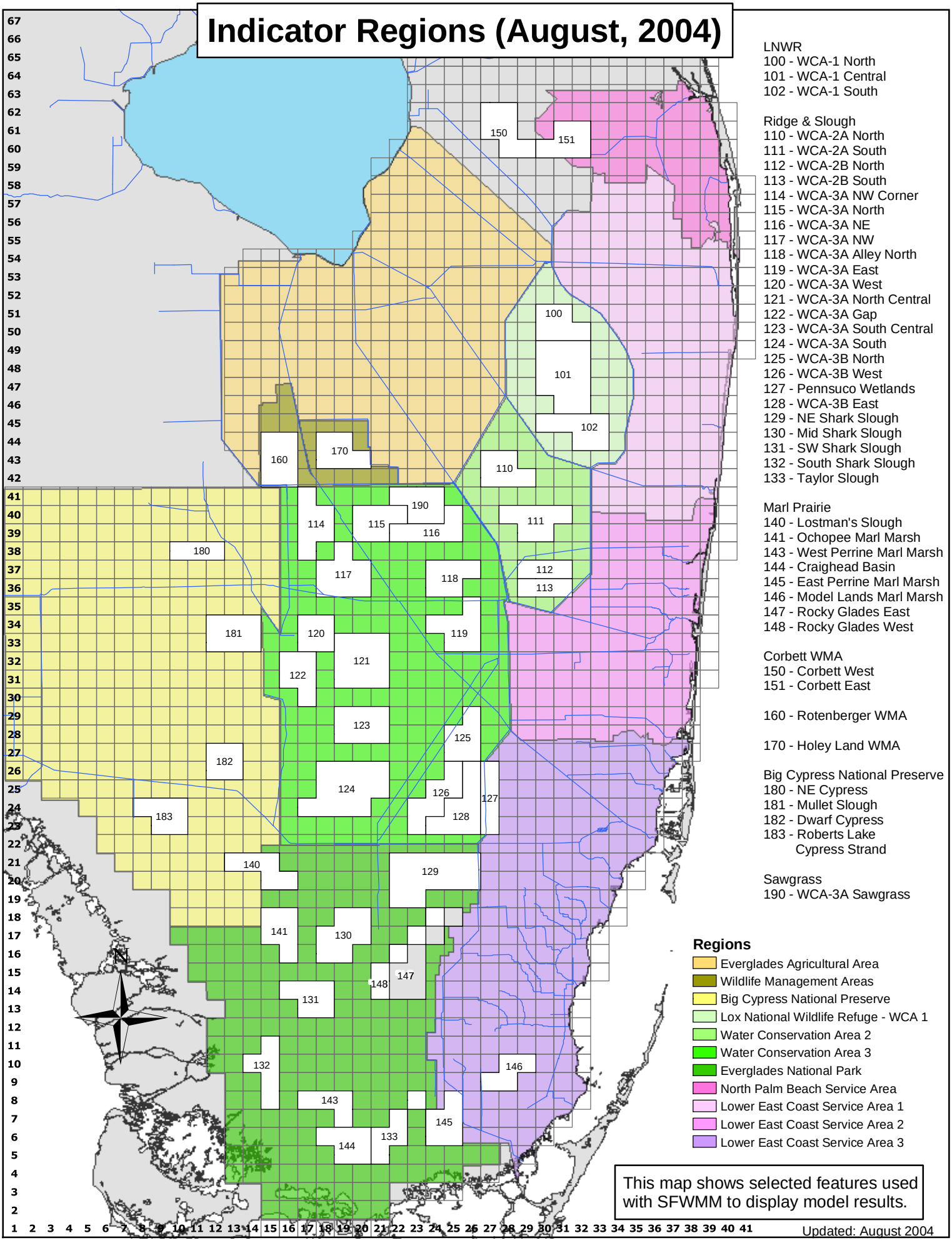
Sensitivity Analysis – TP Concentration of Lake Okeechobee deliveries = 150 ppb

Alternative Case	STA	V AF/yr	TP Load kg/yr	n	PLR g/m2/yr	K_{adj} Type	K_{adj} m/yr	C_i ppb	A ac	C* ppb	C_o ppb	C_o ppb
AltE-1.17 LO=150 ppb	STA-3/4	702,869	89,553	6	1.3	10%	25.4	103	16,543	4	22.1	22.1
	STA-3/4	702,869	89,553	6	1.3	Median	21.4	103	16,543	4	27.1	27.1
	STA-3/4	702,869	89,553	6	1.3	90%	17.9	103	16,543	4	32.6	32.6

APPENDIX I

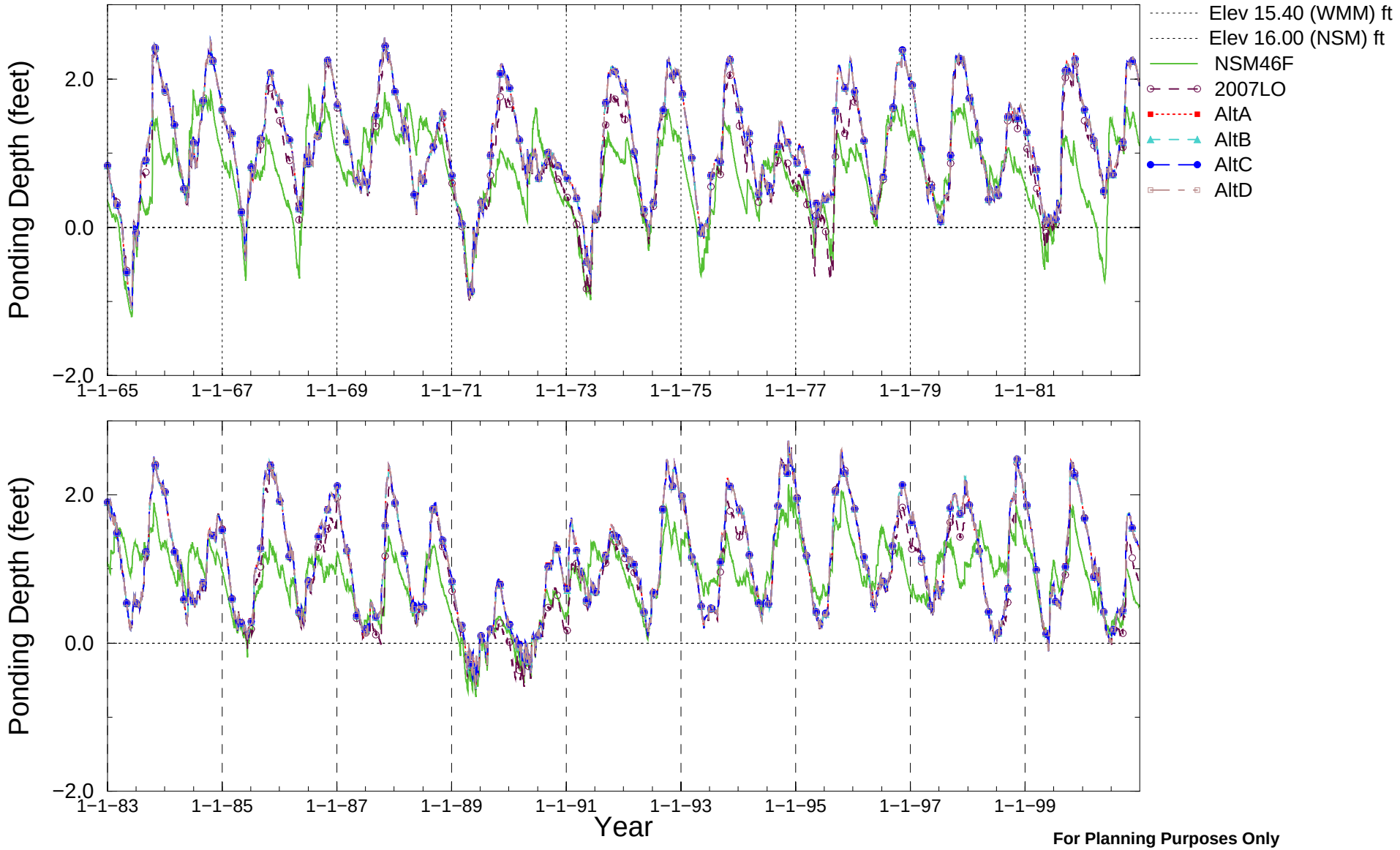
HYDROGRAPHS

Indicator Regions (August, 2004)



Normalized Hydrographs for Central Portion of WCA−1

(Gage 1−7, Cell Row 48 Col 31)



For Planning Purposes Only

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SFWMM V5.5.1

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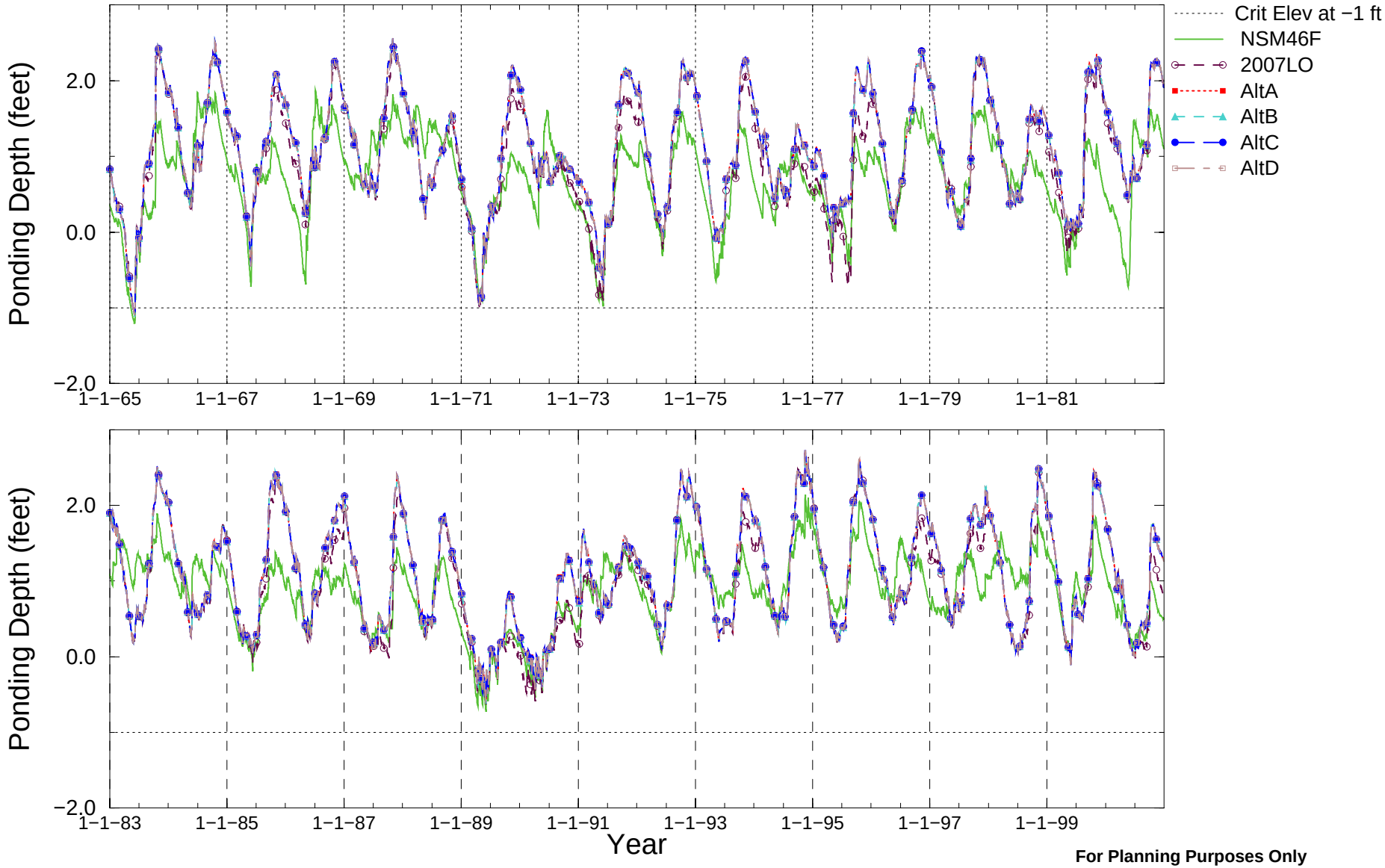
SFWMM P.O.S. 1965 − 2000

Normalized Hydrographs for WCA−1, Key Gauge 1−7

IR 101 (Key Gage at SFWMM ROW 48 COL 31)



Comparison to Criteria Elevation
For MFL Evaluation

For Planning Purposes Only
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SFWMM V5.5.1
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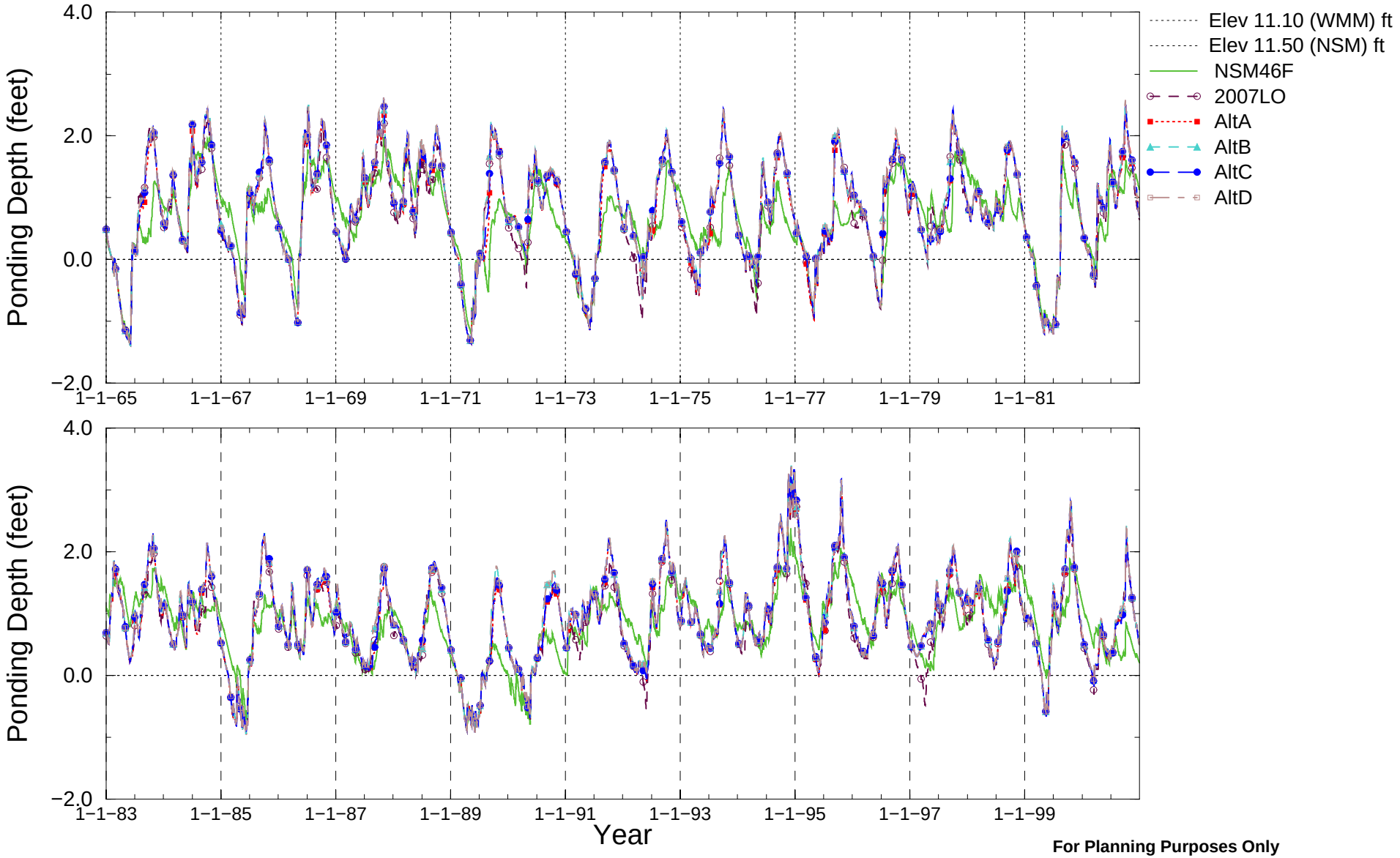
Normalized Hydrographs for Central Portion of WCA−2A

(Gage 2A−17, Cell Row 40 Col 29)



For Planning Purposes Only

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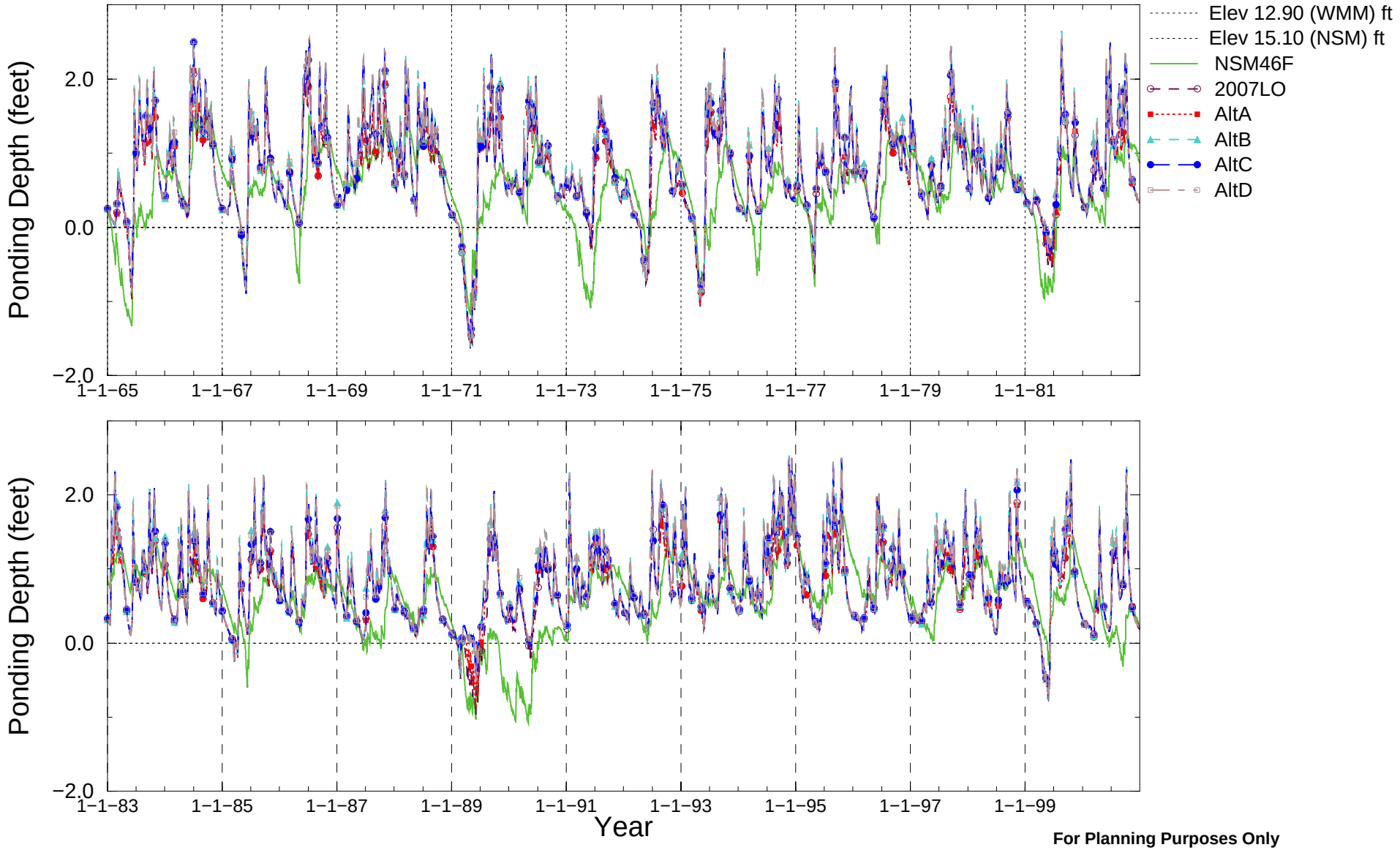
SFWMM P.O.S. 1965 − 2000

Normalized Hydrographs for North End of WCA−2A

(Cell Row 45 Col 28)



For Planning Purposes Only

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SFWMM V5.5.1

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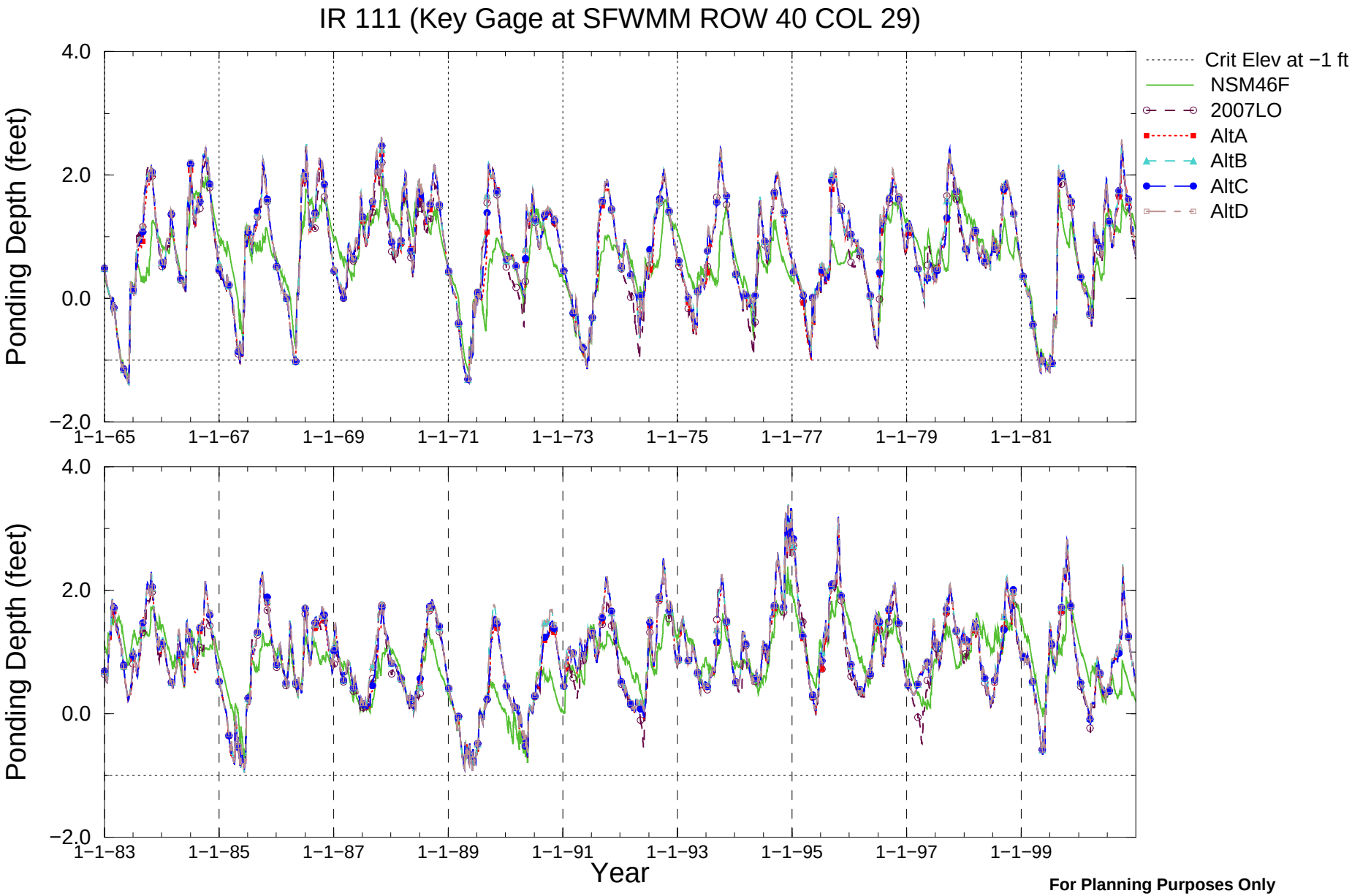
SFWMM P.O.S. 1965 − 2000

Normalized Hydrographs for WCA−2A, Key Gauge 2A−17



Comparison to Criteria Elevation
For MFL Evaluation

For Planning Purposes Only
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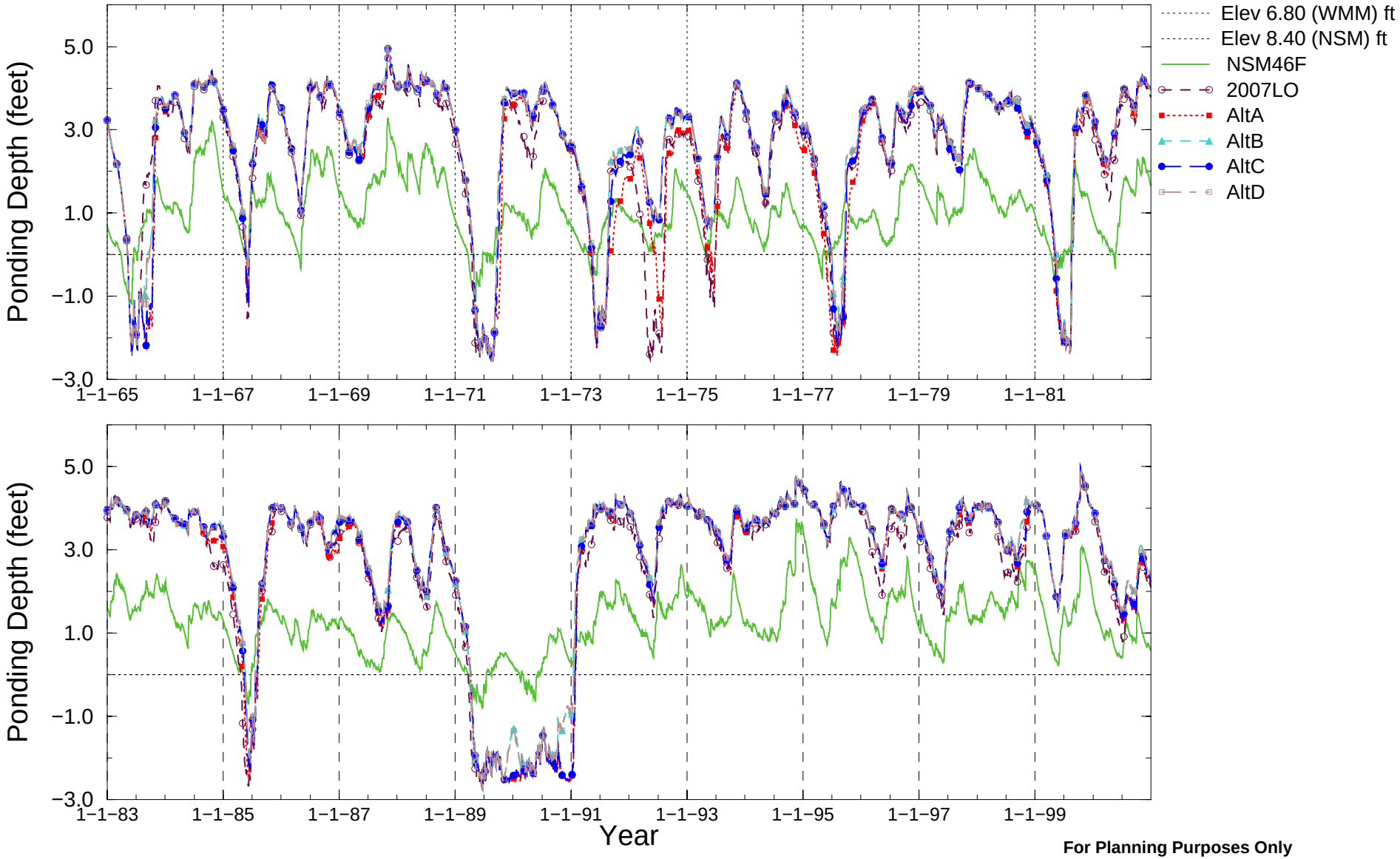
Normalized Hydrographs for South End of WCA−2B

(Gage 2B−21, Cell Row 35 Col 30)



For Planning Purposes Only

Run date: 10/19/07 04:43:25

SFWMM V5.5.1

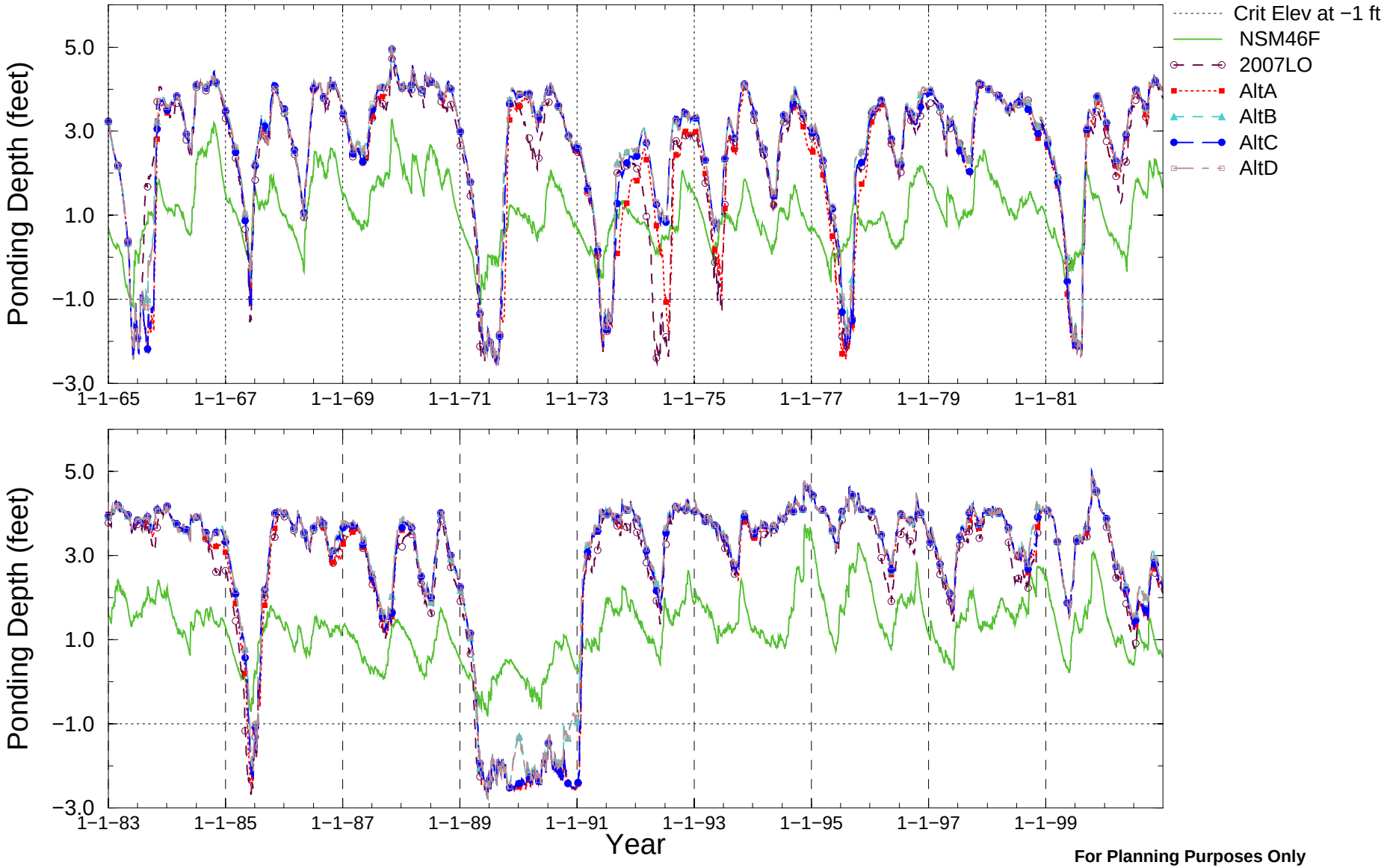
Script used: hyd_dur.scr, V1.11

Filename: 2B−21_3530_dai_stg.fig

SFWMM P.O.S. 1965 − 2000

Normalized Hydrographs for WCA−2B, Key Gauge 3−99

IR 113 (Key Gage at SFWMM ROW 35 COL 30)

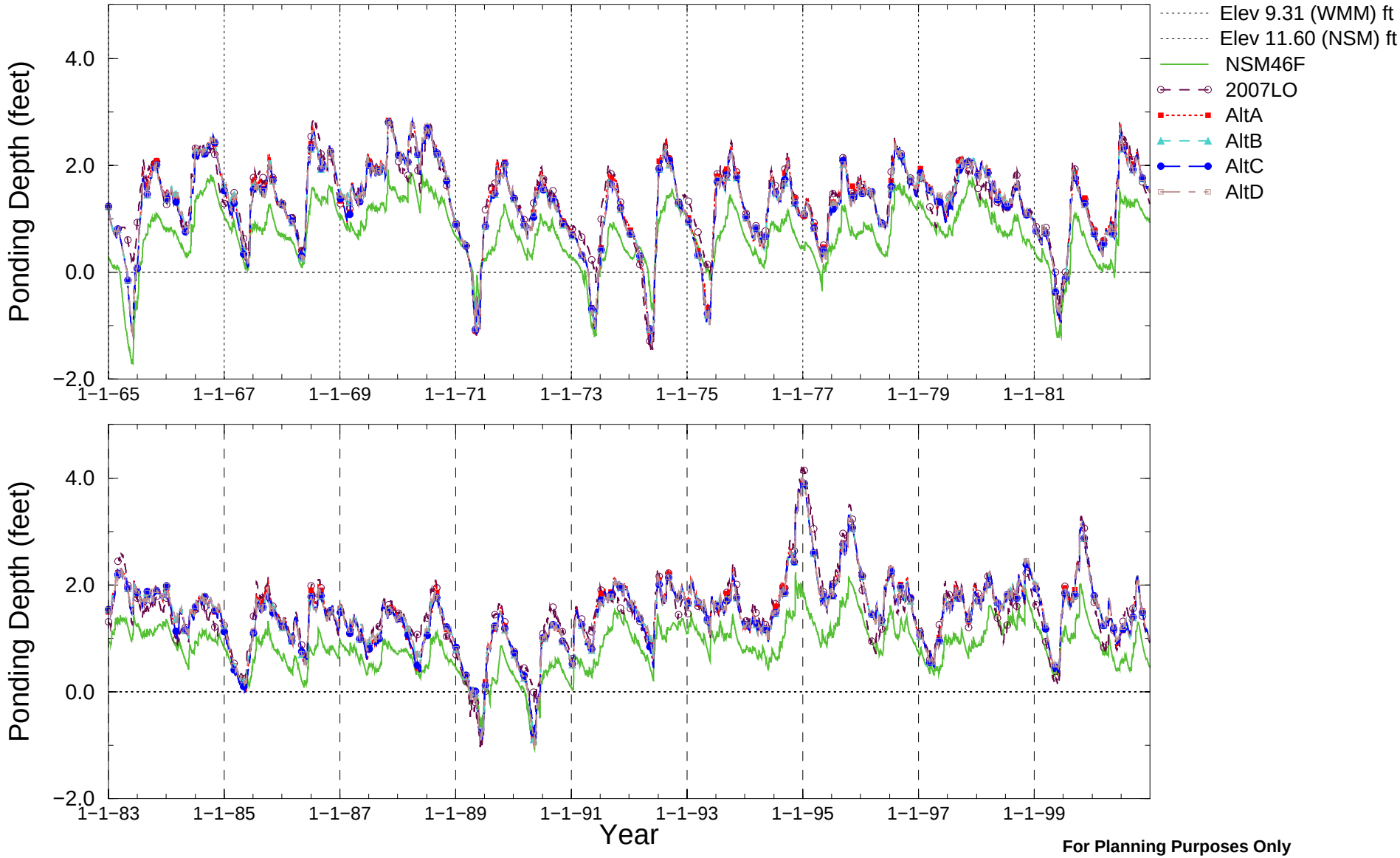


Comparison to Criteria Elevation
For MFL Evaluation

For Planning Purposes Only
Run date: 10/19/07 04:55:40
SFWMM V5.5.1
Script used: mfl.scr, V1.10
Filename: WCA−2B_3−99_stg_mfl.fig

Normalized Hydrographs for North End of WCA3A

(Gage 3A−2, Cell Row 36 Col 18)



For Planning Purposes Only

Run date: 10/19/07 04:43:37

SFWMM V5.5.1

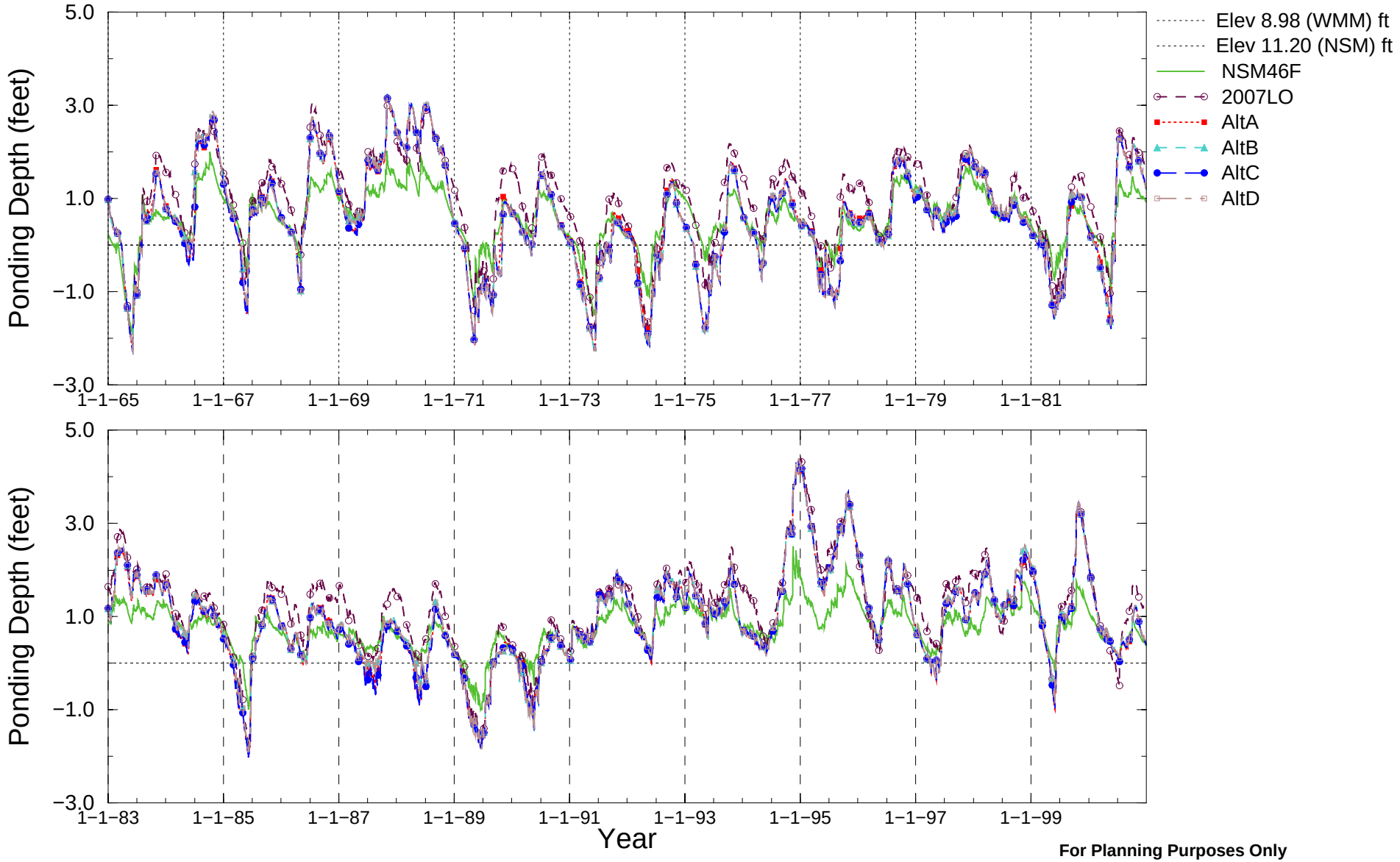
Script used: hyd_dur.scr, V1.11

Filename: 3A−2_3618_dai_stg.fig

SFWMM P.O.S. 1965 − 2000

Normalized Hydrographs for North End of WCA3A

(Gage 3A−3, Cell Row 37 Col 25)



For Planning Purposes Only

Run date: 10/19/07 04:43:49

SFWMM V5.5.1

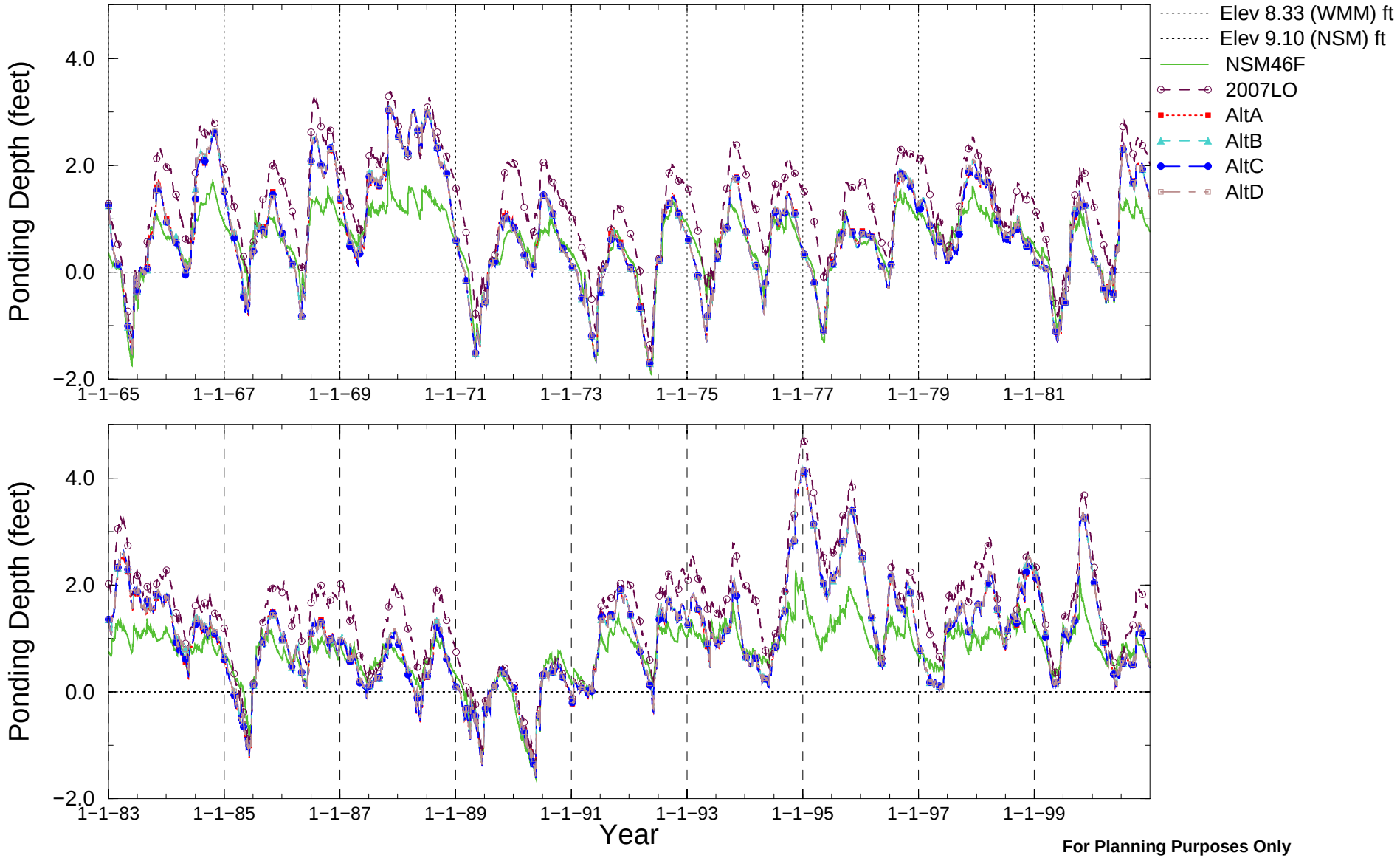
Script used: hyd_dur.scr, V1.11

Filename: 3A−3_3725_dai_stg.fig

SFWMM P.O.S. 1965 − 2000

Normalized Hydrographs for Central Portion of WCA−3A

(Gage 3A−4, Cell Row 29 Col 21)



For Planning Purposes Only

Run date: 10/19/07 04:44:00

SFWMM V5.5.1

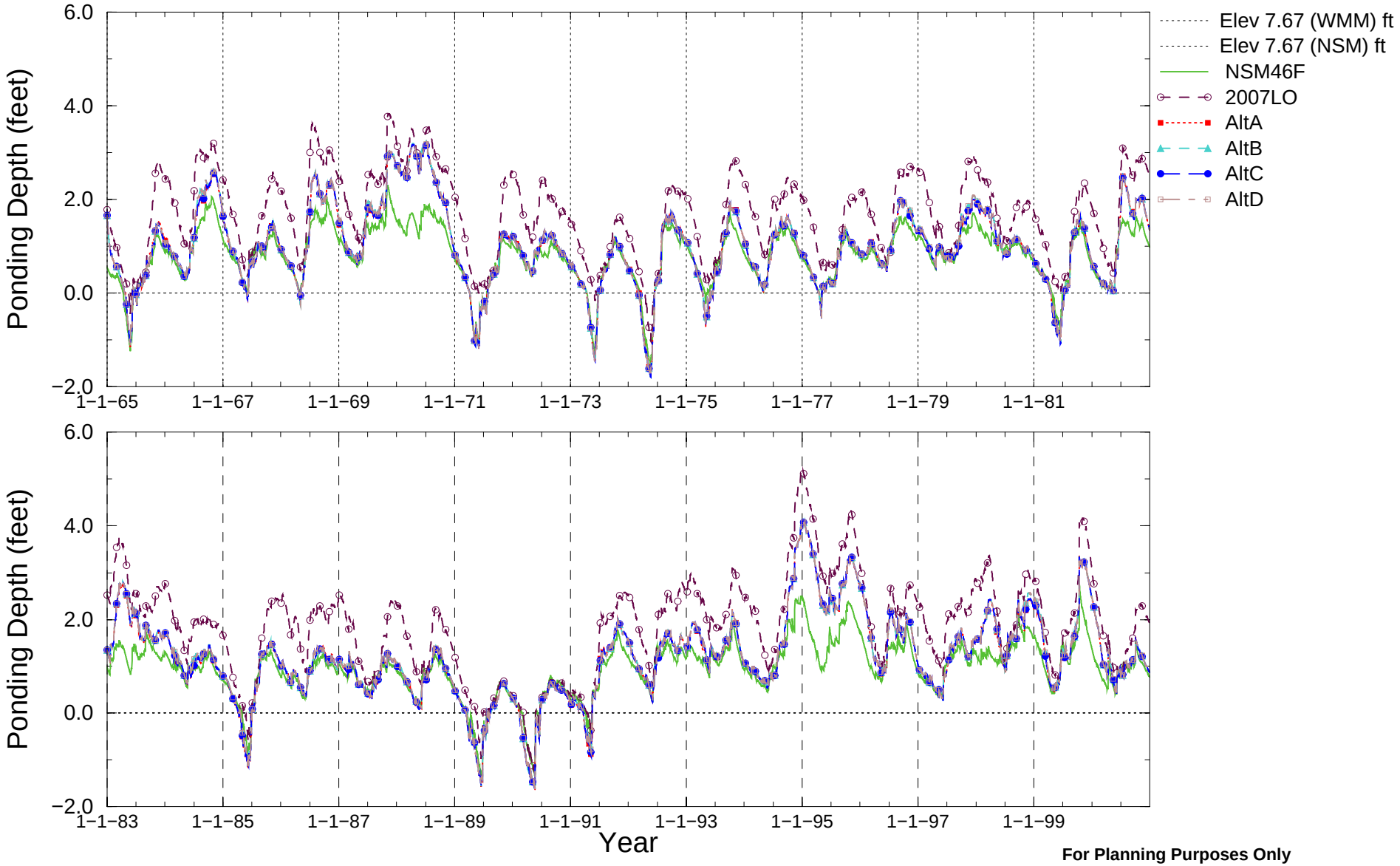
Script used: hyd_dur.scr, V1.11

Filename: 3A−4_2921_dai_stg.fig

SFWMM P.O.S. 1965 − 2000

Normalized Hydrographs for South End of WCA−3A

(Gage 3A−28, Cell Row 24 Col 19)



For Planning Purposes Only

Run date: 10/19/07 04:39:12

SFWMM V5.5.1

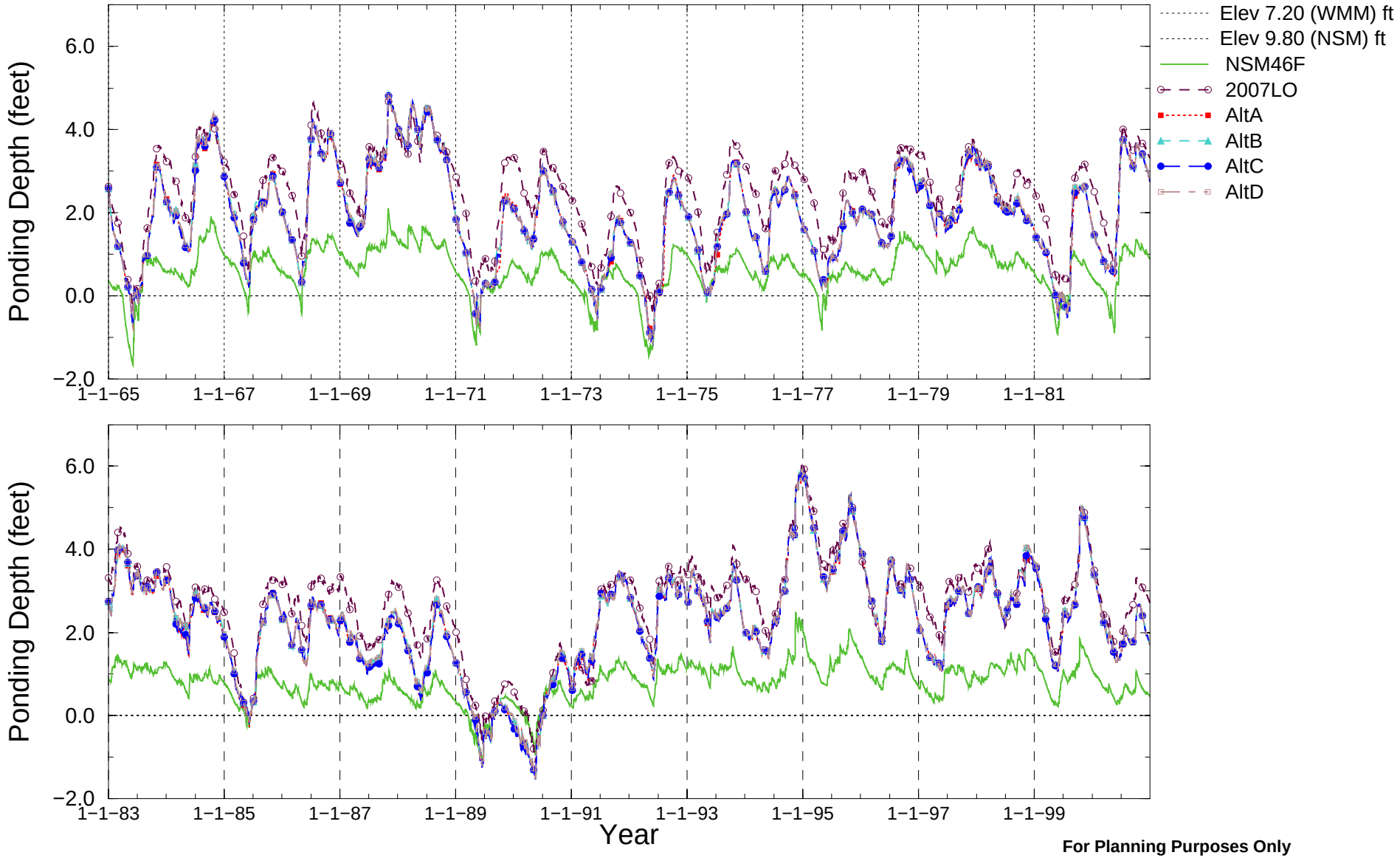
Script used: hyd_dur.scr, V1.11

Filename: 3A−28_2419_dai_stg.fig

SFWMM P.O.S. 1965 − 2000

Normalized Hydrographs for WCA3A Central Cell

(Cell Row 33 Col 26)

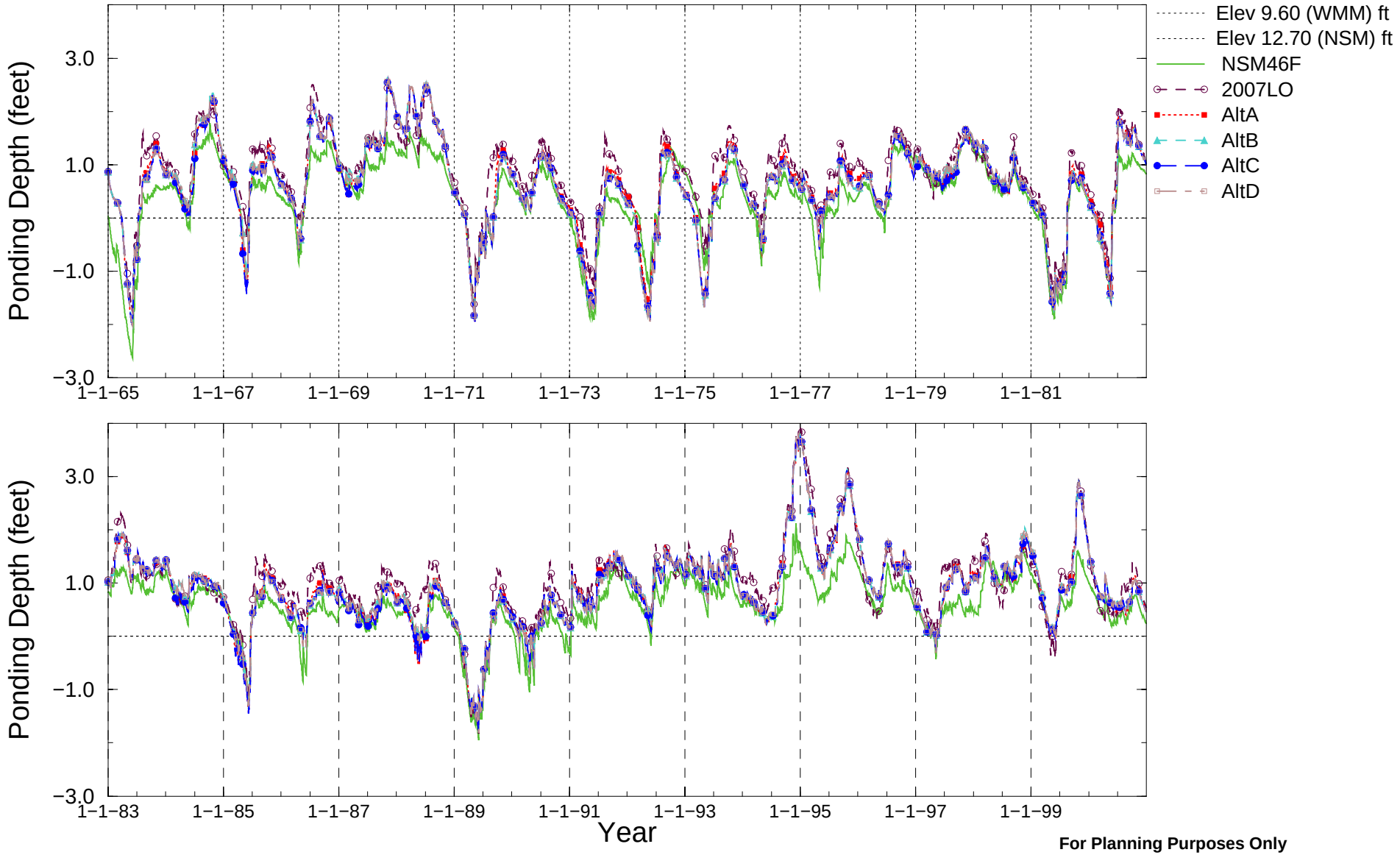


For Planning Purposes Only
Run date: 10/19/07 04:44:12
SFWMM V5.5.1
Script used: hyd_dur.scr, V1.11
Filename: 3A−Central_3326_dai_stg.fig

SFWMM P.O.S. 1965 − 2000

Normalized Hydrographs for North−East End of WCA−3A

(Gage 3A−NE, Cell Row 40 Col 23)



For Planning Purposes Only

Run date: 10/19/07 04:44:24

SFWMM V5.5.1

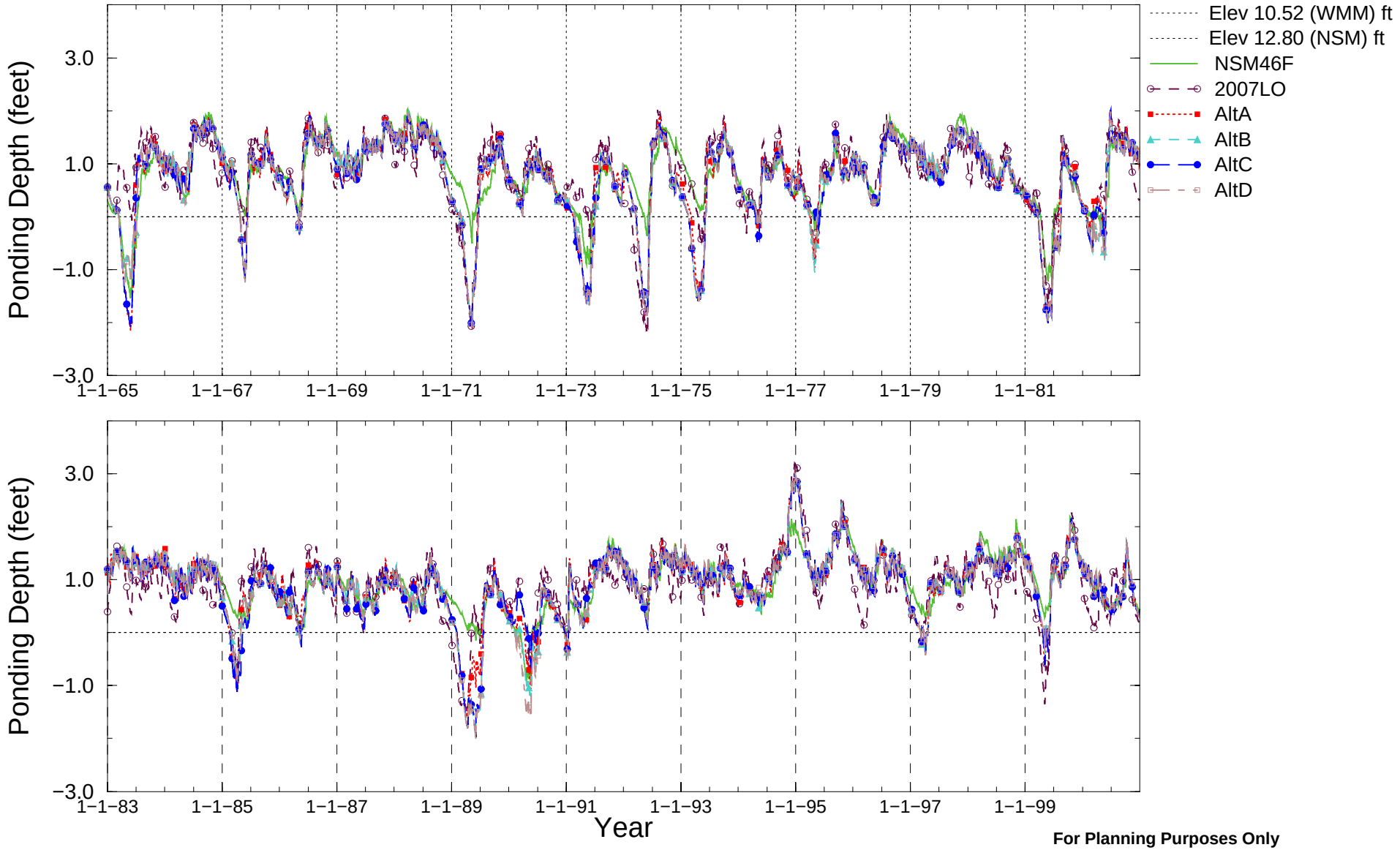
Script used: hyd_dur.scr, V1.11

Filename: 3A−NE_4023_dai_stg.fig

SFWMM P.O.S. 1965 − 2000

Normalized Hydrographs for North−West End of WCA−3A

(Gage 3A−NW, Cell Row 40 Col 18)



For Planning Purposes Only

Run date: 10/19/07 04:44:35

SFWMM V5.5.1

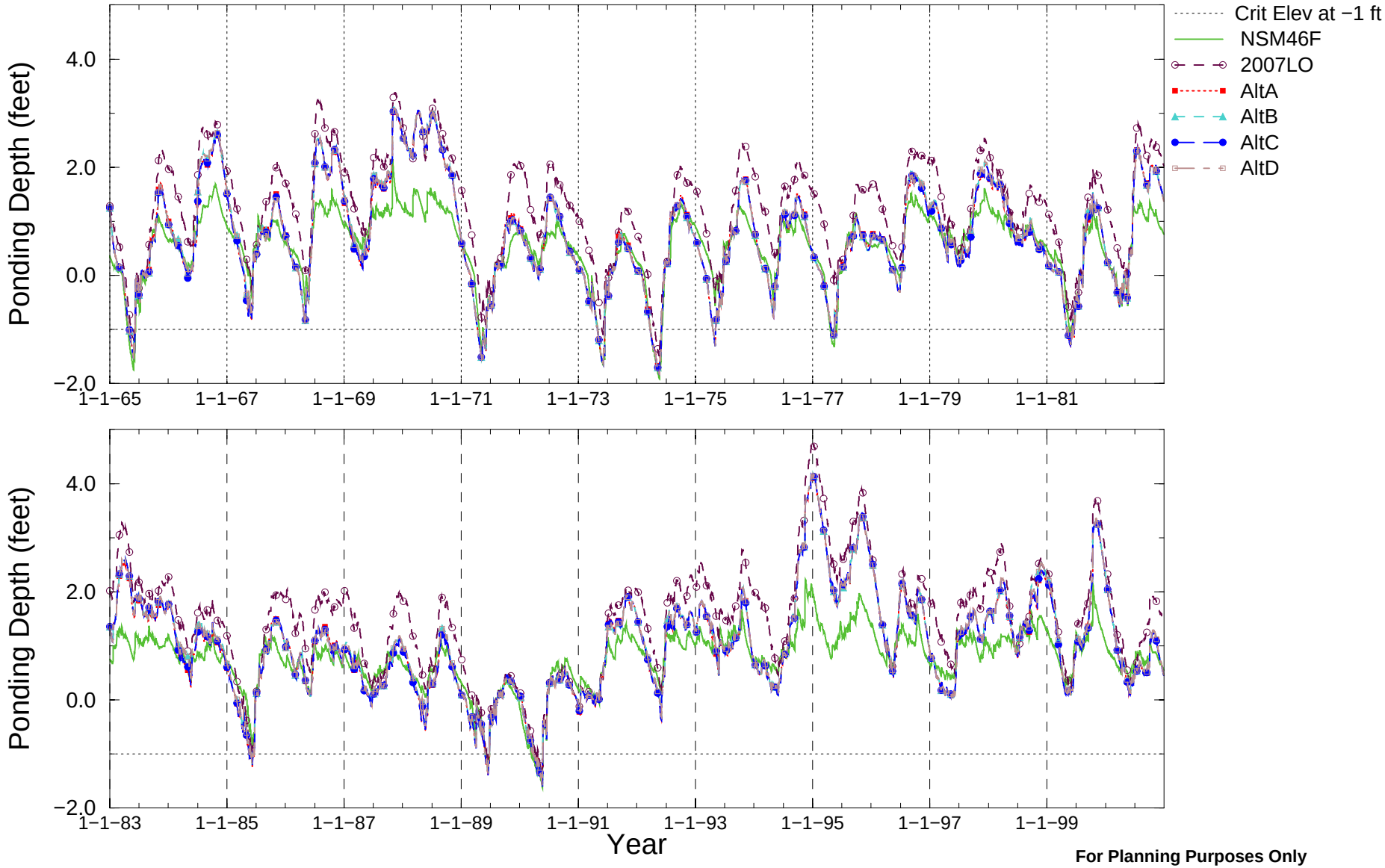
Script used: hyd_dur.scr, V1.11

Filename: 3A−NW_4018_dai_stg.fig

SFWMM P.O.S. 1965 − 2000

Normalized Hydrographs for WCA−3A_Central, Key Gauge 3A−4

IR 123 (Key Gage at SFWMM ROW 29 COL 21)

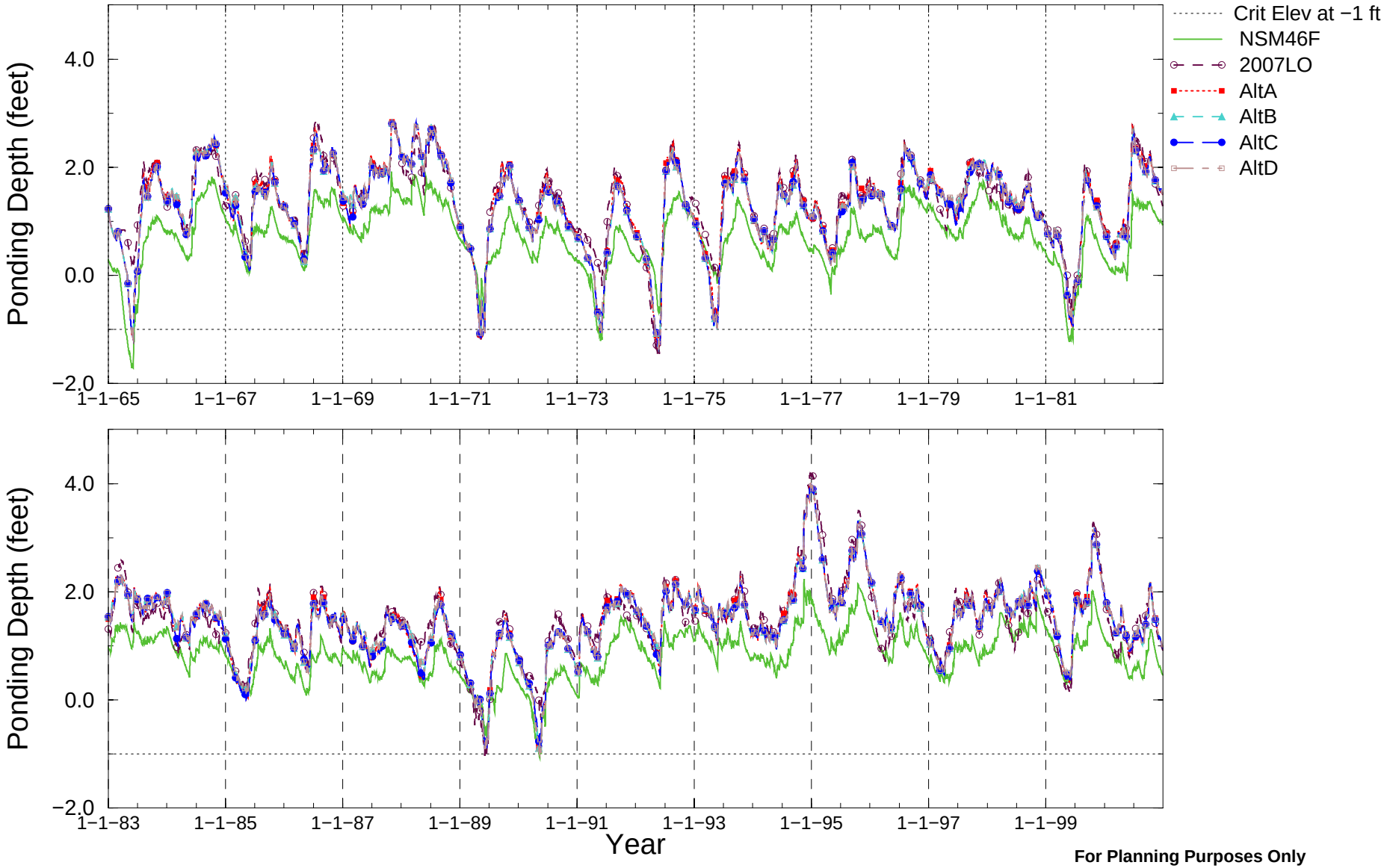


Comparison to Criteria Elevation
For MFL Evaluation

For Planning Purposes Only
Run date: 10/19/07 04:56:36
SFWMM V5.5.1
Script used: mfl.scr, V1.10
Filename: WCA−3A_Central_3A−4_stg_mfl.fig

Normalized Hydrographs for WCA−3A_North, Key Gauge 3A−2

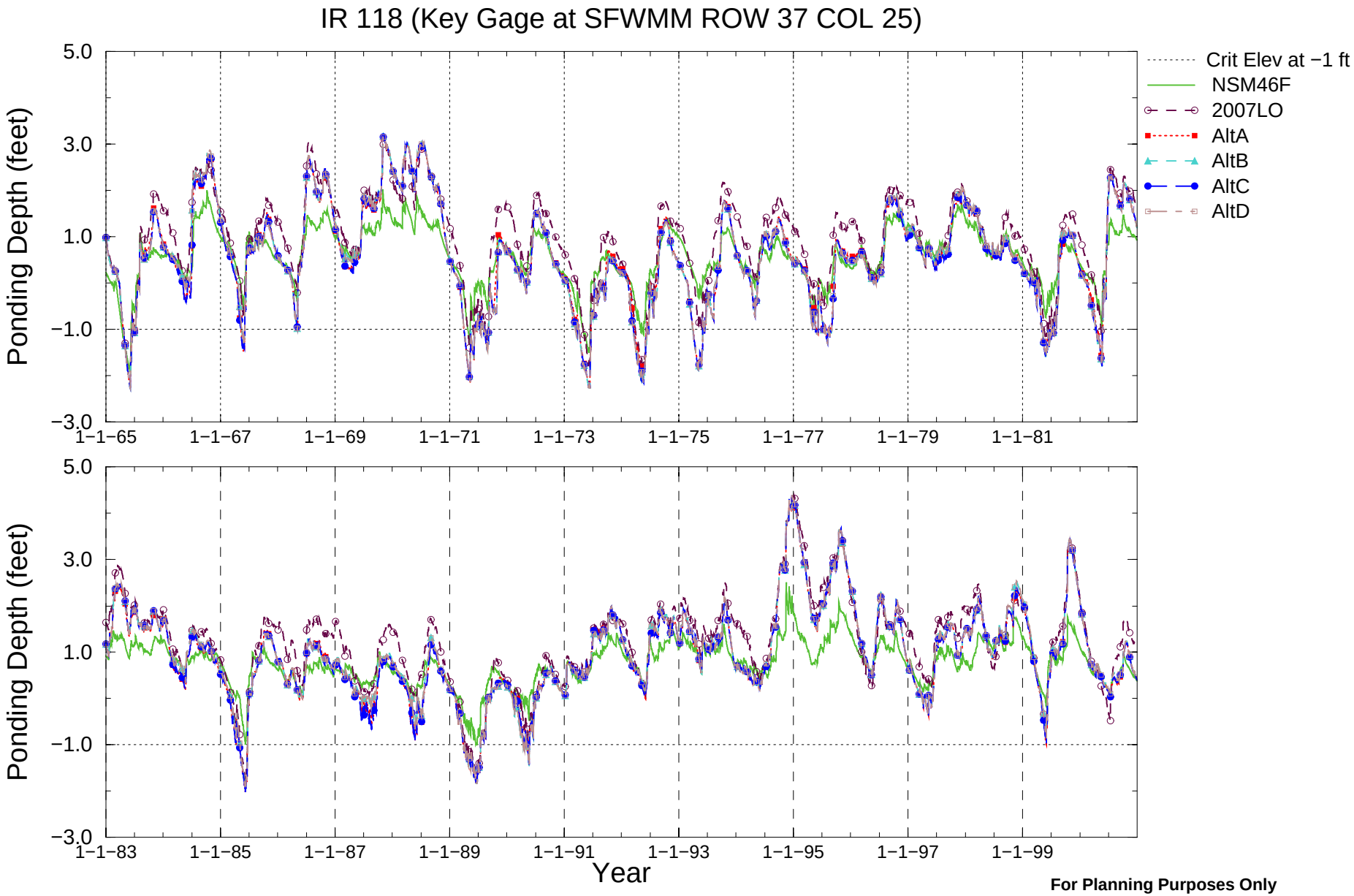
IR 117 (Key Gage at SFWMM ROW 36 COL 18)



Comparison to Criteria Elevation
For MFL Evaluation

For Planning Purposes Only
Run date: 10/19/07 04:56:14
SFWMM V5.5.1
Script used: mfl.scr, V1.10
Filename: WCA−3A_North_3A−2_stg_mfl.fig

Normalized Hydrographs for WCA−3A_North, Key Gauge 3A−3

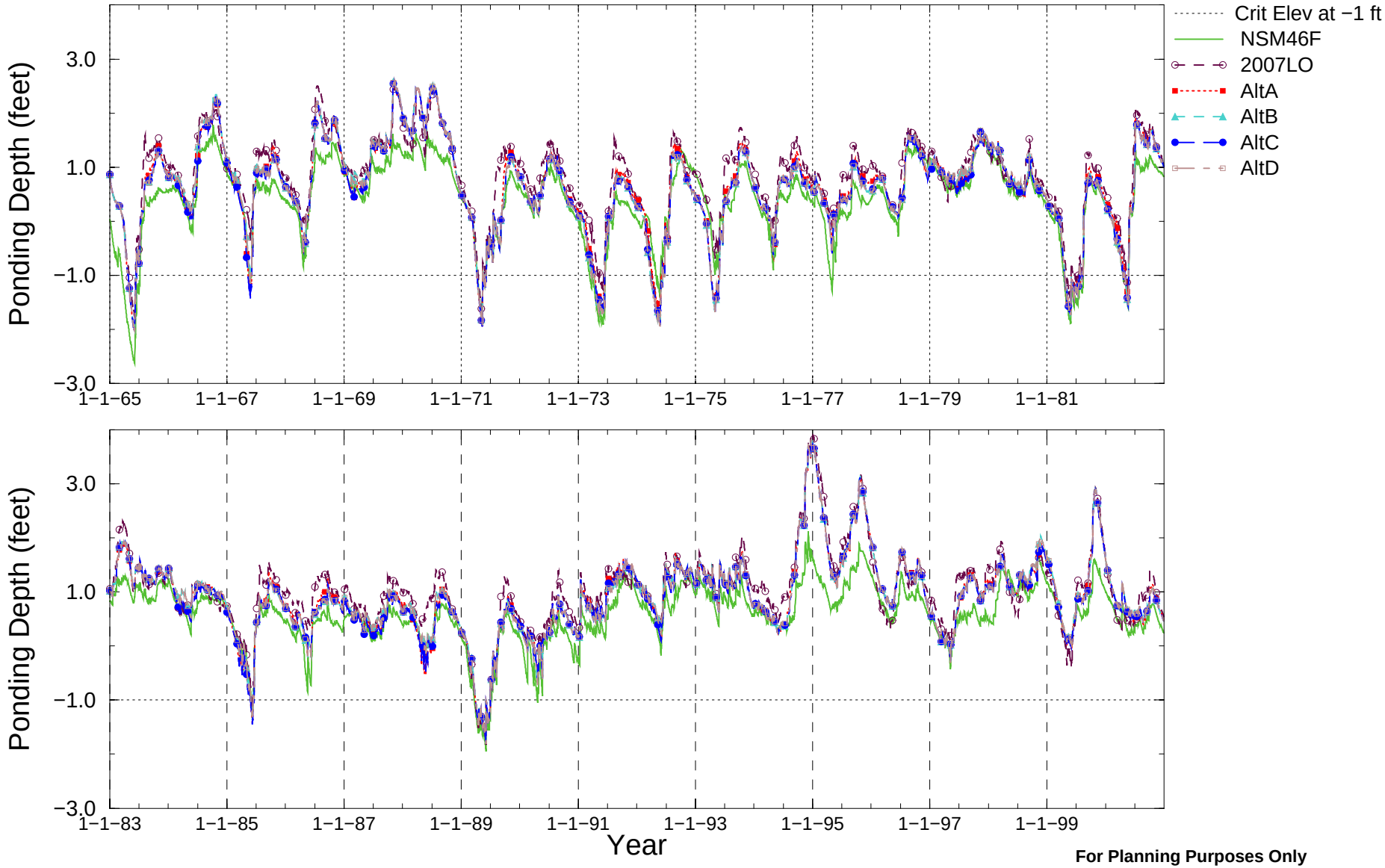


Comparison to Criteria Elevation
For MFL Evaluation

For Planning Purposes Only
Run date: 10/19/07 04:56:25
SFWMM V5.5.1
Script used: mfl.scr, V1.10
Filename: WCA−3A_North_3A−3_stg_mfl.fig

Normalized Hydrographs for WCA−3A_North, Key Gauge 3A−NE

IR 116 (Key Gage at SFWMM ROW 40 COL 23)

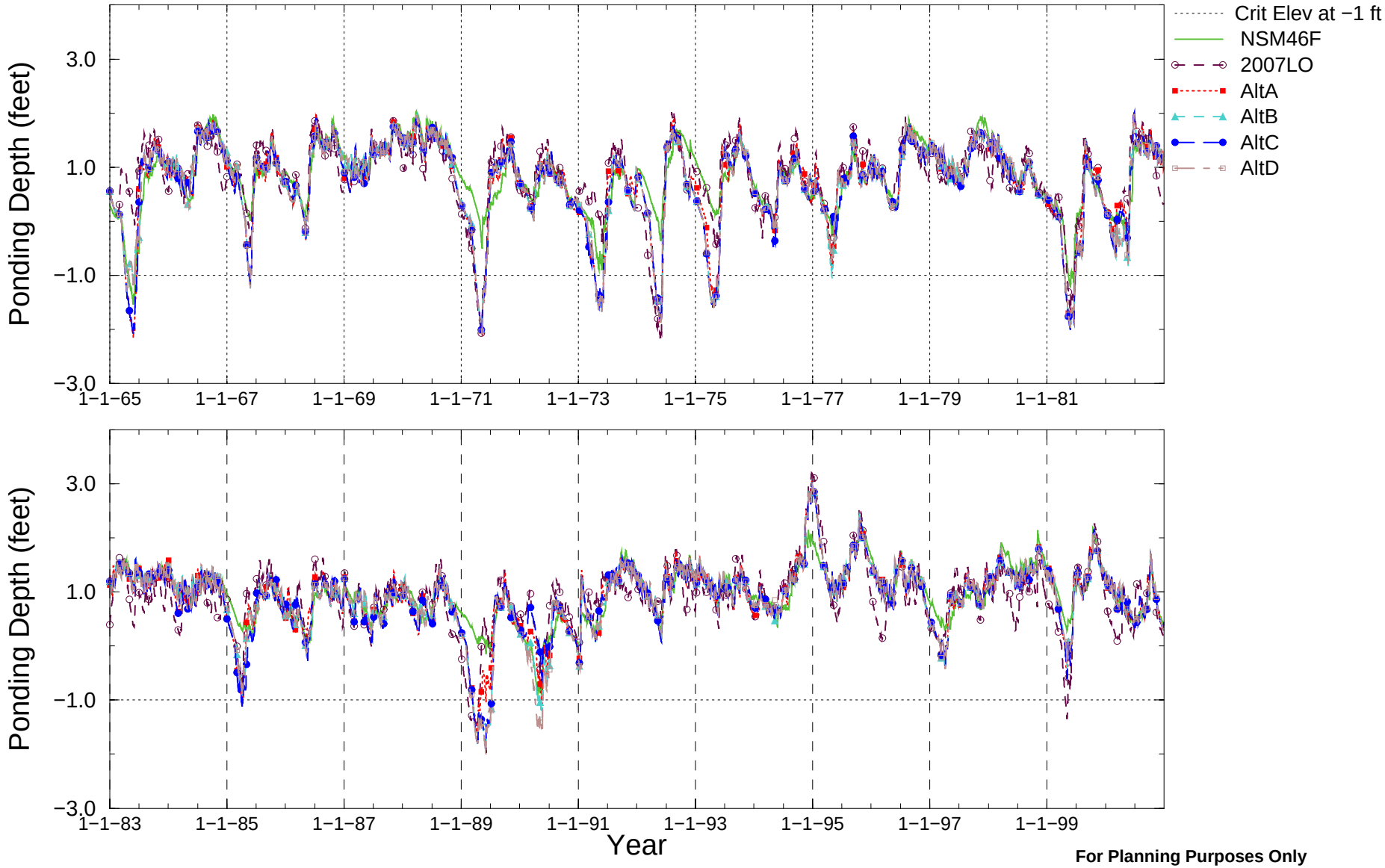


Comparison to Criteria Elevation
For MFL Evaluation

For Planning Purposes Only
Run date: 10/19/07 04:55:51
SFWMM V5.5.1
Script used: mfl.scr, V1.10
Filename: WCA−3A_North_3A−NE_stg_mfl.fig

Normalized Hydrographs for WCA−3A_North, Key Gauge 3A−NW

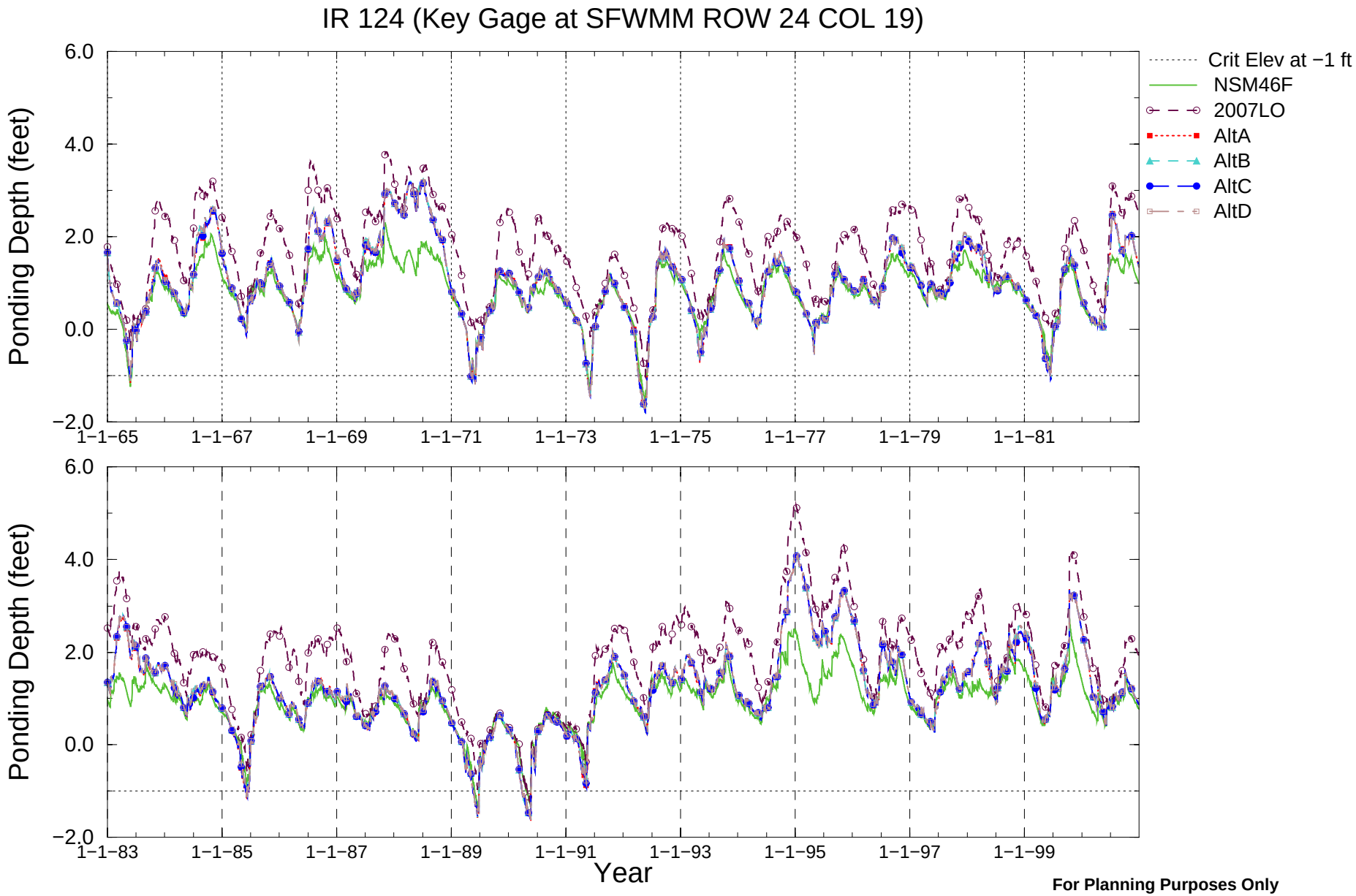
IR 114 (Key Gage at SFWMM ROW 40 COL 18)



Comparison to Criteria Elevation
For MFL Evaluation

For Planning Purposes Only
Run date: 10/19/07 04:56:02
SFWMM V5.5.1
Script used: mfl.scr, V1.10
Filename: WCA−3A_North_3A−NW_stg_mfl.fig

Normalized Hydrographs for WCA−3A_South, Key Gauge 3A−28

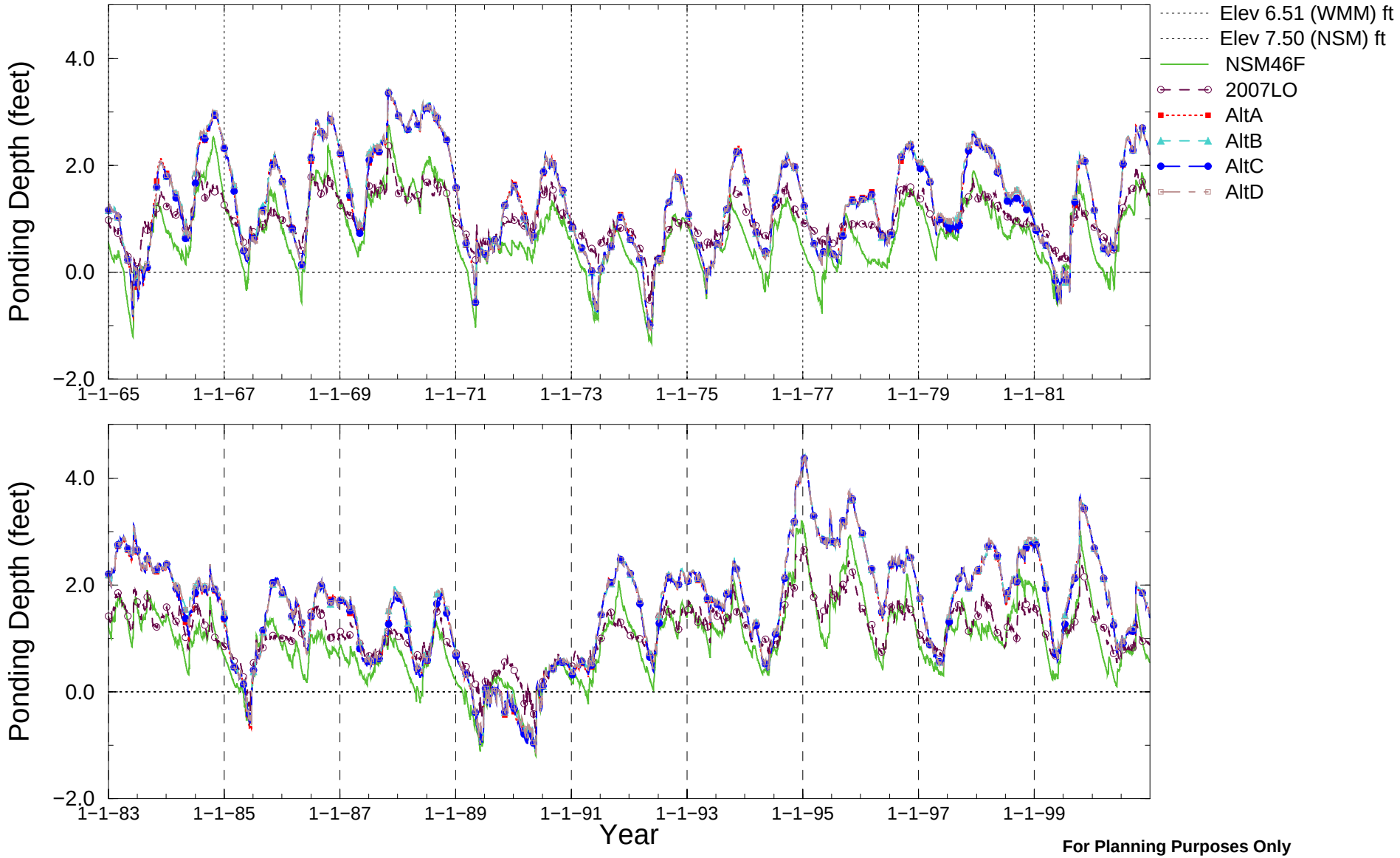


Comparison to Criteria Elevation
For MFL Evaluation

For Planning Purposes Only
Run date: 10/19/07 04:56:47
SFWMM V5.5.1
Script used: mfl.scr, V1.10
Filename: WCA−3A_South_3A−28_stg_mfl.fig

Normalized Hydrographs for West−Central WCA−3B

(Gage 3B−2, Cell Row 26 Col 24)



For Planning Purposes Only

Run date: 10/19/07 04:44:47

SFWMM V5.5.1

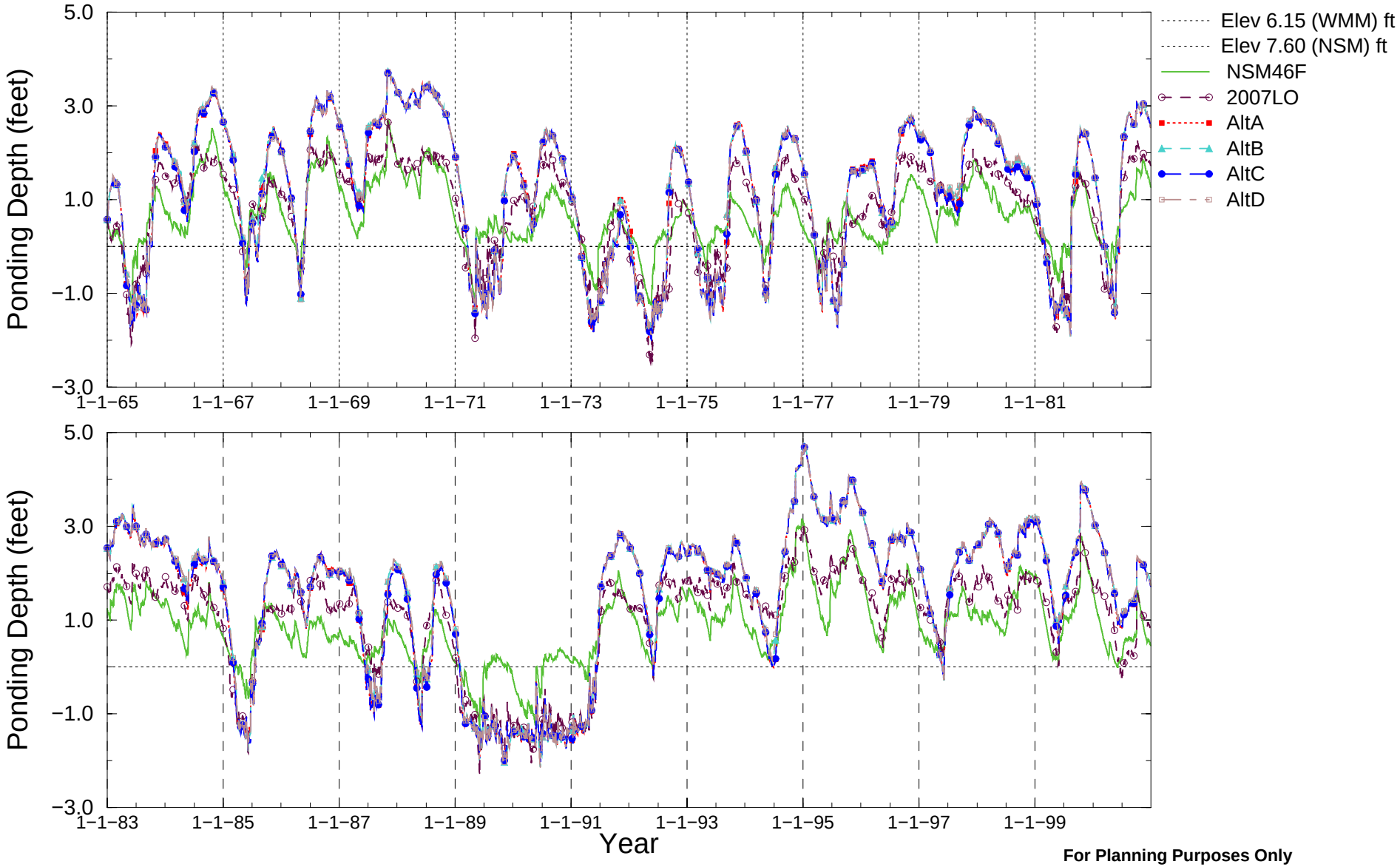
Script used: hyd_dur.scr, V1.11

Filename: 3B−2_2624_dai_stg.fig

SFWMM P.O.S. 1965 − 2000

Normalized Hydrographs for East−Central WCA−3B

(Gage 3B−29, Cell Row 26 Col 26)



For Planning Purposes Only

Run date: 10/19/07 04:44:59

SFWMM V5.5.1

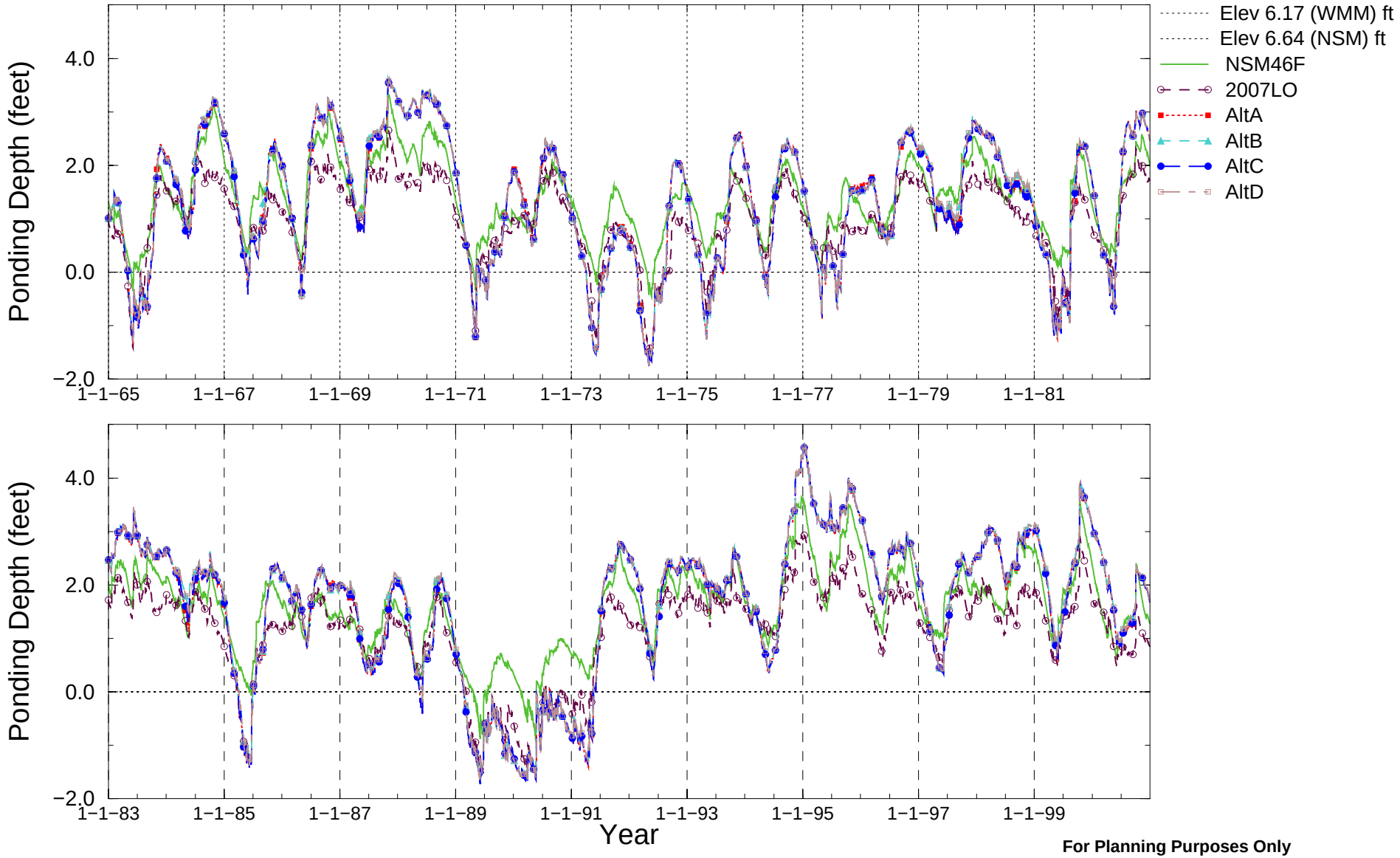
Script used: hyd_dur.scr, V1.11

Filename: 3B−29_2626_dai_stg.fig

SFWMM P.O.S. 1965 − 2000

Normalized Hydrographs for South End of WCA−3B

(Cell Row 24 Col 25)



For Planning Purposes Only

Run date: 10/19/07 04:45:34

SFWMM V5.5.1

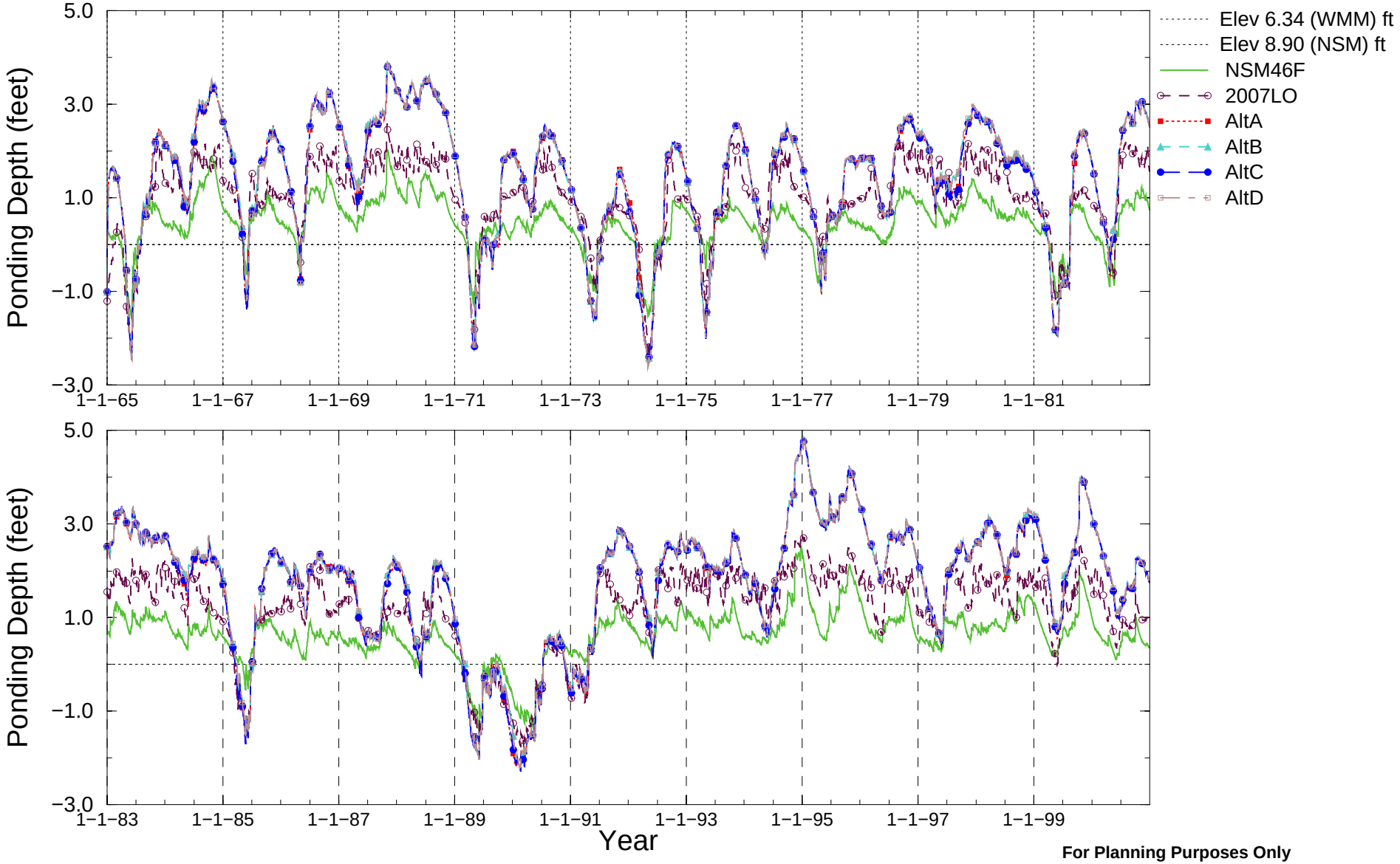
Script used: hyd_dur.scr, V1.11

Filename: 3B−N_2425_dai_stg.fig

SFWMM P.O.S. 1965 − 2000

Normalized Hydrographs for North End of WCA−3B

(Cell Row 30 Col 27)



For Planning Purposes Only

Run date: 10/19/07 04:45:22

SFWMM V5.5.1

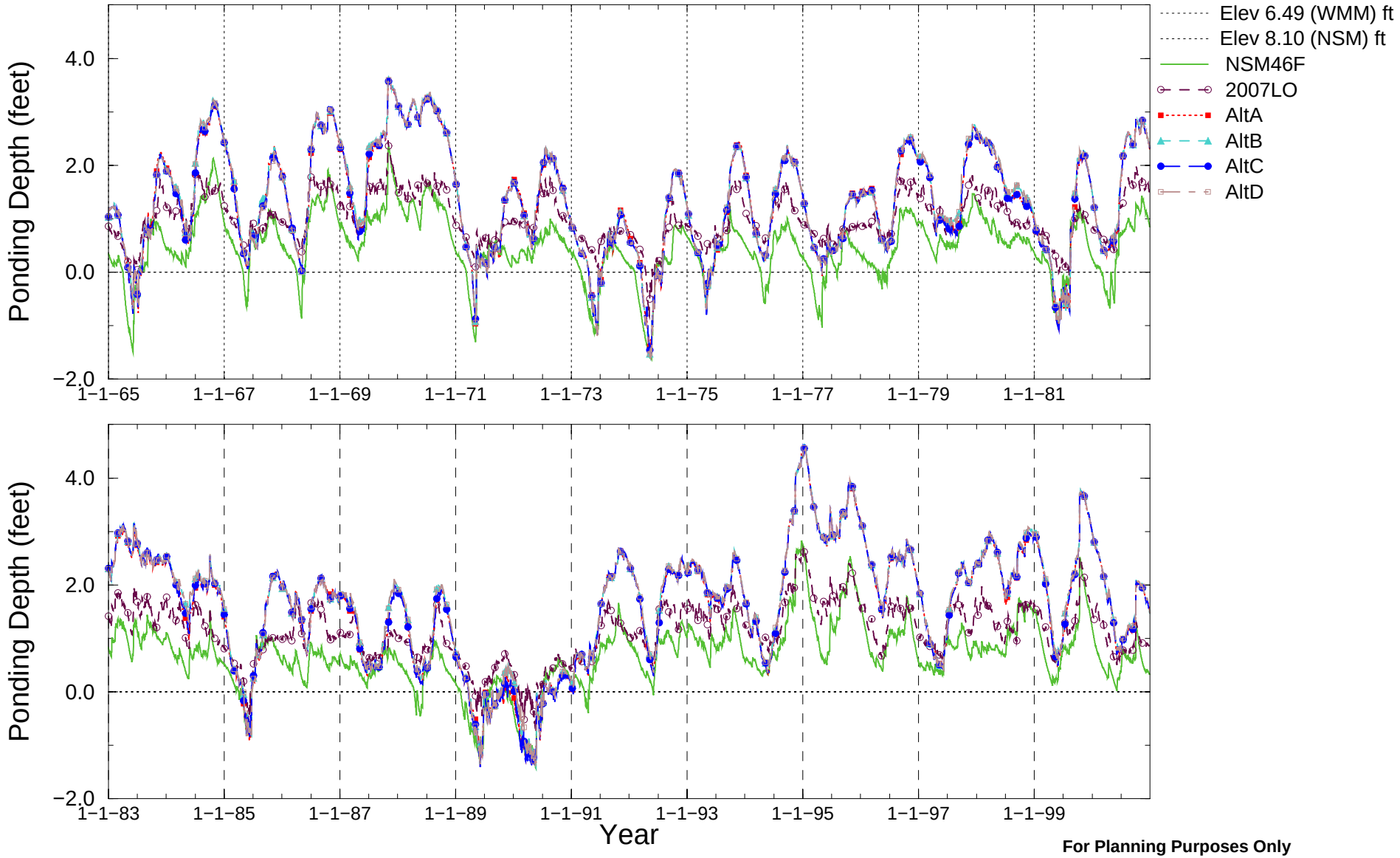
Script used: hyd_dur.scr, V1.11

Filename: 3B−N_3027_dai_stg.fig

SFWMM P.O.S. 1965 − 2000

Normalized Hydrographs for North−Central WCA−3B

(Cell Row 27 Col 25)



For Planning Purposes Only

Run date: 10/19/07 04:45:11

SFWMM V5.5.1

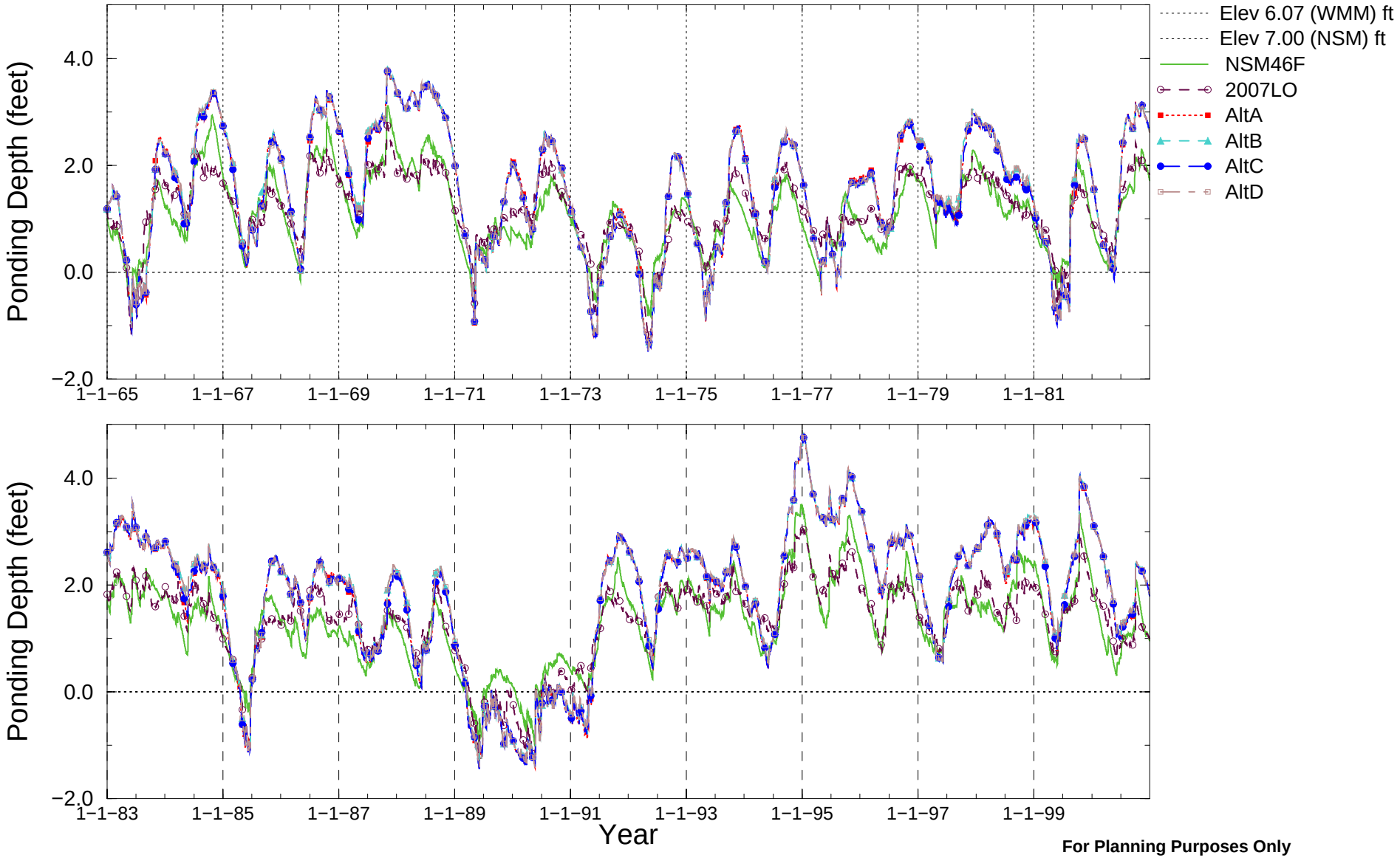
Script used: hyd_dur.scr, V1.11

Filename: 3B−N−Central_2725_dai_stg.fig

SFWMM P.O.S. 1965 − 2000

Normalized Hydrographs for South−Central WCA−3B

(Cell Row 25 Col 25)



For Planning Purposes Only

Run date: 10/19/07 04:45:46

SFWMM V5.5.1

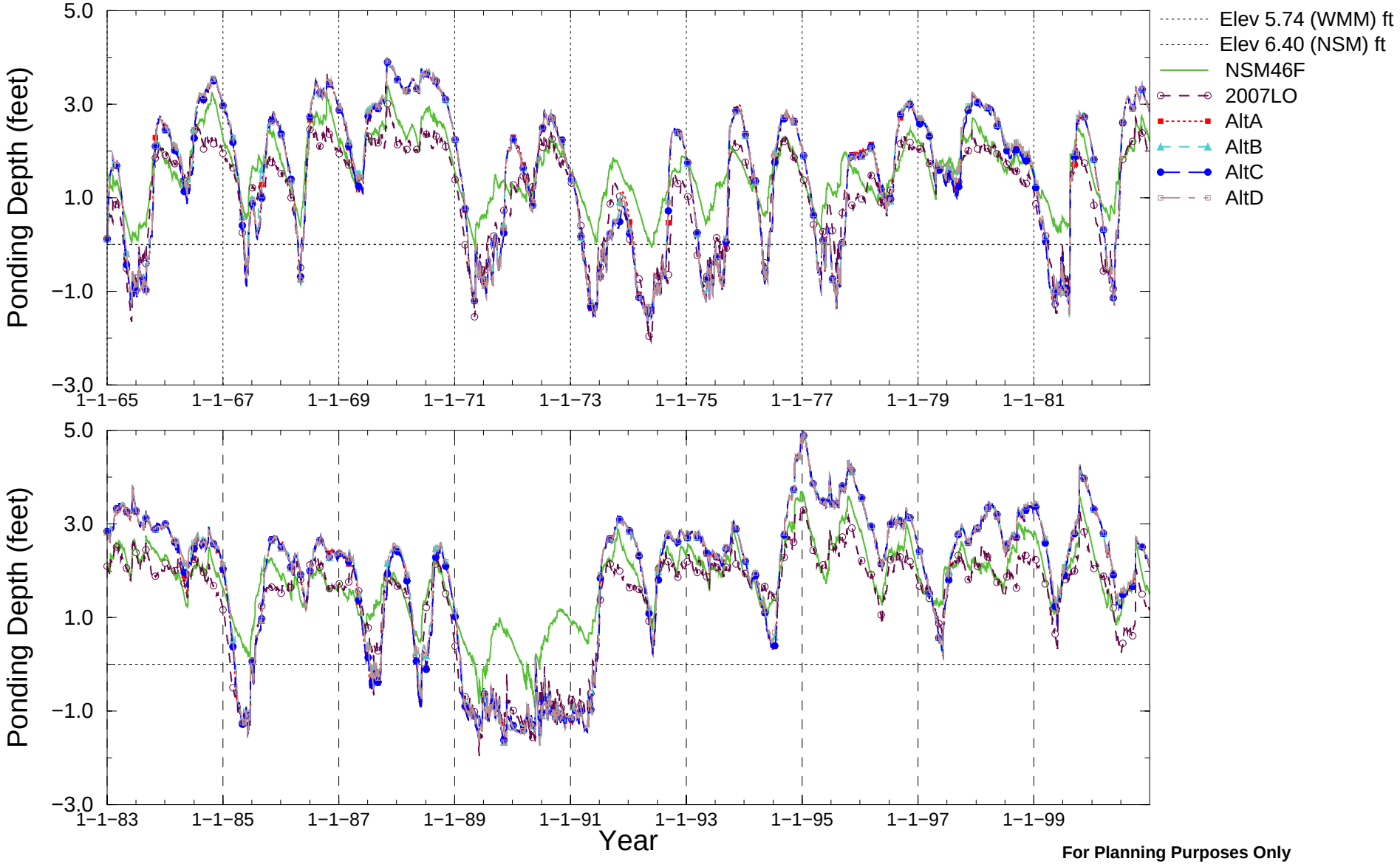
Script used: hyd_dur.scr, V1.11

Filename: 3B−S−Central_2525_dai_stg.fig

SFWMM P.O.S. 1965 − 2000

Normalized Hydrographs for South End of WCA−3B

(Gage 3B−SE, Cell Row 23 Col 26)



For Planning Purposes Only

Run date: 10/19/07 04:45:57

SFWMM V5.5.1

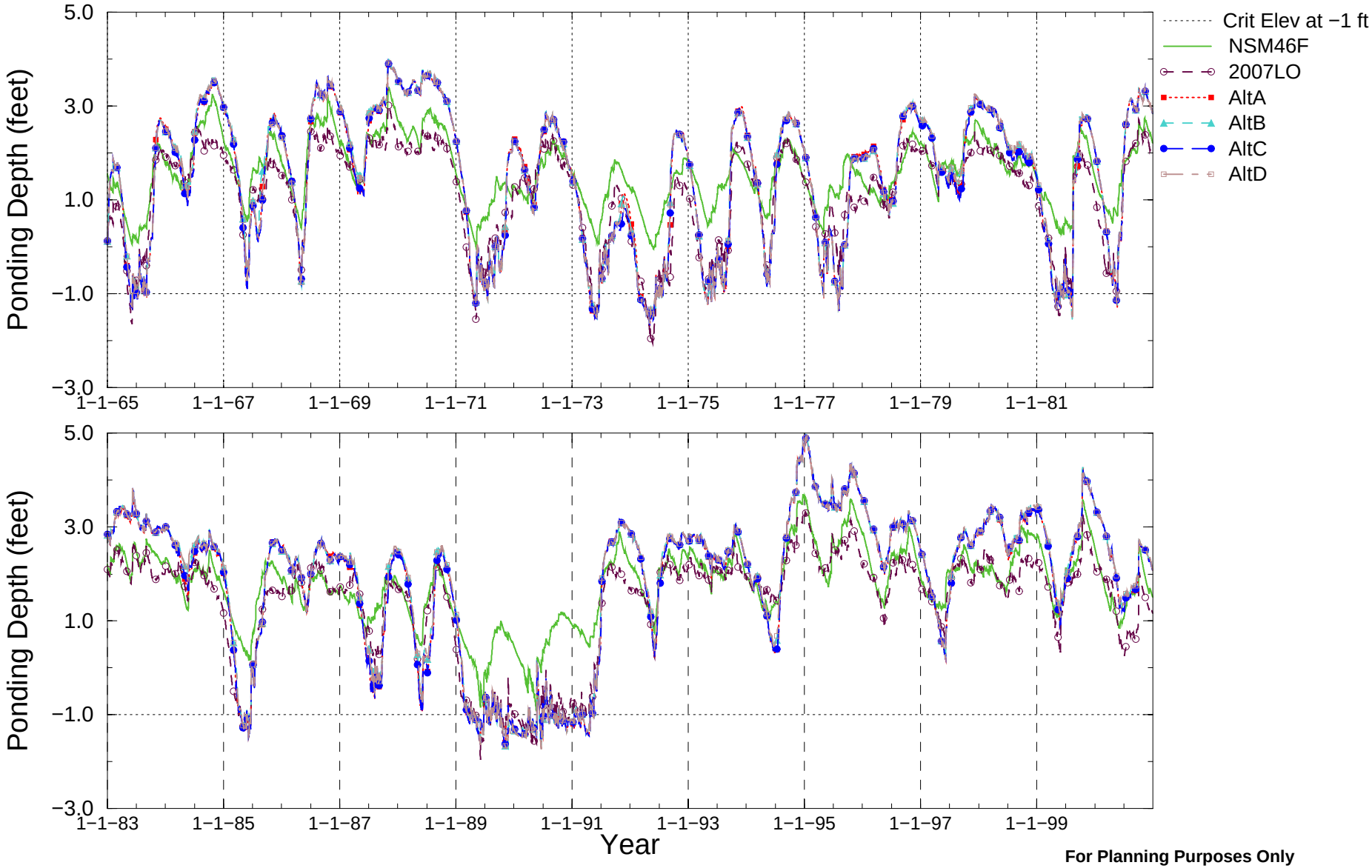
Script used: hyd_dur.scr, V1.11

Filename: 3B−SE_2326_dai_stg.fig

SFWMM P.O.S. 1965 − 2000

Normalized Hydrographs for WCA−3B, Key Gauge 3B−SE

IR 128 (Key Gage at SFWMM ROW 23 COL 26)



Comparison to Criteria Elevation
For MFL Evaluation

For Planning Purposes Only
Run date: 10/19/07 04:56:59
SFWMM V5.5.1
Script used: mfl.scr, V1.10
Filename: WCA−3B_3B−SE_stg_mfl.fig