Meeting Agenda

- Welcome and Introductions
- Project Study, Scope and Schedule
- Plan Formulation Review
- Initial Concepts
- Next Steps
- Public Comment
EAA Storage Reservoir Feasibility Study Timeline

Public Scoping

2017

May 9
SB10 Signed into Law
June 20
Notify Landowners
July 1
Requested USACE to Initiate PACR
Aug. 1
Initiated Project
Oct. 23 and 26
Public Scoping Meetings
Nov. 2
WRAC Meeting

2018

Nov. 6
Plan Formulation
Nov. 15 and 16
Initial Concepts
Dec. 5
Model Results
Dec. 7
WRAC Meeting
Dec. 14
Governing Board Meeting
Nov. 22
Public Scoping Comments Due
Nov. 29
Government Agency Coordination Meeting

2019

Jan. 9
Update Florida Legislature
March 30
Final Report Submitted to ASA
Oct. 1
ASA Submits Report to Congress
Dec. 31
Congressional Authorization

Submit PACR for Congressional Approval
EAA Storage Reservoir Feasibility Study

PROJECT STUDY, SCOPE AND SCHEDULE
South Florida Ecosystem Restoration

NON-CERP & FOUNDATION PROJECTS
- Modified Water Deliveries to Everglades National Park
- Kissimmee River Restoration
- C-111 South Dade
- C-51/Storm Water Treatment Area (STA) 1E
- Storm Water Treatment Areas/ Restoration Strategies
- Tamiami Trail Bridging & Roadway Modifications
- Herbert Hoover Dike (HHD) Rehabilitation
- Seminole Big Cypress Critical Project

CERP GENERATION 1 PROJECTS
- Indian River Lagoon (IRL) – South
- Picayune Strand
- Site 1
- Melaleuca Annex Facility

CERP GENERATION 2 PROJECTS
- C - 43 Reservoir
- Broward County Water Preserve Areas (WPA)
- C-111 Spreader Canal Western Project
- Biscayne Bay Coastal Wetlands Phase 1

DECEMBER 2016 AUTHORIZATION
- Central Everglades Planning Project (CEPP)

PLANNING EFFORTS
- Loxahatchee River Watershed Restoration
- Western Everglades Restoration
- Lake Okeechobee Watershed Restoration

EVERGLADES AGRICULTURAL AREA STORAGE RESERVOIR
Moving Water South-
Existing Conditions

- Water flows out of Lake Okeechobee to the south through the lake outlet structures to the major canals
  - L-8 Canal
  - West Palm Beach Canal
  - Hillsboro Canal
  - North New River Canal
  - Miami Canal
CEPP Recommended Plan ALT 4R2

- **PPA New Water**
  - Seepage Barrier, L-31N Levee

- **PPA North**
  - L-6 Canal Flow Diversion
  - L-5 Canal Conveyance Improvements
  - S-8 Pump Station Complex Modifications
  - L-4 Levee Degrade and Pump Station
  - Miami Canal Backfill

- **PPA South**
  - S-333 Spillway Modification
  - L-29 Canal Gated Spillway
  - L-67A Conveyance Structures
  - L-67C Levee Gap
  - L-67C Levee Degrade
  - Blue Shanty Levee, WCA 3B
  - L-29 Levee Degrade
  - L-67 Extension Levee Degrade and Canal Backfill
  - Old Tamiami Trail Removal
  - S-356 Pump Station Modifications
  - System-wide Operations Refinements
Project Opportunities and Objectives

- Reduce the high-volume freshwater discharges from Lake Okeechobee to the Northern Estuaries
- Identify storage, treatment and conveyance south of Lake Okeechobee to improve flows to the Everglades system
- Reduce ongoing ecological damage to the Northern Estuaries and Everglades system

St. Lucie Inlet
Constraints

- WRDA 2000 Sec. 601(h)(5); Sec. 373.1501, F.S.
  - Elimination or transfer of existing legal sources of water must be addressed
  - Maintain existing level of flood protection

- Meet applicable water quality standards
  - Will not cause or contribute to a violation of state water quality standards, permit discharge limits or specific permit conditions
  - Reasonable assurances exist that adverse impacts on flora and fauna will not occur

- Remain within federal authorities (CERP)
Florida State Law

Chapter 2017-10 Requirements as it Relates to Post-Authorization Change Report

- Engage landowners on a ‘willing seller’ basis
- 240,000 acre-feet of storage and necessary treatment on A-2 Parcel plus conveyance improvements
- 360,000 acre-feet of storage and necessary treatment on A-1 and A-2 Parcels plus conveyance improvements
- Report to State Legislature by January 9, 2018
- Submit Post-Authorization Change Report to Congress for approval by October 1, 2018
Planning Process & Schedule

▪ Section 203 of the Water Resources Development Act (WRDA) of 1986, as amended

▪ Key Activities and Target Dates:
  • Update to Florida State Legislature - by January 9, 2018
  • Draft Report complete – by January 30, 2018
  • Final Report and submittal to Assistant Secretary of the Army for Civil Works – March 30, 2018
  • ASA(CW) submit report to Congress – October 1, 2018
  • Anticipated Congressional authorization – by December 31, 2019
EAA Storage Reservoir Feasibility Study

PLAN FORMULATION REVIEW
Decoupled Regional Modeling Approach

**RSMBN:**
EAA Storage & Treatment

**Interface ("Red Line"):**
Flow Volumes

**RSMGL:**
Greater Everglades

Northern Everglades

Southern Everglades
Regional Modeling Approach

**Scenario**

- Climatic Input
  - Rainfall
  - ET
- Boundary Conditions

**Model Output**

- Daily time series of water levels, flows
- Demands not met

**Project Features**

- Land Use/Land Cover
- Water Demands
- Operating Criteria

**Evaluation**

(Environmental, Water Supply, etc...)

**Period of record:**
1965–2005
Baseline Modeling

- Modeling of “Baseline” scenarios helps to provide reference points for comparison. These scenarios show how current conditions or “No Action” future conditions will perform so that the potential benefits of suggested infrastructure changes can be evaluated.

- Guiding principle in developing baseline modeling for the EAA Storage Reservoir planning effort:

  Maintain consistency with Central Everglades Planning (CEPP)
Baseline Modeling Assumptions (cont)

- Existing Condition Baseline (EARECB) attempts to represent on-ground conditions circa 2017
  
  - Assumptions per CEPP RSMBN ECB and IORBL1 simulations (depending on sub-basin) and CEPP RSMGL 2012EC (Scenarios defined in CEPP Project Implementation Report)

- Future Without Project Baseline (EARFWO) attempts to represent the projected future conditions circa 50 years in the future if there was no EAA Storage Reservoir Project
  
  - Assumptions per RSMBN ALT4R2 and RSMGL ALT4R2 (CEPP Selected Plan + Other Authorized Projects)

- Today’s presentation will review a system-wide comparison of Current EARECB and Future EARFWO Baselines.
Key System Changes
From ECB to FWO

- Kissimmee Headwaters Revitalization
- Indian River Lagoon-South
- C-43 Phase 1 Reservoir
- Other 1\textsuperscript{st} and 2\textsuperscript{nd} Generation CERP & Foundation Projects
- Restoration Strategies / Central Everglades Project Features in the Everglades Agricultural Area
- Central Everglades Project Features in the Greater Everglades
Key System Changes From ECB to FWO

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Kissimmee River Restoration in RSMBN

EARECB & EARFWO

- The Lower Kissimmee Basin is partitioned into three major sub-watersheds: Pools A, BCD (Pool BC & Pool D combined into Pool BCD), and E
- Stage-volume and stage-area relationships updated for Pool BCD
- Structure S-65C is removed
Upper Kissimmee Basin
S65 Operational Schedule: Current System (EARECB)

Figure 1. Interim Operational Schedule and Release Rules for Lakes Kissimmee-Hatchineha-Cypress controlled by S-65.

Source: SFWMD. 2007 South Florida Environmental Report, Appendix 11-1
Upper Kissimmee Basin
S65 Operational Schedule: Headwaters Revitalization (EARFWO)

Source: SFWMD. 2007 South Florida Environmental Report, Chapter 11: Kissimmee River Restoration and Upper Basin Initiatives
Seasonal Change in Flow at S65E due to Headwaters Revitalization in EARFWO

S65E Monthly Average Flow Volumes (CFS-DAY) 1965–2005
Key System Changes From ECB to FWO

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Indian River Lagoon EARECB in RSMBN

[Diagram of the Indian River Lagoon EARECB in RSMBN network, showing interconnections between various nodes and flows.]
Indian River Lagoon EARECB in RSMBN

C44 Basin

- S-80 discharges into the St. Lucie Estuary.
- C44 Basin runoff has potential to backflow into Lake Okeechobee when Lake stage is below 14.5 feet NGVD.
- C44 Basin supplemental demands for surface water irrigation are met by Lake Okeechobee.

C23, C24, TMC and NF-SF-B456 (NSF) Sub-watersheds

- Three outlet structures discharge from each of the basins into the St. Lucie Estuary.
- Structure capacity is assumed to be limited only by available basin runoff.
- No regional deliveries to meet demands.
Indian River Lagoon EARFWO in RSMBN

Flow (Water Supply, Flood Control, etc.)

Basin with DMD and/or RO

Canal for "traffic control"

Boundary Condition

Demand

Flow (Water Supply, Flood Control, etc...)

Basin with DMD and/or RO

Canal for "traffic control"

Boundary Condition
Indian River Lagoon EARFWO in RSMBN

FWO Project Features

- Consistent with CERP Indian River Lagoon – South DDRs updates to the authorized 2004 PIR.
- Includes operational intent (Opti6) per St Lucie River Watershed Protection Plan (January 2009).
- Basin demands can be met by project features.

C44 Reservoir and STA

- Storage capacity: 50,246 acre-feet
- Footprint: 12,125 acres (assumed 9700 effective acres / 80%)
Indian River Lagoon EARFWO in RSMBN (cont)

C23/24 Reservoir
- Storage capacity: 92,094 acre-feet
- Footprint: 8675 acres (assumed 6940 effective acres / 80%)

C23/C24 STA
- Storage capacity: 3852 acre-feet
- Footprint: 3323 acres (assumed 2568 effective acres / 80%)

Ten Mile Creek Reservoir and STA
- Storage capacity: 7078 acre-feet
- Footprint: 820 acres (assumed 656 effective acres / 80%)
Improvements in both low and high discharge events observed in EARFWO (e.g. IRL & CEPP)
Key System Changes From ECB to FWO

- Kissimmee Headwaters Revitalization
- Indian River Lagoon-South
- C-43 Phase 1 Reservoir
- Other 1st and 2nd Generation CERP & Foundation Projects
- Restoration Strategies / Central Everglades Project Features in the Everglades Agricultural Area
- Central Everglades Project Features in the Greater Everglades
Caloosahatchee EARECB in RSMBN

C43 Basin

- S-79 discharges into the Caloosahatchee Estuary.
- C43 Basin runoff has potential to backflow into Lake Okeechobee when Lake stage is below 11.1 feet NGVD.
- C43 Basin supplemental demands for surface water irrigation are met by Lake Okeechobee.
Caloosahatchee Basin EARFWO in RSMBN

Basin with DMD and/or RO

Flow (Water Supply, Flood Control, etc.)

Canal for "traffic control"

Boundary Condition
Caloosahatchee EARFWO in RSMBN

C43 Reservoir

- Modeled consistent with September 2007 PIR
- Storage capacity: 175,800 acre-feet
- Maximum footprint: 9,379 acres
- Operates to meet estuary environmental target time-series (EST05)
Improvements in both low and high discharge events observed in EARFWO (e.g. C43Res & CEPP)

RECOVER Performance Measure
Key System Changes From ECB to FWO

- Kissimmee Headwaters Revitalization
- Indian River Lagoon-South
- C-43 Phase 1 Reservoir
- Other 1\textsuperscript{st} and 2\textsuperscript{nd} Generation CERP & Foundation Projects
- Restoration Strategies / Central Everglades Project Features in the Everglades Agricultural Area
- Central Everglades Project Features in the Greater Everglades
Other 1st and 2nd Generation CERP & Foundation Projects

Modeled in a manner consistent with CEPP for EARFWO (examples)

- Broward County WPAs: C11 = 1355 acres, C9 = 1970 acres
- Full construction of C111 South Dade
- S-200 inflow pumps
  - Three 75 cfs pumps divert water to Frog Pond Detention Area (590 Acres)
- S-199 inflow pumps
  - Three 75 cfs pumps divert water to Aerojet Canal

These features not included in EARECB

- Partial construction of C111 South Dade

Example: C-11 Broward WPA

Example: C111 South Dade and C111 Spreader Canal Features
Other 1st and 2nd Generation CERP & Foundation Projects

Modeled in a manner consistent with CEPP for EARFWO (examples)

- Broward County WPAs: C11 = 1355 acres, C9 = 1970 acres
- Full construction of C111 South Dade
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- Partial construction of C111 South Dade
Key System Changes
From ECB to FWO

- Kissimmee Headwaters Revitalization
- Indian River Lagoon-South
- C-43 Phase 1 Reservoir
- Other 1\textsuperscript{st} and 2\textsuperscript{nd} Generation CERP & Foundation Projects
- Restoration Strategies / Central Everglades Project Features in the Everglades Agricultural Area
- Central Everglades Project Features in the Greater Everglades
• EARFWO assumes A1 & A2 FEBs as Authorized in Central Everglades
• EARECB only assumes A1 as constructed

A1 Effective Area = 15,853 aces
A1+A2 Effective Area = 28,467 aces
Lake discharges down Miami and NNR canals when FEB / STA can accept Lake water and canal capacity (2000 cfs – runoff) exists.

Lake discharges down Miami and NNR canals when STA can accept Lake water and canal capacity (2000 cfs – runoff) exists.

No Lake discharges to downstream FEB or STA.
EARFWO (CEPP) Promotes Additional Flow South

EARECB  EARFWO
STA34   383   596
Add water = +213
(Average annual discharges in kac-ft)
Stage Duration Curves for Lake Okeechobee

EARFWO stages generally higher than EARECB (except at extremes)
Recall 10/31 Baselines Presentation: One Challenge to Consider

Existing Lake Okeechobee regulatory release protocols balance multiple objectives for Lake and system management.

Simply adding discharges to storage in addition to existing regulatory protocols may over-drain the Lake and impact system performance.
CEPP Utilizes Operational Flexibility within the Existing Lake Okeechobee Regulation Schedule:

Examples:

Part D: Establish Allowable Lake Okeechobee Releases to Tide (Estuaries)

2008 LORS

Note: This operational guidance provides essential supplementary information to be used in conjunction with other supporting documentation including text within the Water Control Plan.

Consider different events “dry” for the THC and Climate Outlooks.

* Very Dry Conditions may require that releases to tide (estuaries) be discontinued.
Key System Changes From ECB to FWO

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Greater Everglades EARECB in RSMGL

- Assumptions Consistent with the CEPP 2012 Existing Condition (2012EC) Baseline
- Water Conservation Area 3A and Everglades National Park Inflow Operations per 2012 Everglades Restoration Transition Plan (ERTP)
CEPP Recommended Plan ALT 4R2

- **PPA New Water**
  - Seepage Barrier, L-31N Levee
- **PPA North**
  - L-6 Canal Flow Diversion
  - L-5 Canal Conveyance Improvements
  - S-8 Pump Station Complex Modifications
  - L-4 Levee Degrade and Pump Station
  - Miami Canal Backfill
- **PPA South**
  - S-333 Spillway Modification
  - L-29 Canal Gated Spillway
  - L-67A Conveyance Structures
  - L-67C Levee Gap
  - L-67C Levee Degrade
  - Blue Shanty Levee, WCA 3B
  - L-29 Levee Degrade
  - L-67 Extension Levee Degrade and Canal Backfill
  - Old Tamiami Trail Removal
  - S-356 Pump Station Modifications
  - System-wide Operations Refinements

**EARFWO assumes Central Everglades**
Improvements in Everglades ponding, hydroperiods and sheet flow observed in EARFWO (e.g. CEPP, Bridges, etc...)
Average Annual Overland Flow across Transect 27
Southwestward flow in Central Shark River Slough

Increased flow through Greater Everglades observed in EARFWO
EAA Storage Reservoir Modeling Data


Link can also be found on www.sfwmd.gov/EAAreservoir
**Important Considerations**

- Initial analyses to identify performance potential for the facility (Reservoir, STA and associated infrastructure)

- Project alternatives will be modeled to honor physical and legal constraints
  - Potential for reduced performance
  - Other CERP components may enhance performance

- Detailed modeling of alternatives will identify reduction in undesirable discharges and additional flow south

- Must meet State and Federal laws

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**Storage Capacities**

- 240,000 ac-ft of storage
- 360,000 ac-ft of storage
Informing the EAA Storage Reservoir Study: Defining the CERP Goal

The following scenarios represent the with- and without- CERP conditions:

- Pre-CERP Baseline (PCB1) per RECOVER, 2005
- Full CERP (CERPA) per RECOVER 2005

These scenarios combined with the original Plan report (Restudy, 1999) help to inform EAA Storage Reservoir planning.
CERP Vision for EAA Storage Reservoir

- CERP defined a 360 k-acft, multi-purpose storage reservoir in the EAA
  - Received both Lake Okeechobee discharge and EAA runoff
  - Supplied Flow to both the Greater Everglades and EAA Agriculture
- CERP also contemplated improvements to the Miami and North New River Canals in the EAA to help convey Lake water south.
- EAA Storage worked with other CERP storage (also North, East and West of Lake O.) to reduce damaging discharges to the Northern Estuaries
Characteristics of Additional Flow South in CERP

Annual Increase in Flow South for CERP (360 kaf EAA reservoir) averages ~300 kaf/yr

In some years, very little additional flow is provided while in others, storage performs “dynamically” and sends several times the static storage volume south – up to 1.3 maf/yr of additional flow.
Characteristics of Additional Flow South in CERP (cont)

Distribution of Average Monthly Flow to the Everglades Protection Area

CERP increases average flow by an additional ~300 kaf/yr, mainly during the dry season months.
EAA Storage Reservoir Feasibility Study

INITIAL CONCEPTS
Project Features

- Reservoirs
- Stormwater Treatment Areas (STAs)
- Conveyance Improvements
Screening Process Strategy

- Use the DMSTA model (as used in CEPP and Restoration Strategies) to evaluate potential sizing of reservoir and stormwater treatment area (STA) footprints that meet water quality standards
- Provide DMSTA evaluation for the range of flows observed between CEPP and CERP
- Public input used to identify initial concepts
DMSTA Flow Routing Diagram

Sources of Water

Potential EAA Storage Reservoir Project Features

EAA & STA Canals

Existing STAs
Initial DMSTA Modeling Results: Potential Additional Flow South vs Reservoir & STA Acreage for 240,000 ac-ft of Storage

Assumed effective area = 16 kac
Assumed Reservoir storage = 240 kacf

~300 kacf additional flow = 6 kac STA and 10 kac Res

Note: Any point on the line can meet water quality standards
240,000 ac-ft of Storage Initial Concept

- Miami Canal
  - A2 + A2 Exp
    - 10,000 ac
  - STA
    - 6,000 ac

- North New River Canal
  - A1 FEB
    - 15,000 ac
  - STA 3/4
  - STA 2

Additional ~300,000 ac-ft of average annual flow to the Everglades

~300 kacft add flow ~ = 6 kac STA and 10 kac Res
240,000 ac-ft of Storage Initial Concept

~300 kacft add flow ~ = 6 kac STA and 10 kac Res

Additional ~300,000 ac-ft of average annual flow to the Everglades
Initial DMSTA Modeling Results: Potential Additional Flow South vs Reservoir & STA Acreage for 360,000 ac-ft of Storage

- Assumed effective area = 31 kac
- Assumed Reservoir storage = 360 kacft
- 300 kacft additional flow ~ 9 kac STA and 22 kac Res

Note: Any point on the line can meet water quality standards
360,000 ac-ft of Storage Initial Concept

- Miami Canal
  - A2 + A2 Exp + A1
  - 22,000 ac
  - STA
  - 9,000 ac

- North New River Canal
  - STA 2
  - STA 3/4

~300 kacft add flow ~= 9 kac STA and 22 kac Res

Additional ~300,000 ac-ft of average annual flow to the Everglades
360,000 ac-ft of Storage Initial Concept

Miami Canal

STA 9,000 ac

A2 + A2 Exp + A1
22,000 ac

North New River Canal

STA 3/4

STA 2

~300 kacft add flow ~ = 9 kac STA and 22 kac Res

Additional ~300,000 ac-ft of average annual flow to the Everglades
Project Features: Initial Concepts

- **Storage reservoir**
  - 240,000 ac-ft of storage
  - 360,000 ac-ft of storage

- **STAs**
  - 6,000-6,500 acres (associated with 240,000 ac-ft storage)
  - 9,000-9,500 acres (associated with 360,000 ac-ft storage)

- **Conveyance improvements**
  - Canal and structure improvements in Miami and North New River Canals
Spillways from Lake Okeechobee into Miami and North New River Canals have capacity limits.

Increase conveyance to meet project objectives.

Current level of service for EAA flood protection and water supply will continue.

Reservoir operations will be used to reduce harmful discharges to the estuaries and improve flows to the Everglades.
Conveyance

- Goal is to capture additional harmful discharges to the estuaries above what CEPP was able to achieve.
EAA Storage Reservoir Feasibility Study

NEXT STEPS
Development of Alternative Configurations from Initial Concepts

For each reservoir size, configurations will be developed to optimize performance by considering:

- STA location and operation
- Pump Station(s)
- Water Control Structures
- Canal conveyance
- Cost
Concepts → Alternatives

Lake Okeechobee

Miami Canal

- A2 + A2 Exp 16,000 ac
- STA 3/4

North New River Canal

- A1 FEB 15,000 ac
- STA 2

Everglades
Public Meetings

**Project Meetings:**
- November 29th – Government Agency Coordination Meeting (virtual)
- December 5th – Modeling Results - West Palm Beach

**Other Public Meetings:**
- December 7th – Water Resources Analysis Coalition (WRAC) Meeting - West Palm Beach
- December 14th – Governing Board Meeting - West Palm Beach
Public Comment Opportunities

- Public Comments Cards
- Email Address EAAreservoir@sfwmd.gov
- Mailing address:
  Mike Albert, Project Manager
  South Florida Water Management District
  3301 Gun Club Road, MSC 8312
  West Palm Beach, FL 33406

- Additional information available at www.sfwmd.gov/EAAreservoir
DISCUSSION

www.sfwmd.gov/EAAreservoir