EAA STORAGE RESERVOIR

Everglades Agricultural Area Storage Reservoir Feasibility Study

December 5, 2017

Meeting Agenda

- Welcome and Introductions
- Project Schedule
- Planning Process
- “What We’ve Heard”
- Modeling Approach
- Initial Concepts to Configurations
- Cost Benefit Analysis
- Savings Clause and Project Assurances
- Protecting Water for the Natural System
- Next Steps
- Public Comment

EAA Storage Reservoir Feasibility Study

WELCOME AND INTRODUCTIONS

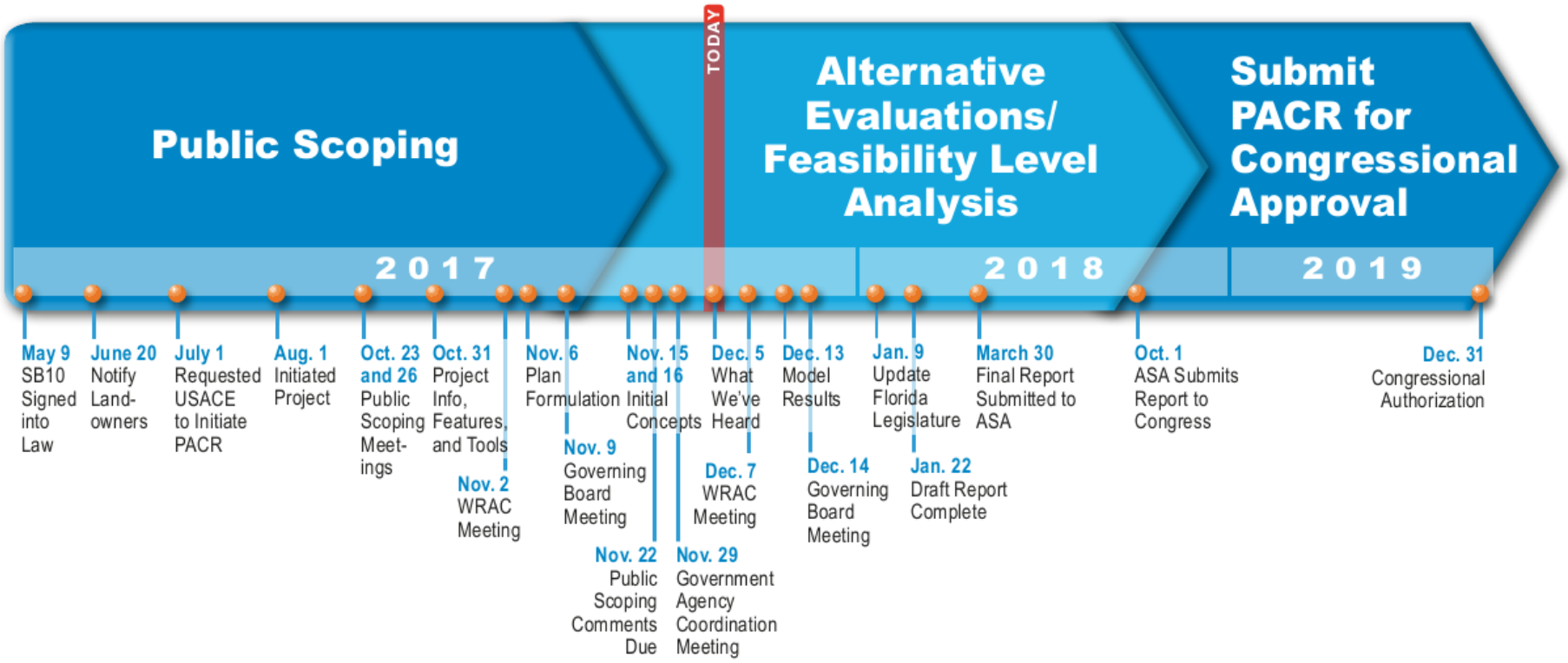
Laws of Florida Ch. 2017 – 10
CEPP Post Authorization Change Report

- The District is committed to planning, designing and constructing a project that meets the storage goals and water quality criteria set forth in state law and the Comprehensive Everglades Restoration Plan (CERP)
- The Central Everglades Planning Project (CEPP) included the first increment of CERP storage, treatment and conveyance south of Lake Okeechobee
- The CEPP Post Authorization Change Report (PACR) builds upon the first increment of CEPP and is consistent with the CERP by providing additional water storage, treatment and conveyance south of the lake to reduce the volume of regulatory discharges of water from the lake to the northern estuaries
- This increment of CEPP emphasizes the components that maximize reductions of harmful discharges to the estuaries

EAA Storage Reservoir Feasibility Study

PROJECT SCHEDULE

Project Schedule



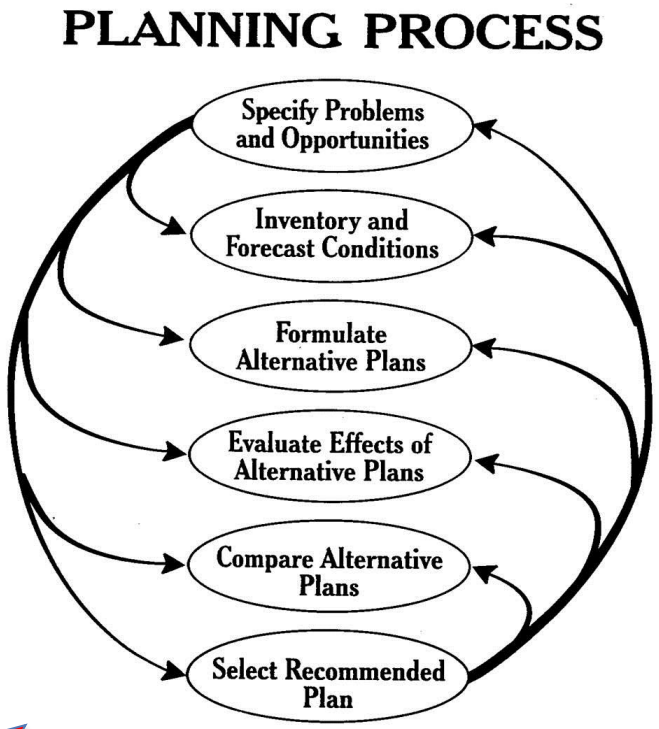
EAA Storage Reservoir Feasibility Study

PLANNING PROCESS

Planning Process

The six steps of the planning process

1. Specify Problems & Opportunities
2. Inventory & Forecast Conditions
3. Formulate Alternative Plans
4. Evaluate Effects of Alternative Plans
5. Compare Alternative Plans
6. Select Recommended Plan



We Are Here

EAA Storage Reservoir Feasibility Study

WHAT WE'VE HEARD

Public Involvement Overview

- Six Public Meetings held to-date
  - 2 evening meetings in Clewiston, 4 evening/daytime meetings in West Palm
  - Discussion/Q&A opportunities have been provided at each meeting
  - Several comment cards have been received
- Additional coordination meetings have been conducted
  - Governmental Agency, Tribal and Non-Governmental Organizations (NGOs)
- Over 800 emails and several written correspondence received
- The project website has received approximately 3,000 views
- Comments received from governmental agencies, non-governmental organizations and the general public
- Additional Public Meetings will be held and comments will continue to be received throughout the planning process and development of the feasibility report

NOTE: Comments received will be summarized in the Feasibility Report

What We've Heard – Comment Overview

- Broad public support for additional storage, treatment and conveyance south of Lake Okeechobee
- Extensive support for the expedited schedule to address damaging discharges to the estuaries
- Varying interpretations of the footprint, storage and treatment descriptions in State law
- Concerns regarding some of the assumptions used in the DMSTA modeling for STA sizing
- Apprehensions regarding reservoir depth

What We've Heard – Comment Overview (cont.)

- Questions whether there is enough land for project features
- Desire to purchase additional land
- Questions regarding extremely wet years in the model period of record and analysis
- Document the economic impact of the damaging discharges to the northern estuaries
- Questions regarding how the Section 203 process differs from the typical CERP process
- Storage north of the lake is needed in addition to storage south
- Appreciation for open dialogue in public forums

Planning Process

Step 1 - Complete

The six steps of the planning process

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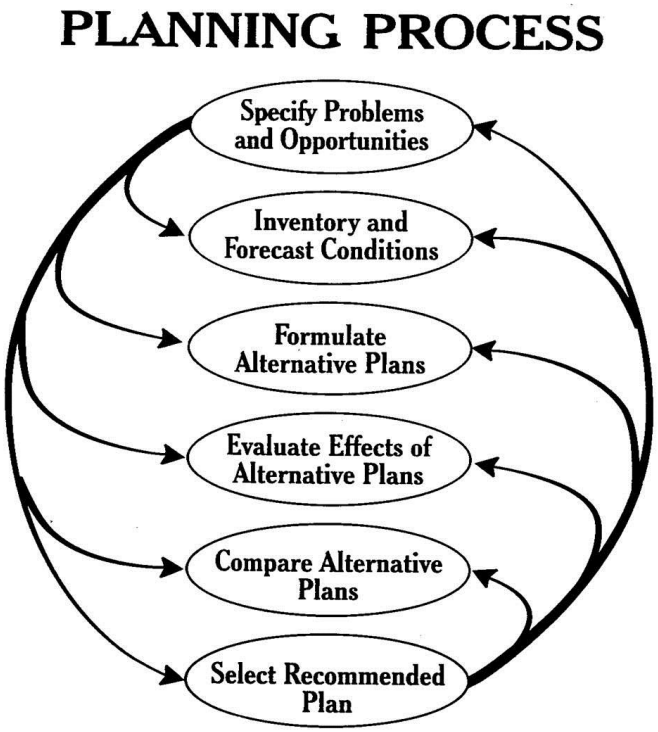


Problems and Opportunities

- High-volume damaging freshwater discharges from Lake Okeechobee to the Northern Estuaries
- Lack of freshwater flow to the Everglades system
- Identify the next increment of storage, treatment and conveyance south of Lake Okeechobee to reduce ongoing ecological damage to the Northern Estuaries and Everglades system

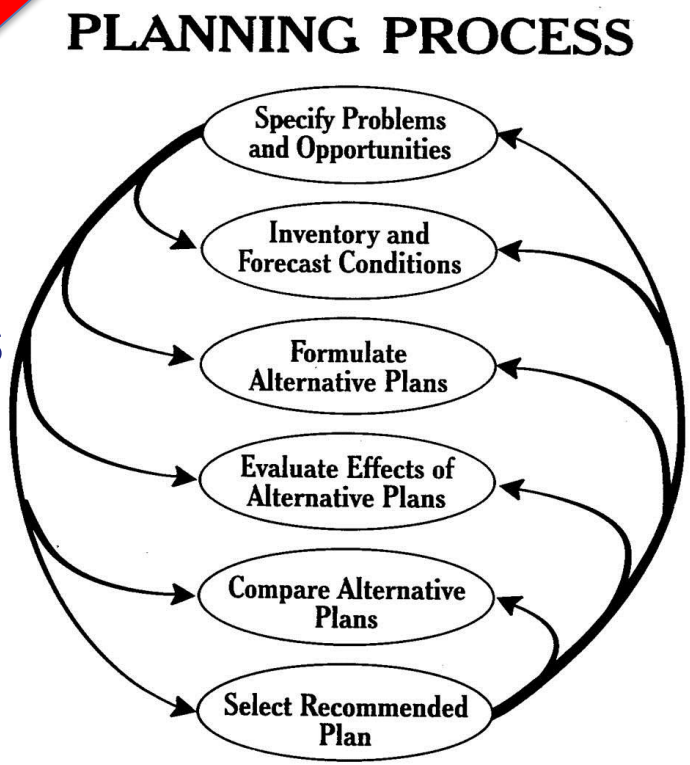
St. Lucie Inlet

Planning Process

Step 2 - Complete

The six steps of the planning process

1. Specify Problems & Opportunities
2. Inventory & Forecast Conditions
3. Formulate Alternative Plans
4. Evaluate Effects of Alternative Plans
5. Compare Alternative Plans
6. Select Recommended Plan



Inventory and Forecast Conditions

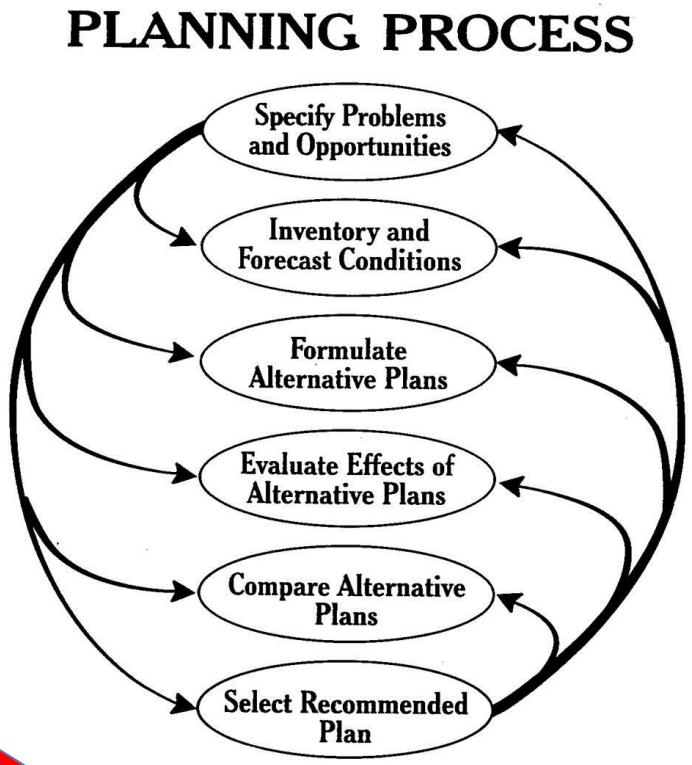
Principles and Guidelines of Water Resources Planning

Evaluate the effects of alternative plans based on a comparison of the existing and most likely future conditions

In order to make this type of comparison, descriptions must be developed for two different project conditions:

- Existing conditions base – what is assumed to be in place at the time the project is being developed (Circa 2012)
- Future without project condition – what is assumed to be in place without the project that is being evaluated

Planning Process



The six steps of the planning process

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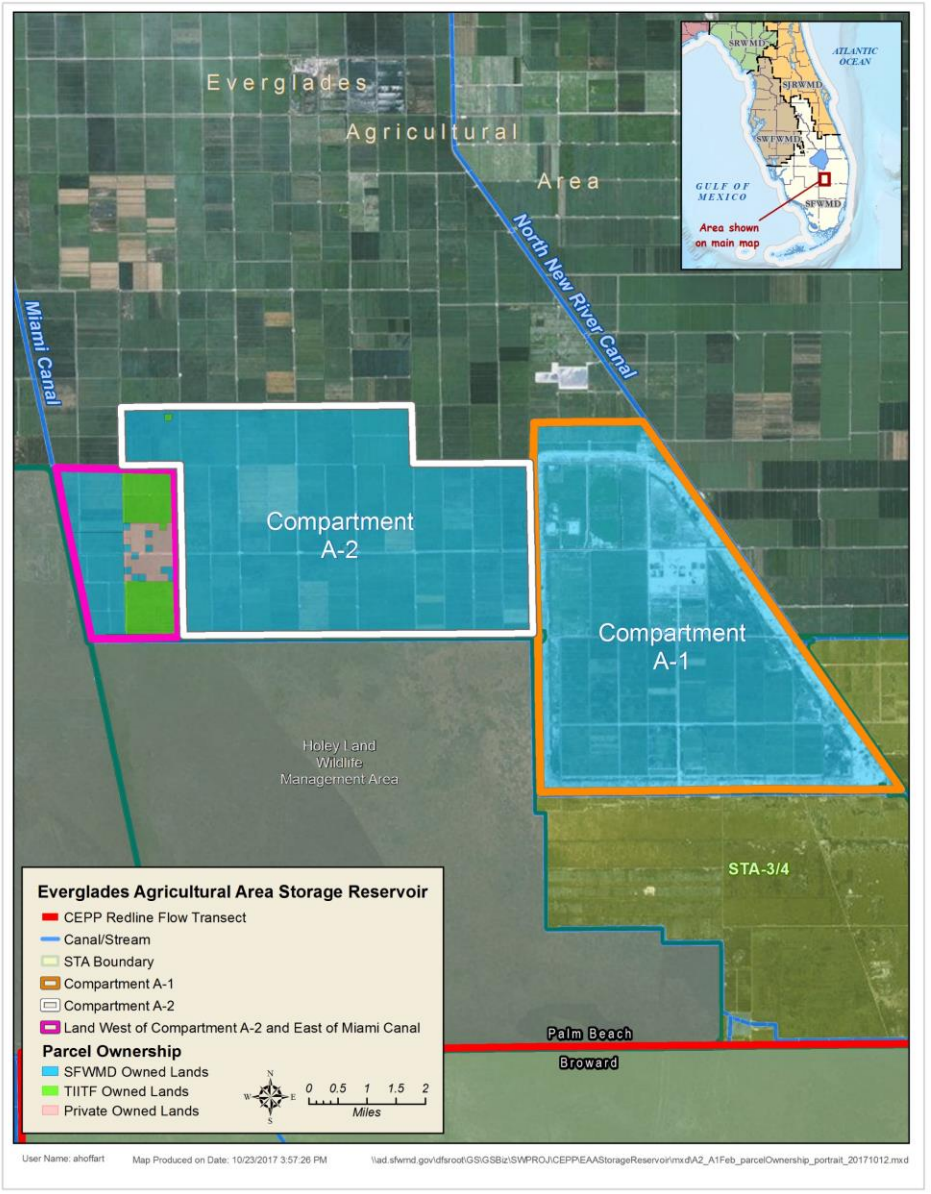
Step 3 – In-Progress

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

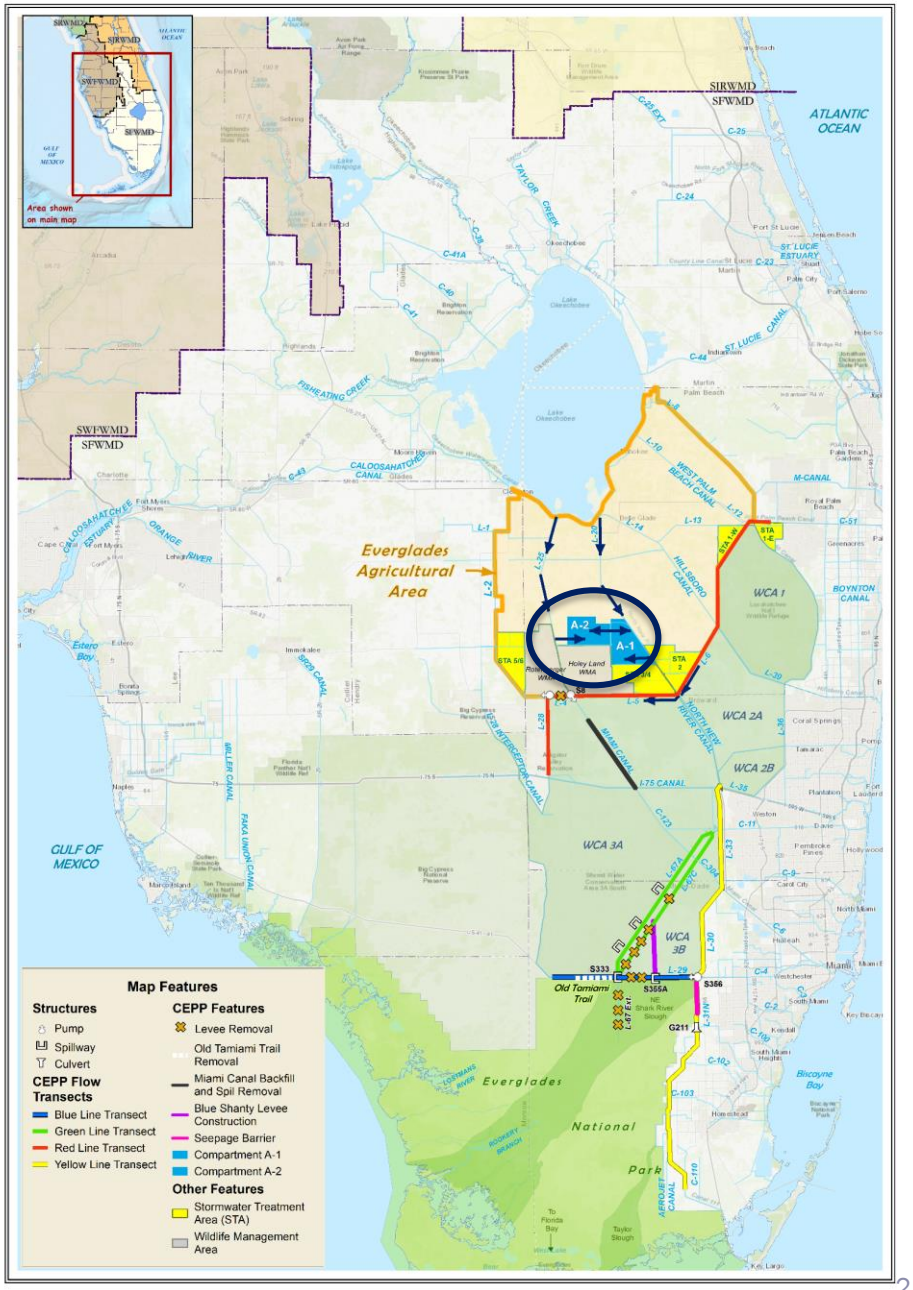


Laws of Florida Ch. 2017 – 10
CEPP Post Authorization Change Report

- The District is directed to jointly develop a Post Authorization Change Report with the USACE for the CEPP
- The District, when developing the project implementation report, must focus on the goals of the EAA reservoir project as identified in CERP

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) and focus on the goals of the EAA Reservoir project as identified in CERP**



CEPP Recommended Plan ALT 4R2

- PPA New Water
  - A-1 & A-2 Flow Equalization Basin
  - 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

EAA Storage Reservoir Feasibility Study

MODELING APPROACH

How Modeling Fits into Project Planning

First Phase:
Screening Modeling to Assist in Selection and Sizing of Features that will be Evaluated in More Detail

Second Phase:
Detailed Modeling of a Variety of Options to Determine how to Route Water to Achieve Desired Project Benefits

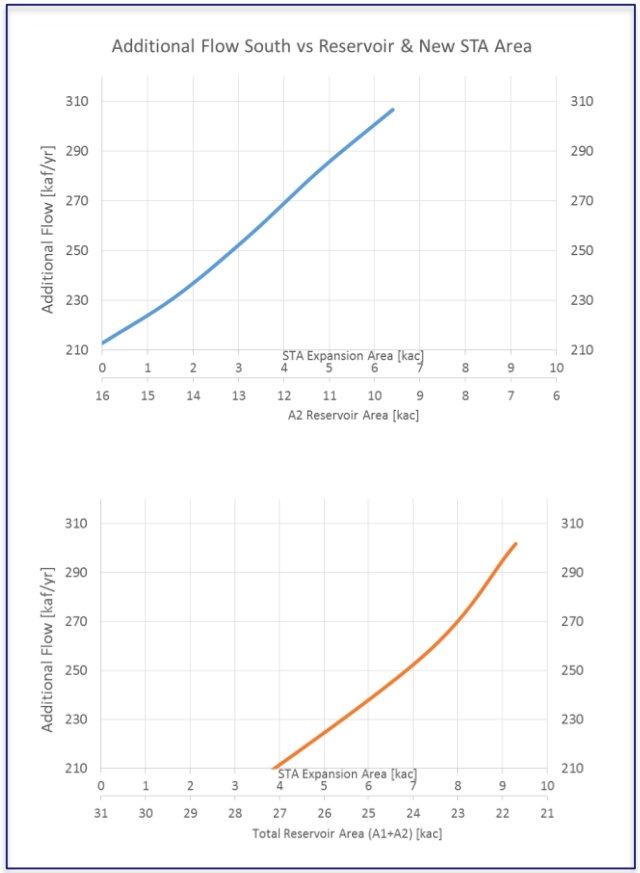
Third Phase:
Detailed Modeling of a Variety of Options Provides Information for System Evaluation (e.g. Habitat Units)

Final Phase:
Incorporating Feedback and Information Gained in Earlier Steps, Refine Detailed Modeling of a Highly Performing Option

Along this path, there are many opportunities for refinement. Intermediate products serve the immediate need and then are enhanced, incorporating feedback and information as the process progresses.

First Phase: Screening Modeling Completed

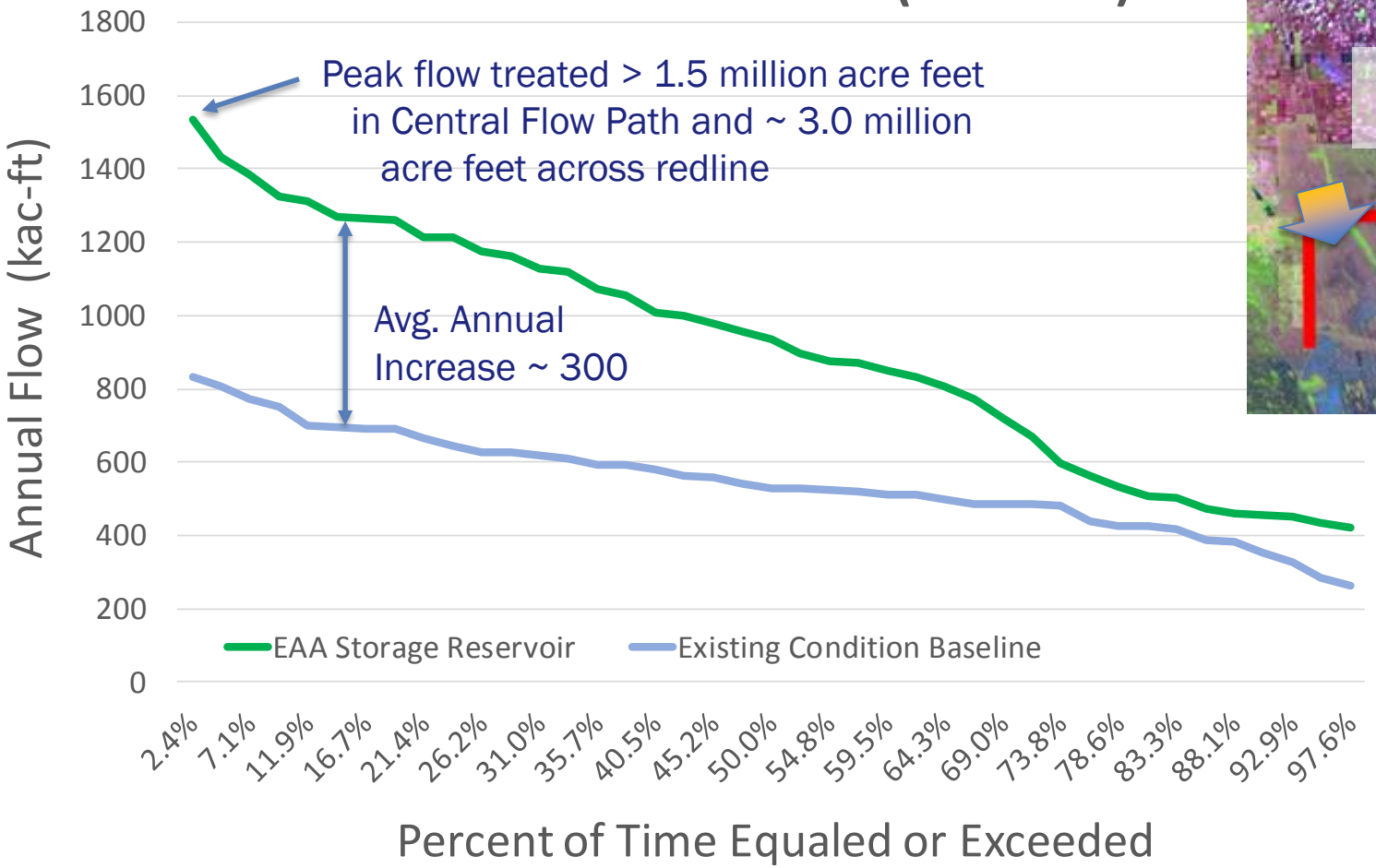
- Identified the CERP goals for sending water south to the Everglades and reduce damaging discharges to the Northern Estuaries
- Used the DMSTA model to approximate area required to treat the CERP target flow
  - Goal of 300 kac-ft average annual increase in flow
- First presented at Nov 6 public meeting

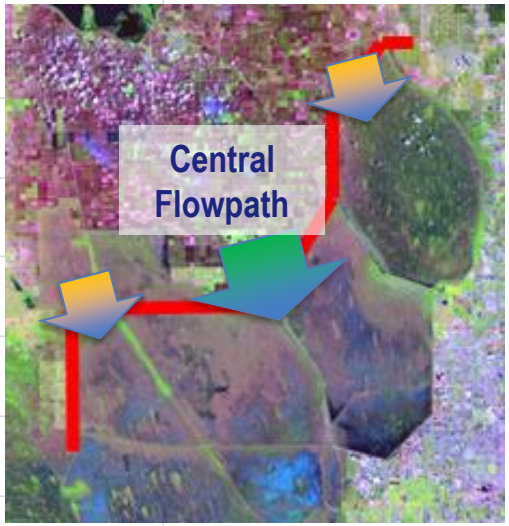


First Phase: Screening Modeling
What We've Heard and Some Perspective

- Concerns regarding DMSTA simulated performance, particularly low reservoir stages and diversion flows
  - DMSTA in screening is primarily used for STA sizing. More detailed operation and routing algorithms exist in the RSM and these observed concerns will be addressed in the next phase
- Concerns about assumed treatment (settling) in the deep storage reservoir being overly optimistic
  - The current screening work was done with similar assumptions used in other CERP efforts (e.g. C44 reservoir in IRL); the project team is further exploring whether a more conservative assumption is warranted.
- Concerns that the project is sizing STAs for an "average" year
  - This is a misconception. Identified STA sizes will work for wet, average and dry years.

DMSTA Target Flow for Central Flowpath
STA2 + STA34 + ERSTA (new STA)





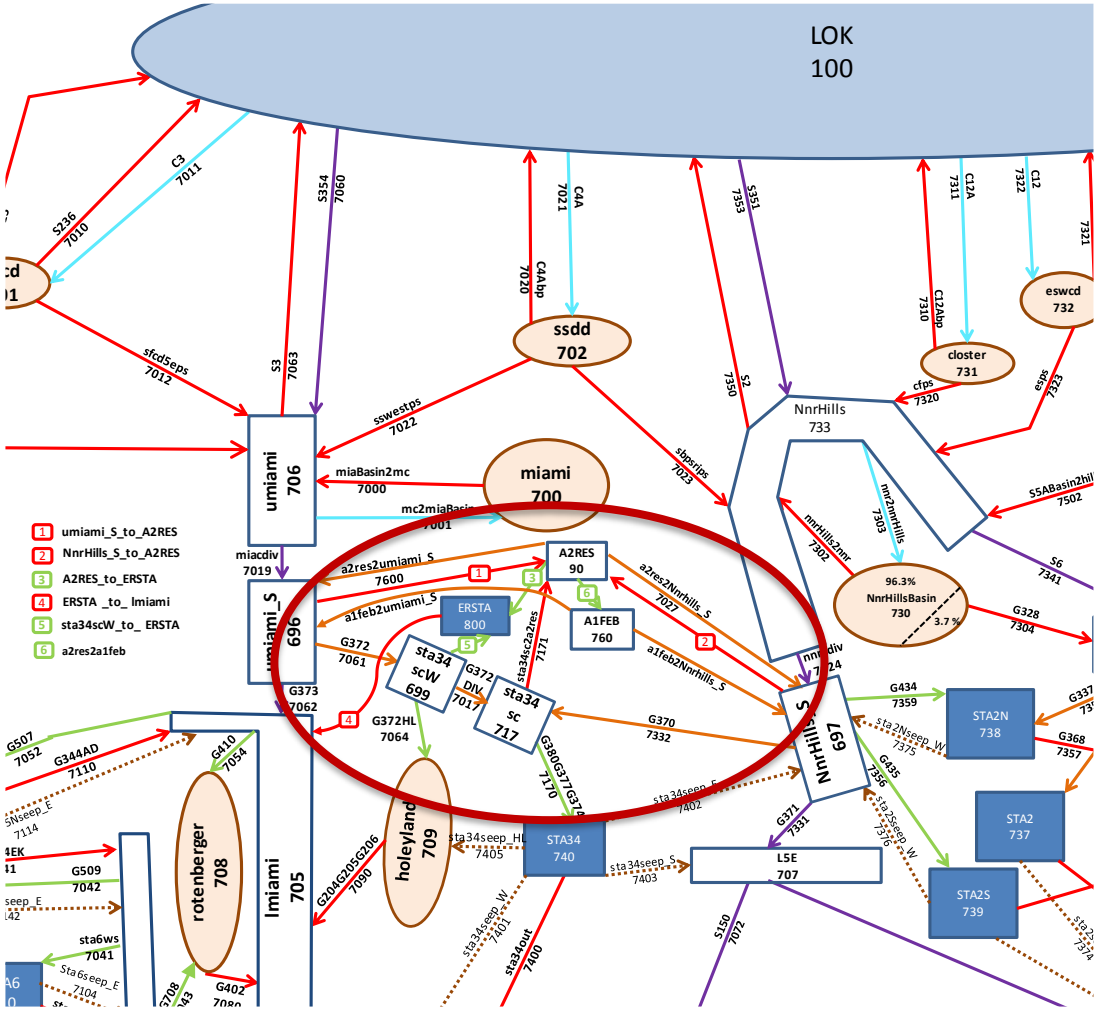
Note: Graphic only shows Central Flowpath contribution to redline, not total flow (from Eastern, Central and Western Flowpaths)

Second & Third Phases: Detailed Modeling and Evaluation (in Progress)

- Project concepts are being incorporated into the RSM and operational protocols to work with project features being developed
  - RSM modeling tool described at 10/31 public meeting
  - More on this topic will be presented at the next meeting
- Model post processing will summarize information to inform evaluation of the concepts
  - Concepts will be compared to Existing Condition and Future Without Project Baselines (as presented on Nov 6)
  - More detail on this topic will be provided later in this presentation

Example RSM model setup and flow routing diagram for a potential EAA Storage Reservoir concept

Detailed view in the vicinity of the A1 & A2 parcels displayed; does not show entire model domain or study area



Final Phase: Define a Complete and Robust Plan (On Our Way – Not There Yet)

- Once detailed modeling has been produced and evaluated, one or more highly performing options may be identified.
- It is expected that feedback and refinements to these option(s) will be identified through the public process, technical review and ongoing project efforts (e.g. project assurances, engineering optimization, final back-checks to ensure water quality compliance)
- This is a normal and desired step in the process and helps to ensure a complete and robust final plan.

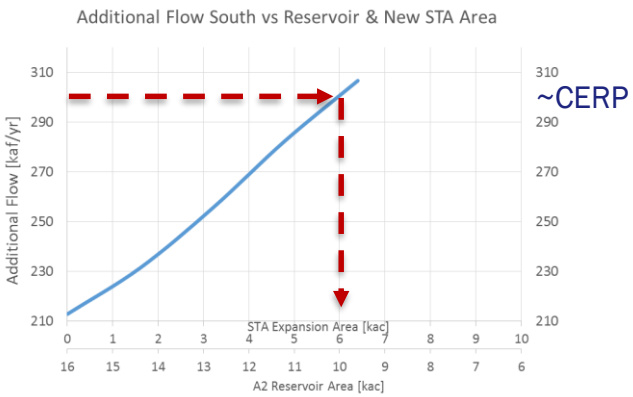
EAA Storage Reservoir Feasibility Study

INITIAL CONCEPTS TO CONFIGURATIONS

Concepts ➡ Configurations

- 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

240,000 ac-ft of Storage Initial Concept



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

Miami Canal

A2 + A2 Exp
10,000 ac

STA
6,000 ac

A1 FEB
15,000 ac

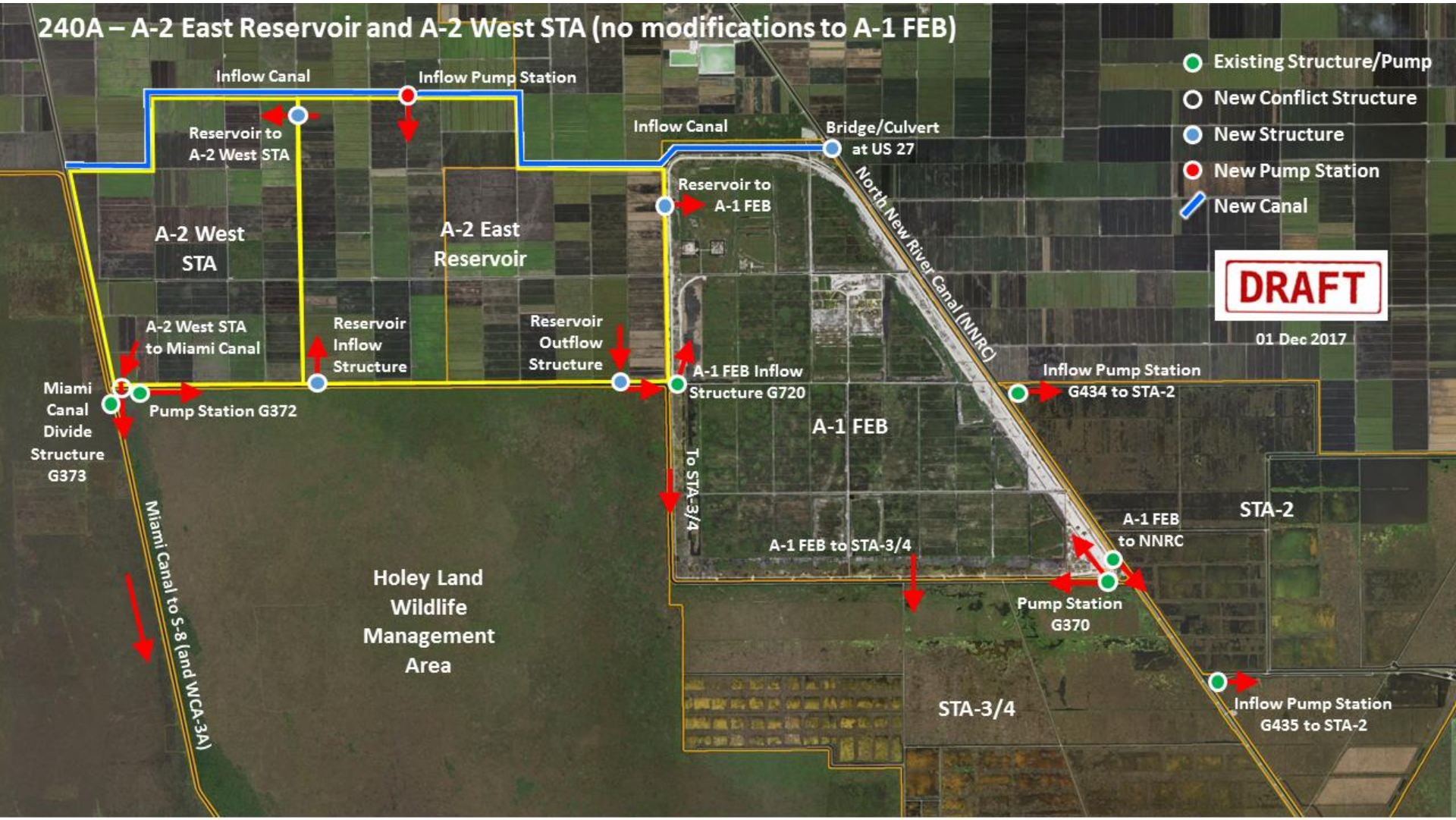
STA 3/4

North New River Canal

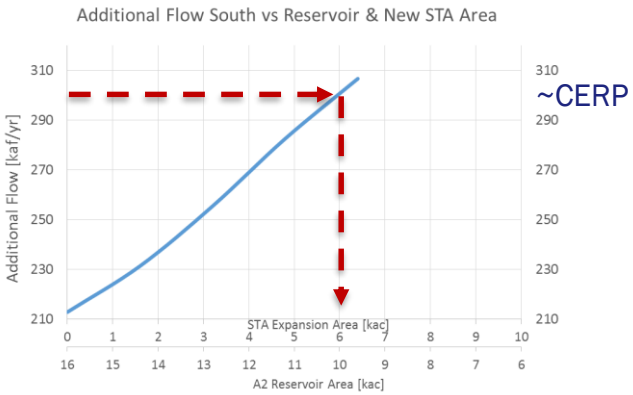
STA 2

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

240A: A-2 East Reservoir and A-2 West STA (no modifications to A-1 FEB)



240,000 ac-ft of Storage Initial Concept



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

Miami Canal

A2 + A2 Exp
10,000 ac

STA
6,000 ac

A1 FEB
15,000 ac

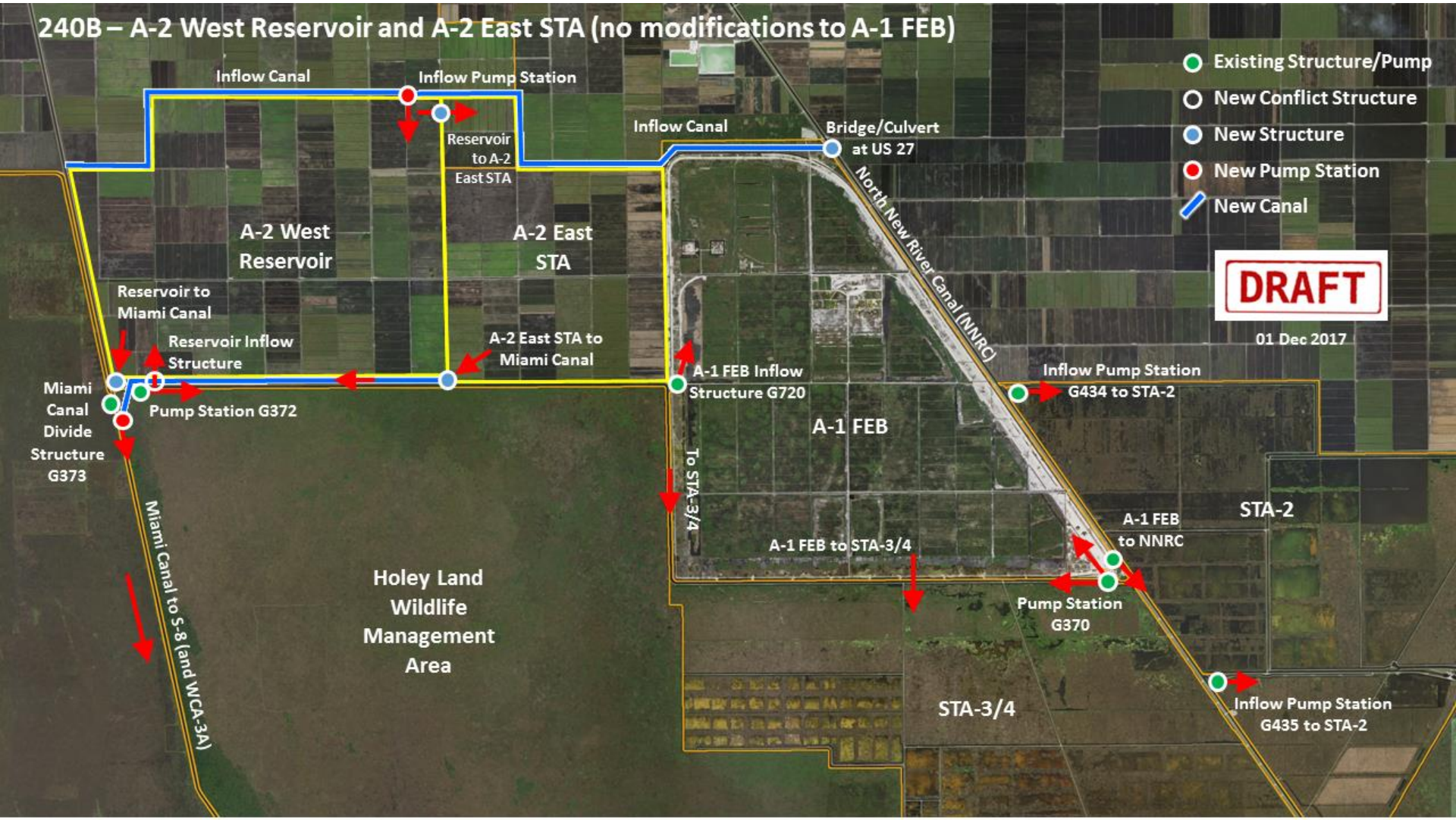
STA 3/4

North New River Canal

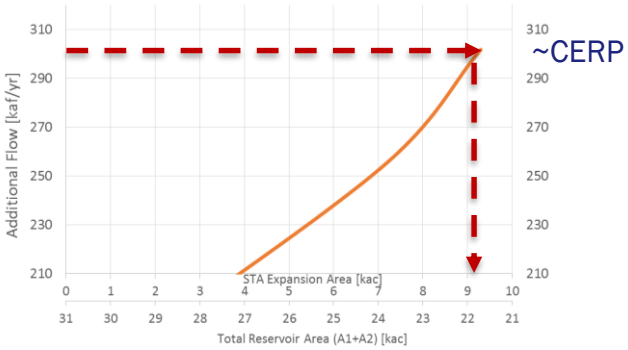
STA 2

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

240B: A-2 West Reservoir and A-2 East STA (no modifications to A-1 FEB)



360,000 ac-ft of Storage Initial Concept



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

Miami Canal

STA 9,000 ac

A2 + A2 Exp + A1 22,000 ac

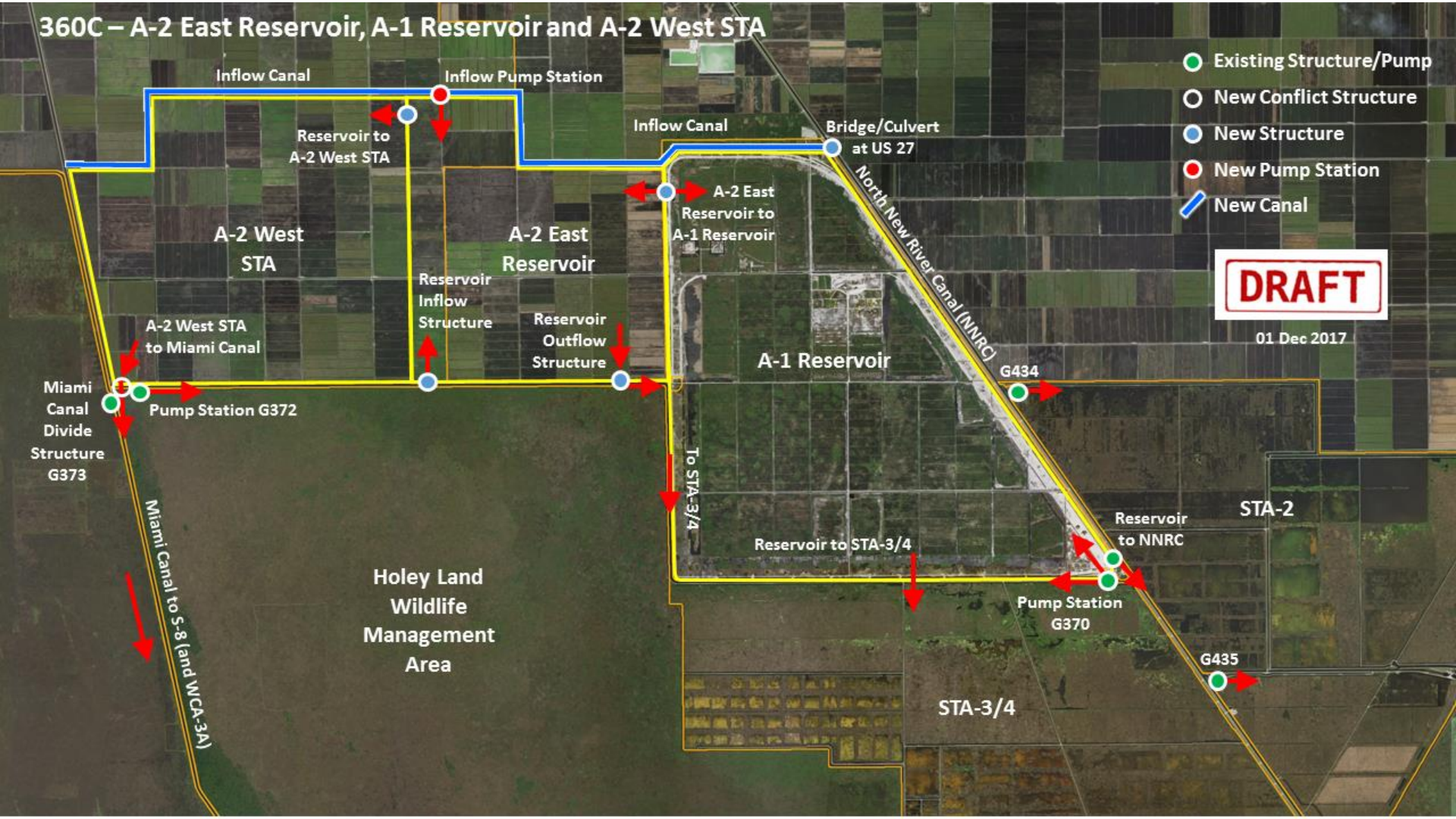
STA 3/4

North New River Canal

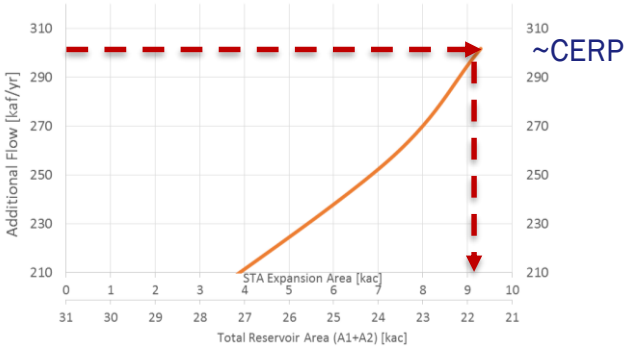
STA 2

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

360C: A-2 East Reservoir, A-1 Reservoir and A-2 West STA



360,000 ac-ft of Storage Initial Concept



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

Miami Canal

A2 + A2 Exp + A1
22,000 ac

STA
9,000 ac

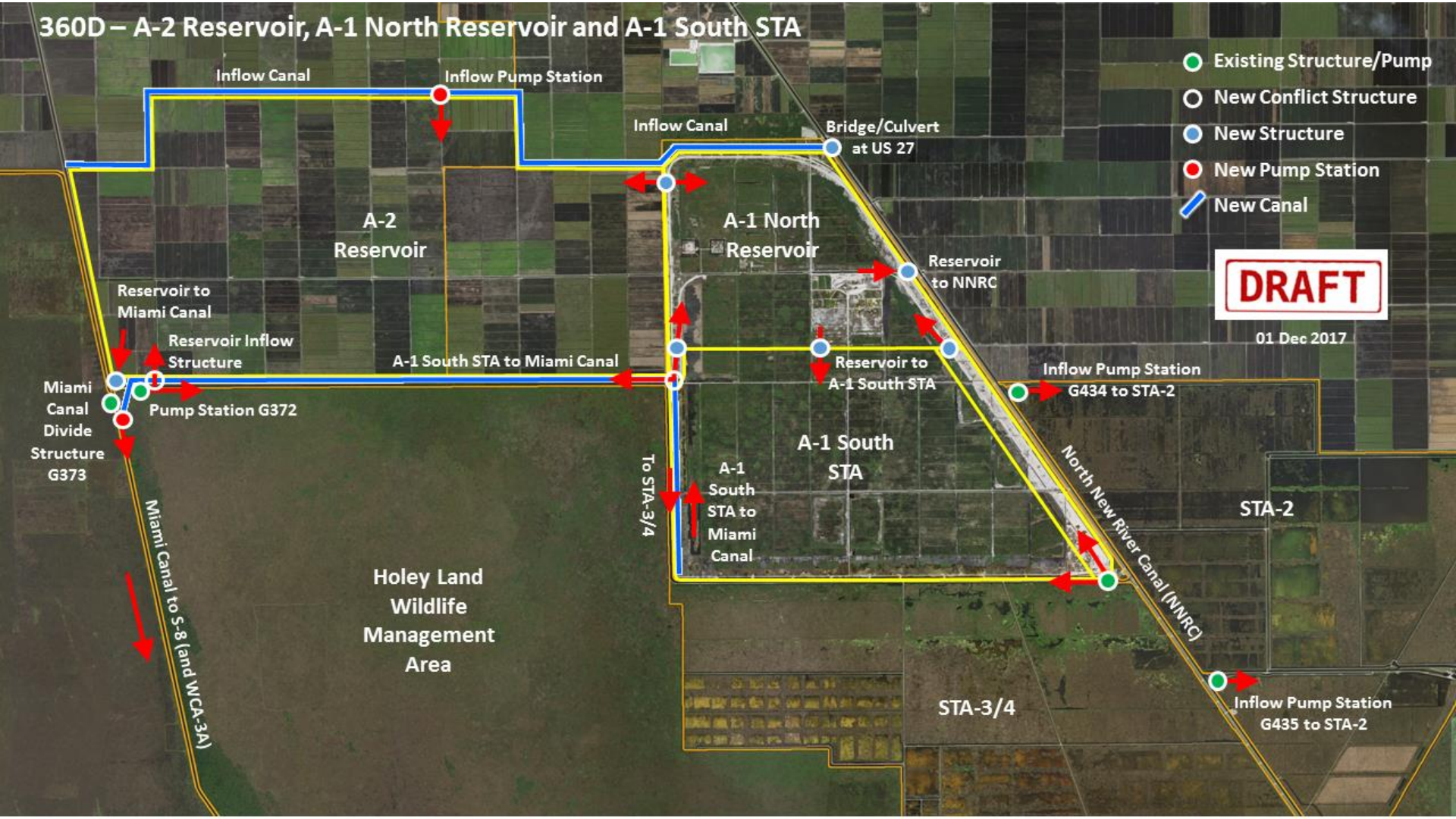
STA 3/4

North New River Canal

STA 2

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

360D: A-2 Reservoir, A-1 North Reservoir and A-1 South STA



Planning Process

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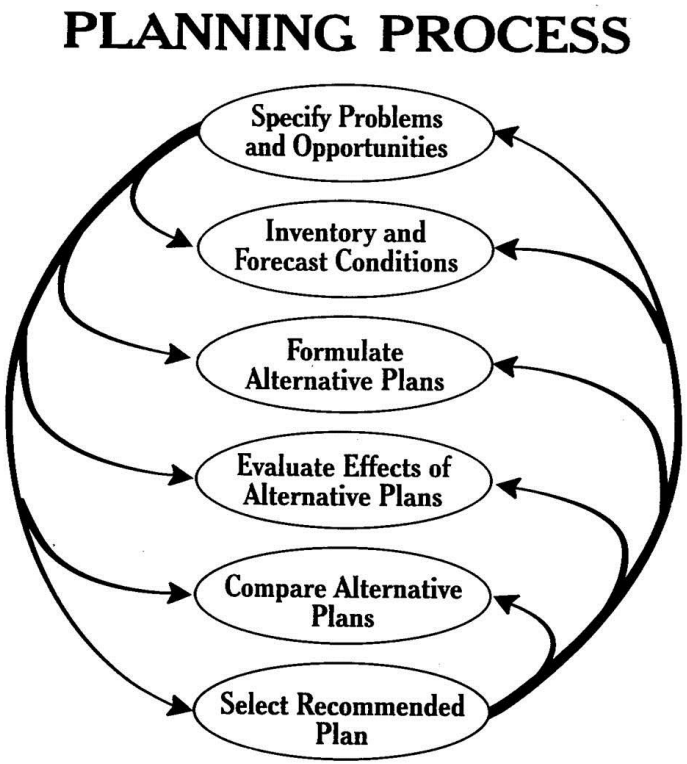


Step 4 – In-Progress

Planning Guidance
Engineering Regulation 1105-2-100
Department of the Army. U.S. Army Corps of Engineers

"Selecting the plan requires careful consideration of the plan that meets planning objectives and constraints and reasonably maximizes ecological benefits while passing tests of cost effectiveness and incremental cost analyses, significance of outputs, acceptability, completeness, effectiveness and efficiency."

Evaluate Effects of Alternative Plans: Evaluation Criteria

- **Acceptability:** the extent to which the alternative plans are acceptable in terms of applicable laws, regulations and public policies
- **Completeness:** the extent to which the alternative plans provide and account for all necessary actions to ensure the realization of the planning objectives, including actions by other Federal and non-Federal entities
- **Effectiveness:** the extent to which the alternative plans contribute to achieve the planning objectives
- **Efficiency:** the extent to which an alternative plan is the most cost effective means of achieving the objectives

Habitat Units are a Measure of Ecological Benefits

Ecological Benefits

- Reduce Lake Okeechobee damaging discharges to the northern estuaries
  - Caloosahatchee and St. Lucie Estuary Flow Targets
- Increase flow to water conservation areas and Everglades National Park
  - Sheetflow in the Ridge and Slough landscape
- Improve wetland hydroperiod
  - Inundation duration in the Ridge and Slough landscape

Habitat Units are a Measure of Ecological Benefits

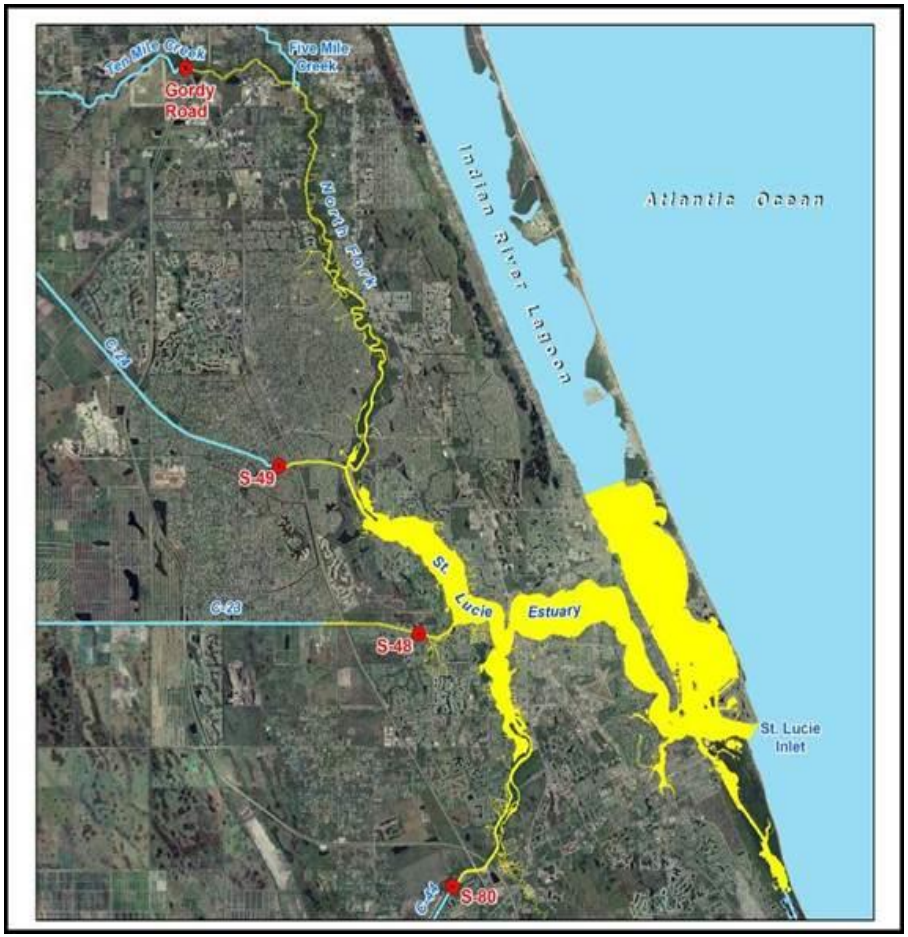
HABITAT UNITS - USACE Methodology

Methodology for quantifying ecological benefits on the array of alternatives

St. Lucie Estuary

14,994 acres

Salinity envelope target based on habitat suitability for oysters and submerged aquatic vegetation



Habitat Units are a Measure of Ecological Benefits

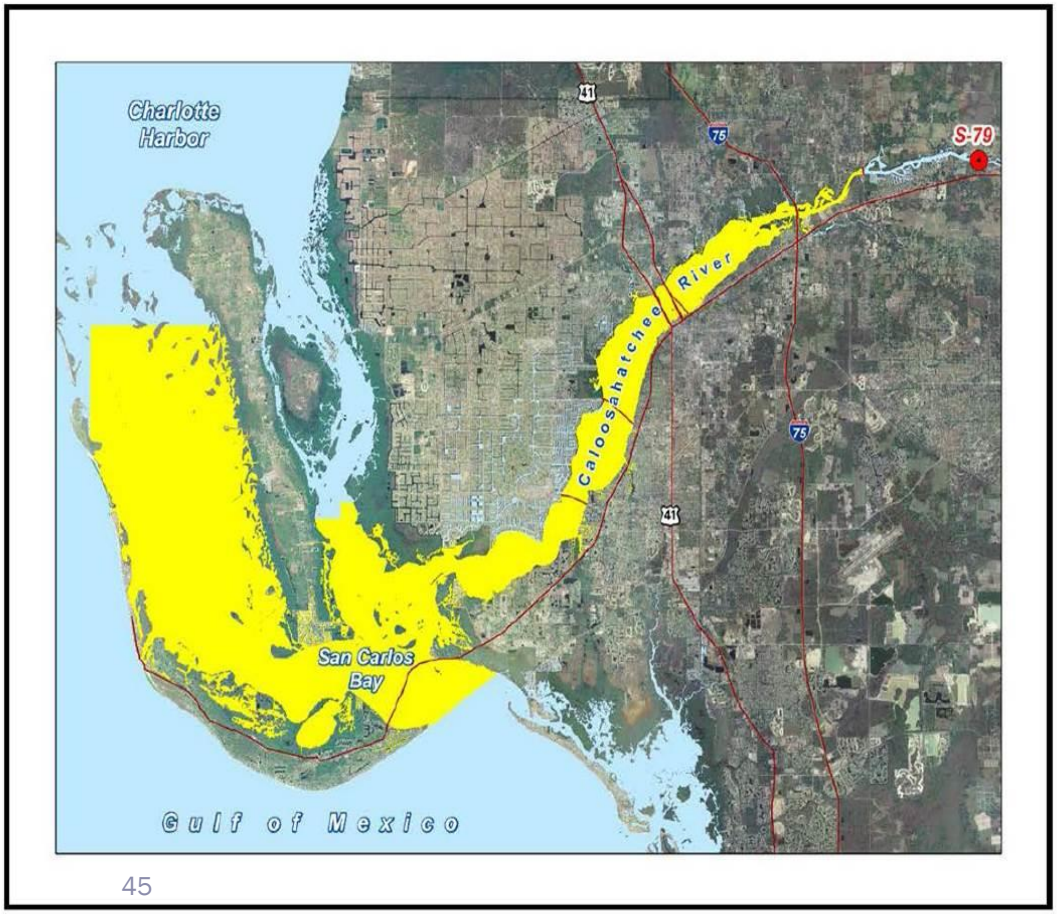
HABITAT UNITS - USACE methodology

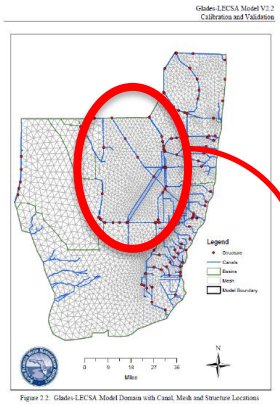
Methodology for quantifying ecological benefits on the array of alternatives

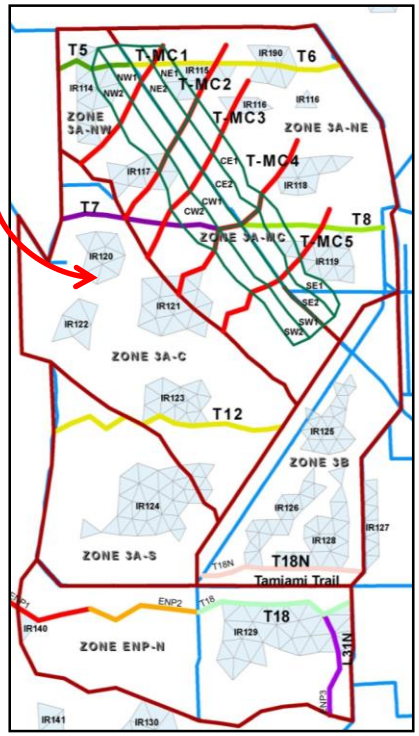
Caloosahatchee Estuary

70,979 acres

Salinity envelope target based on habitat suitability for oysters and submerged aquatic vegetation







RSM Model Mesh

RSM Zones:

- 3A-NE
- 3A-NW
- 3A-MC
- 3A-C
- 3A-S
- 3B
- ENP-N

HABITAT UNITS - USACE methodology

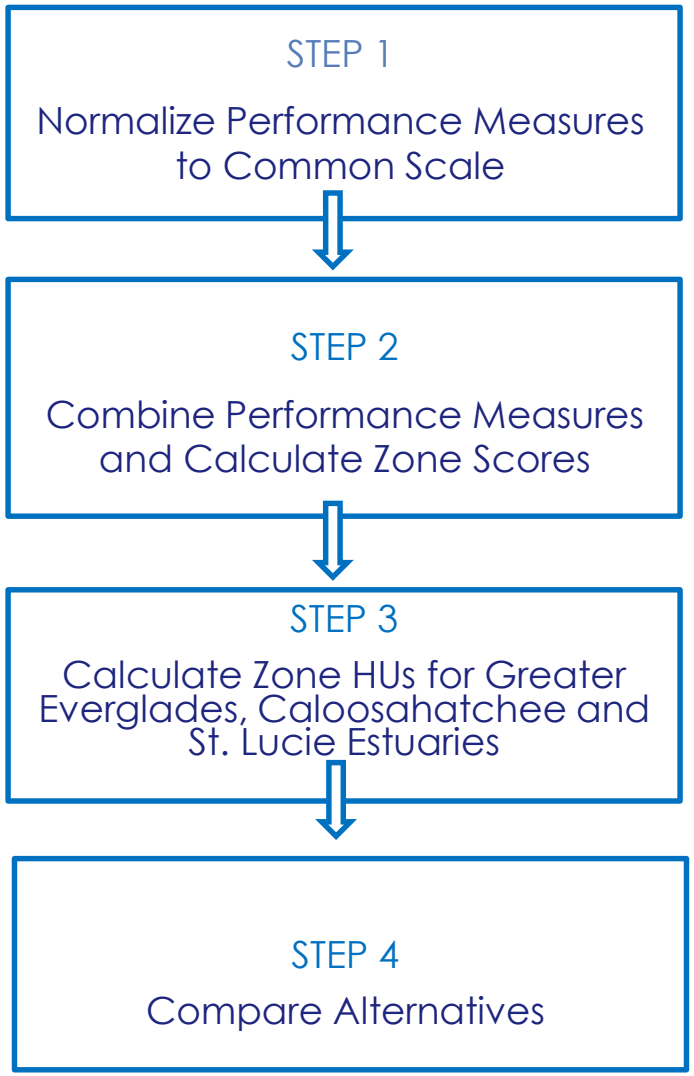
Methodology for quantifying ecological benefits on the array of alternatives

Greater Everglades Indicator Regions, Zones and Transects

1,076,248 acres

Indicator region - Depth, distribution and duration of surface flooding

Transects - timing and distribution of flows



HABITAT UNITS – USACE methodology

Methodology for quantifying ecological benefits on the array of alternatives

Step 1:

- Raw performance measure sub-metrics are linearly re-scaled between 0 and 100.

Step 2:

- Within each zone, performance measure metrics are combined for each project alternative to produce a net zone benefits score between 0 and 1.

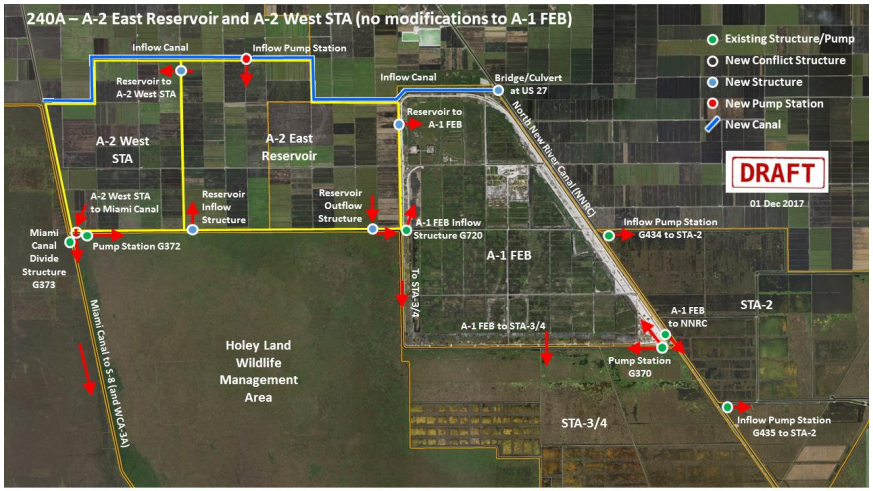
Step 3:

- The 0 to 1 benefits score for each zone is then multiplied by the acreage of the zone to generate a HU value for the zone.
  - Northern Estuaries (Two Zones)
  - Greater Everglades (Seven Zones)

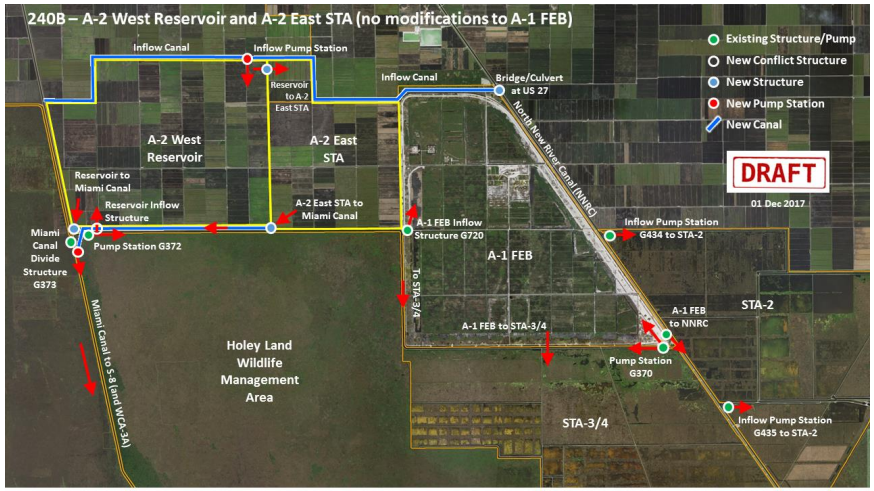
Step 4:

- HU Lift = Alternative – FWO Project Condition

Rough Order of Magnitude Cost Estimates will be Developed for Each Configuration



240A



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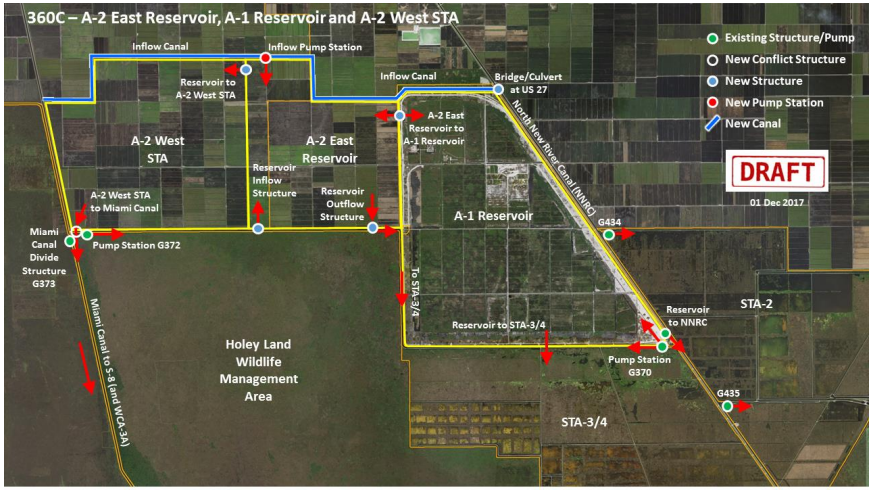
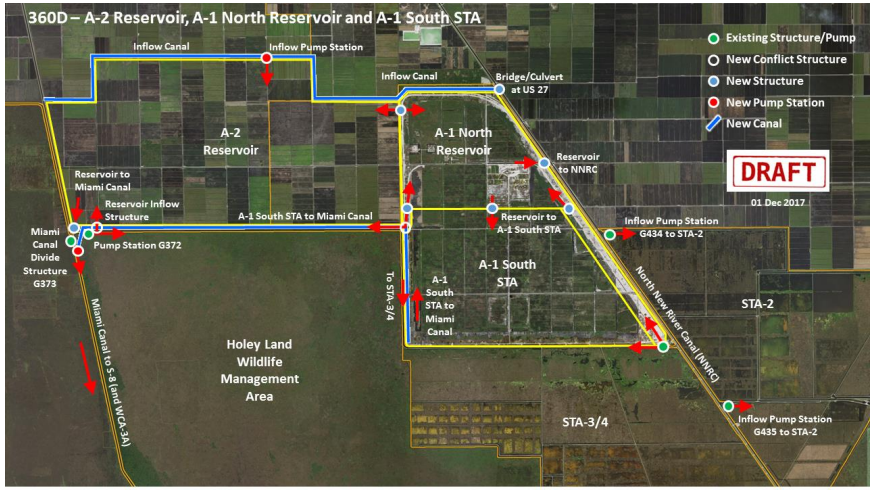


360C

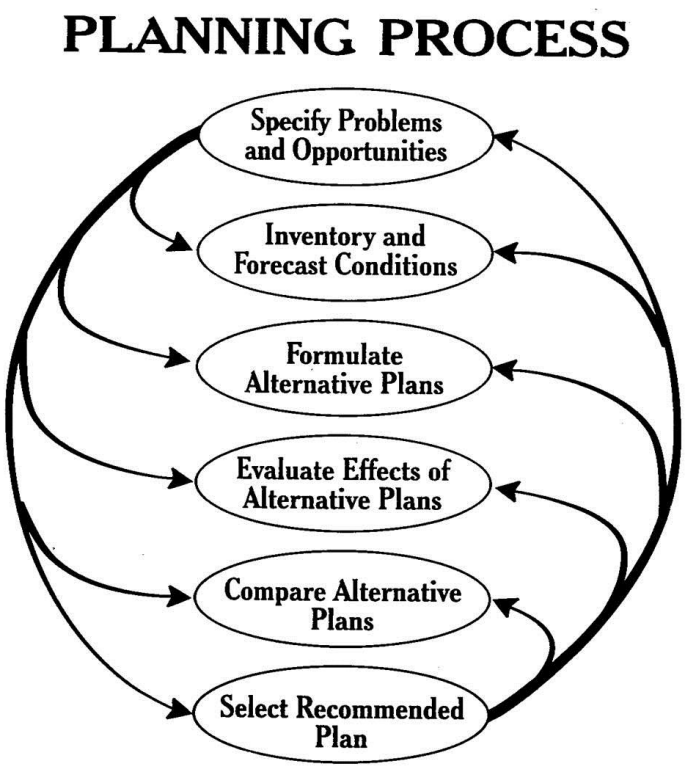


360D

Rough Order of Magnitude Cost Factors

- Ability to use existing infrastructure
- Embankment length and height
- Operational requirements for pump stations
- Water control structure location and capacity
- Water flow conflicts between untreated and treated water
- Power grid and electrical requirements
- Seepage management measures
- Facility discharge canals
- STA treatment cell orientation
- Facility inflow and outflow requirements
- Real estate costs

Planning Process



The six steps of the planning process

1. Specify Problems & Opportunities
2. Inventory & Forecast Conditions
3. Formulate Alternative Plans
4. Evaluate Effects of Alternative Plans
5. Compare Alternative Plans
6. Select Recommended Plan

Step 5 – Dec 2017

EAA Storage Reservoir Feasibility Study

COST BENEFIT ANALYSIS

Cost Benefits Analysis

- A cost benefit analysis is a systematic approach to estimating the strengths and weaknesses of alternatives
- Cost effectiveness is the degree to which something is effective or productive in relation to cost
- Utilizes each alternative's habitat units and costs to determine cost benefit variances
- Reveals changes in cost for increasing levels of environmental output
- Assists decision makers in allocating limited resources more efficiently by selecting an economically prudent project plan

Planning Process

The six steps of the planning process

1. Specify Problems & Opportunities
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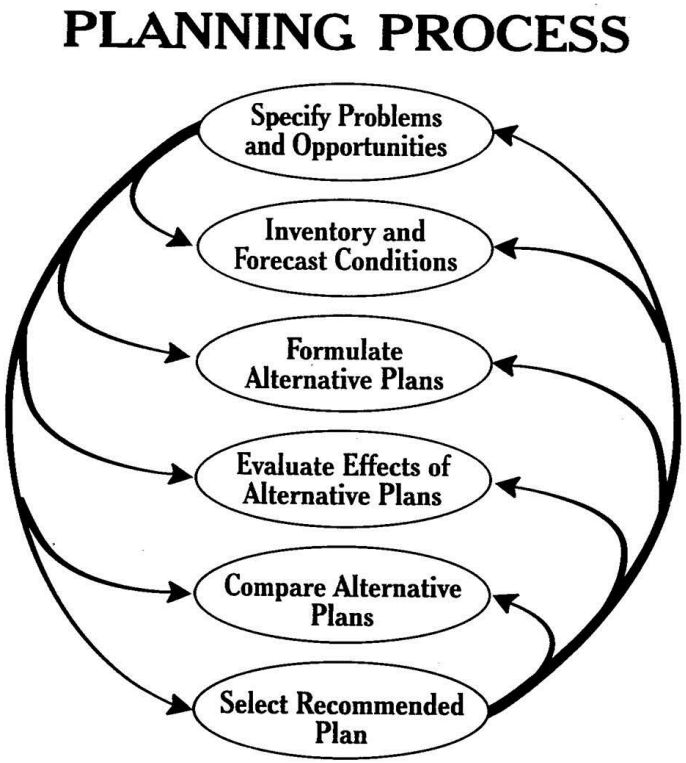

Step 6 – Jan 2018

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PROJECT ASSURANCES AND SAVINGS CLAUSE ANALYSIS

Applicable Laws

- **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
- **Section 373.1501 Florida Statutes - Compliance Report**
  - Requires FDEP to ensure:
    - all water resource issues are considered
    - project is technologically feasible
    - cost effective
    - consistent with state and federal laws
  - Reasonable Assurance the project meets applicable laws
    - Water Supply Assurances
    - Flood Protection
    - Meets the needs of Natural Environment
    - Impacts to utilities and public infrastructure are minimized
- **2017-10 (SB10)**

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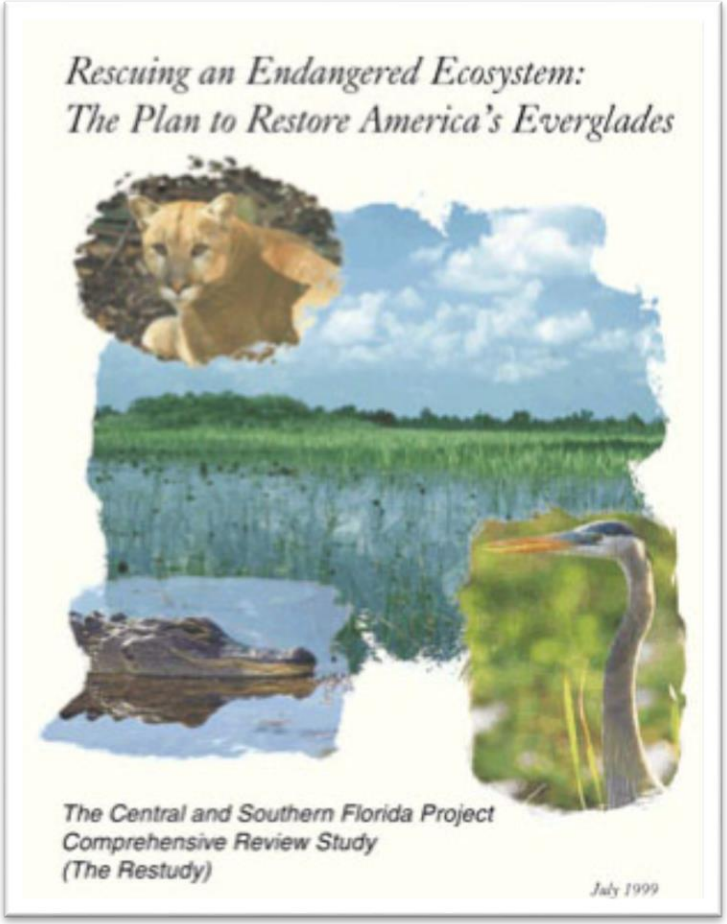
PROTECTING WATER FOR THE NATURAL SYSTEM

Federal Process – Protecting Water for Natural System

- Water Resources Development Act of 2000 requires that Feasibility Studies identify the appropriate quantity, timing and distribution of water dedicated and managed for natural system and that the State is responsible for protecting water using State process– Sec. 601(h)(4)(A)
- Programmatic Regulations for the Implementation of CERP required development and use of Guidance Memorandum to identify natural system water -33 C.F.R Sec. 385.(b)(3)

Water Resource Protection Tools and Everglades Restoration

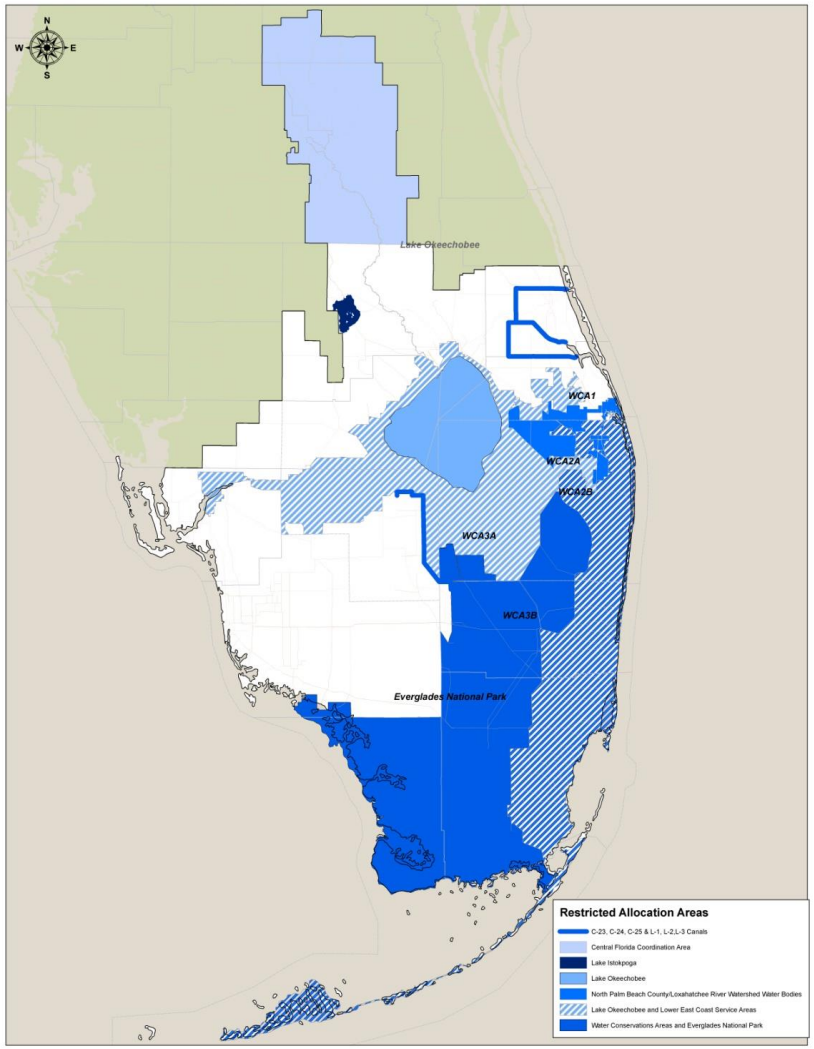
- Chapter 373 requires natural system water from CERP projects be protected using State authorities
- Two primary tools used under State law:
  - Restricted Allocation Rules
  - Water Reservation Rules



Restricted Allocation Rules

- Implemented where there is a lack of water available to meet projected needs of the region
- Restricts new or increased consumptive use allocations
- Large geographic areas covering multiple ecosystems (Everglades, Lake Okeechobee, Loxahatchee)
- Public interest considerations by Governing Board determination
- Rules also protect future water made available for the natural system by CERP projects

Restricted Allocation Areas (RAA)



- C-23, C-24, & C25 Canal system
- L-1, L-2, & L-3 Canal System
- Lake Istokpoga/Indian Prairie Canal
- Everglades & Loxahatchee River watersheds
- Lake Okeechobee and Lower East Coast Service Area

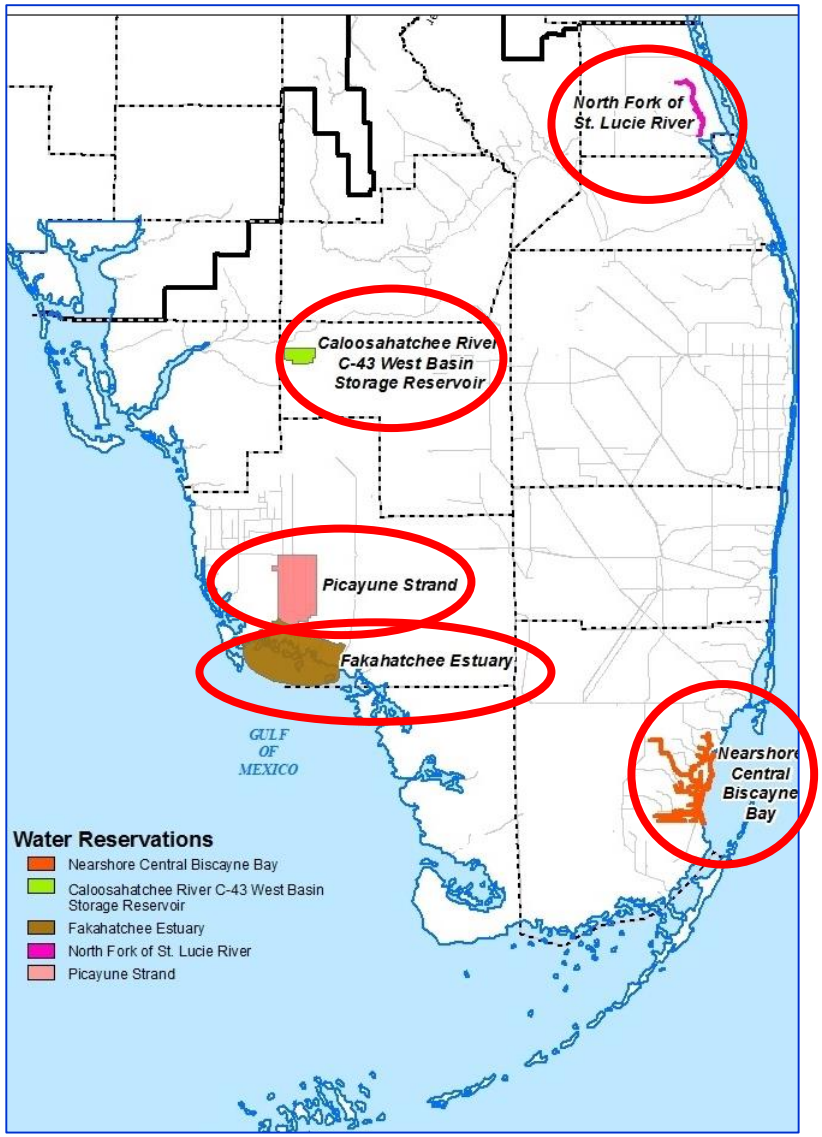
Water Reservation Rules F.S. 373.223(4)

- Sets aside water from consumptive uses for the protection of fish and wildlife (or public health and safety)
- The governing board or the department, by regulation, may reserve from use by permit applicants, water in such locations and quantities, and for such seasons of the year, as in its judgment may be required for the protection of fish and wildlife or the public health and safety.

State Process for Establishing Water Reservation

- Reservation established by rule
- Rulemaking governed by Section 120.54, F.A.C. – Administrative Procedures Act
    - Public participation
    - Coordination with Office of Fiscal Accountability and Regulatory Responsibility
    - Governing Board for policy direction
    - Reviewed by Florida Department of Environmental Protection (DEP), Joint Administrative Procedures Committee (JAPSC), Small Business Regulatory Advisory Council and Department of Economic Opportunity

Adopted Water Reservations



- Picayune Strand
- Fakahatchee Estuary
- North Fork of the St. Lucie River
- Nearshore Central Biscayne Bay
- Caloosahatchee River C-43 West Basin Storage Reservoir

Reservations cover ~343,674 acres

EAA Storage Reservoir Feasibility Study

NEXT STEPS

Compare Alternative Plans

- Calculate habitat units for each alternative
- Develop rough order magnitude (ROM) cost estimates for each alternative
- Conduct cost benefits analysis on each alternative
- Submit report to Legislature on or before January 9, 2018
- Prepare Post Authorization Change Report/Feasibility Report
- Submit Post Authorization Change Report to ASA – March 30, 2018

Public Meetings

- **Project Meetings:**
  - December 13th – Modeling Results – West Palm Beach
- **Other Public Meetings:**
  - December 7th – Water Resources Analysis Coalition (WRAC) – West Palm Beach
  - December 14th – Governing Board Meeting - West Palm Beach
  - December 18th- WRAC Recreation Meeting – West Palm Beach

Public Comment Opportunities

- Public Comment 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