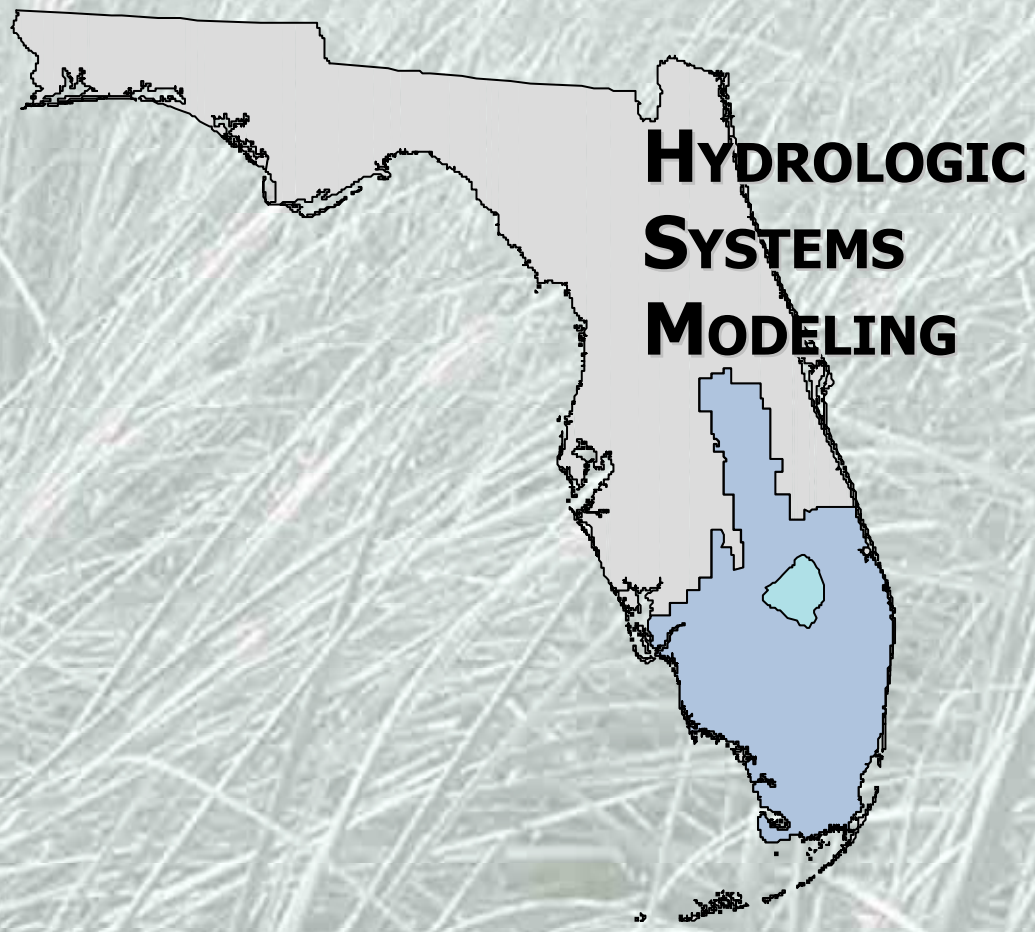
System-Wide Modeling for EAA Storage Reservoirs

For

EAA Storage Reservoirs Phase 1



By

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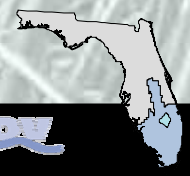
July 25, 2002

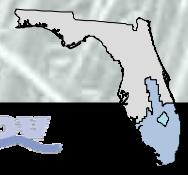
Outline

- **What modeling was done in Restudy**
- **What modeling has been done since Restudy**
  - Scenarios
  - LEC
  - ECP & Basin Specific Feasibility Study
- **What modeling is coming up**
  - Initial CERP update
  - SFWMM refinements

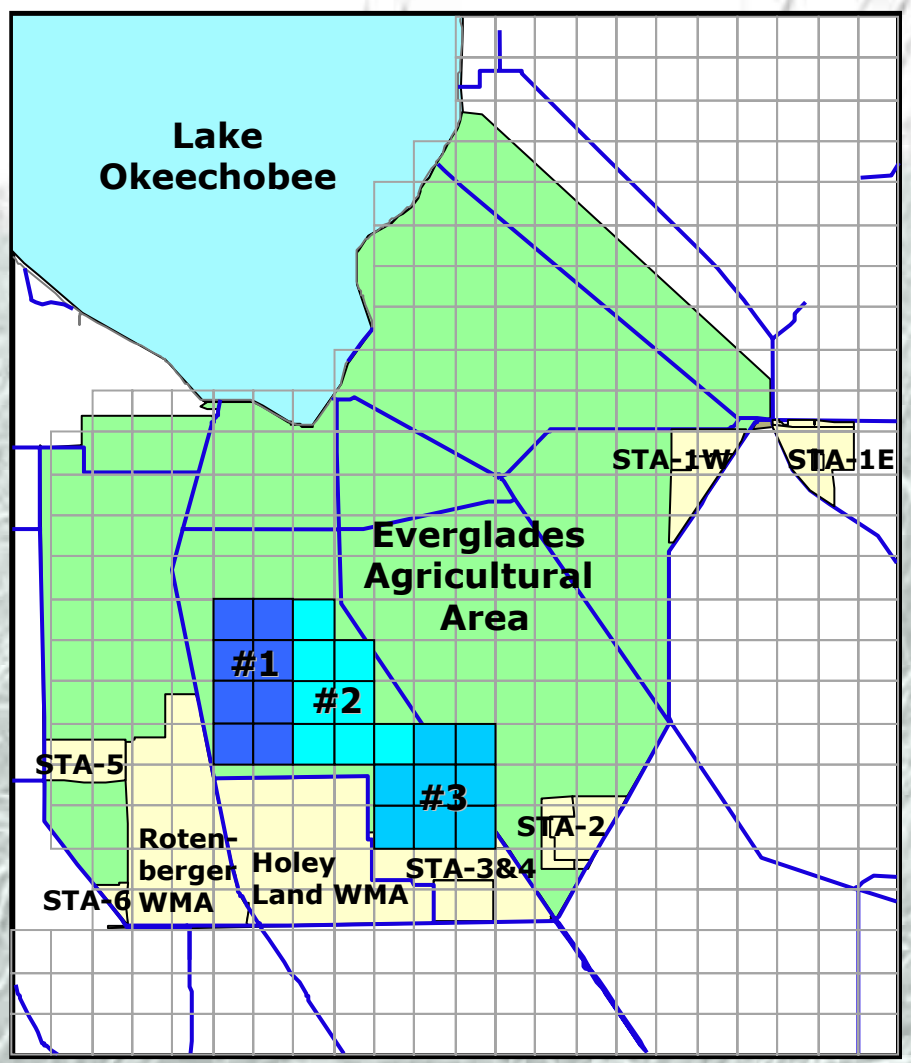


EAA Reservoirs in D13R

"The initial design for the reservoirs assumed 60,000 acres, divided into three equally-sized compartments (1, 2A, 2B), with the water level fluctuating up to six feet above grade in each compartment. The final size, depth, and configuration of this facility will be determined through more detailed planning and design."



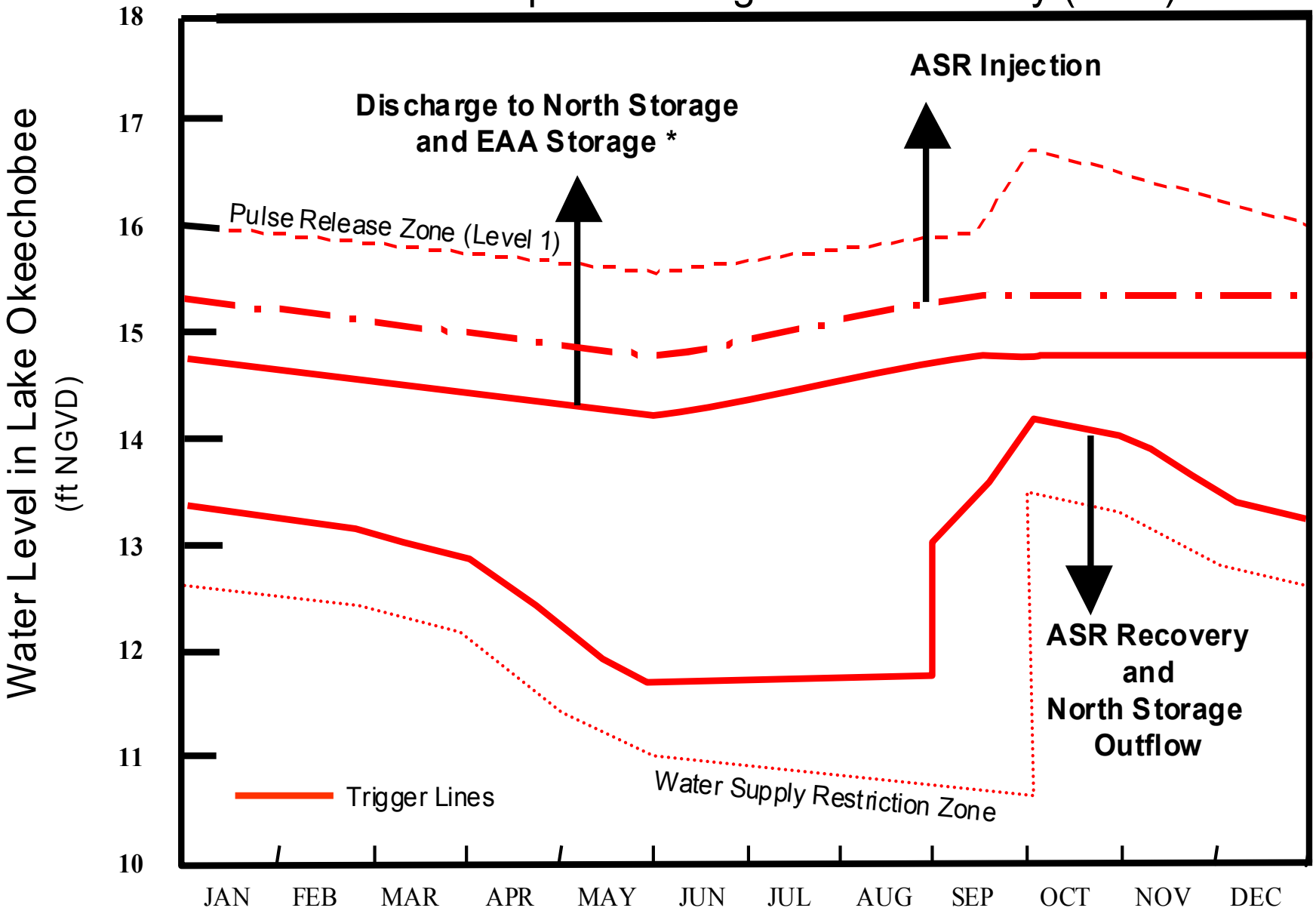
EAA Reservoirs in D13R



Total Storage (360,000 ac-ft)
Equivalent to 0.8 ft on LOK

- **Compartment #1 (120,000 ac-ft)**
  - ➔ used to meet Everglades Agricultural Area irrigation demands
- **Compartments #2&3 (each 120,000 ac-ft)**
  - ➔ used to meet environmental demands as a priority

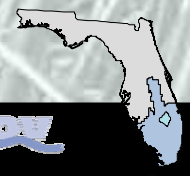
Figure 1. Trigger Lines for North of Lake Okeechobee Storage and Lake Okeechobee Aquifer Storage and Recovery (ASR)



* Discharge to North and EAA Storage if Lake Okeechobee stage is forecasted to be above "Discharge to …Storage" line, or if stage is above Pulse Release Zone (level 1) line.

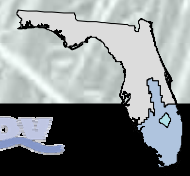
System-Wide Modeling Since Restudy

- EAA-Related Model Input Requirements
- Scenarios based on Alt. D13R
- LEC
- ECP & BSFS



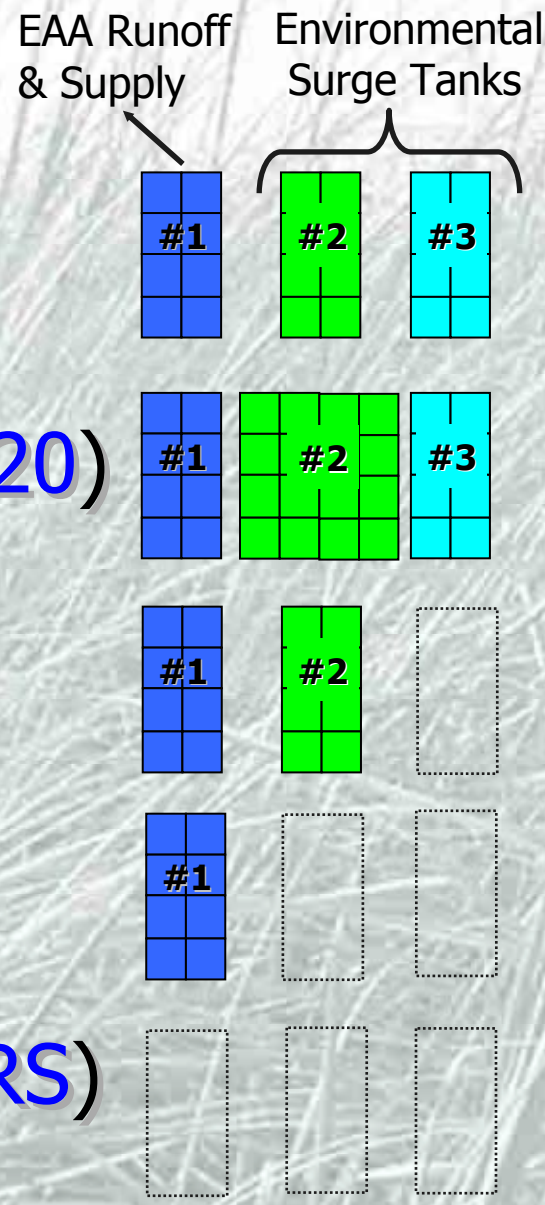
EAA Reservoir Related Model Input Requirements

- Reservoir Configuration
  - number of compartments
  - footprint
  - storage capacity (min/max depth)
- Operational Criteria
  - sources & destinations of flows
  - pump/structure capacities
  - operating rules (e.g., trigger levels, priorities)



EAA Reservoir Scenarios

- Based on CERP (D13R)
- Double size of Reservoir 2 (SGT4020)
- Remove Reservoir 3 (SGT1x20)
- Remove Reservoirs 2 & 3 (EAARS)
- Remove all EAA Reservoirs (NEAARS)

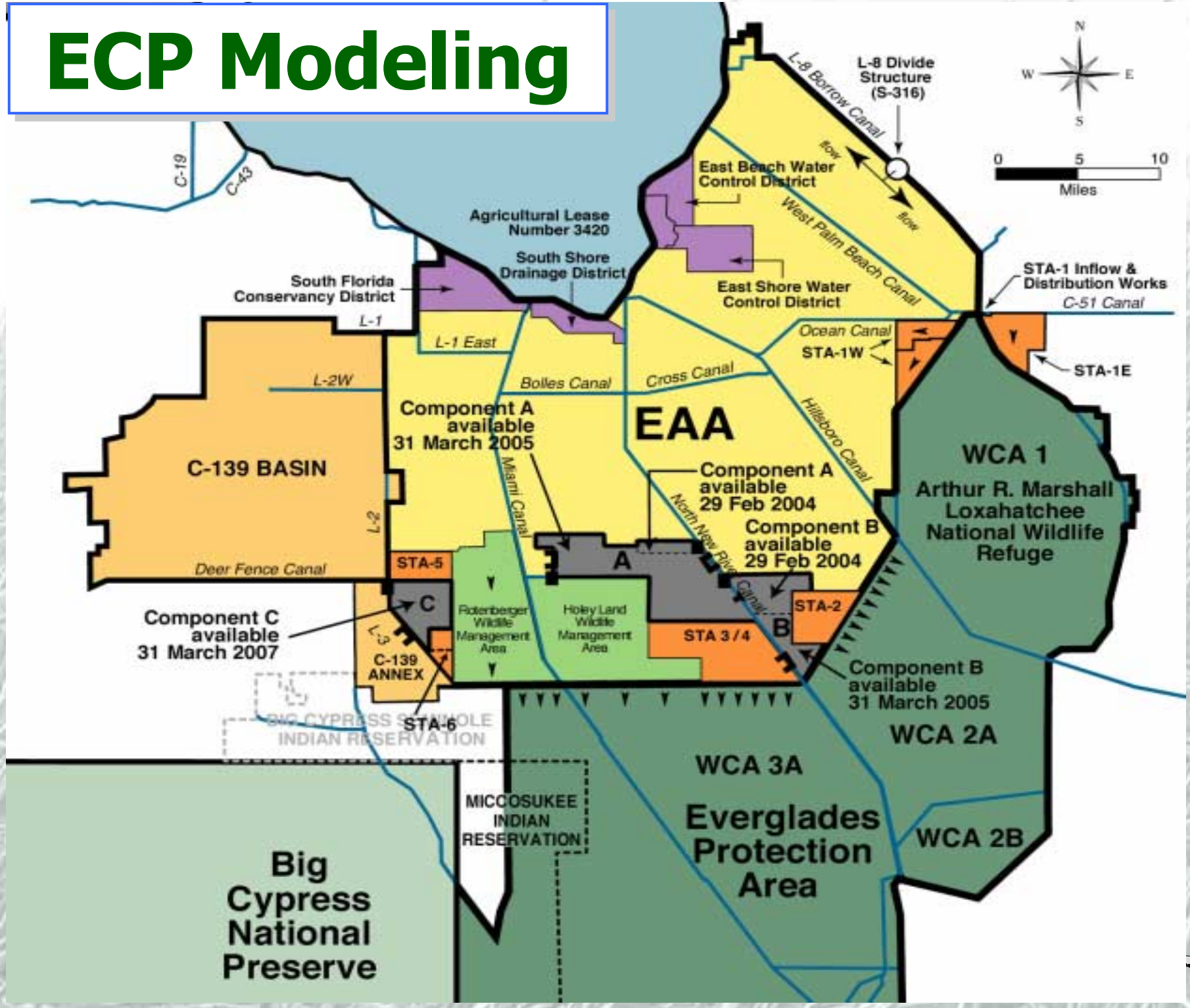


Described in Central and Southern Florida Project, Comprehensive Review Study, 1999, Appendix B-68,69,104-141

EAA Reservoir Configuration in LECRWSP

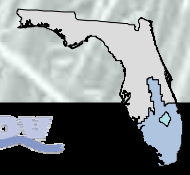
- Compartment 1 increased to 30,000 acres
- Compartment 2A remains 20,000 acres
- Compartment 2B decreased to 10,000 acres
- Interbasin transfers to better utilize compartment 1

ECP Modeling



ECP & BSFS Modeling

- Used in support of Everglades Construction Project and Basin-Specific Feasibility Study
- Updated Alt. D13R to include latest Talisman footprint using a more recent version of SFWMM
- Included phases 1 & 2 of EAA Reservoir Project (as in Alt. D13R)

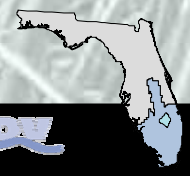


What Modeling is Coming Up

- Initial CERP update (ICU)
- Refinements to SFWMM

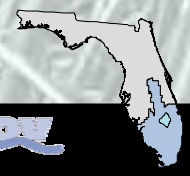
Initial CERP Update

- Using additional data
- Upgrading the system-wide simulation models
- Re-simulating the Comprehensive Plan



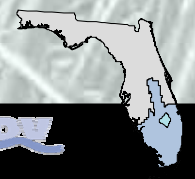
Additional Data

- **Extended Climatic record by 5 additional years to include data through December 2000.**
- **Updated topography**
  - Latest USGS topo in ENP and WCA-3
- **Updated land cover**
  - latest satellite images (1995) and areal photographs (2000)
- **Updated population projections and associated water demands**



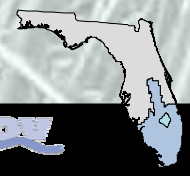
System-Wide Simulation Models

- SFWMM
- NSM
- ELM
- LOKWQM
- ATLSS
- RSM



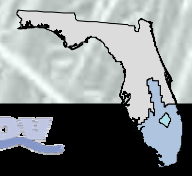
Refinements to SFWMM
(SFWMM v 5.x)

- **Ability to use 36-year record**
  - Modified performance measures and incorporated new performance measures
- **Code modifications**
  - small reservoirs
  - ASR recovery across basins
  - WSE schedule for LOK
  - Position analysis mode



Refinements to SFWMM continued
(SFWMM v 5.x)

- Forward pumping from LOK
- Ability for water supply backpumping of EAA runoff
- Day specific deliveries to meet supplemental EAA and LEC demands
- Structure specific operations for selected structures



Design Suggestions

- CERP (Alt D13R) is a good starting point; more detailed analysis is needed
- Look for opportunities to optimize local design for system-wide benefits.
- Consider lessons learned from other modeling (Alt. D13R scenarios, ECP, LEC)
- Ensure optimization of components that work with EAA Reservoirs, through RECOVER
- Pay close attention to ICU and ASR contingency modeling

Resources

- C&SF Comprehensive Review Study, Hydrologic Performance Measures web Page

  http://www.sfwmd.gov/org/pld/restudy/hpm/

- C&SF Comprehensive Review Study, Hydrology and Hydraulics Modeling, Appendix B.
- Lower East Coast Regional Water Supply Plan, SFWMD, May 2000.
- Scenario Simulations for Reservoirs in the EAA. Memorandum from R. Santee & L. Cadavid to C. Neidrauer, September 4, 1998

Resources

- 2010 Case Study with EAA Reservoir Storage Volume Doubled, Novoa and Tarboton, 2001, http://www.sfwmd.gov/org/pld/hsm/pubs/evals/eaarsx2_final_100101.pdf
- Modeling of EAA Storage Reservoirs in SFWMM D13R Restudy Run. Memorandum from Raul Novoa to Victor Powell, July 9 , 2001
- ECP Base Simulation and 2050 with Project Simulation Using the South Florida Water Management Model. Memorandum from L. Brion and A. Ali to G. Goforth & T. Piccone, April 15, 2002