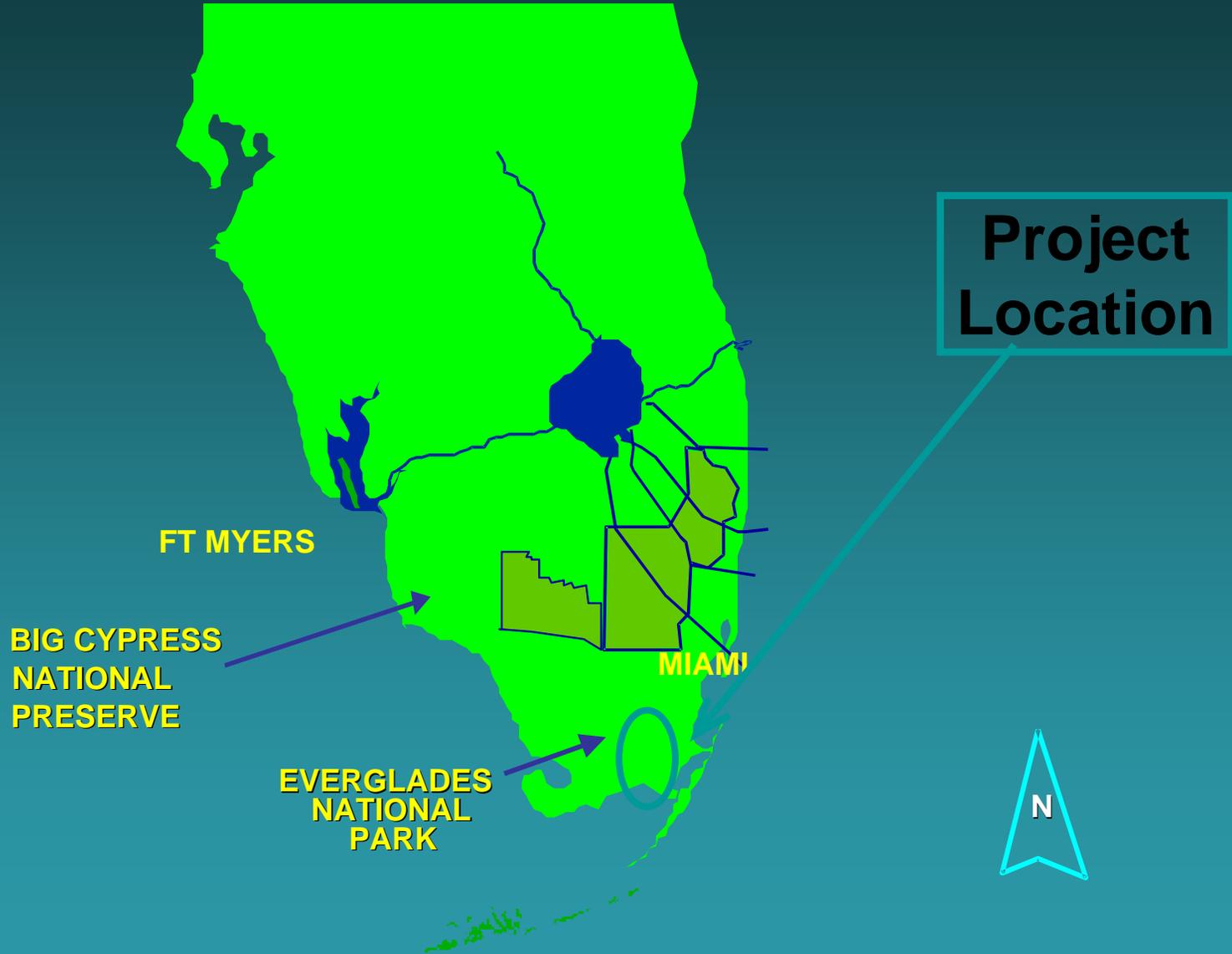


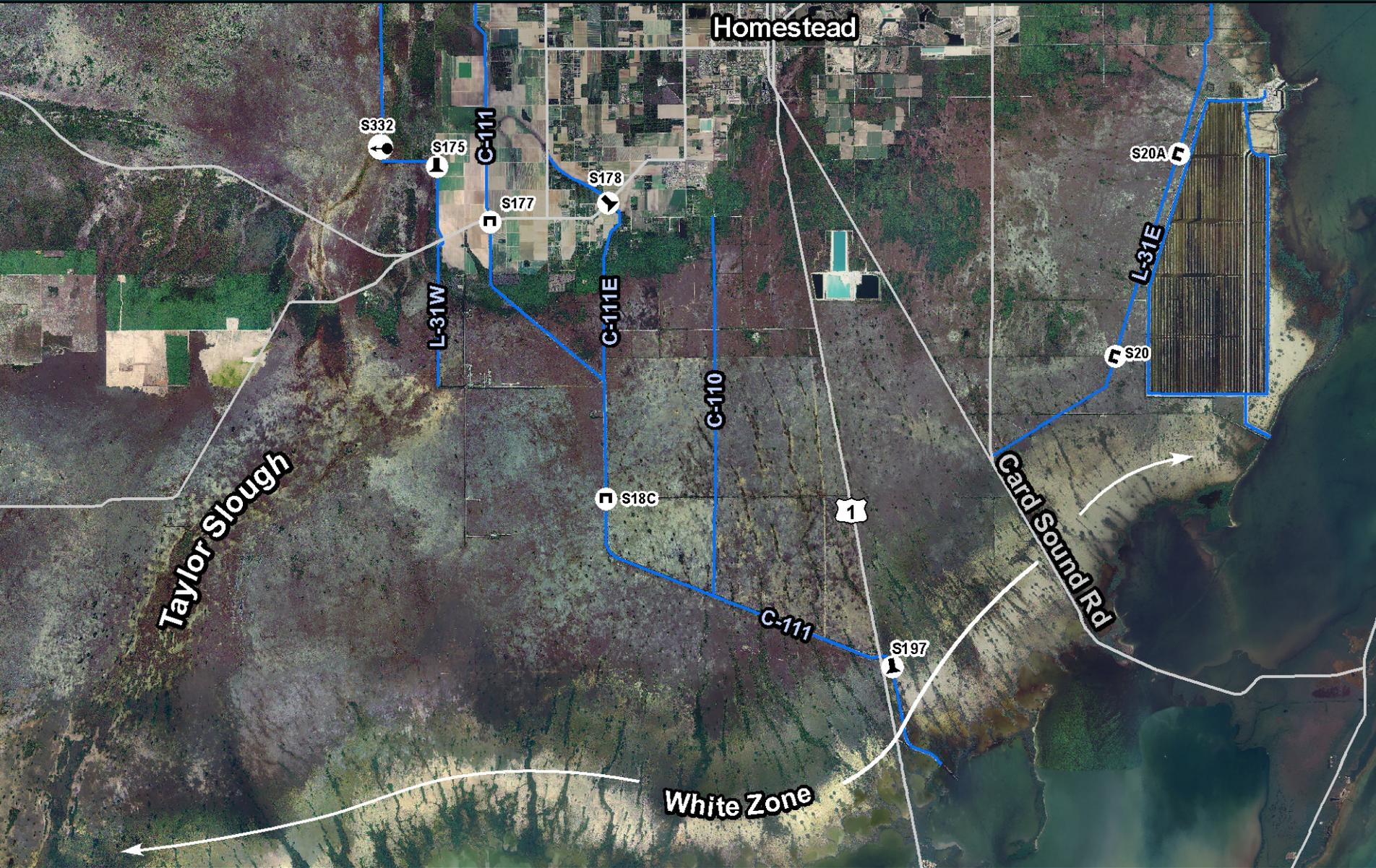
***C-111 Canal Project/Spreader
And Frog Pond Reservoir***

**Dewey Worth, SFWMD
Dir. CERP Project Management**

C-111 Canal/Spreader Project

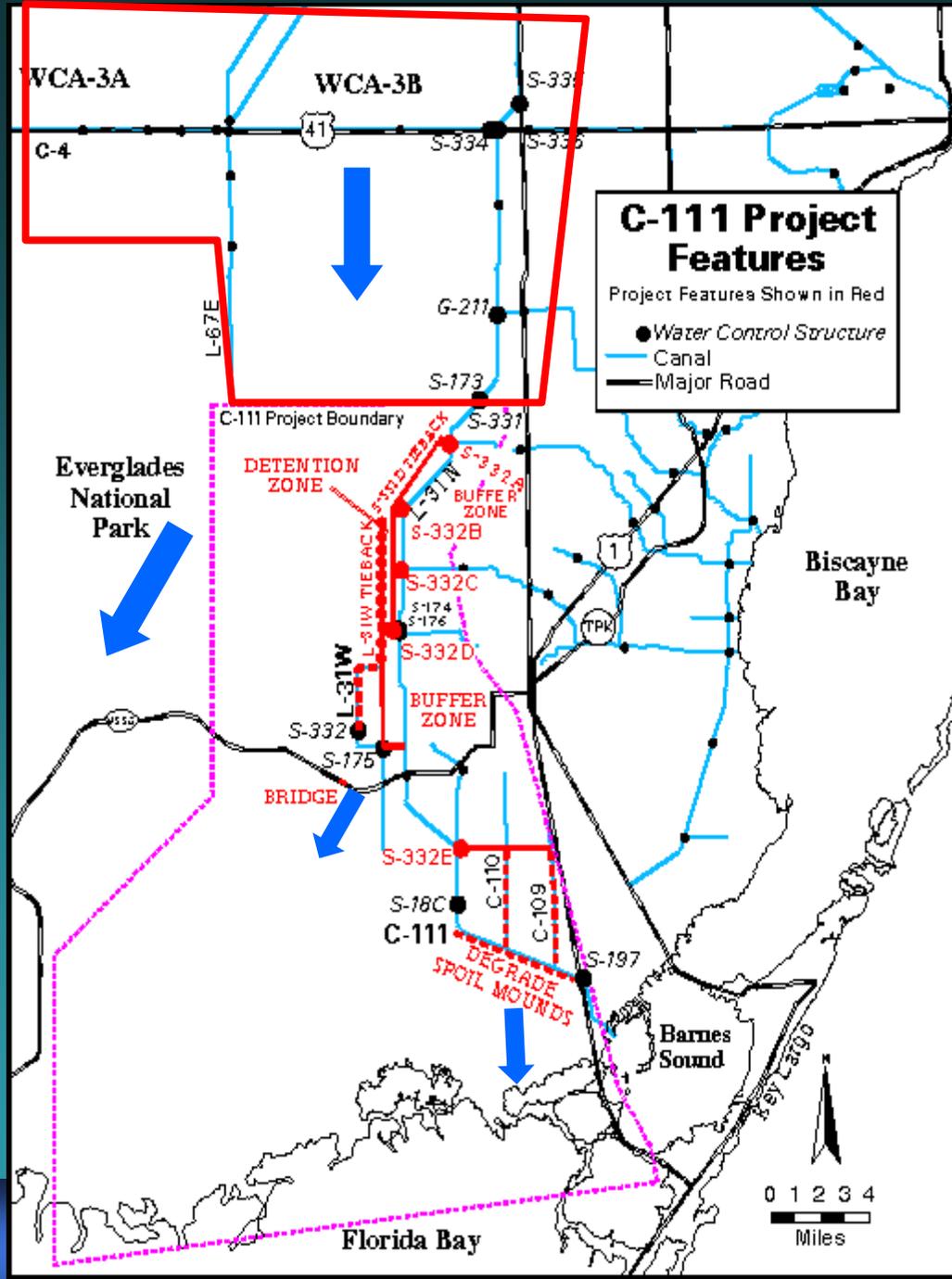


Lower C-111 Canal System



C-111 Canal and S-197 Structure



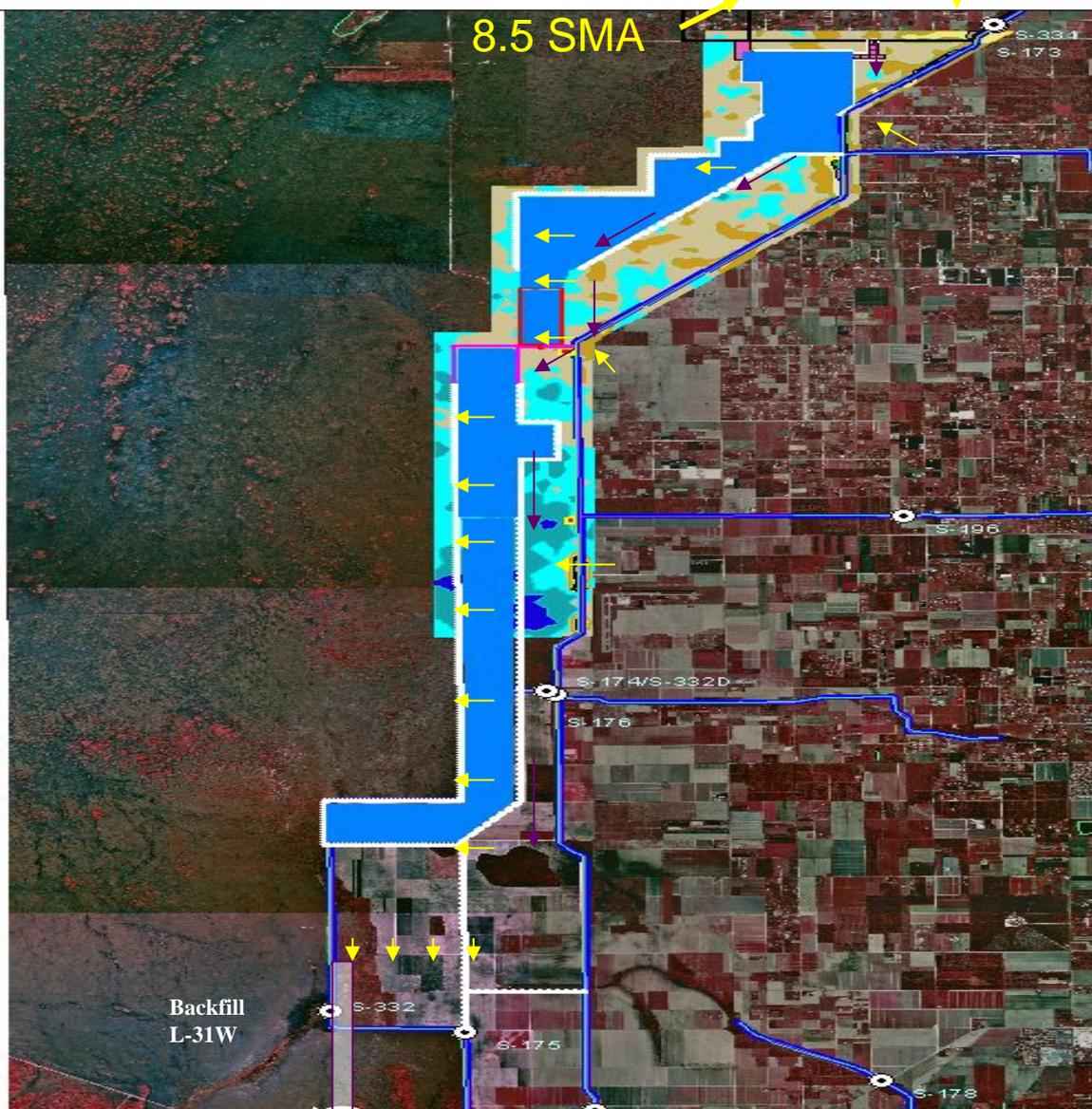


Restoration of Natural Hydrology for ENP and Florida Bay

MWD Increase to Shark Slough

C-111 Changes to Taylor Slough and Panhandle

C-111 Spreader Canal



- ### Purpose
- Reduce C-111 canal impacts on ENP and Taylor Slough
 - Create a buffer area between the ag/urban corridor and ENP
 - Pump water from the canal into the buffer to offset the canal influence on the natural areas
 - Maintain existing levels of flood protection

C-111 Project Area and 8.5 SMA STA

Everglades Division
Water Resources Management

Conceptual C-111 Buffer Plan - 2002

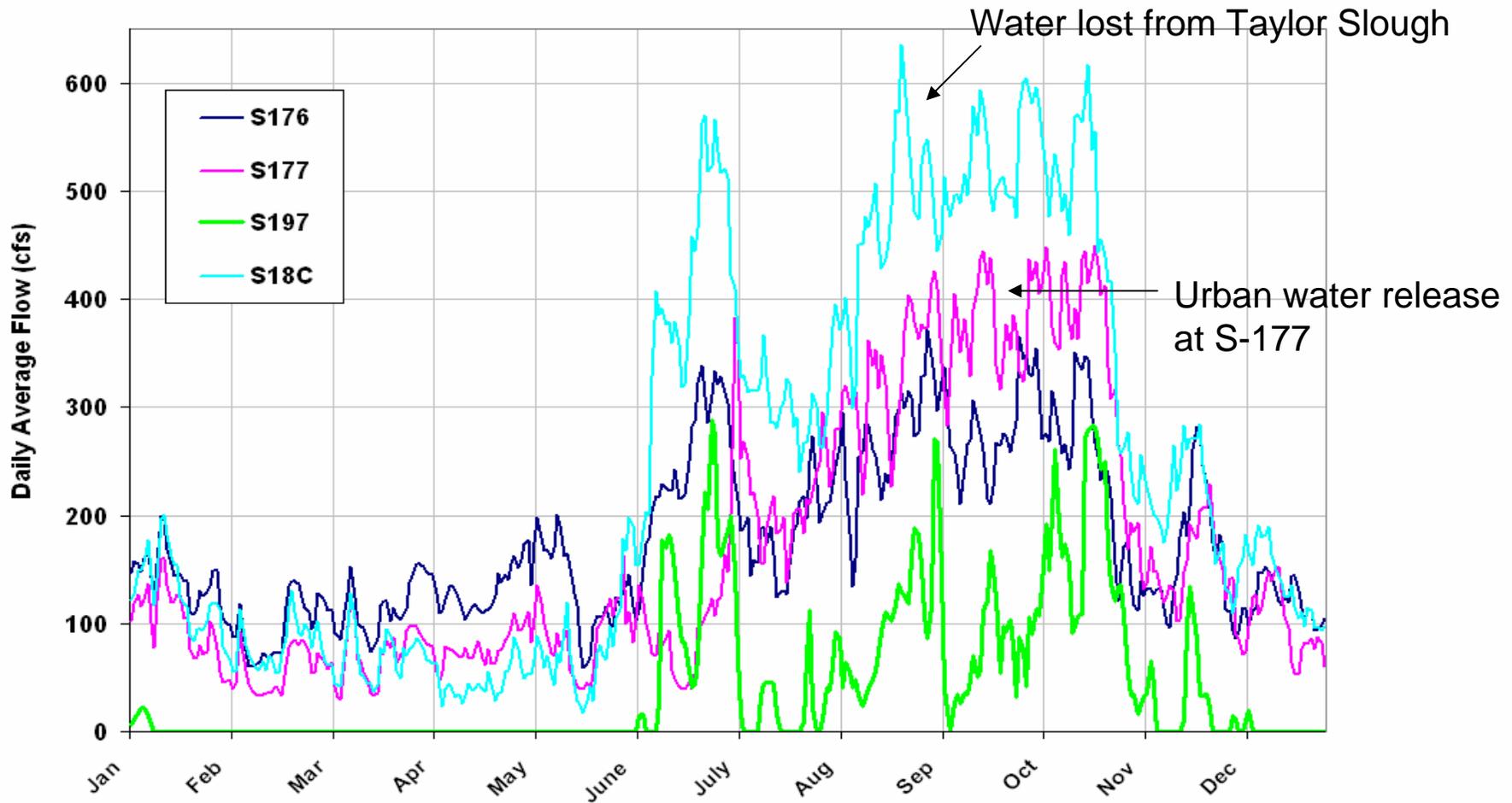
Under CERP

The Federal C-111 Plan was assumed to be part of the “pre” CERP condition – it was modeled as if it were already built and operational. Upstream L-31N and C-111 canal influence would be minimal.

A Spreader Canal was proposed under CERP to replace the lower C-111 Canal and address some of the unresolved issues not satisfied by the Federal C-111 Project – Model Land Rehydration, S-18C/S-197 operations, reconnection of natural areas

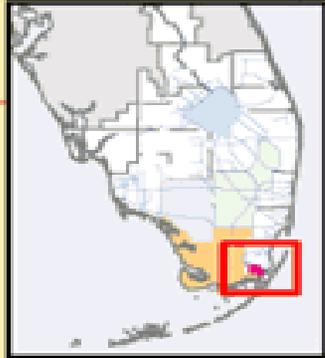
What is wrong with the existing C-111 system?

Historic Daily Average Flow Comparison
at Structures (January 1985- December 2002)



The C-111 canal effectively pulls groundwater away from Taylor Slough

C-111 Spreader Canal

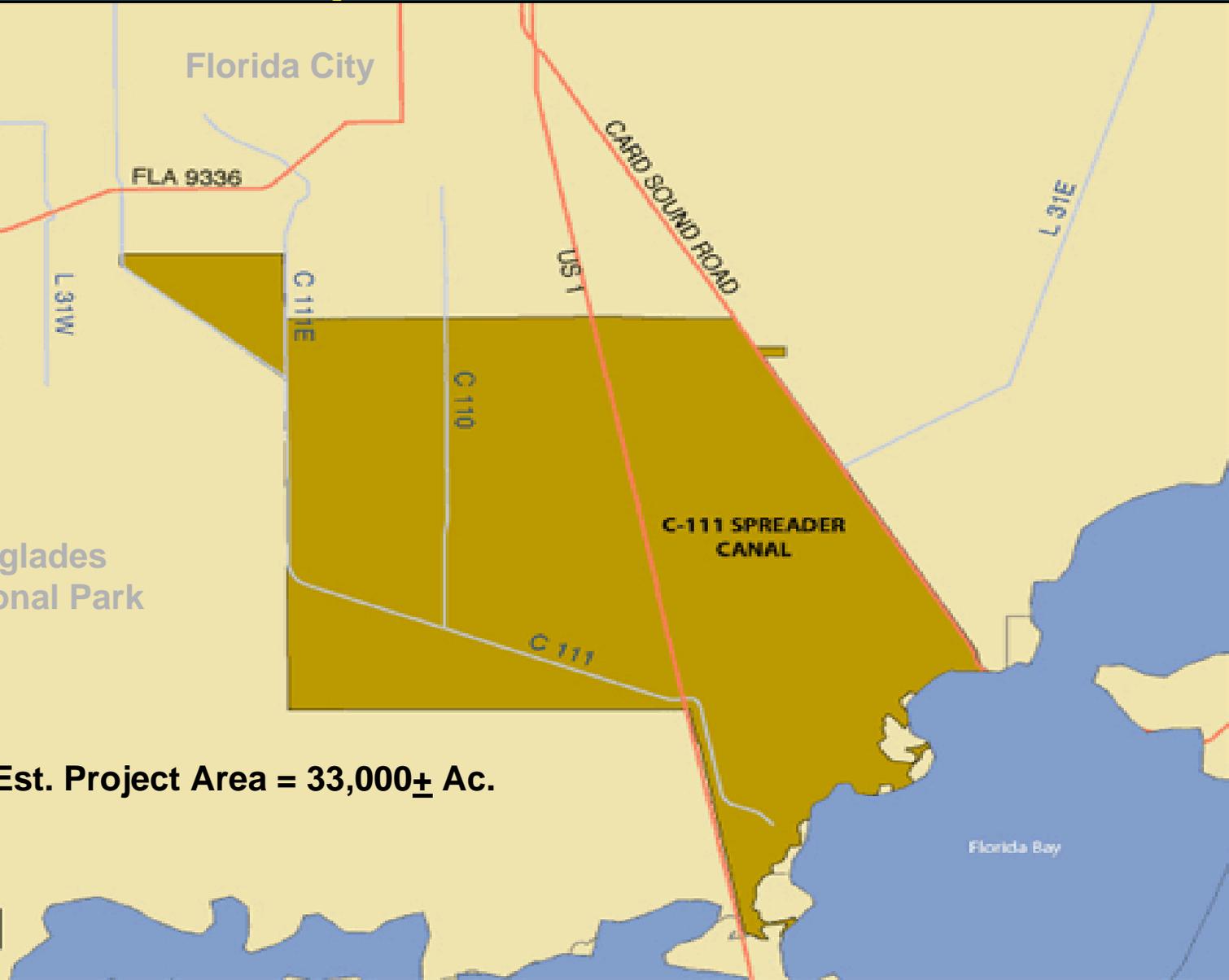


Everglades
National Park

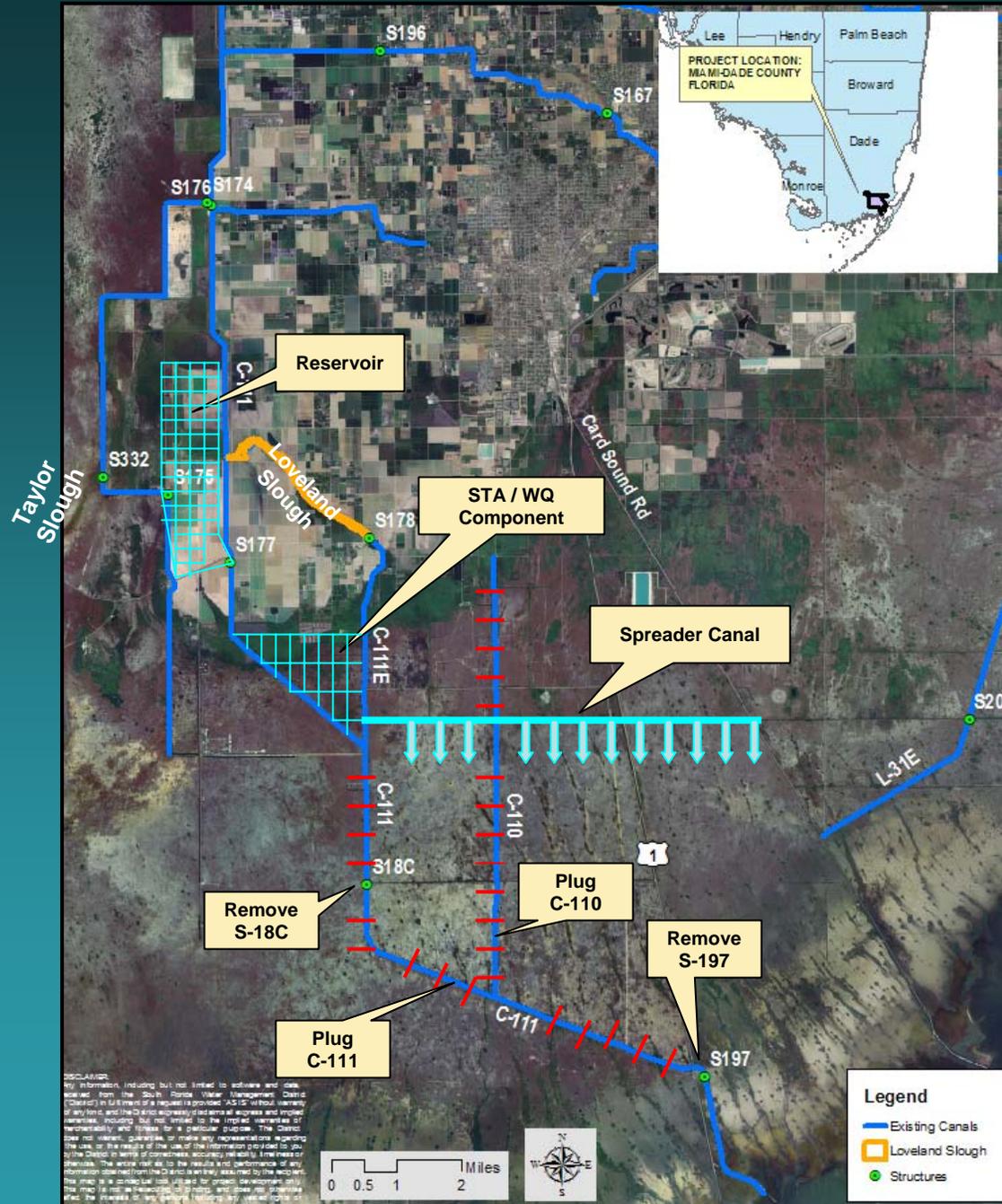
Est. Project Area = 33,000 \pm Ac.

Legend:
Roads (Red line)
Canals (Blue line)

Scale bar: 0, 1.25, 2.5 Miles



C-111 Spreader Canal Project Components Identified by PIR PDT

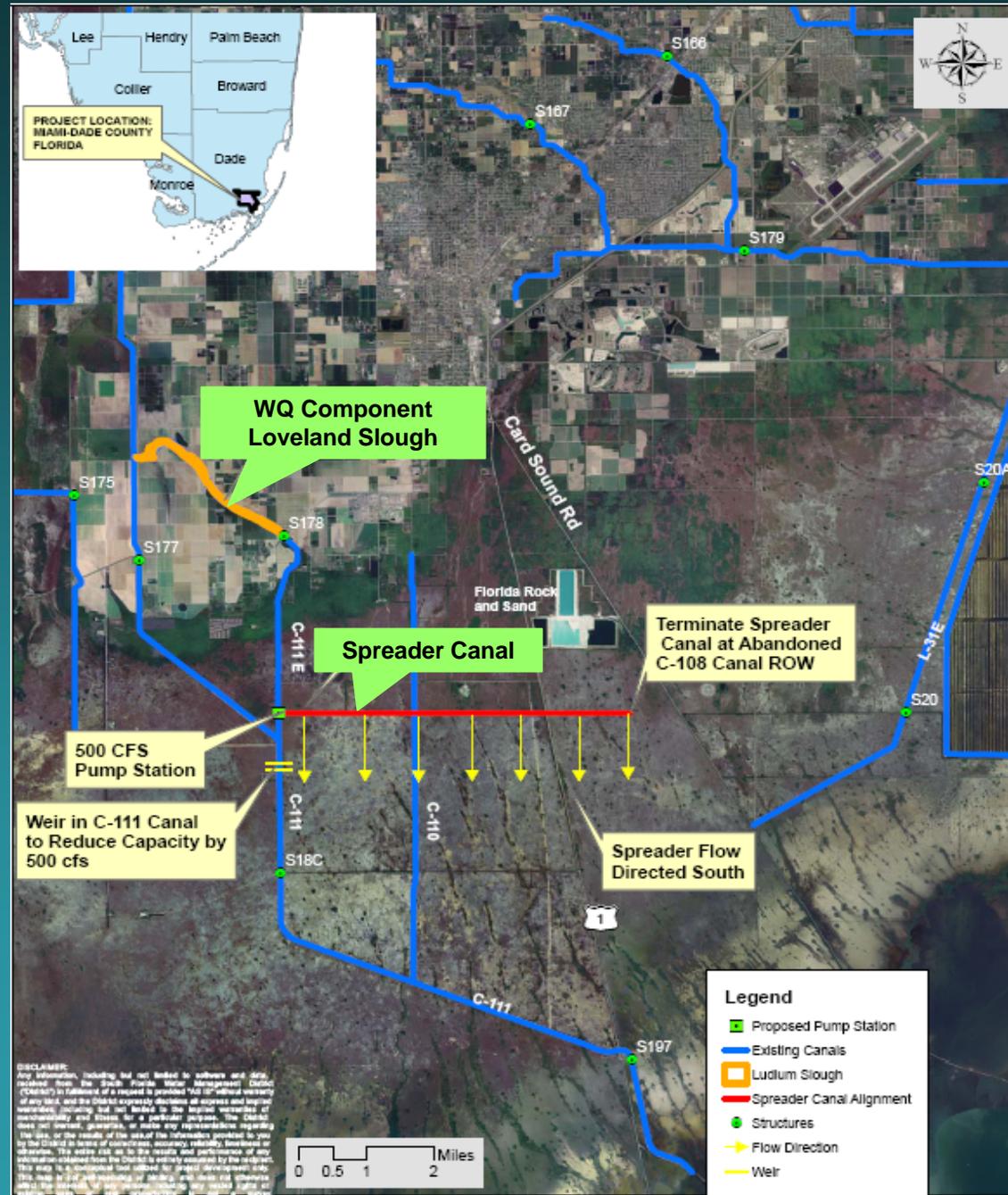


Draft BODR Project Components Phase 1

Recommended Design Alternative 5:

- 5.4 mile Canal Along Central Alignment from C-111E to C-108 (Abandoned Canal Right-of-Way)
- 500 cfs Pump Station at C-111E Canal
- Overflow Weirs along Spreader Canal
- Flow control structure in C-111 Downstream of Proposed Pumping Station
- Loveland Slough Water Quality improvements
- Modifications to Operations of S-18C

BROWN AND
CALDWELL



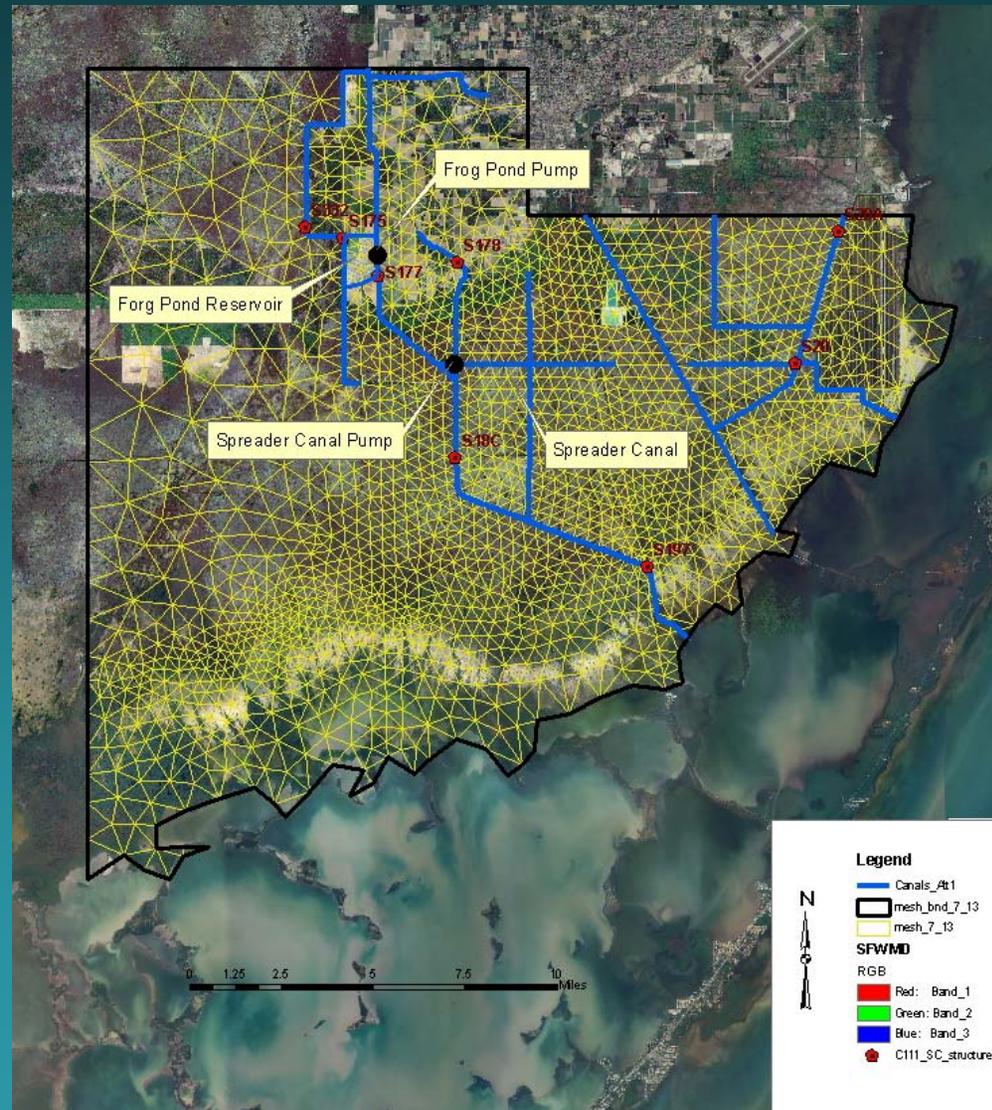
Agency and Other Stakeholder Responses

- PIR plan selection moving slower than expected – hydrologic modeling of alternatives not completed
- Uncertainty on canal alignment – balance between flood control impacts and maximizing environmental benefits
- ENP concerned that Taylor Slough restoration would continue to be adversely impacted by pump station and spreader canal operation
- Proposed water quality treatment at Loveland Slough may not be adequate

Is It Lemonade Or Is It Onion Soup?

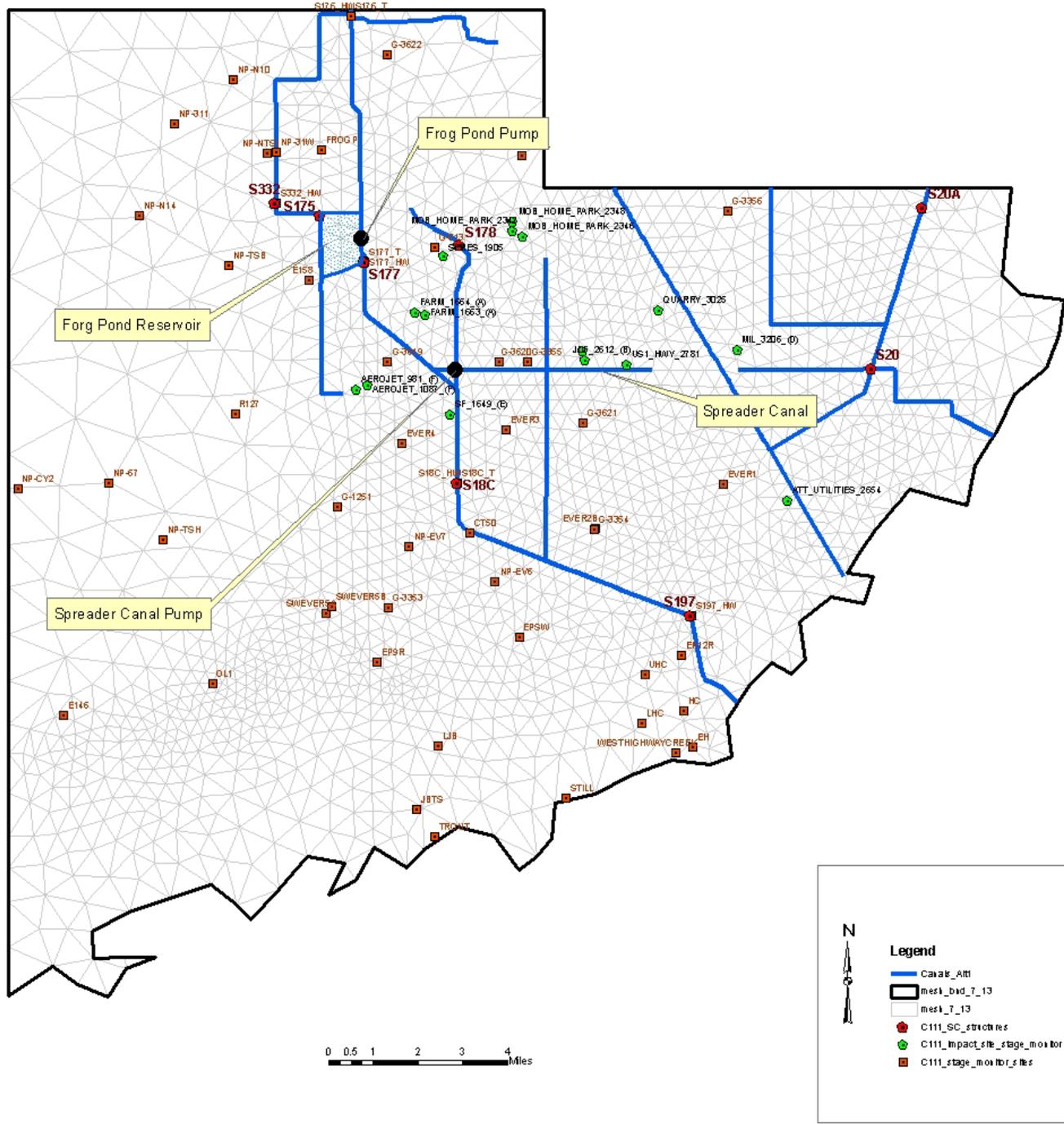
- Retaining water in Taylor Slough is needed for Central Florida Bay
- Point source discharges to S-197 continue to be a major impact to Manatee Bay and Barnes Sound
- The spreader canal alignment, pumping options and flood control issues are highly complicated and costly
- Loveland Slough WQ treatment options are still evolving in the PIR
- Overall costs are rising but the construction budget is fixed at \$40M
- A reservoir is common to 3 out of 4 PIR alternatives – SFWMD owns the land

Design Alternative Assessment C-111 RSM Application

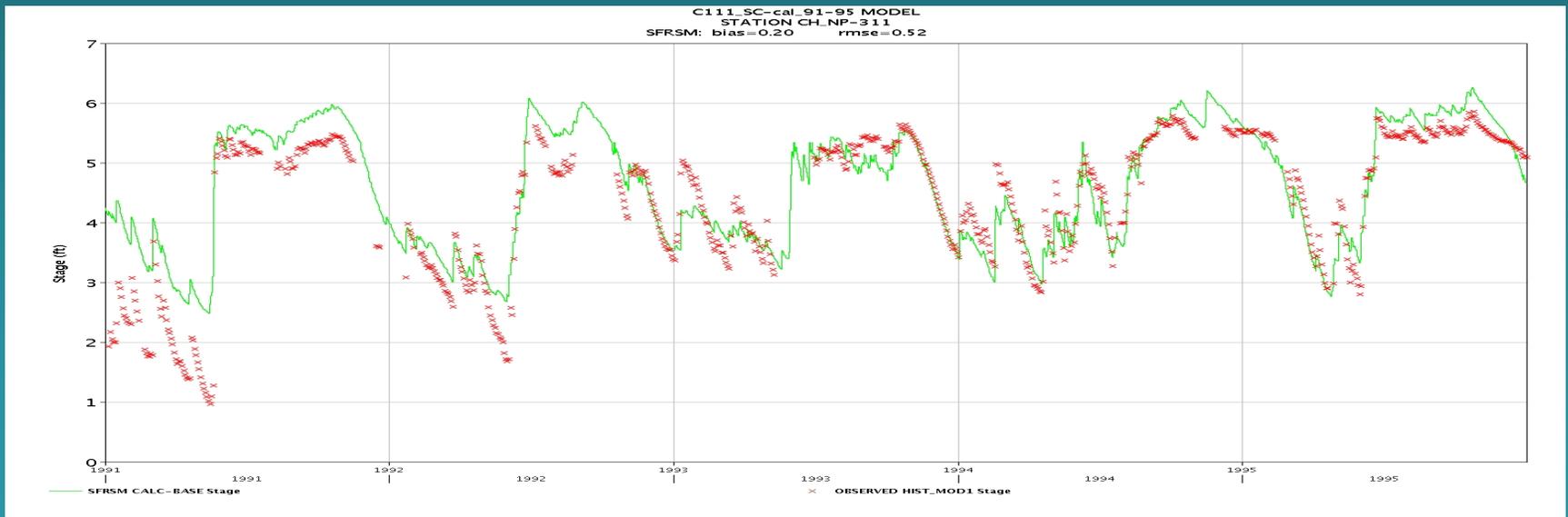
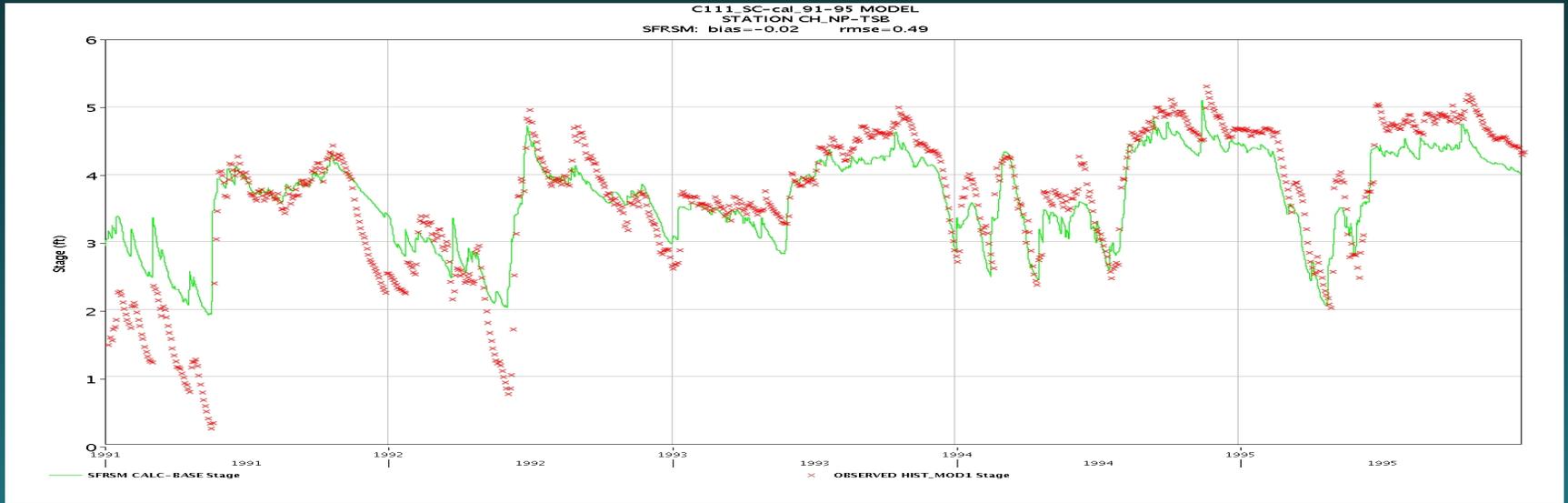


Model Mesh and Canal Network

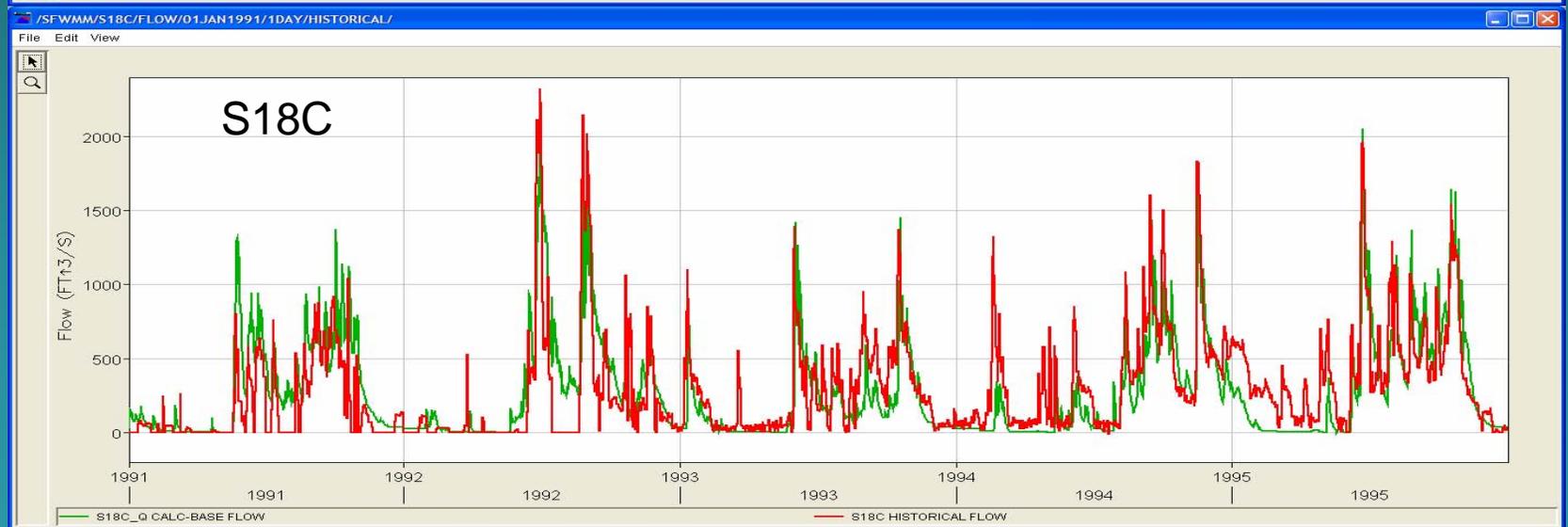
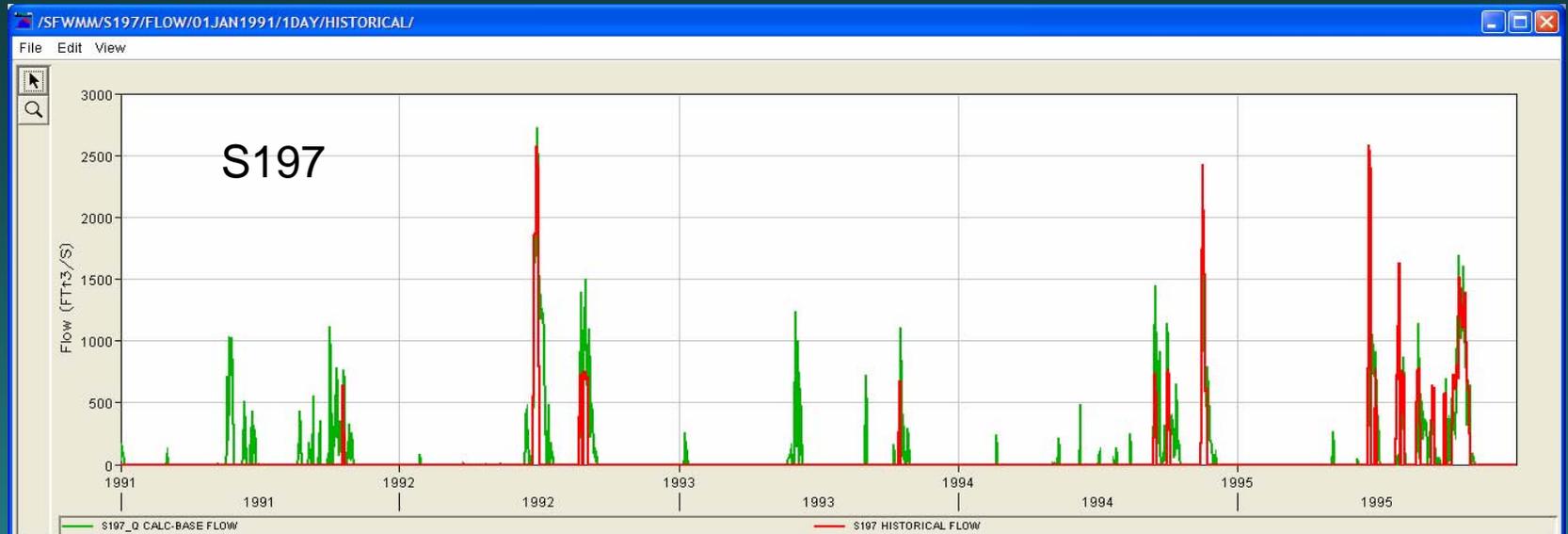
Stage Monitor Sites



Calibration Results – Marsh Stages



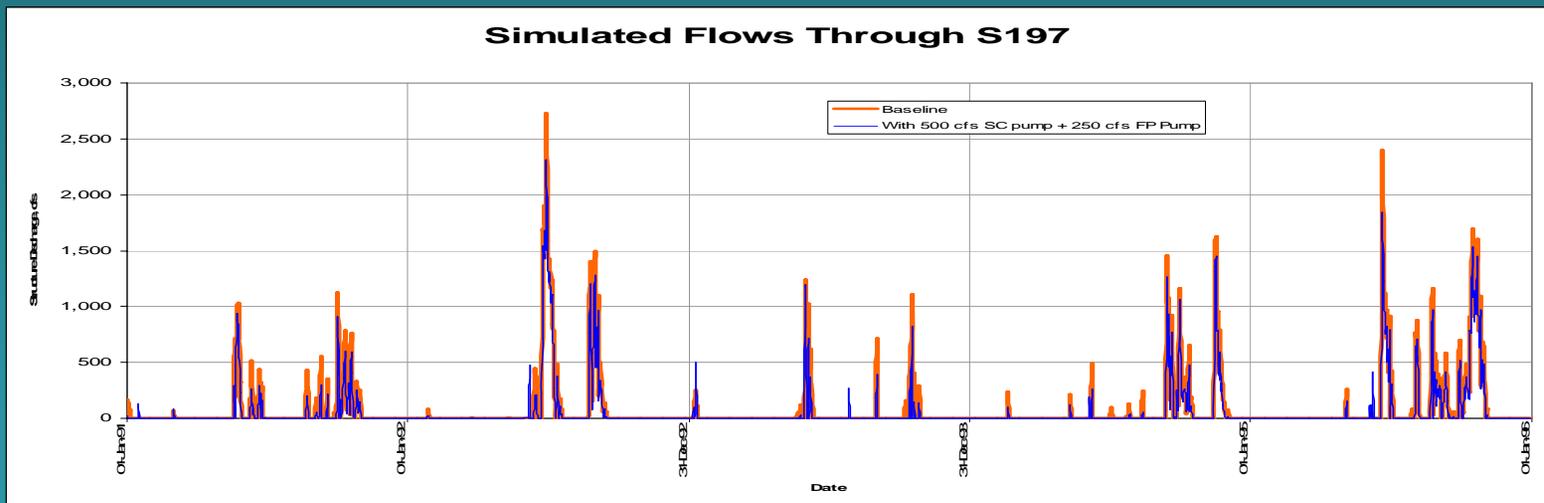
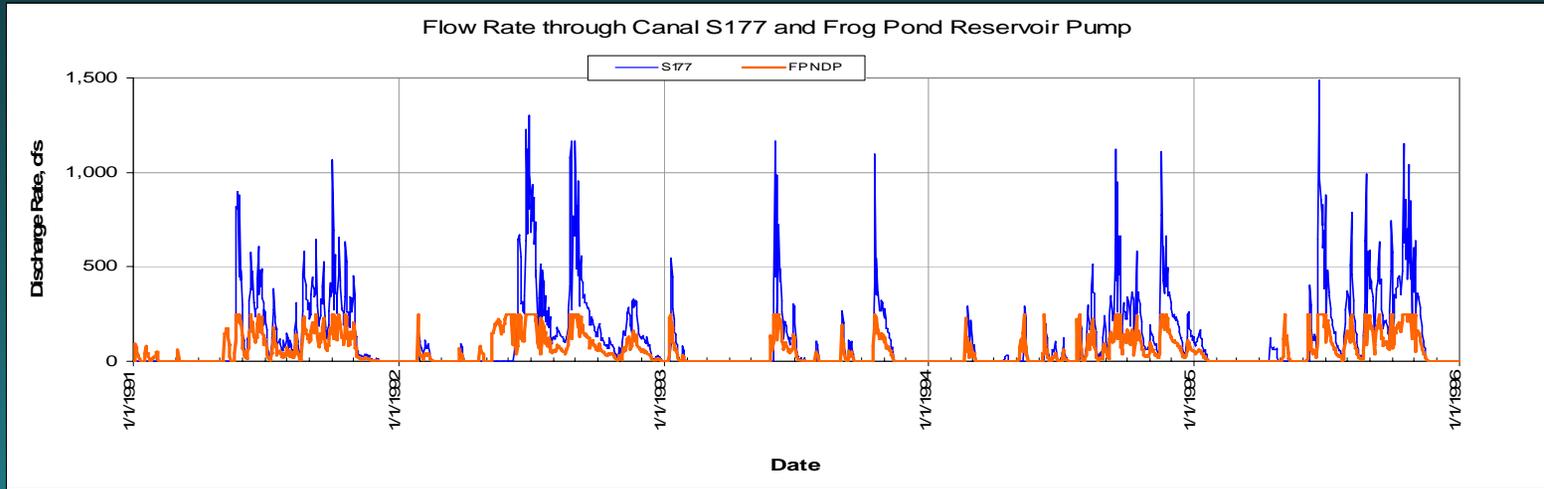
Observed and Simulated Flows at Key Structures (1991-1995)



Simulation Results With Frog Pond Reservoir

- Frog Pond Reservoir is 745 Acres
- Includes Frog Pond reservoir pump (250 cfs)
- Pump operates prior to S177 being open – pumping starts as headwater stage begins to exceed the gate open criteria
- Flow out of reservoir is through seepage only

Simulated Flows through S177, FP Reservoir Pump Operations and S197 discharges



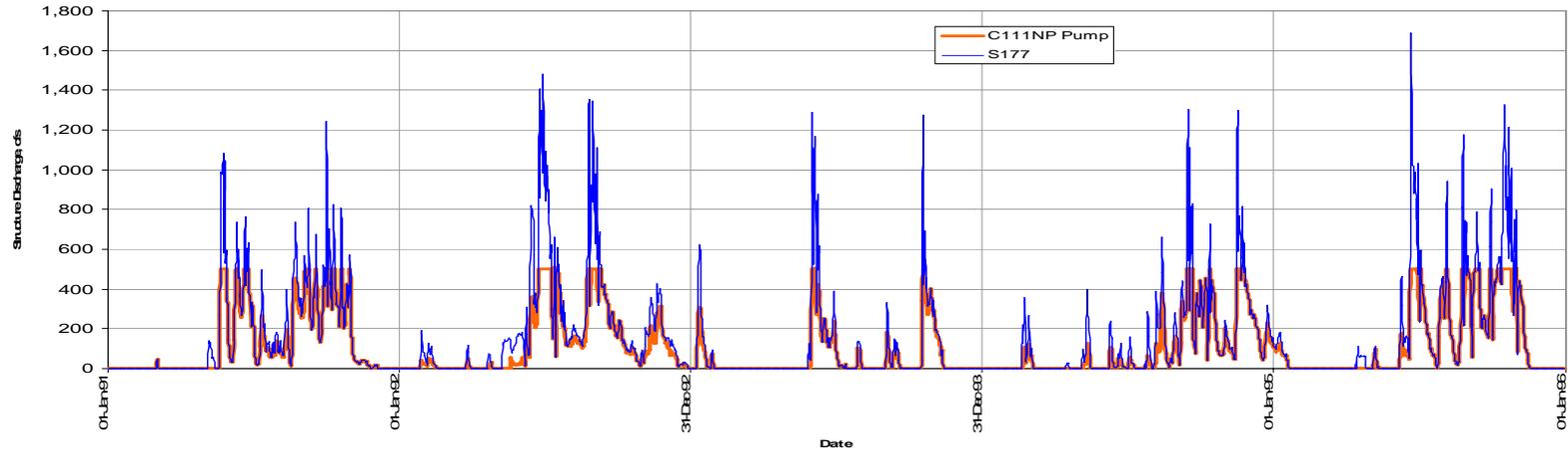
Simulation Results

Spreader Canal

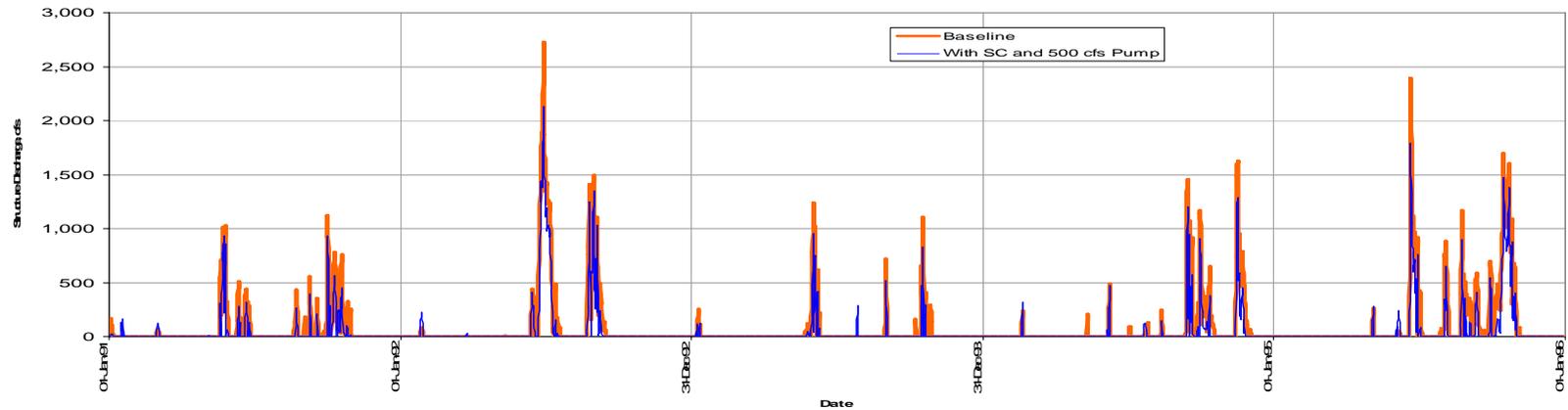
- Spreader canal is 4.6 miles from C111 canal to US 1
- Includes spreader canal pump (500 cfs)
- Spreader canal has 11 levee gaps 35 – 55 ft wide
- Spreader canal pump operates only when S177 headwater stage exceeds the open criteria and begins discharging

Simulated Flows through S177, Spreader Pump Operation and S197 discharges

Simulated Flows Through S177 and C111NP Pump



Simulated Flows Through S197

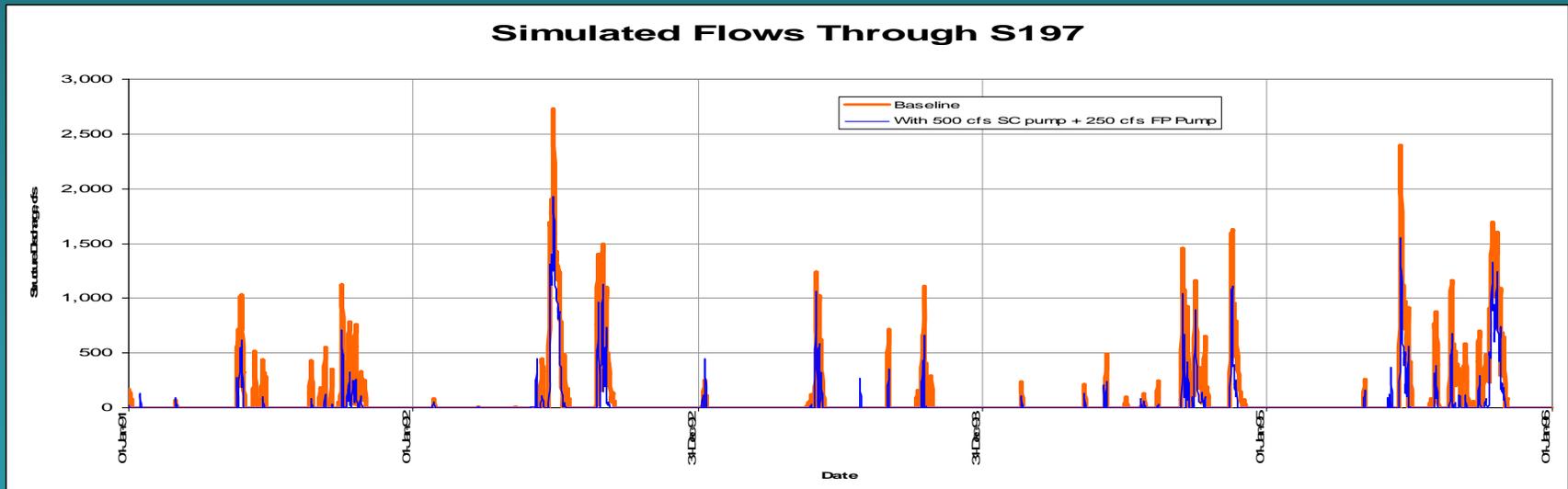
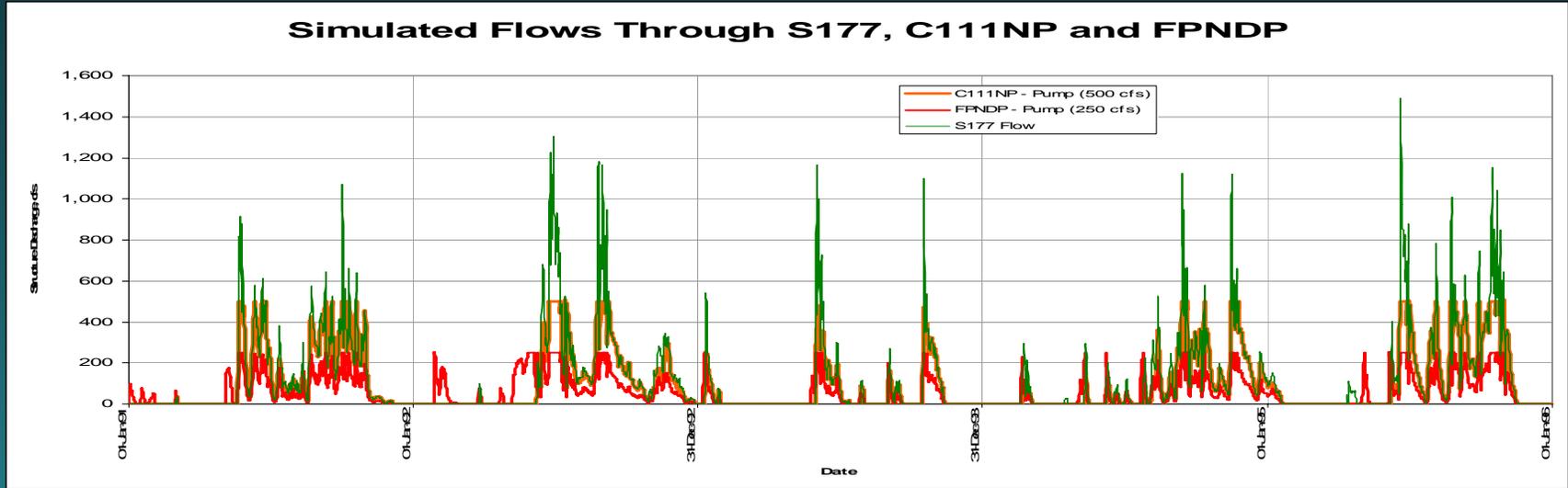


Simulation Results

Spreader Canal + Frog Pond Reservoir

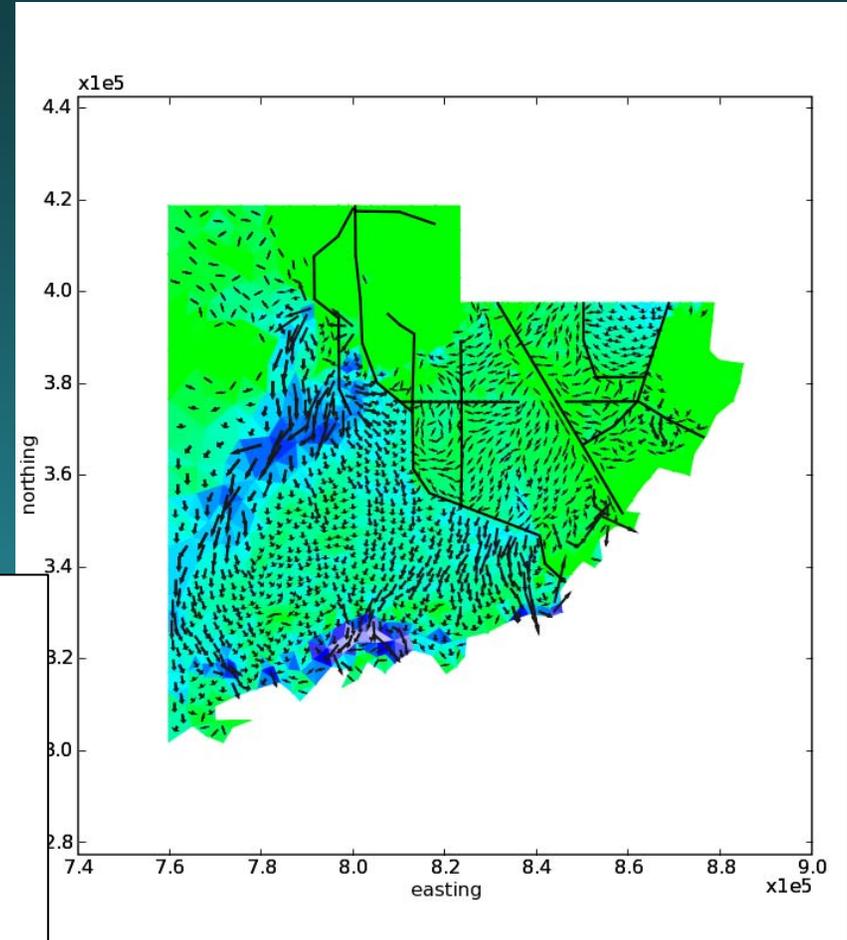
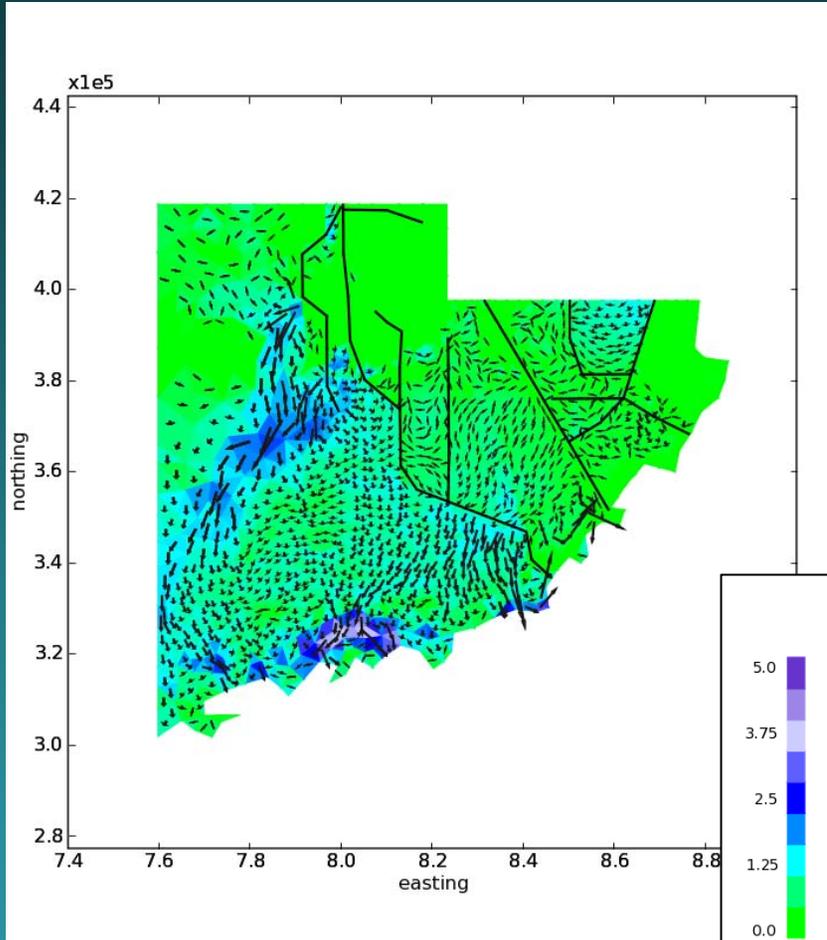
- Frog Pond Reservoir Pump “on” (250 cfs) before S177 opens
- Spreader canal is 4.6 miles from C111 canal to US 1
- Includes spreader canal pump (500 cfs)
- Spreader canal 11 gaps 35 – 55 ft wide
- Spreader canal pump operates only when S177 is discharging

Simulated Flows through S177, pumping to FP Reservoir, pumping to spreader canal and S197 discharges



BASELINE

WITH FROG POND RESERVOIR

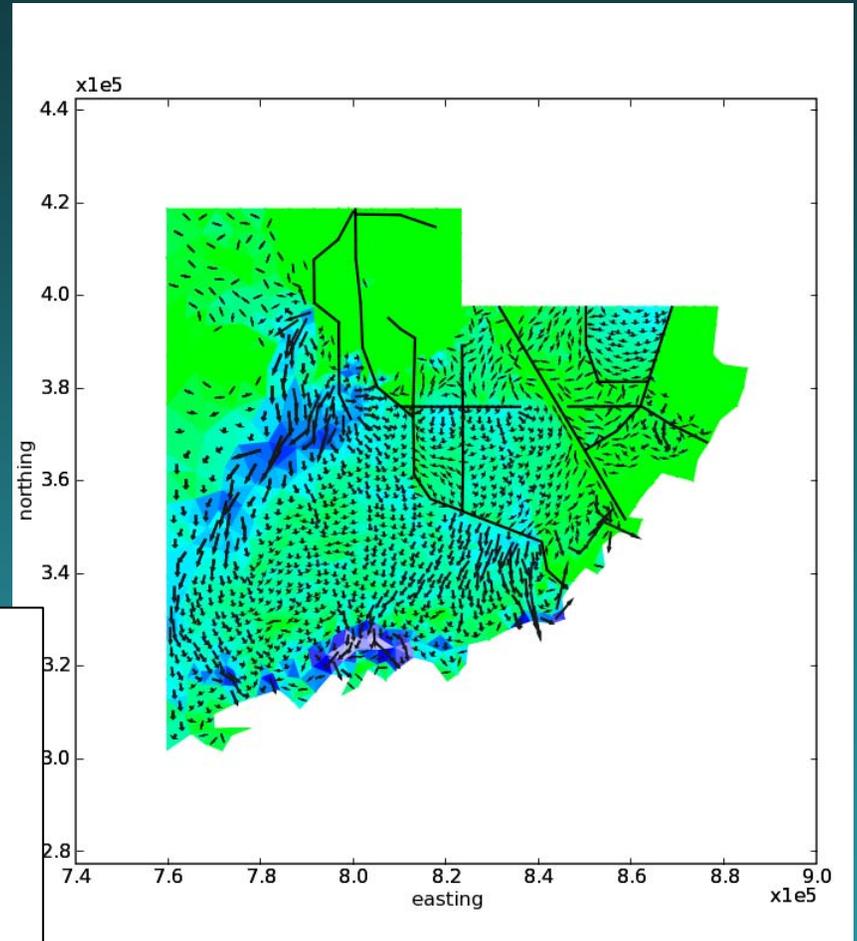
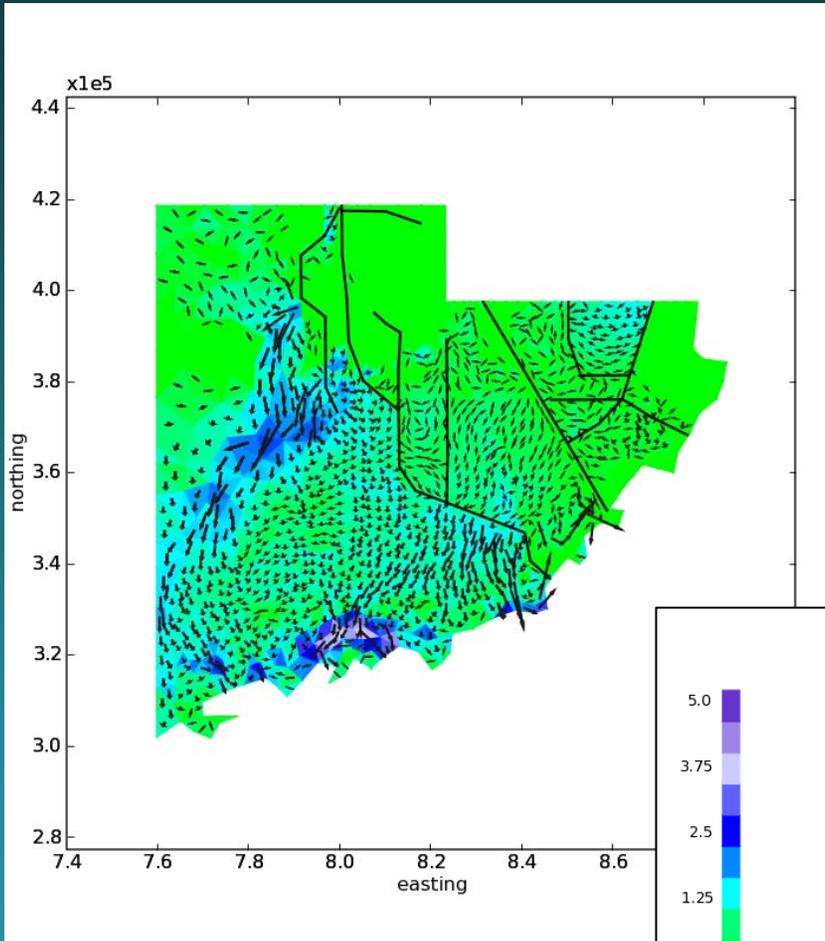


5.0
3.75
2.5
1.25
0.0

Timestep: 1354
Date: 1994-09-16
Variable Name: Ponding
Units: FT

BASELINE

WITH SPREADER CANAL

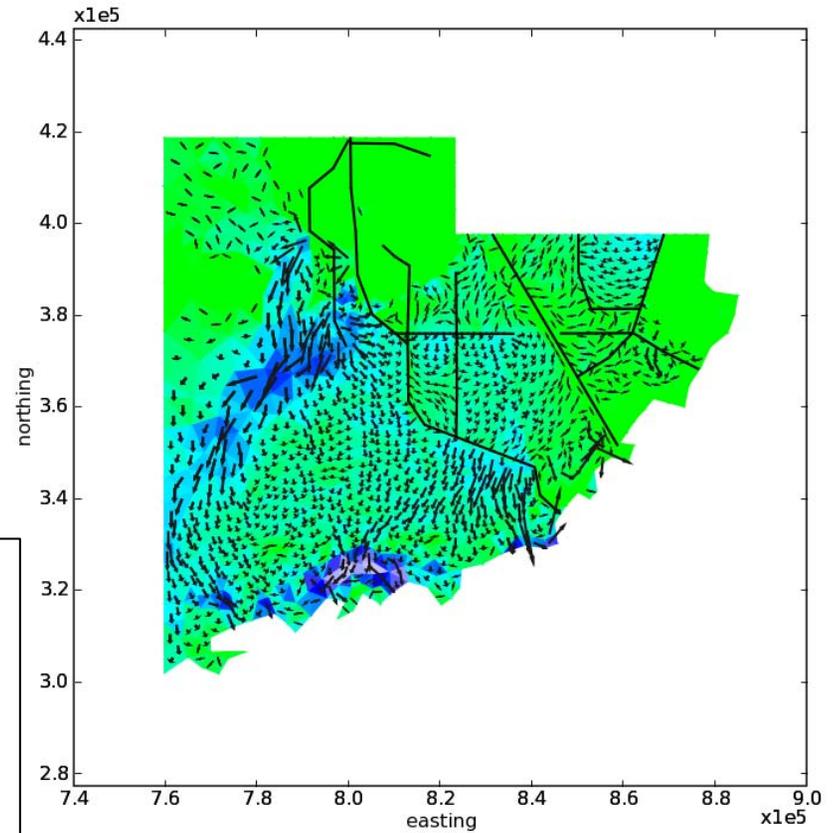
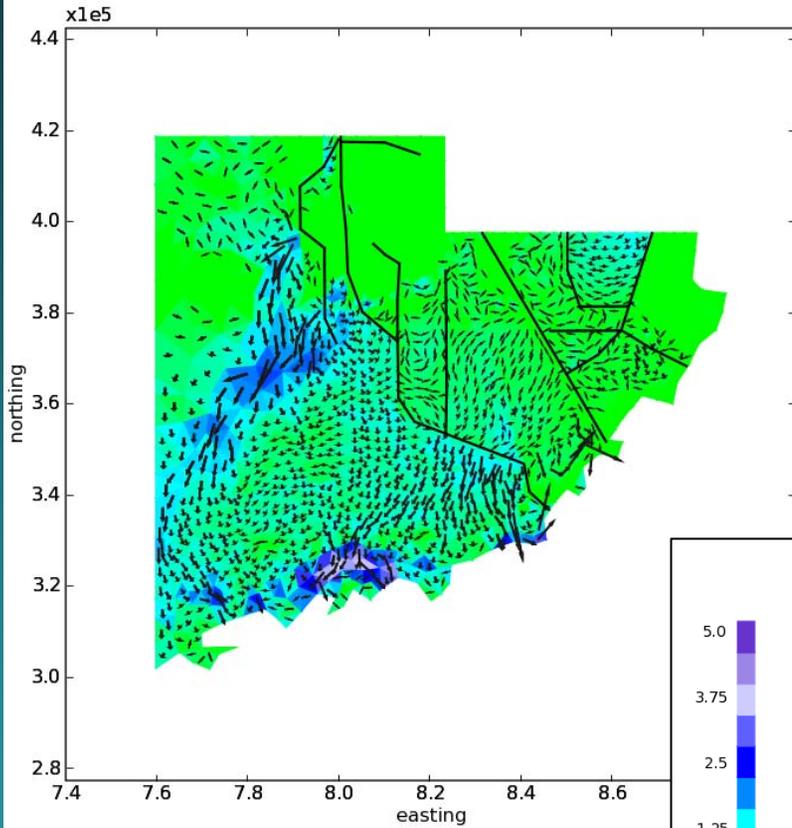


5.0
3.75
2.5
1.25
0.0

Timestep: 1354
Date: 1994-09-16
Variable Name: Ponding
Units: FT

BASELINE

WITH SPREADER CANAL + FROG POND RESERVOIR

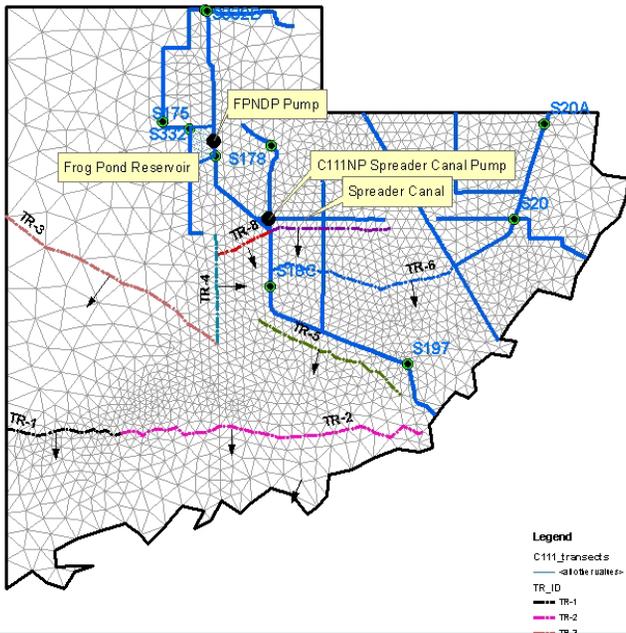


5.0
3.75
2.5
1.25
0.0

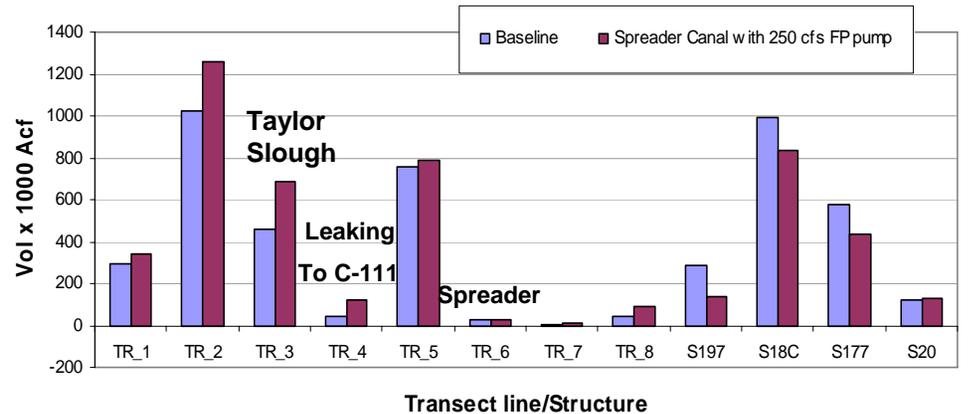
Timestep: 1354
Date: 1994-09-16
Variable Name: Ponding
Units: FT

Transect Flow Analysis

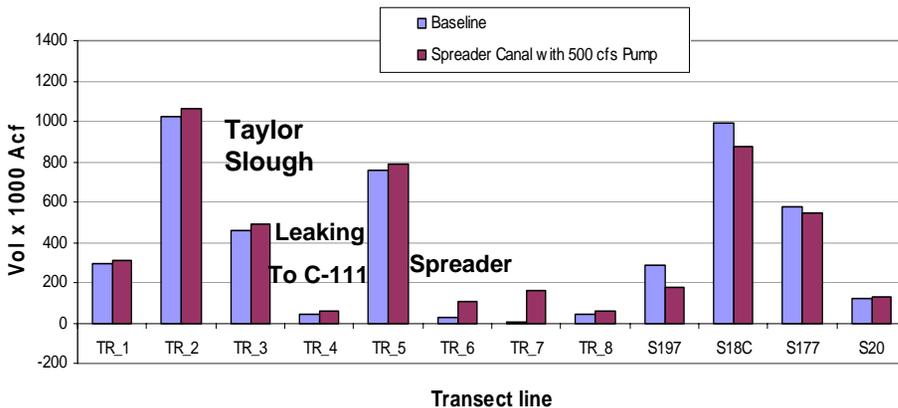
C111-Spreader Canal Flow Transects



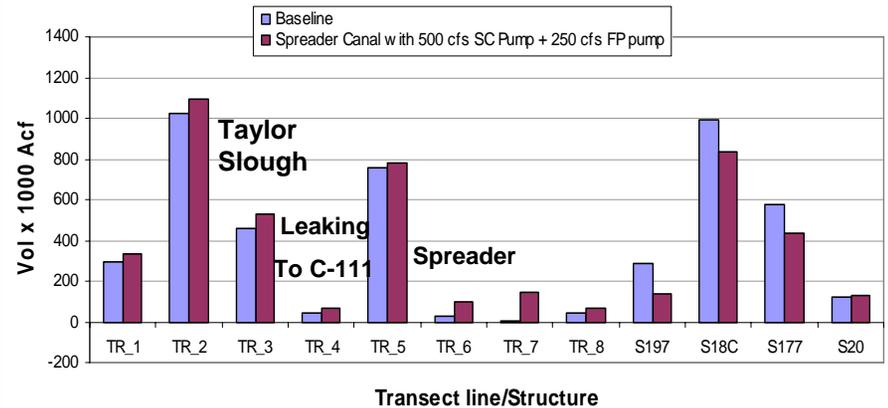
Transect and Control Structure Cummulative Volumes (FP Scenario - 1/1/1991-12/31/1995)



Transect and Control Structure Cummulative Volumes (Spreader Canal Only (SC) Scenario - 1/1/1991-12/31/1995)



Transect and Control Structure Cummulative Volumes (SC+FP Scenario - 1/1/1991-12/31/1995)



Conclusions

- A Frog Pond Reservoir produces desirable improvements in Taylor Slough hydrology by retarding the loss of water to the lower C-111 system
- A Frog Pond Reservoir is compatible with future PIR features and can be operated in concert with a future spreader canal to achieve multiple environmental purposes

Amended Draft BODR Project Components Phase 1

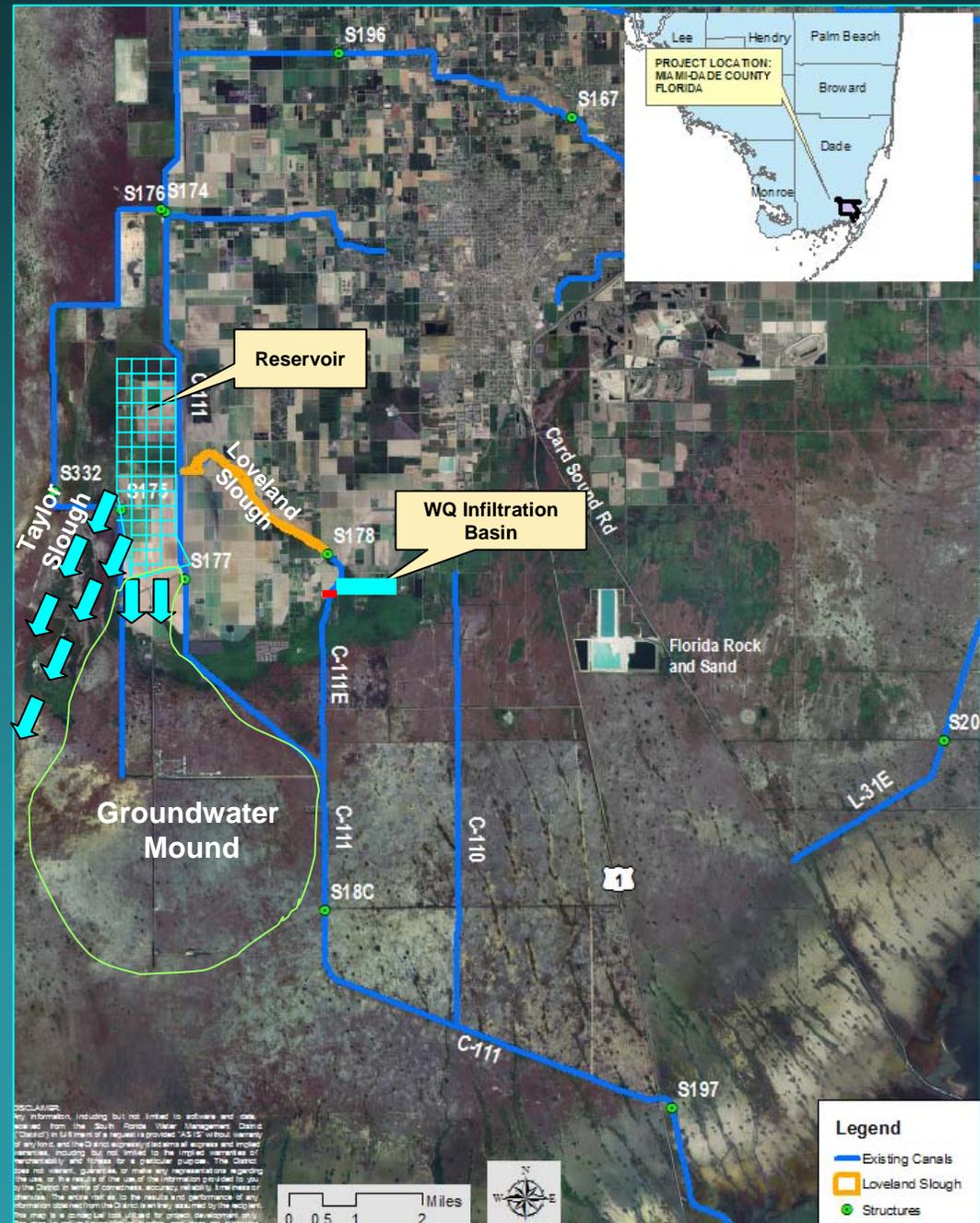
Reservoir and Pump Station

- Up to 1,421 Acres.
- Canals, Levees, Water Control Structures, and Pump Station.

Water Quality Component - Infiltration Basin

- Use Public Lands
- Inflow Canal.
- Pump Station.
- Plug / Gate Structure C-111E
Canal

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CALDWELL



Amended Draft BODR Opinion of Probable Costs Frog Pond Reservoir and WQ / Infiltration Basin

Project Component	Estimated Construction Cost
Frog Pond Reservoir / Pump Station	\$24.0 million
WQ Component - Infiltration basin	\$12.1 million
Project Total	\$36.1 million

Next Steps in the Frog Pond Reservoir Assessment

- Optimize pumping criteria for the Frog Pond Reservoir to capture larger pulse flows balanced to groundwater infiltration rates to create hydrologic barrier
- Further evaluate Taylor Slough responses to Frog Pond pumping, effects of the hydrologic barrier, and increase in control stages at the S-18C structure
- Evaluate interconnection of Frog Pond Reservoir and Aerojet Canal - infiltration to extend affects of the hydrologic barrier
- Identify what can be achieved within the budget

Questions

