Curtain Wall as Part of Flood Protection Strategy in South Dade

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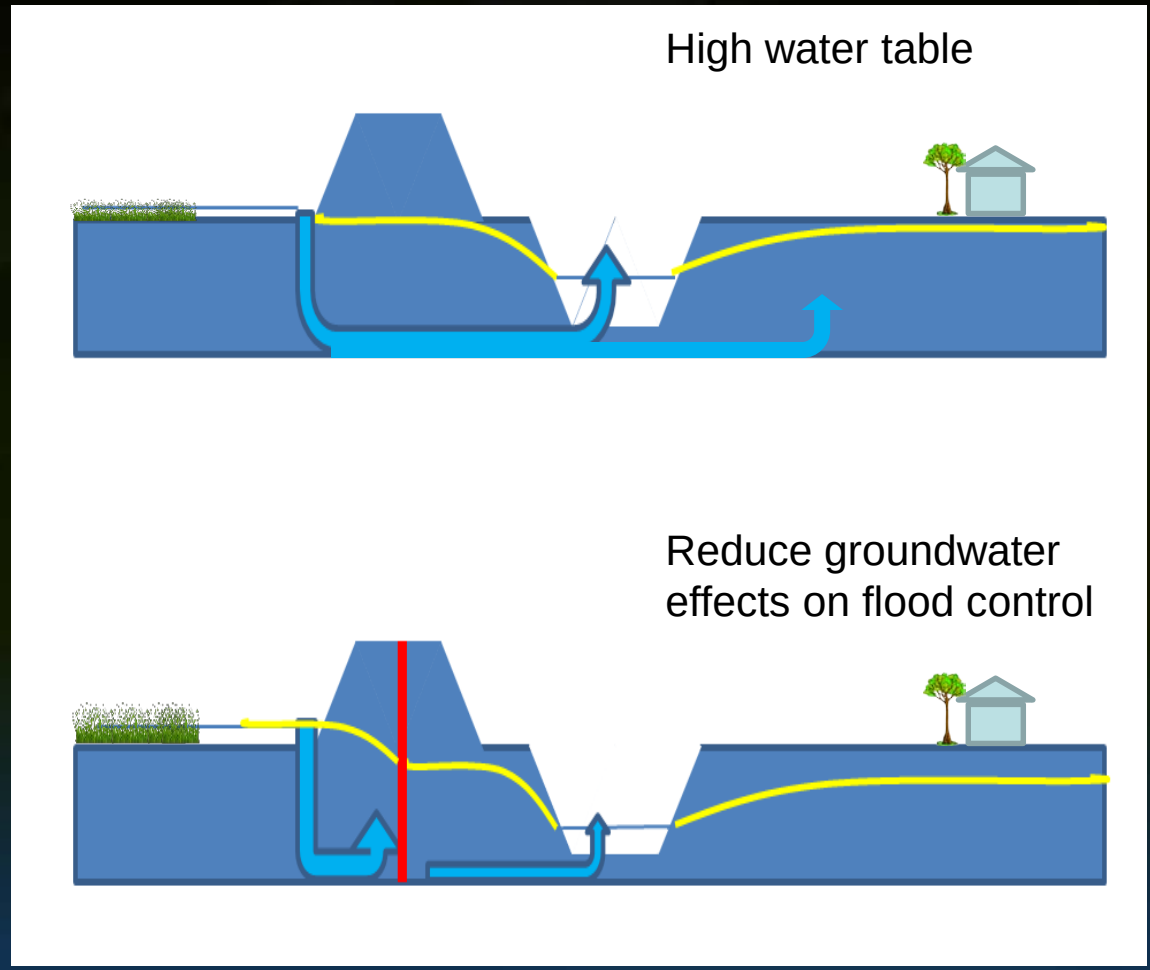
Curtain Walls

- In South Dade the goal is to improve flood control in areas impacted by elevated water tables.
- The use of a less permeable material, placed in the flow path to help manage groundwater.



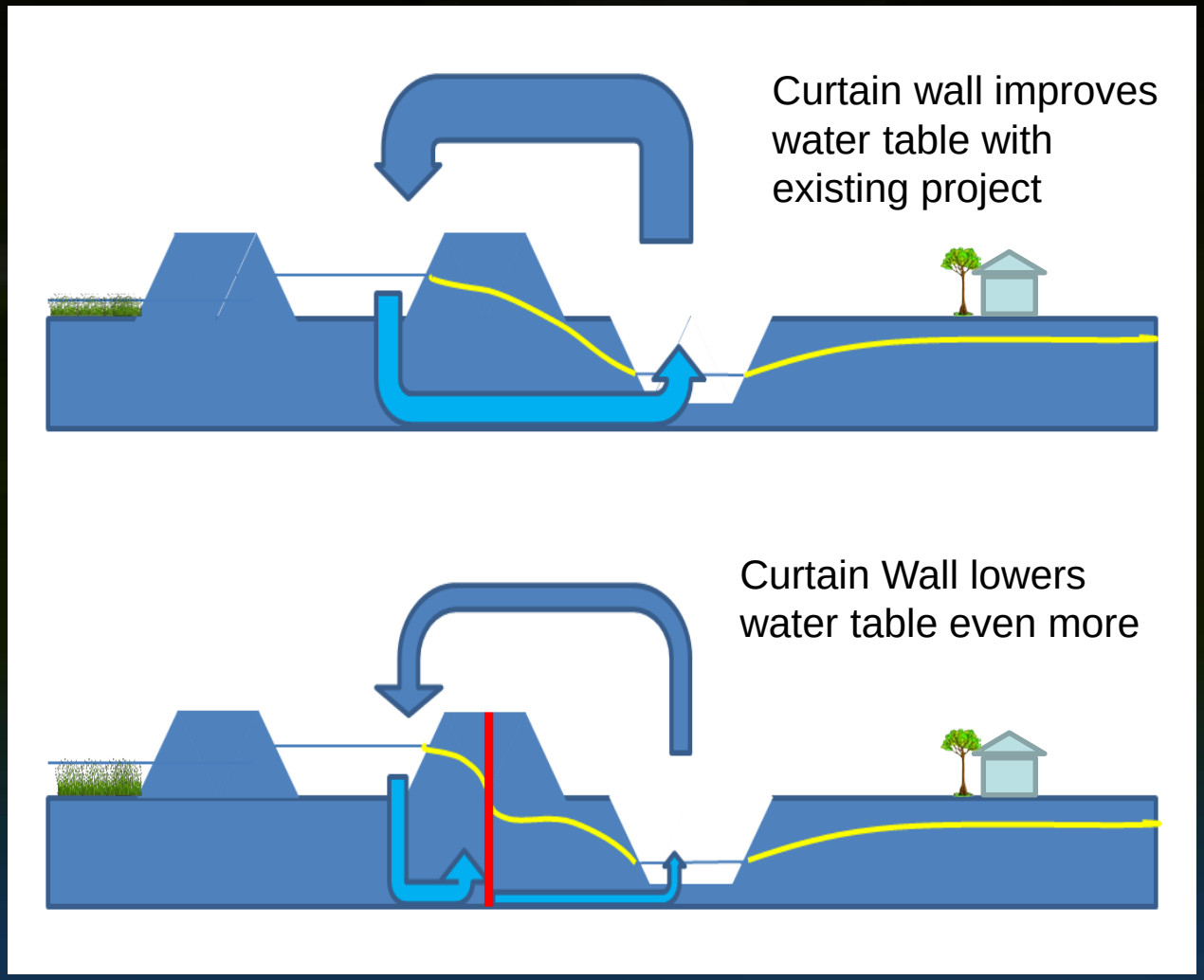
Characteristics of Curtain walls

- Passive groundwater management solution that is not operated (switched on and off)
- Non-selective in function in that it blocks flows in both directions including potentially recharge to water supply sources
- Effective solution to provide flood protection, in conjunction with pumping and by extension operational costs
- Little to no maintenance cost post construction

Need for Curtain Walls

- Functions in combination with operations and other features
- Increasing need for this option to preserve flood protection as restoration progresses
- Long history of analysis and some recent experience of functionality with the rock miners 5-mile segment
- Of interest to all parties in the region, private and public, local, state and federal

Photos from Bill Baker's Presentation on the MDPLA Seepage Project



Curtain Wall Concept is not New

Dates back to the 1990's

Evaluated as part of the 2015-2016 SFWMD's South Dade Study

GENERAL
FEASIBILITY AND COST EVALUATION ANALYSIS

FOR

THE CURTAIN WALL CONCEPT

IN SOUTH DADE COUNTY

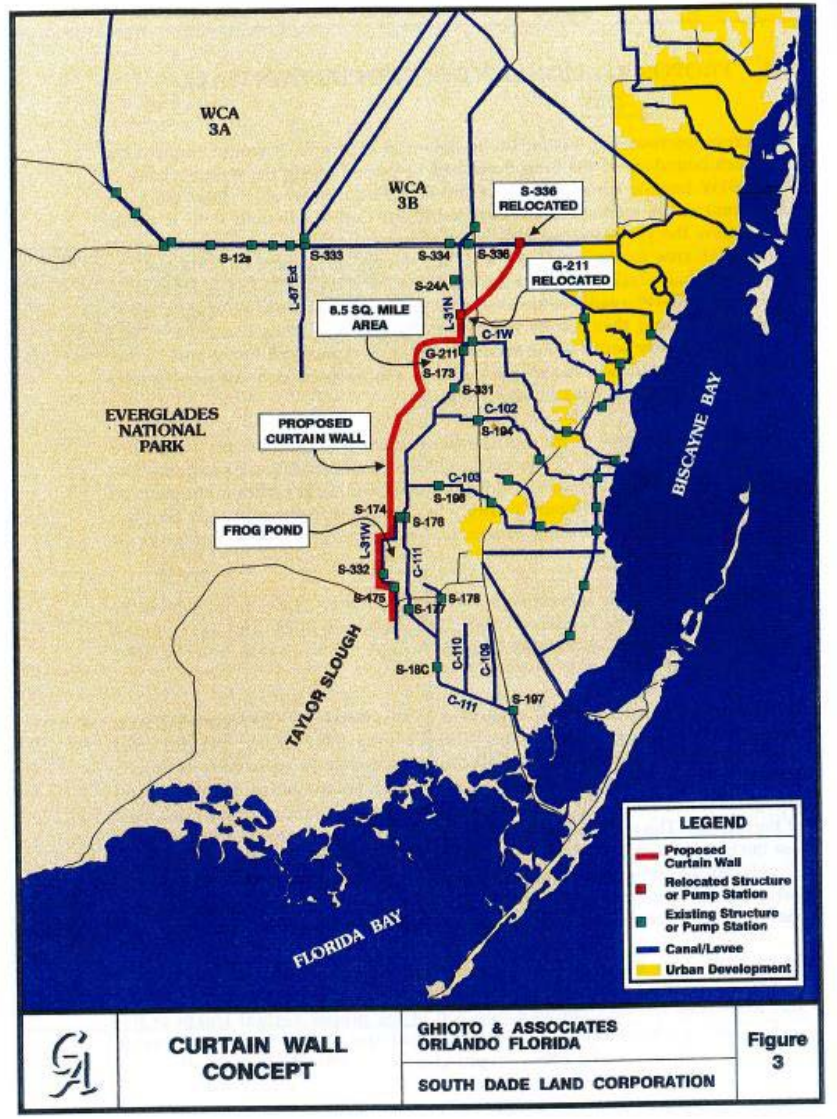
May 26, 1994

Prepared for

SOUTH DADE LAND CORPORATION

by

GHIOTO & ASSOCIATES
Water Resources and Civil Engineering
Orlando Florida



Opportunity to Study and Construct a Flood Protection Solution

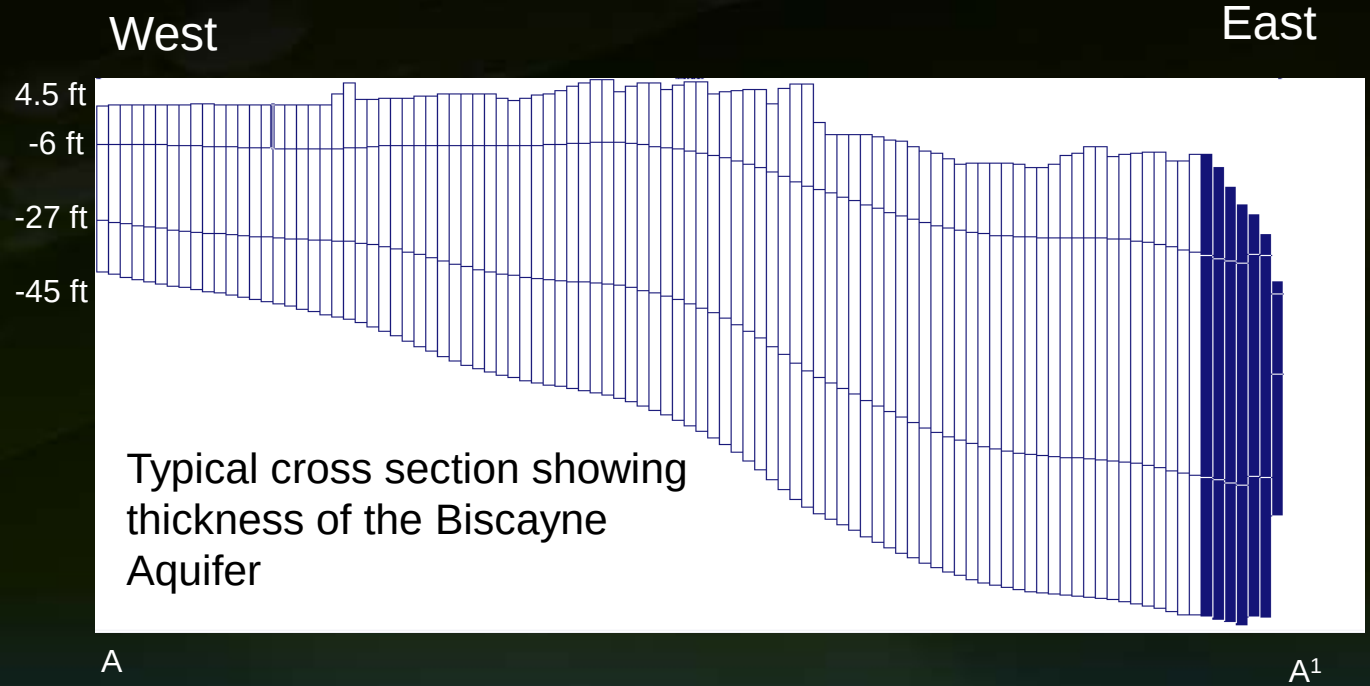
- Multiple requests from stakeholders, legislators and other interested parties to implement a comprehensive flood protection strategy for South Dade
- Request to consider a flood control focused study
- Protect property, mitigate flooding concerns of South Dade farmers with a view to sustain broad support for restoration initiatives in the region

Proactive Assessment of Curtain Wall as Part of a Comprehensive Flood Protection Strategy

Comprehensive look outside the scope of any one ongoing study or project

- Provide flood protection to homeowners and agriculture east of ENP
- Integrates and functions seamlessly with existing efforts
- Preserves existing water supply and salt water intrusion protection
- Ensures significant investment in managing ecosystem restoration benefits continues

Scope and Project Conceptualization



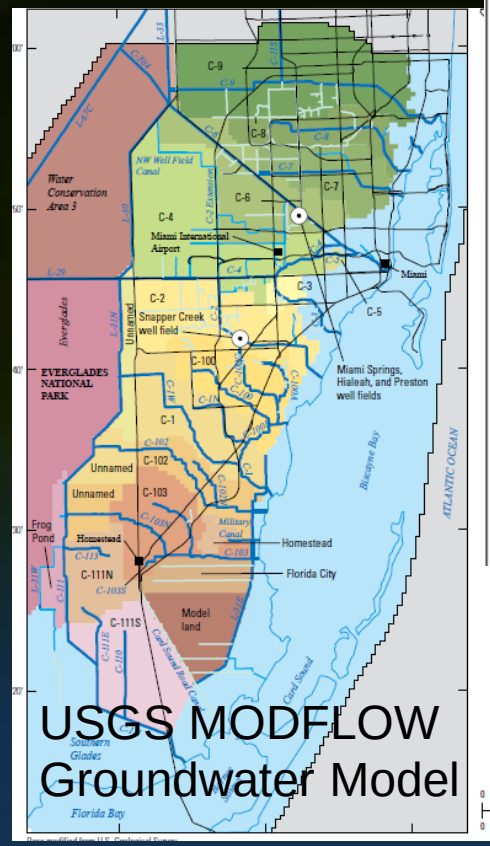
Typical cross section showing thickness of the Biscayne Aquifer

(Not to scale)

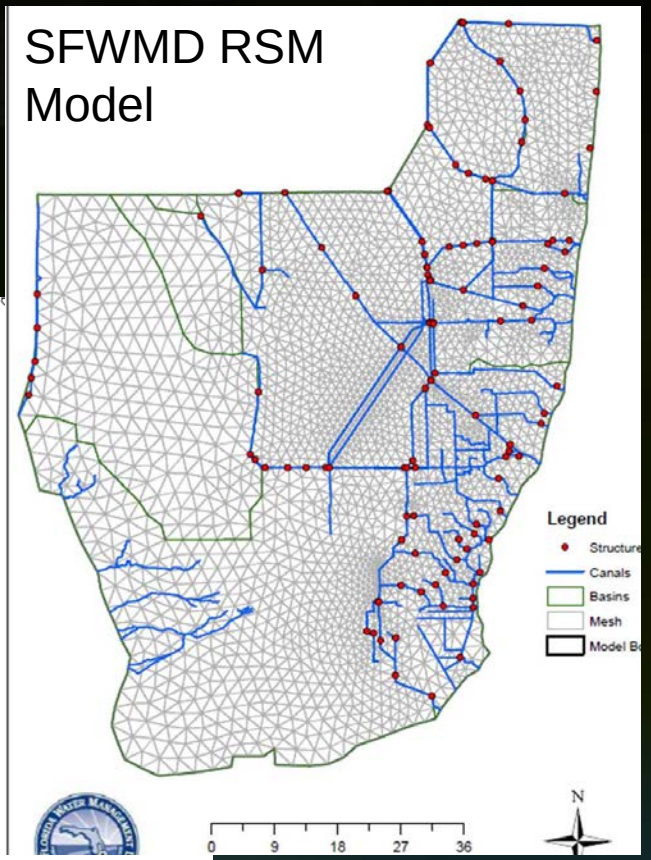
Assessment Methodology

Companion models used for evaluation:

- SFWMD's Regional Simulation Model Glades-LECSA for curtain wall alignment, regional impacts, operations, surface water and shallow groundwater effects
- USGS MODFLOW model for curtain wall depth, water supply at wells and other groundwater related effects
- Several Curtain Wall alignments simulated with different operations of the South Dade system representing current and future conditions



USGS MODFLOW Groundwater Model

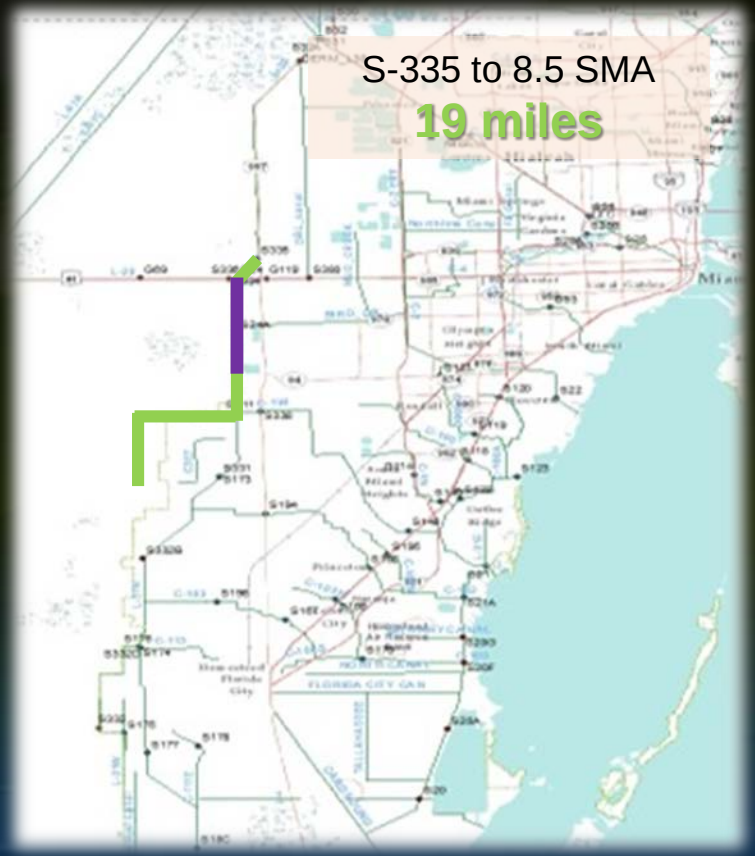


SFWMD RSM Model

Curtain Wall Configurations

South: including portion of 8.5 SMA

North: Stops after 8.5 SMA



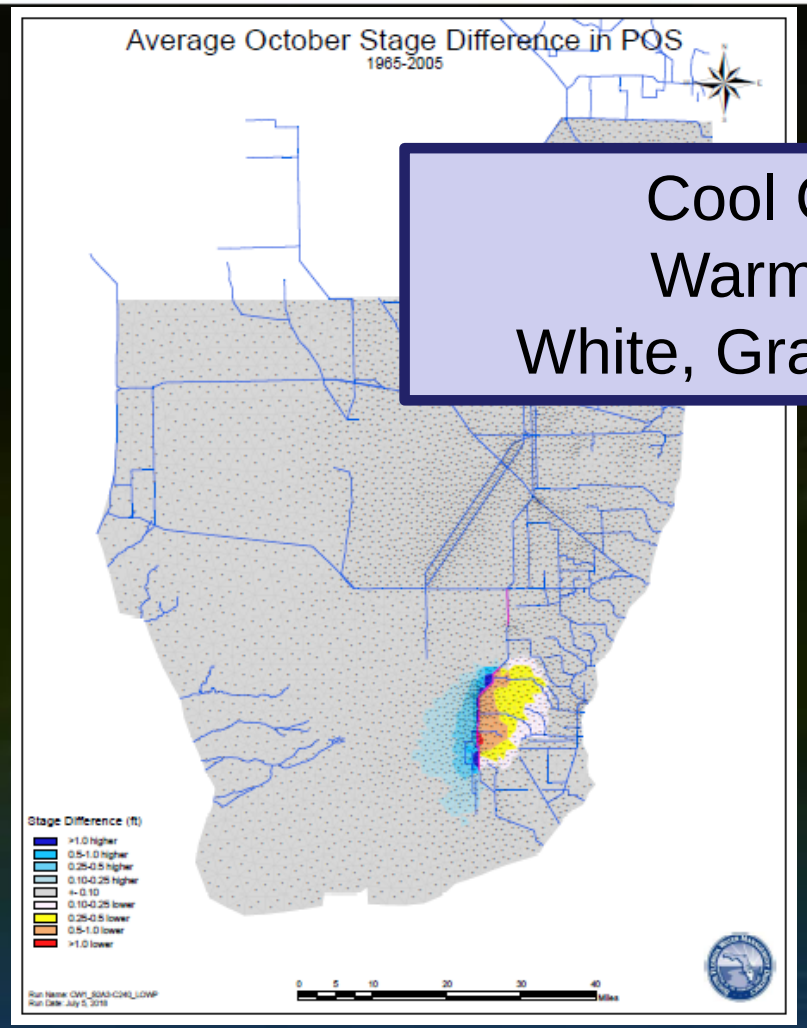
Full: Full extent

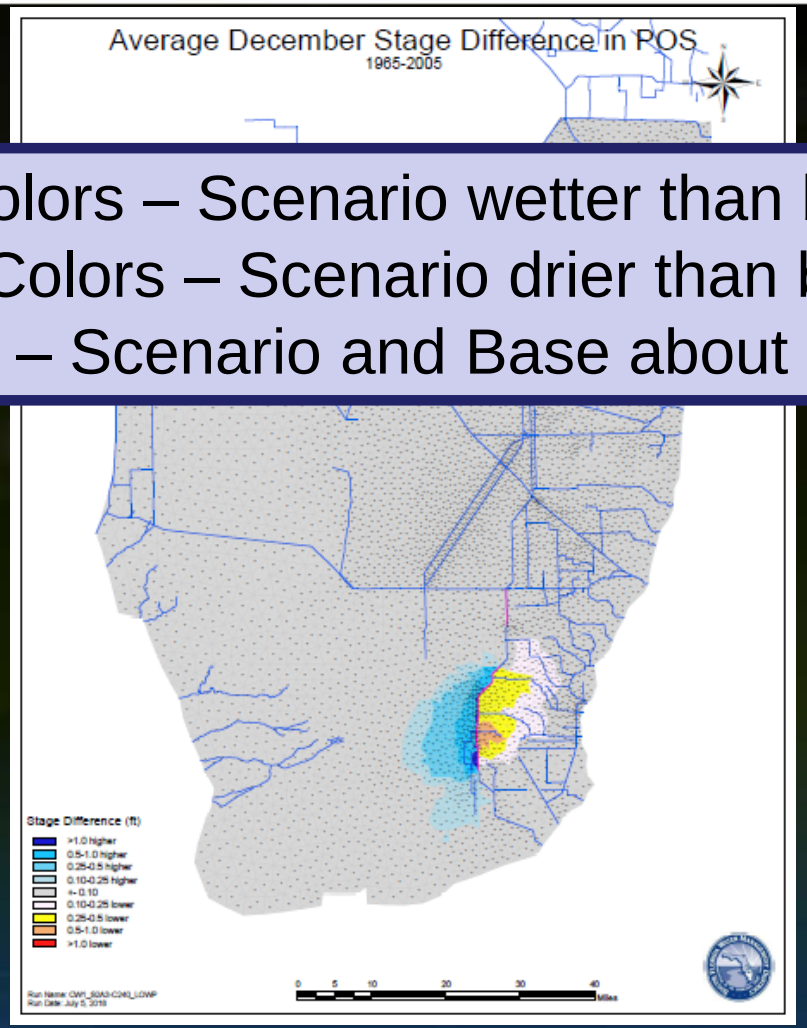
Metrics Evaluated

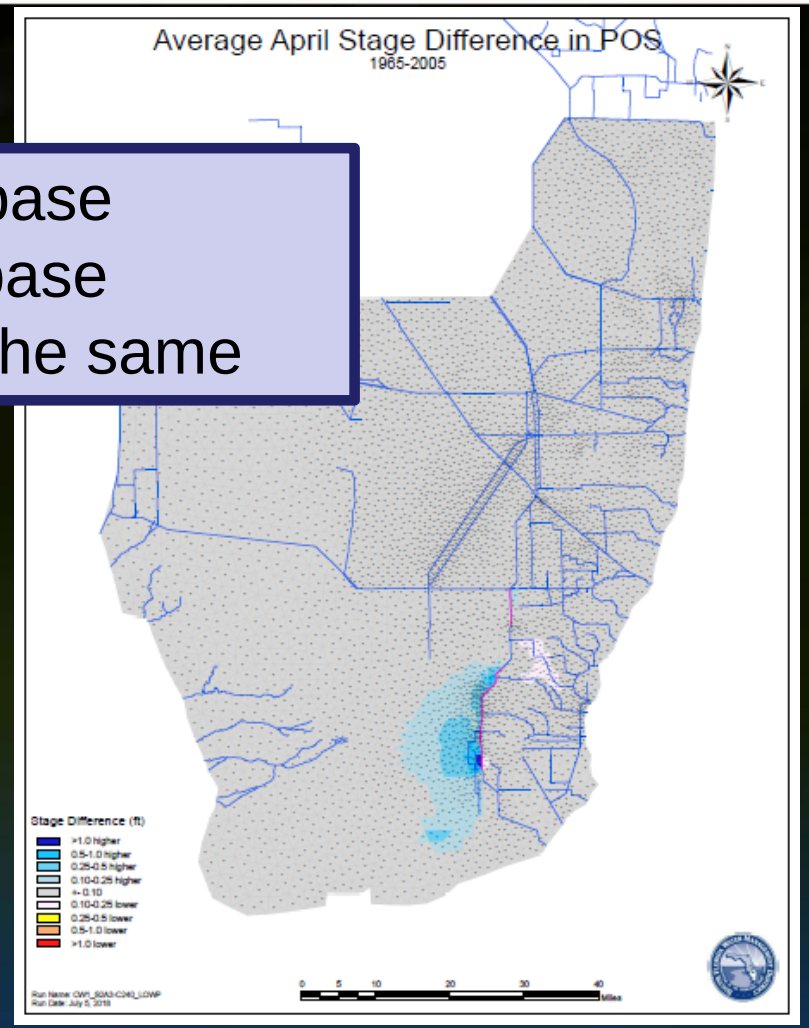
Evaluated Typical Suite of performance metrics:

- Seasonal water table reduction in developed areas
- Seasonal and annual depths and overland flow improvements
- Water supply risk
- Far-field effects
  - Flows to Taylor Slough (eastern Florida Bay)
  - Flows to Biscayne Bay

Key to Difference Maps





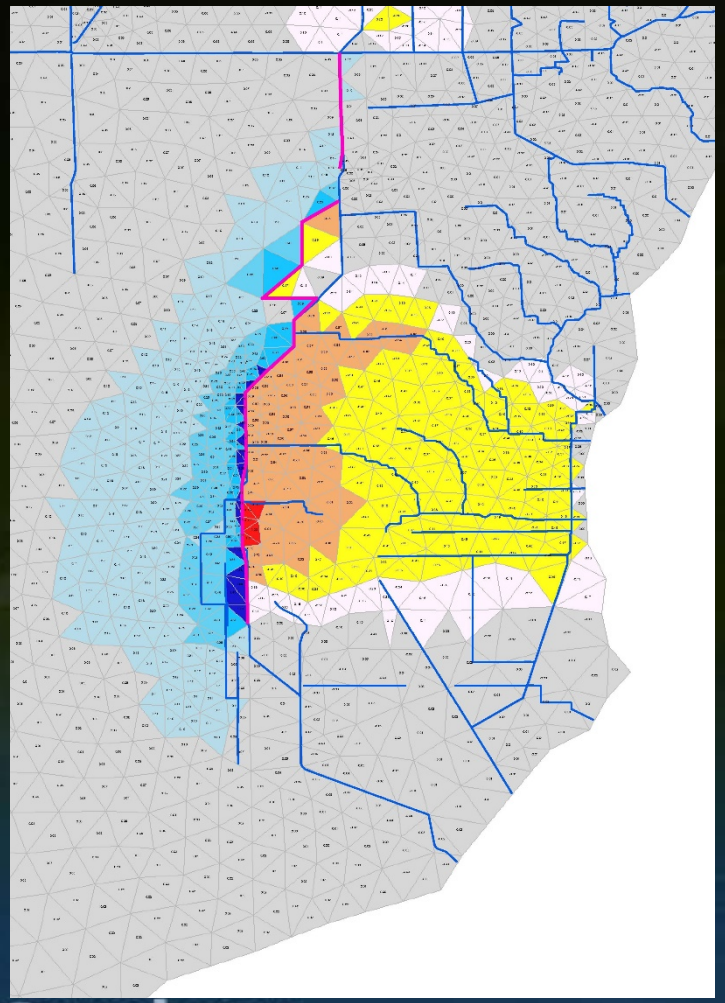


Cool Colors – Scenario wetter than base
Warm Colors – Scenario drier than base
White, Gray – Scenario and Base about the same

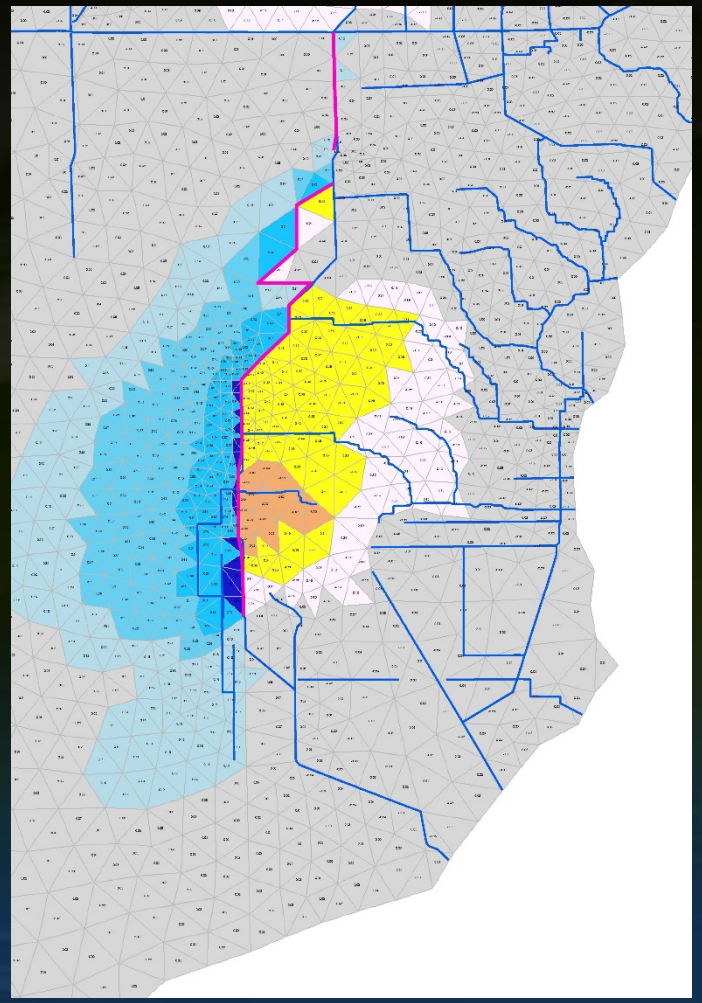
For more detailed description watch presentation of modeling results on South Dade study at : https://www.sfwmd.gov/our-work/south-dade-study

South Wall Scenario
Difference maps – with and without curtain wall

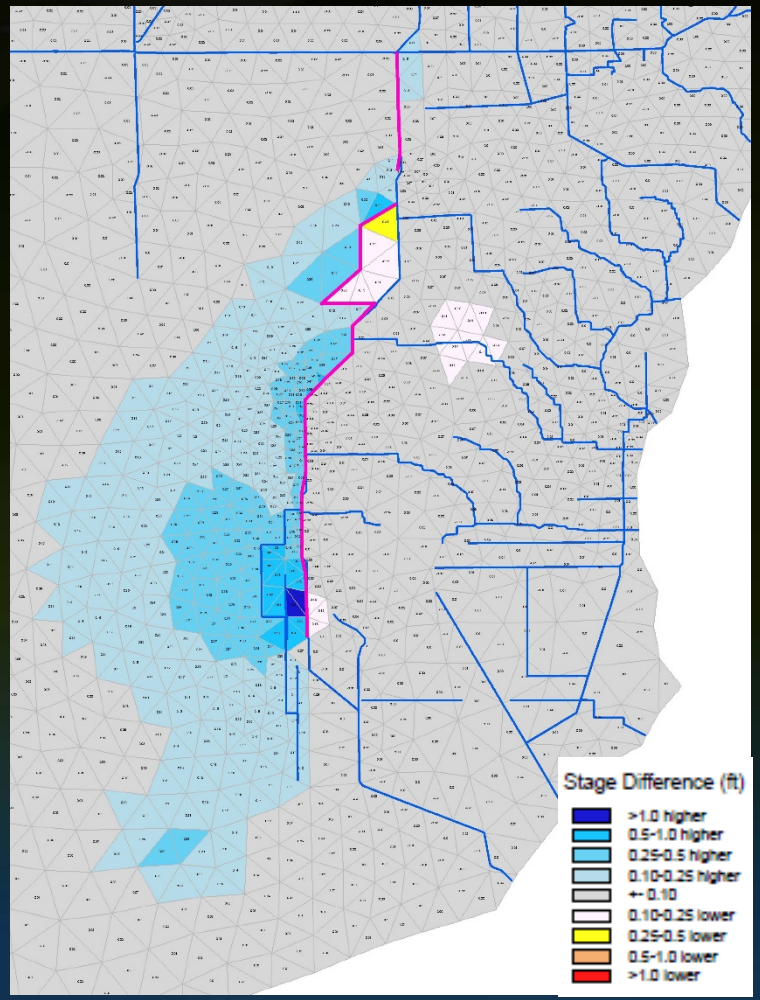
Avg OCTOBER Stage Difference
1965-2005



Avg DECEMBER Stage Difference
1965-2005

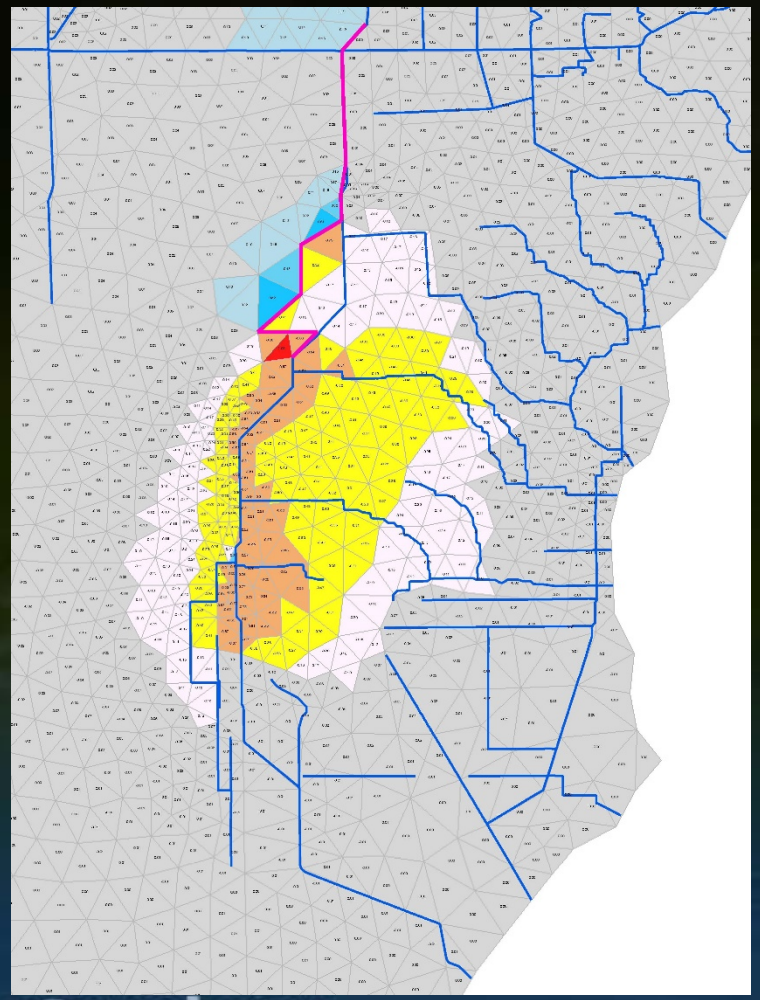


Avg APRIL Stage Difference
1965-2005

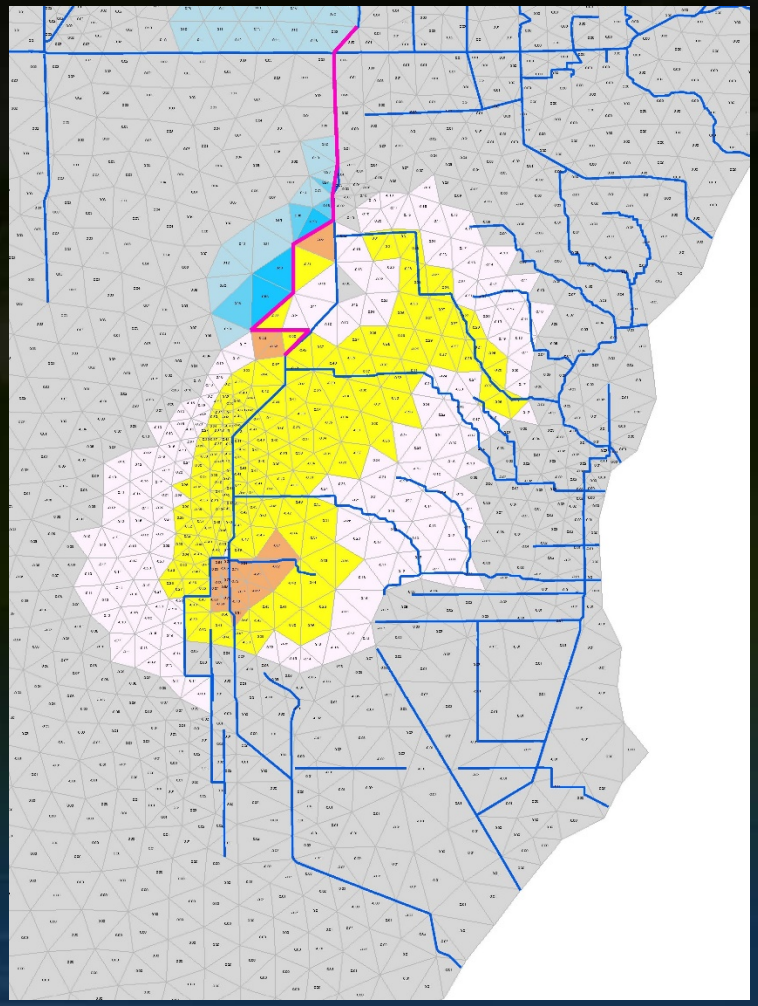


North Wall Scenario
Difference maps – with and without curtain wall

Avg OCTOBER Stage Difference
1965-2005



Avg DECEMBER Stage Difference
1965-2005



Avg APRIL Stage Difference
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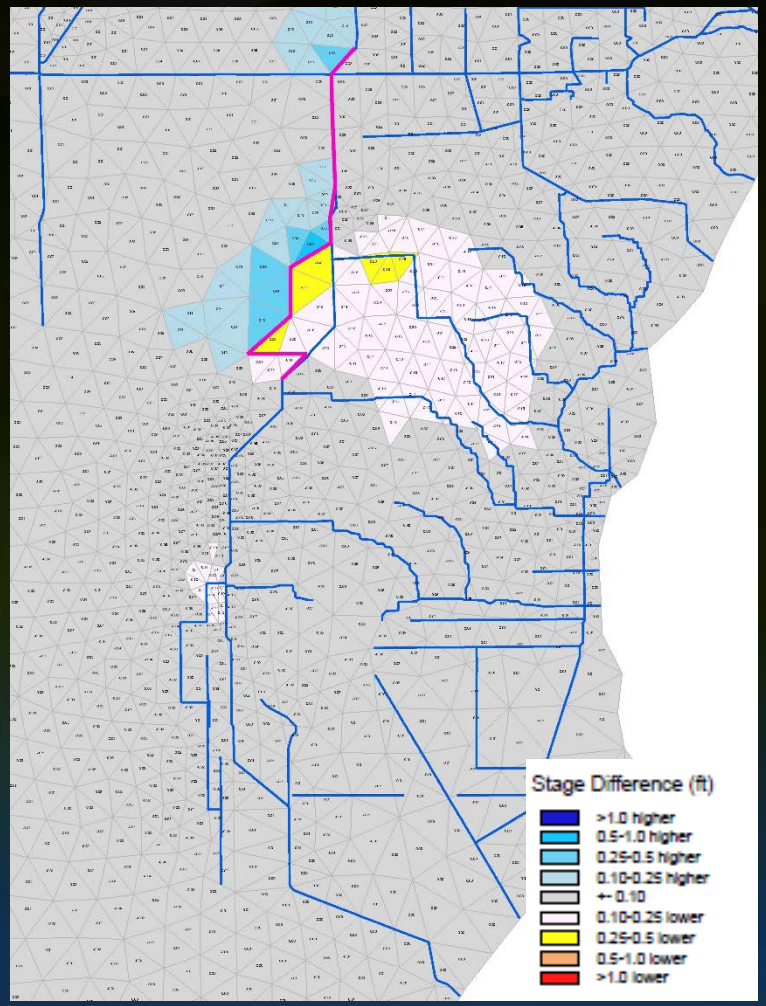
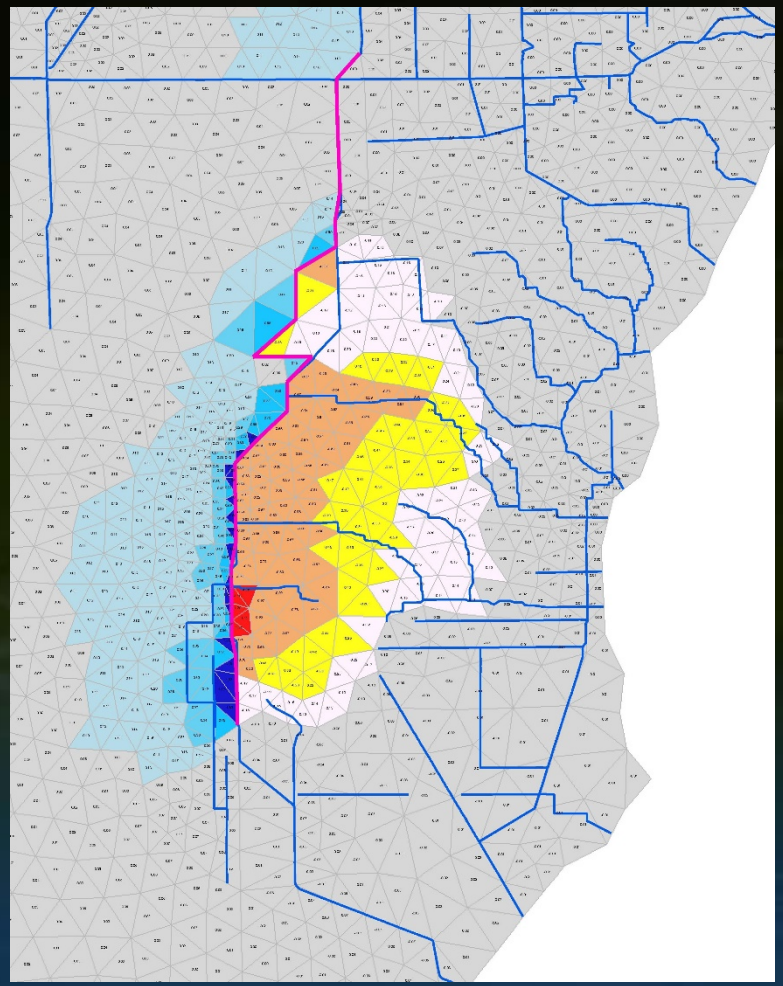


Full Wall scenario
Difference maps – with and without curtain wall

Avg OCTOBER Stage Difference
1965-2005



Avg DECEMBER Stage Difference
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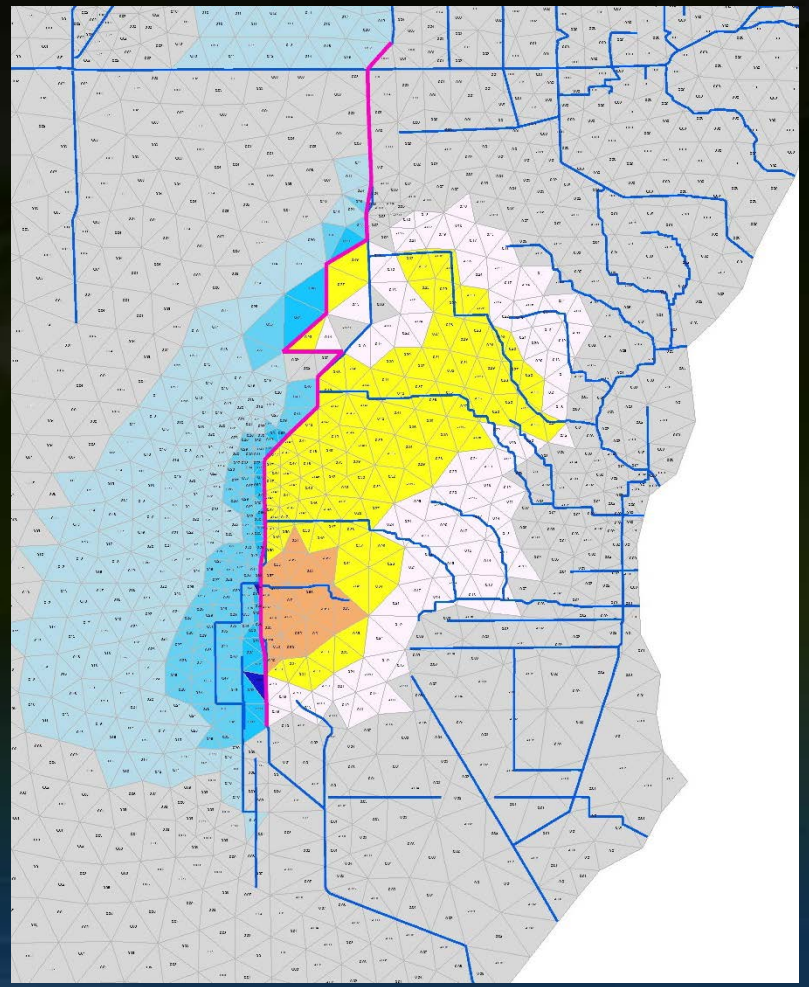

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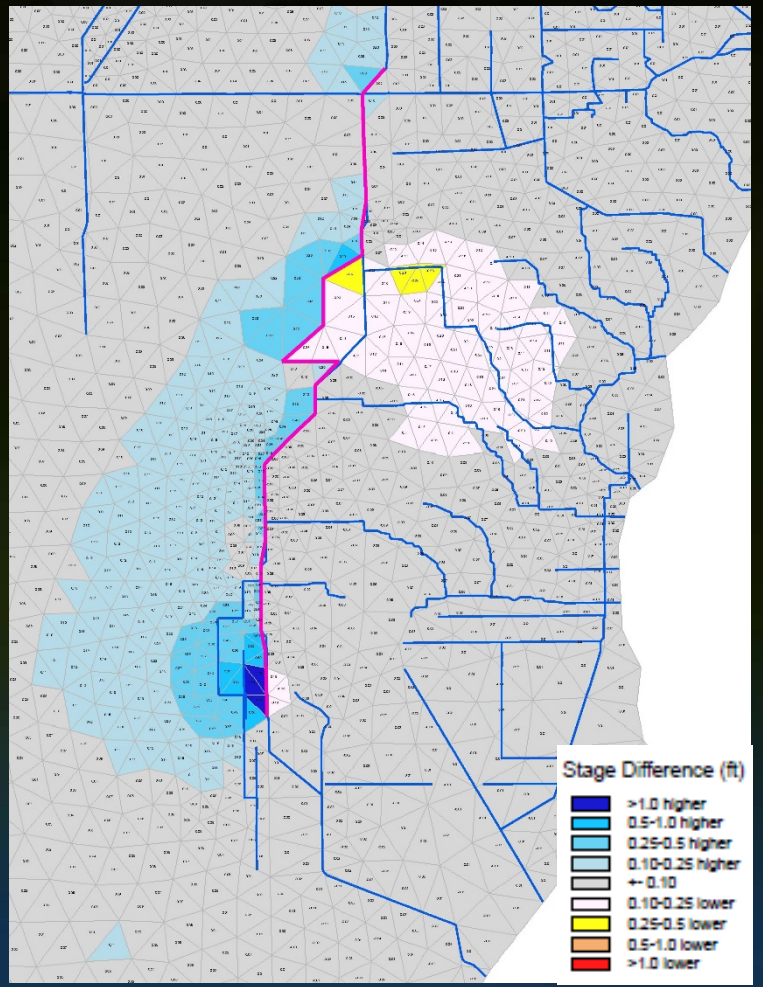

Summary of Average Annual Simulated Overland Flow (k ac-ft)

	No Wall	South Wall	North Wall	Full Wall
Shark River Slough	833	890	873	884
Wet Season (Jun-Oct)	466	501	486	491
Dry Season (Nov-May)	367	389	387	393
Taylor Slough	85	109	82	99
Wet Season (Jun-Oct)	61	74	59	69
Dry Season (Nov-May)	24	35	23	30
Biscayne Bay	927	874	897	889
North Bay	561	534	571	570
Central Bay	120	114	121	121
South Bay	246	226	205	198

Key Findings

- South Wall configuration shows the potential of a well designed curtain wall will improve flood protection to the residential and agricultural lands in South Dade without adversely impacting conditions in Everglades National Park.
- Assessment of flows to Biscayne Bay highlight the importance of ongoing efforts to send more flows to the Bay now and as restoration projects continue
- Flood control with passive curtain walls must be paired with operations to ensure desirable flows continue to Biscayne Bay and for Water Supply
- Design of curtain wall and operations that allow some flows through S-331 South will improve flows through Taylor Slough to eastern Florida Bay.

Multi Agency Coordination

Outstanding Important topics for multi-agency coordination

- Refine site specific detail
- Distribution and balance of benefits between Everglades National Park and Biscayne Bay
- Engineering details such as curtain wall depth
- Funding and best strategy to ensure expeditious implementation