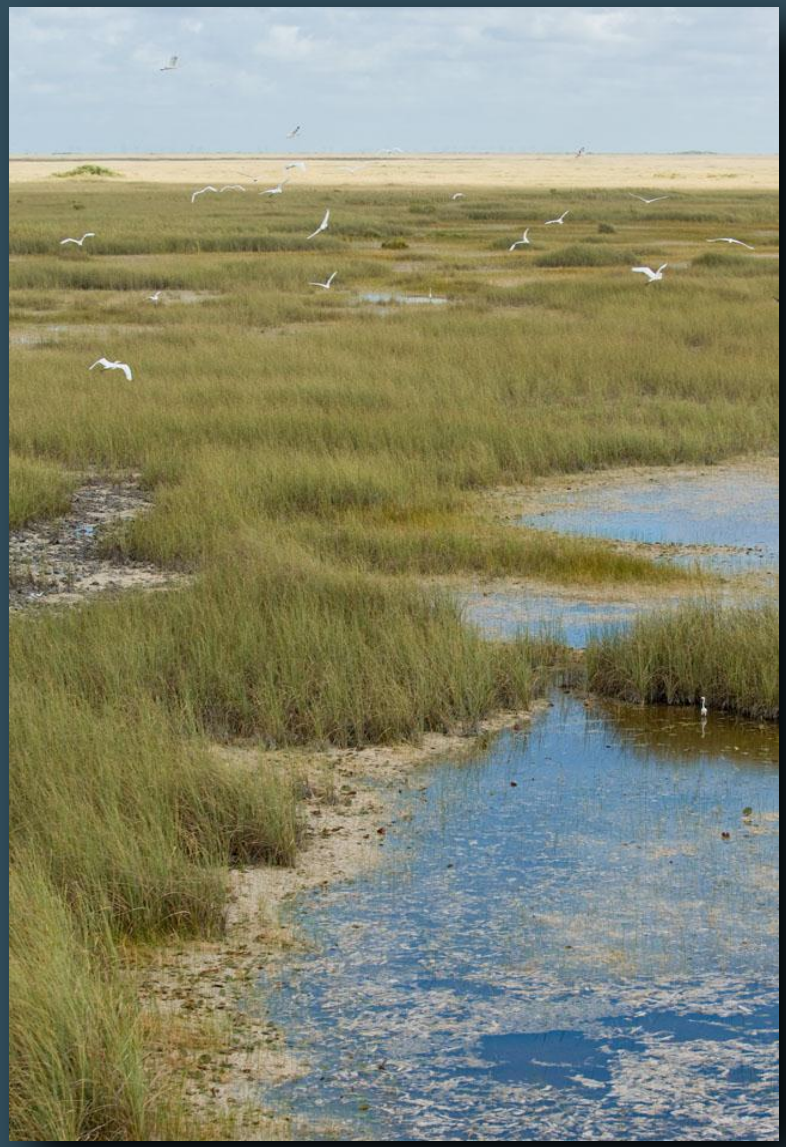


Tools for Broader-Scale Everglades Hydrologic Analysis and Planning

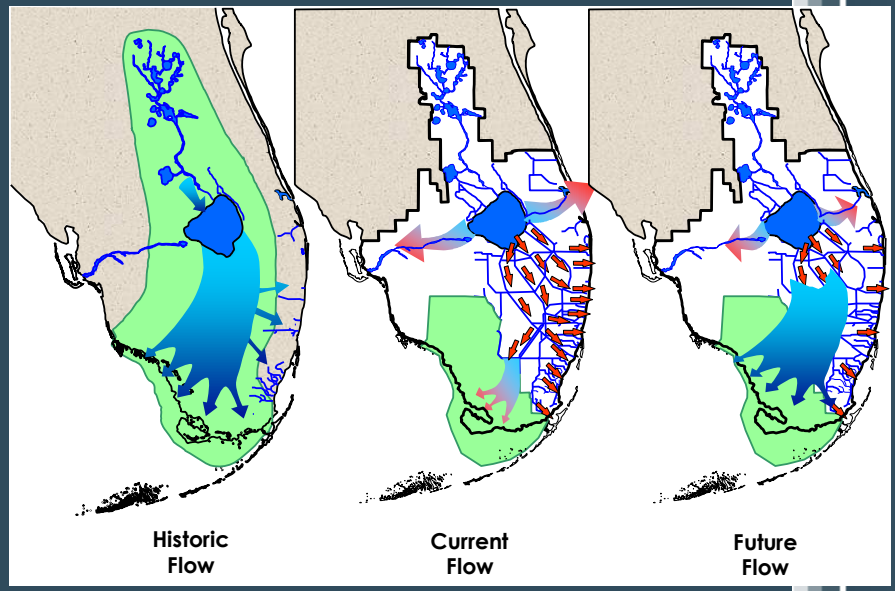
Walter M. Wilcox
Section Leader
Hydrologic & Environmental Systems Modeling

International Wetlands Conference (INTECOL)
June 3-8, 2012

sfwmd.gov

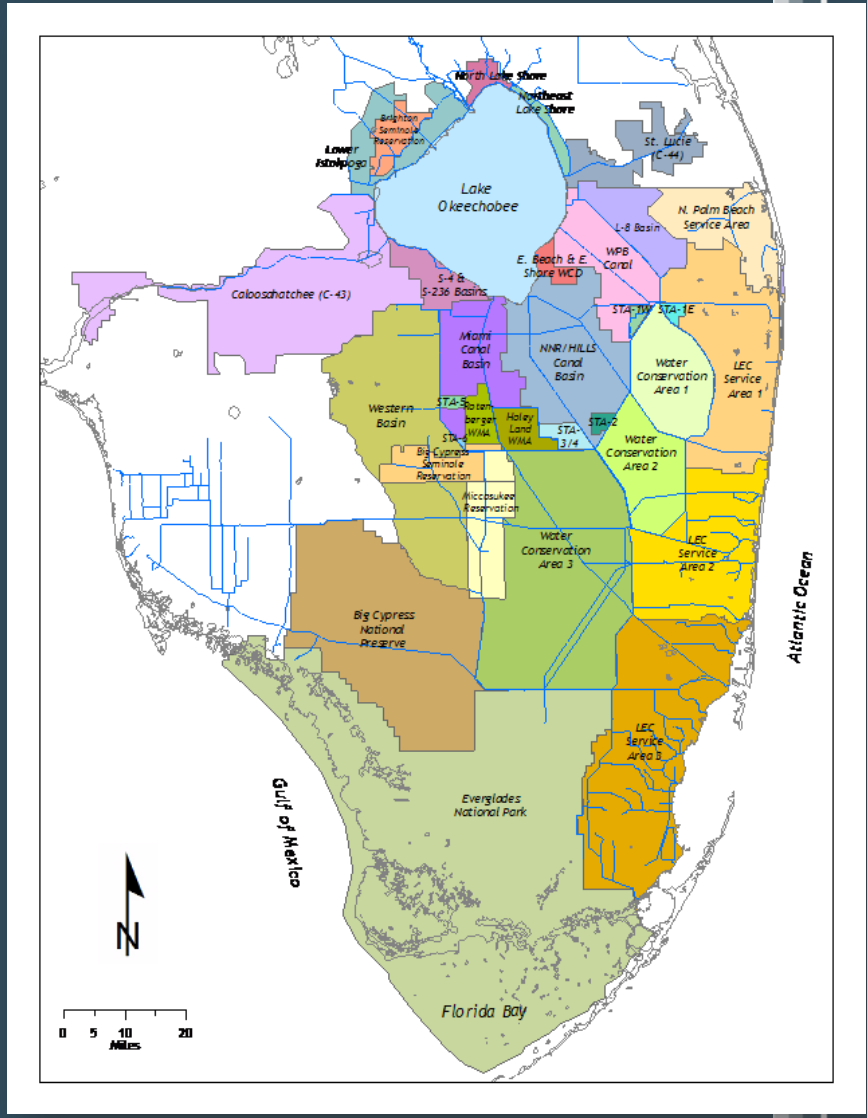
Presentation Outline

- The Everglades Planning Paradigm – Detail Oriented
- The Benefits of Higher Level Initial Screening
  - RESOPS Model Example
- Keeping the System-Wide Perspective
  - Everglades Viewing Windows
- Engaging Clients and Promoting the Understanding of Outcomes



Enhancing the Everglades Planning Paradigm

- Traditional Everglades planning involves the use of detailed modeling and evaluation tools to scrutinize a limited suite of pre-identified alternatives
- This level of detail is necessary and appropriate for feasibility or design level planning
- Solely relying on resource-intensive detailed tools can:
  - Leave large portions of the potential solution set untested
  - Delay identification of potential performance tradeoffs until significant resource investment has already occurred

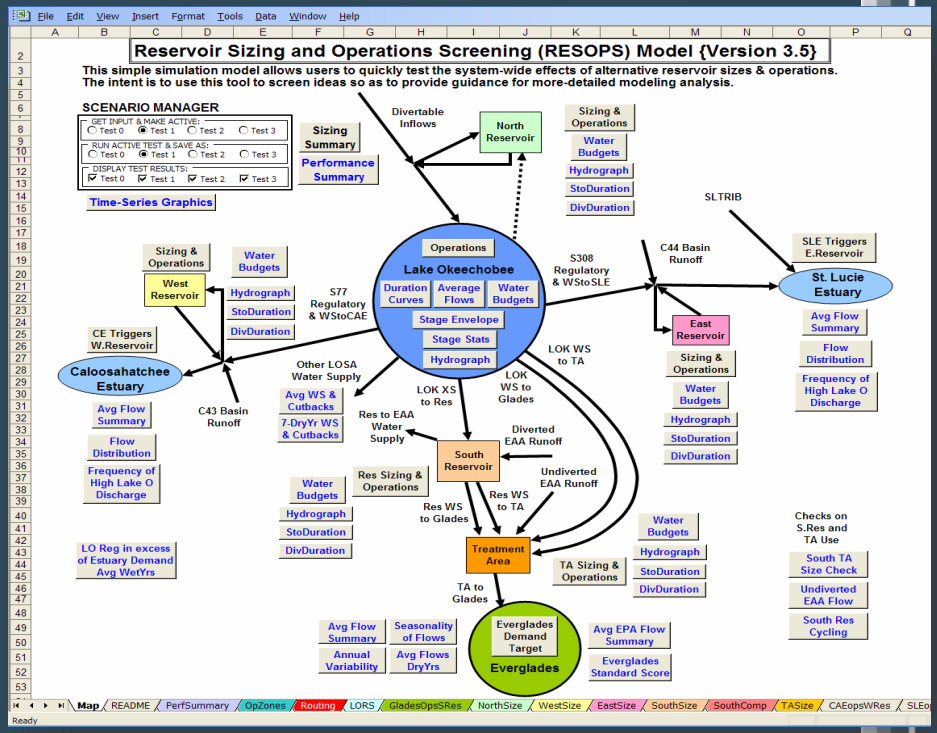


Screening Tools and Techniques

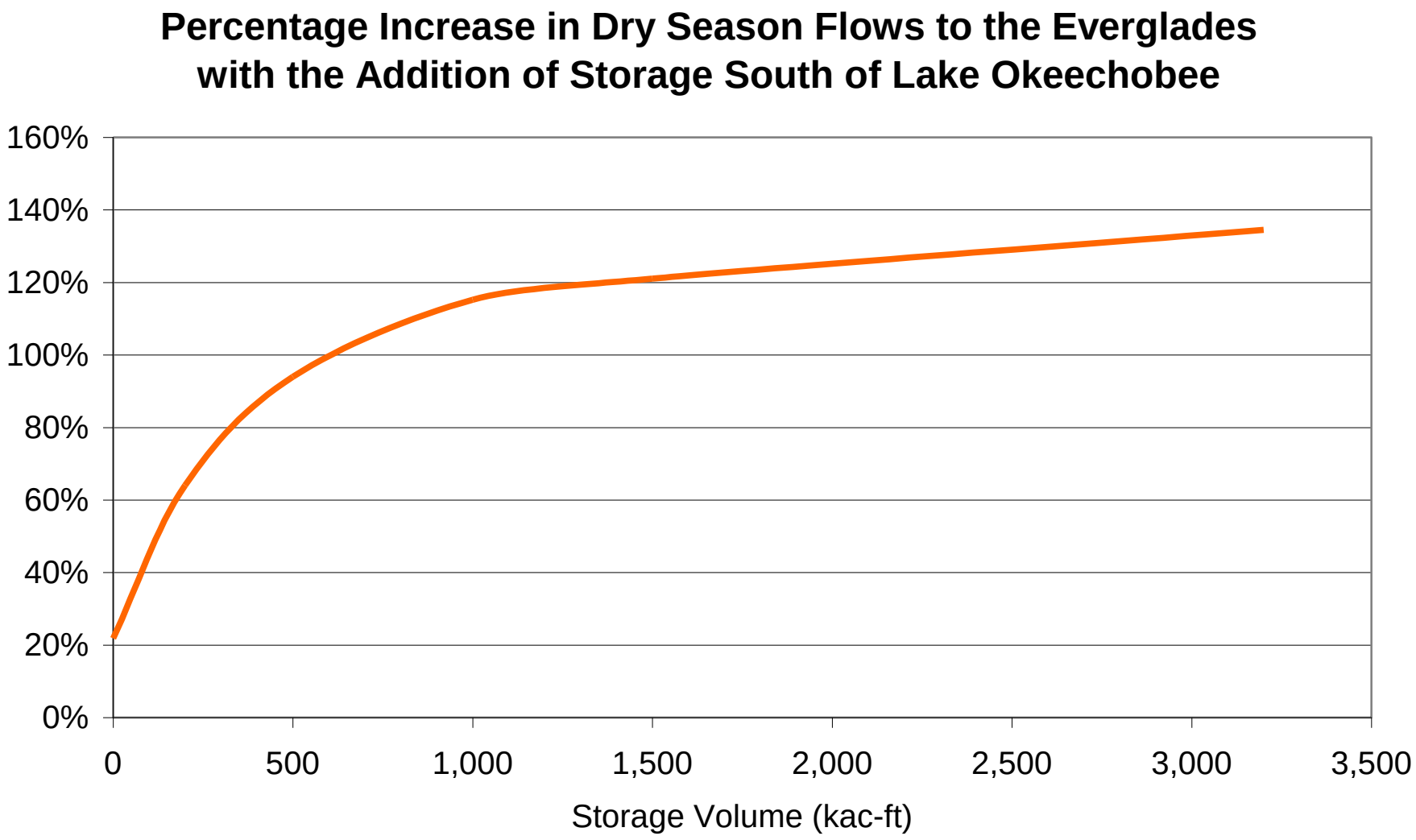
- The benefit of up-front screening is to quickly test the performance of alternative configurations and scenarios to identify feasible ideas for further in-depth analysis
  - Not a replacement for the detailed regional models
  - Can reduce the burden on the more complicated regional models and inform project decision making efforts
- Optimization and inverse modeling techniques can be used to automatically evaluate thousands of operating rules and select the best performers

Example Screening Tool: REservoir Sizing and OPerations Screening (RESOPS) Model

- Coarse-scale Water Management Simulation Model
- Provides rapid screening-level testing of the integrated effects of alternative reservoir sizes and proposed operating rules for…
  - Lake Okeechobee,
  - EAA Storage
  - Other Northern Everglades Storage
  - Flows to the Everglades
- Performs 41-year continuous simulations (monthly time-step) of the hydrology and operations of the water management system
- Runtime = ~ 1 second

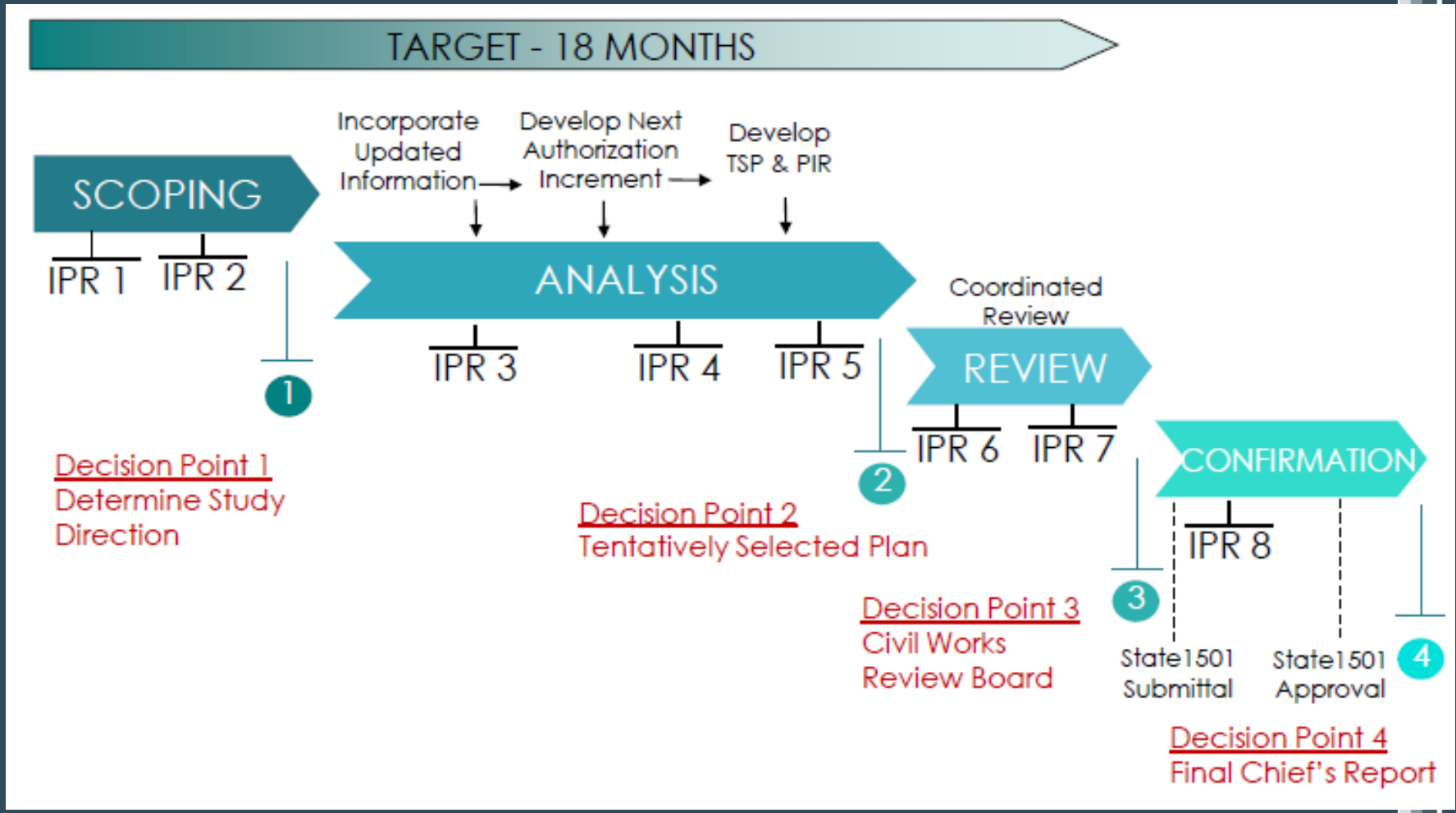


Example RESOPS Screening

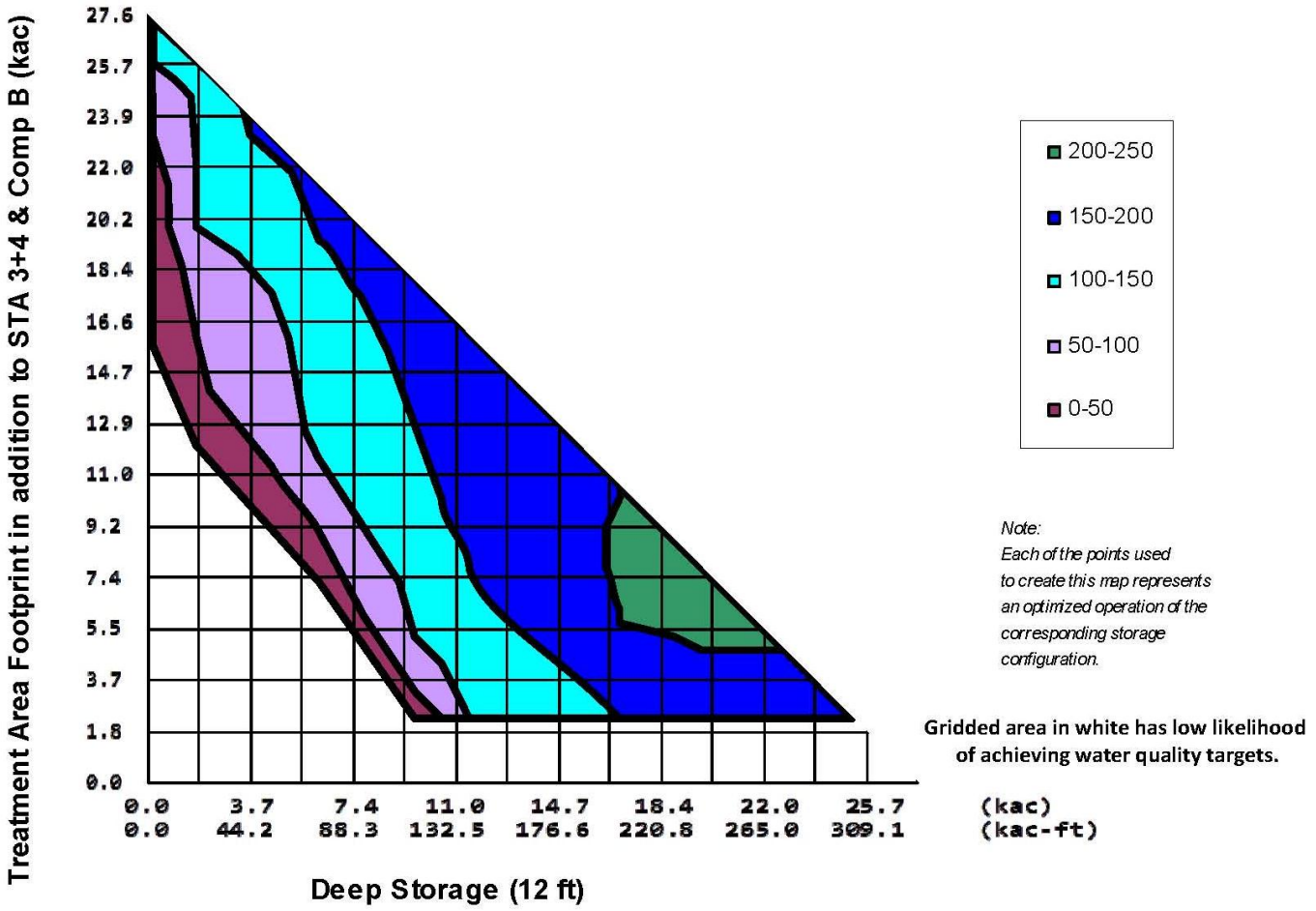


Based on RESOPS Screening Analysis of November to May Deliveries During the 1965 to 2005 Period.

Central Everglades Planning – Expedited USACE Schedule



Application of RESOPS to Central Everglades Planning



Examining the Everglades while Maintaining a System-wide Perspective

- Existing Performance Measures (PMs) and other evaluation tools provide rigorous, scientifically defensible information to relate modeled hydrology to key system objectives

- For project teams, the public and decision makers, the vast amount of information provided can be overwhelming if not presented in a clear, succinct way

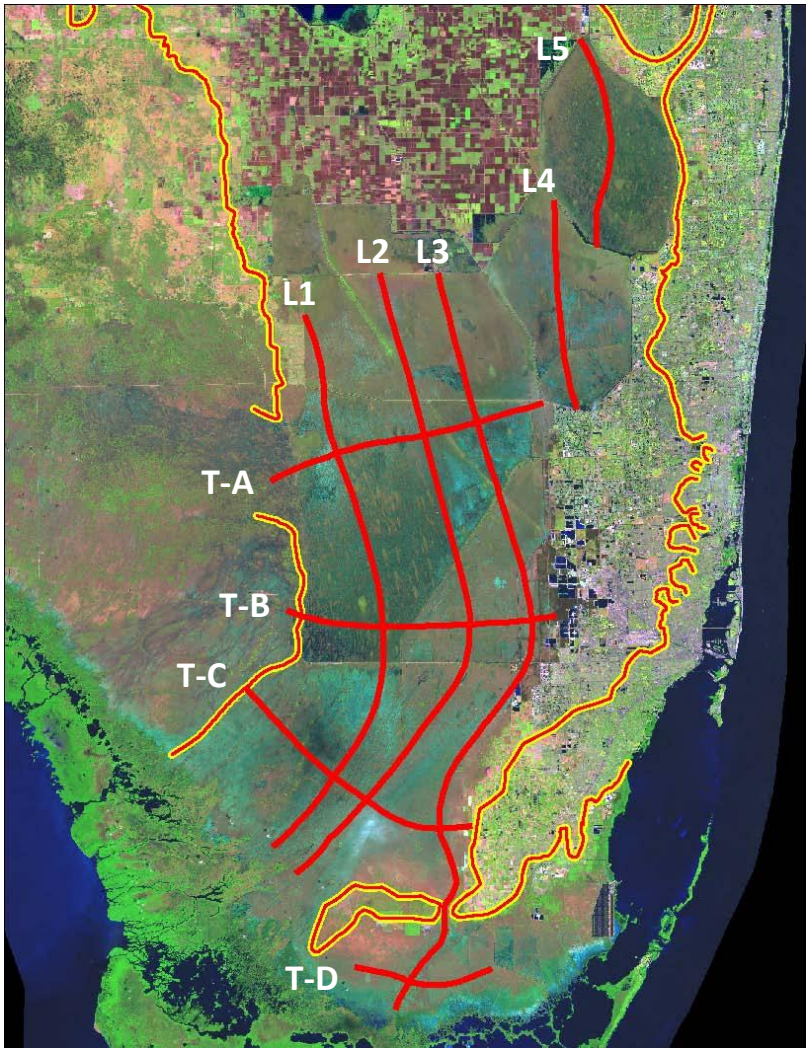
- As a complement to (or as a precursor of) focusing on a detailed outcomes for several portion of the system, use of simplified, system-wide analytical tools can help promote understanding and decision making

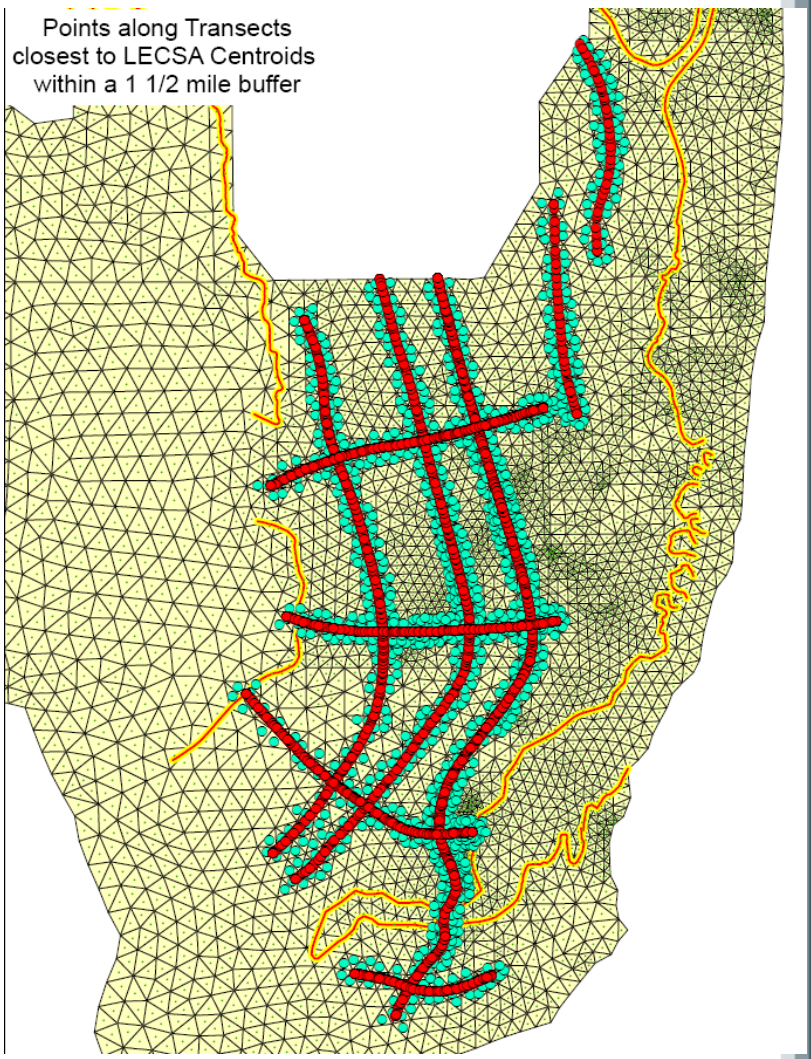
Supplemental Evaluation Tools – "Everglades Viewing Windows"

- Viewing window concept
  - Tools to link hydrology and ecology
- Neither performance measures, nor targets
  - But do facilitate whole system viewing
- Applied equally across all Everglades models
  - Pre-drainage, Current, Future (scenarios)
- Viewing Windows to Observe:
  - Depth, duration, discharge, seepage, flow directions, and spatial components

Everglades Viewing Window Transects

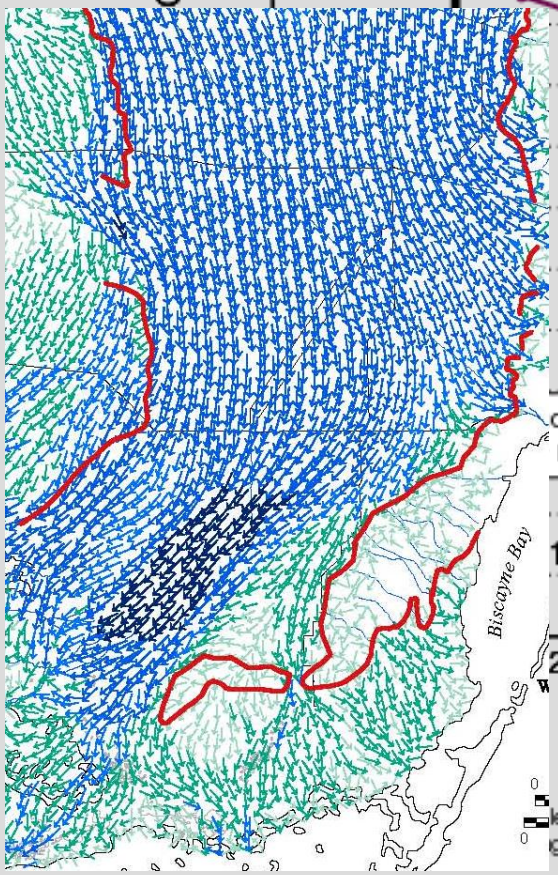
Aligned with Landscape Directionality





Water Depth Viewing Window

Transect L1 for Pre-drainage NSRSMv3.3

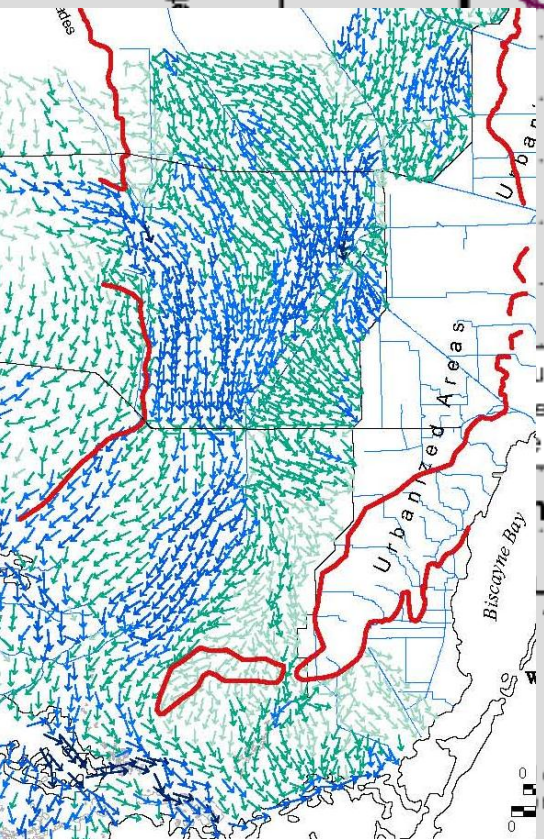


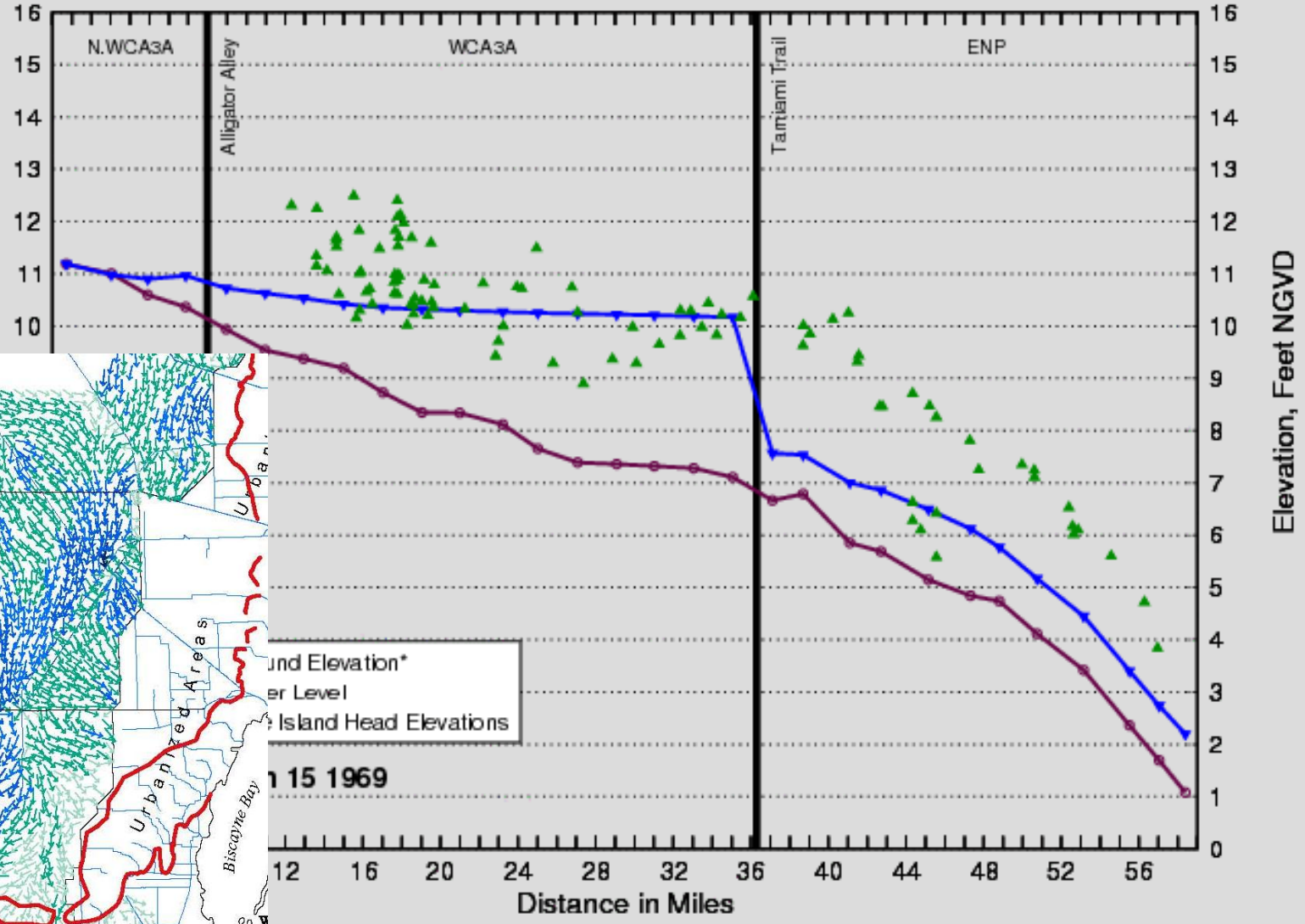
levation = slough bottom.
ge model ground surface.

Script used: depth_transects.scr
Filename: depth_transects_L1_NSRSMv3.3_ANIM.agr

Water Depth Viewing Window

Transect L1 for Scenario RSM_PCB1_GLD_rev_4848





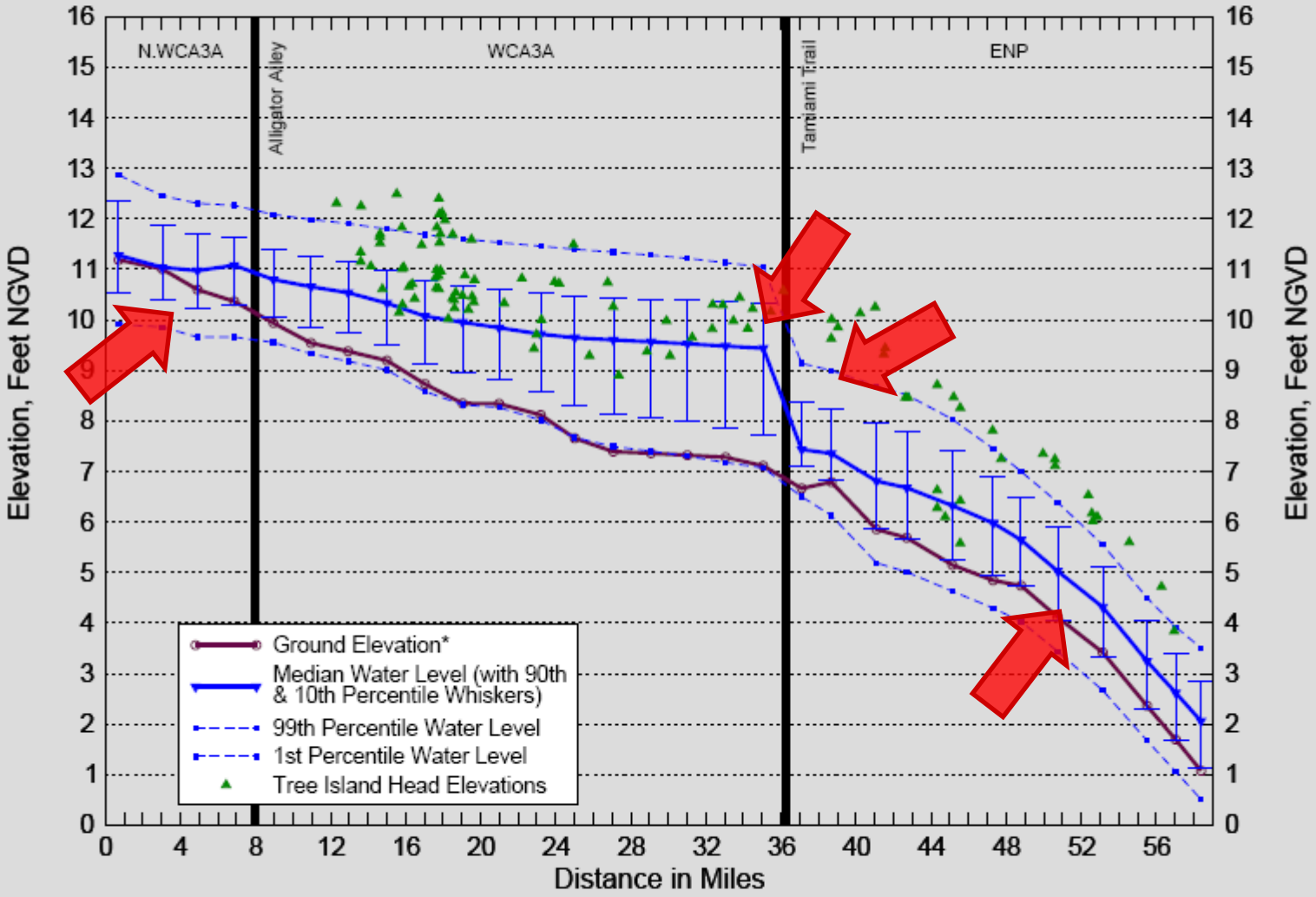
elevation = slough bottom.
rage model ground surface.

Script used: depth_transects.scr
Filename: depth_transects_L1_RSM_PCB1_GLD_rev_4848.agr

CURRENT
L1 Transect

Water Depth Viewing Window

Transect L1 for Scenario RSM_PCB1_GLD_rev_4848

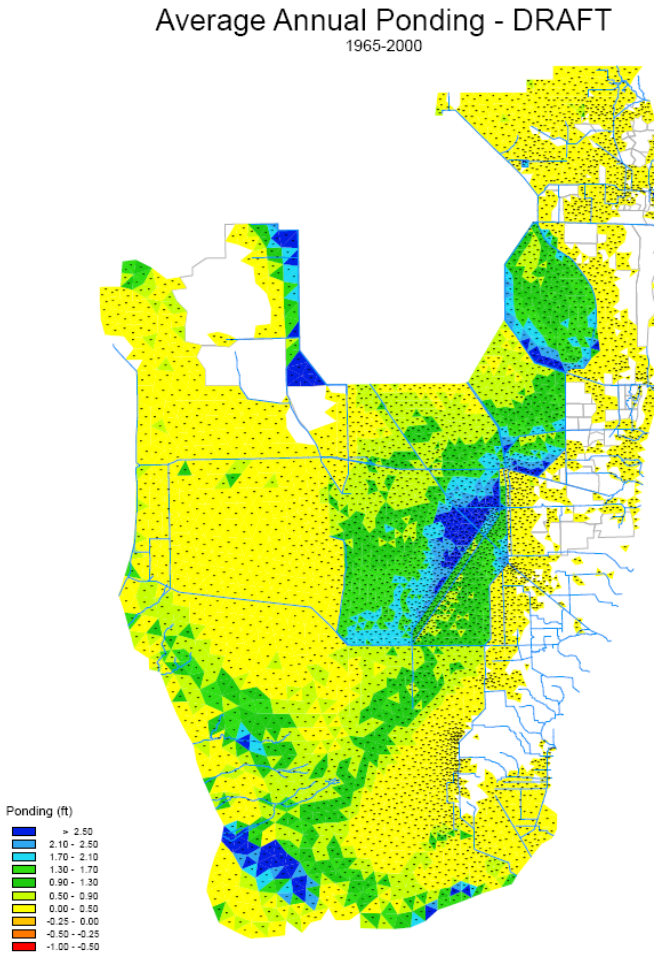


* Within the ridge & slough landscape, ground elevation = slough bottom.
For other landscapes, ground elevation = average model ground surface.

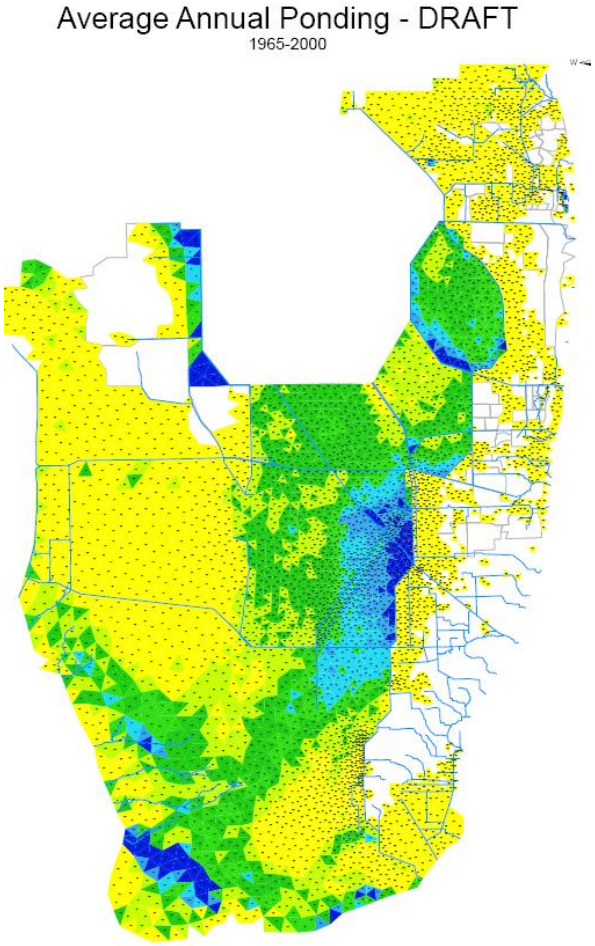
P.O.S. = 01-01-1965 to 12-31-2000
Script used: depth_transects.scr
Filename: depth_transects_L1_RSM_PCB1_GLD_rev_4848.agr

Spatial Viewing Window (Ponding)

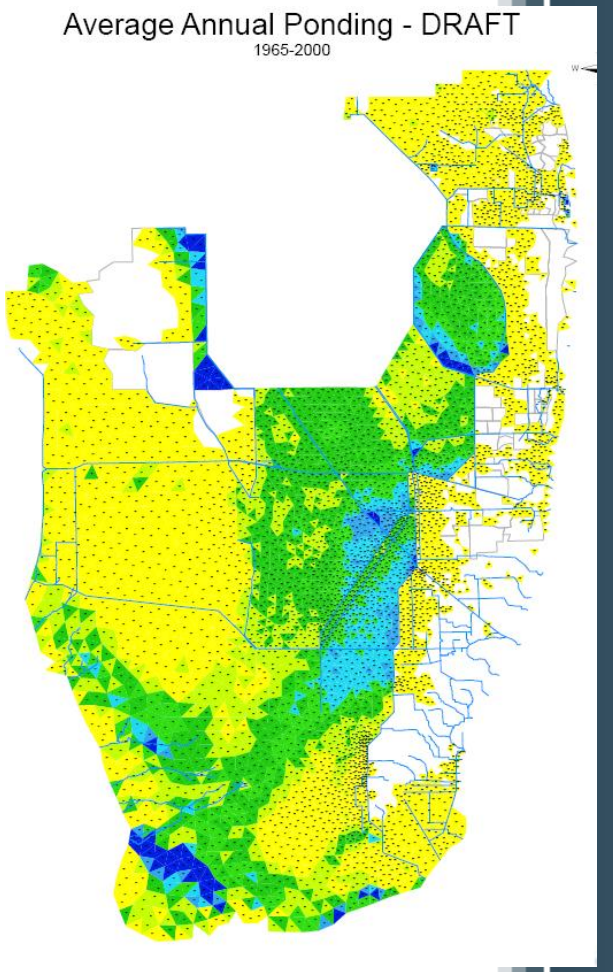
Current



Example 1



Example 2



Enhancing Public Participation

- Short simulation times facilitate rapid response to planner, stakeholder and public input and built trust in agency efforts.
- In combination with other, more traditional and detailed assessment tools, the RESOPS and Everglades Viewing Window tools allow projects to be planned with strong and real stakeholder and public engagement, yet without sacrificing overall planning objectives and timelines.
- These tools also allow the public to improve their knowledge and understanding of technical issues.

QUESTIONS?

Tools for Broader-Scale Everglades Hydrologic Analysis and Planning

Walter M. Wilcox
Section Leader
Hydrologic & Environmental Systems Modeling

Acknowledgements

Calvin J. Neidrauer
Christopher W. McVoy