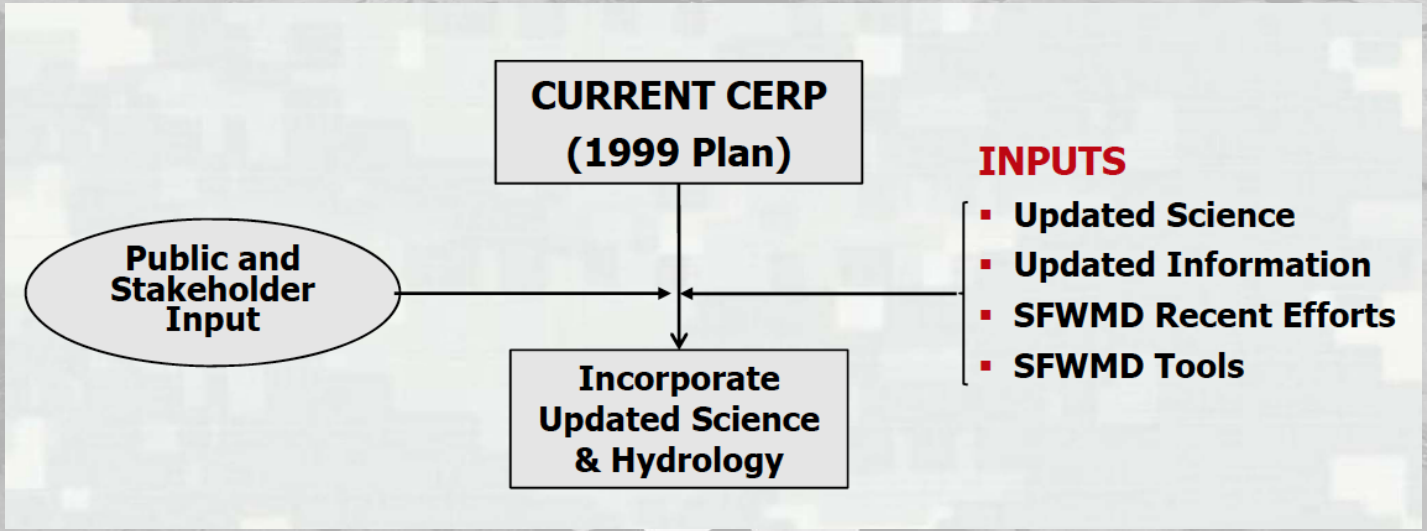
Integrating sound science and adaptive management into a truncated timeline for Central Everglades restoration

Stephen E. Davis III
Everglades Foundation

CERP: Comprehensive Everglades Restoration Plan
CEPP: Central Everglades Planning Project

EVER GLADES FOUNDATION

CEPP is CERP



EVERGLADES FOUNDATION

A lot has happened since 2000

- iPod (2001), iPhone (2007) and iPad (2010)
- Pythons documented to be established
- Long-term WQ plan
- Hurricanes, Drought, Fire, Cold snap
- Changes in operations
- C-111 Spreader, Tamiami Trail, Picayune Strand
- Everglades Science: over 150 technical publications per year since 2000.

EVERGLADES FOUNDATION

CEPP Goals

- Reducing harmful discharges to Northern estuaries (Caloosahatchee and St. Lucie)
- Delivering new, clean water to Central Everglades
- Restoring sheetflow and habitat

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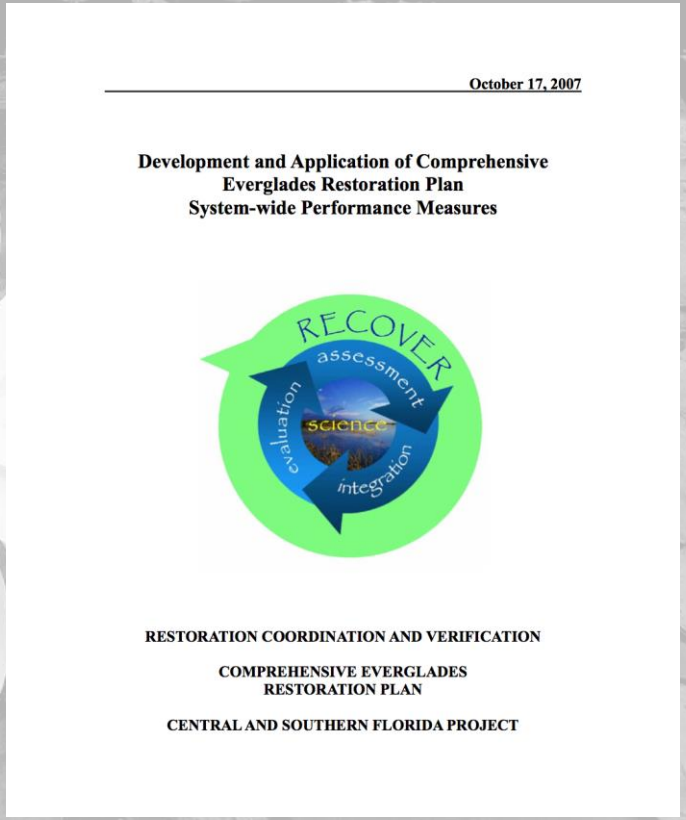
Since WRDA 2000

- System-wide performance measures
- Used to evaluate and assess
- Science-based indicators of attributes
- Targets as desired conditions
- Robust and feasible



October 17, 2007

Development and Application of Comprehensive
Everglades Restoration Plan
System-wide Performance Measures

RECOVER
assessment
science
integration
evaluation

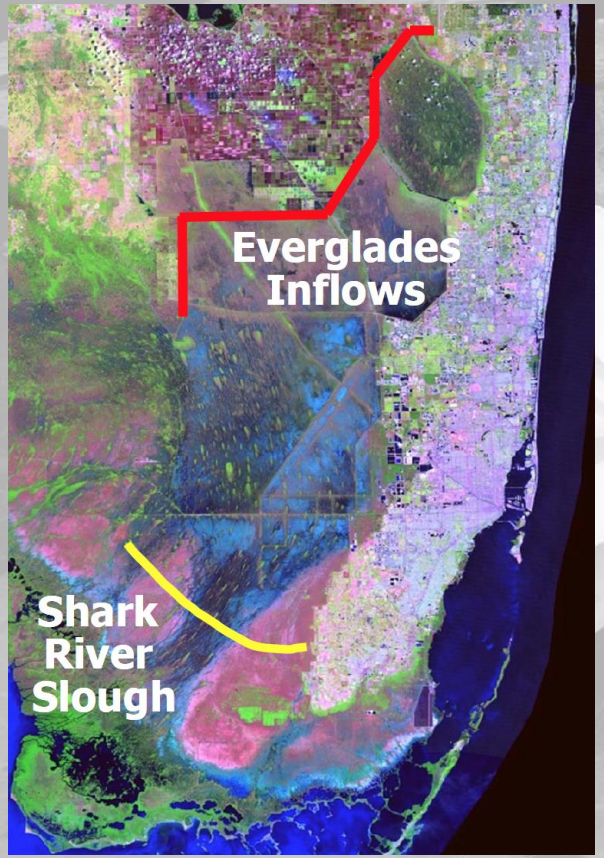
RESTORATION COORDINATION AND VERIFICATION

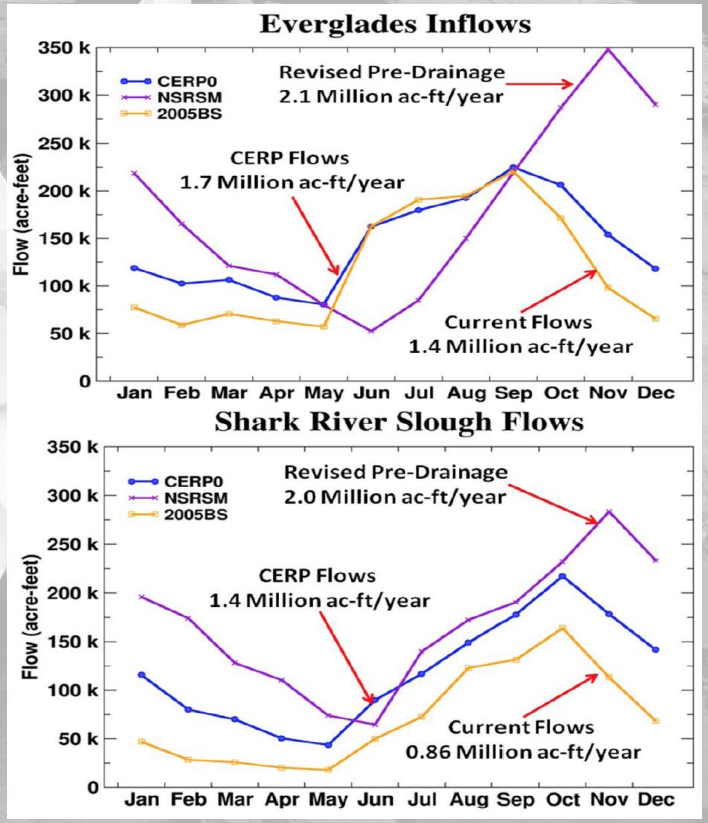
COMPREHENSIVE EVERGLADES
RESTORATION PLAN

CENTRAL AND SOUTHERN FLORIDA PROJECT

EVERGLADES FOUNDATION

Revised hydrologic target





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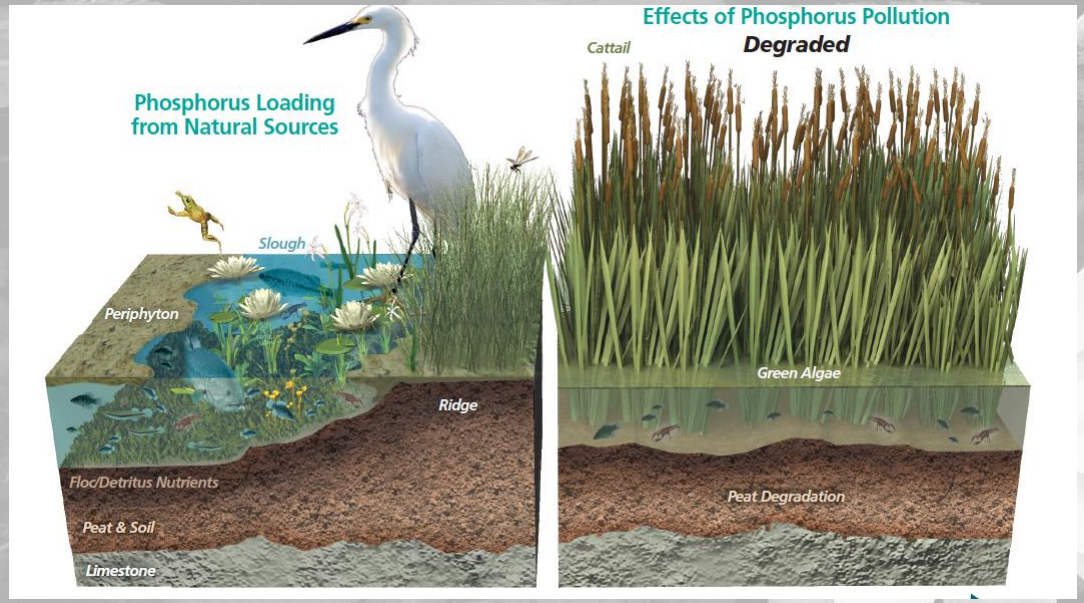
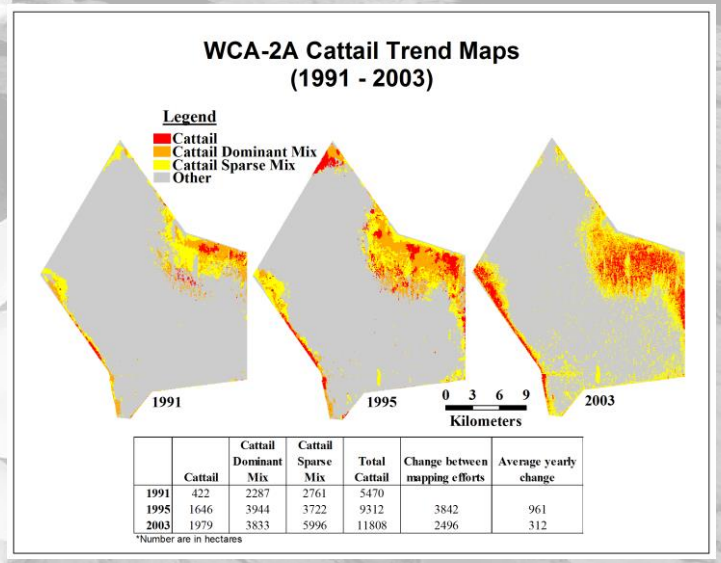
Water quality impacts





	Cattail	Cattail Dominant Mix	Cattail Sparse Mix	Total Cattail	Change between mapping efforts	Average yearly change
1991	422	2287	2761	5470		
1995	1646	3944	3722	9312	3842	961
2003	1979	3833	5996	11808	2496	312

*Number are in hectares

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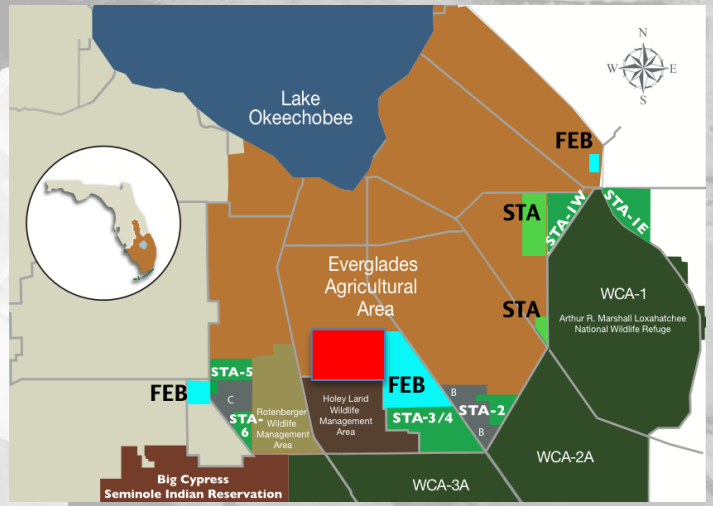
CEPP Water quality and quantity

- Existing lands and WQ
- FEB vs. deep reservoir
- Performance screened:
  - Additional flow volume
  - Dry standard score
  - Relief to N. Estuaries
- Cost!



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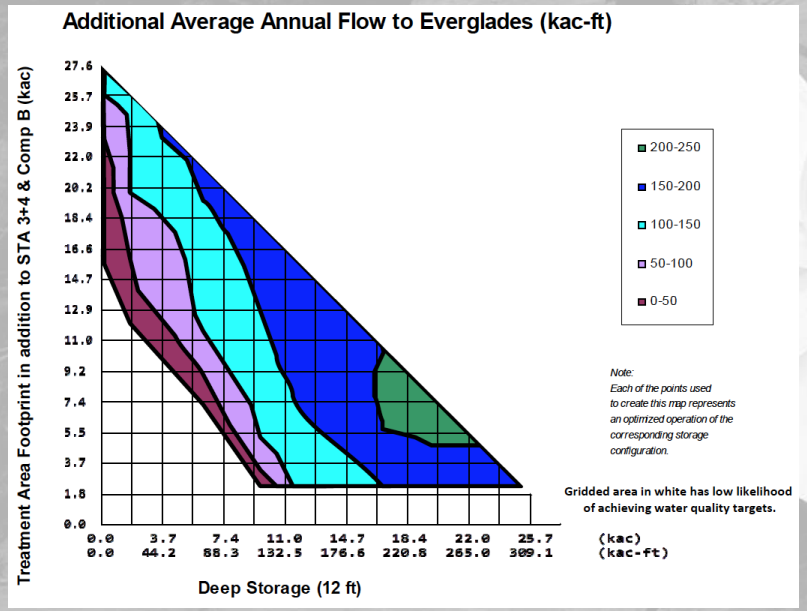
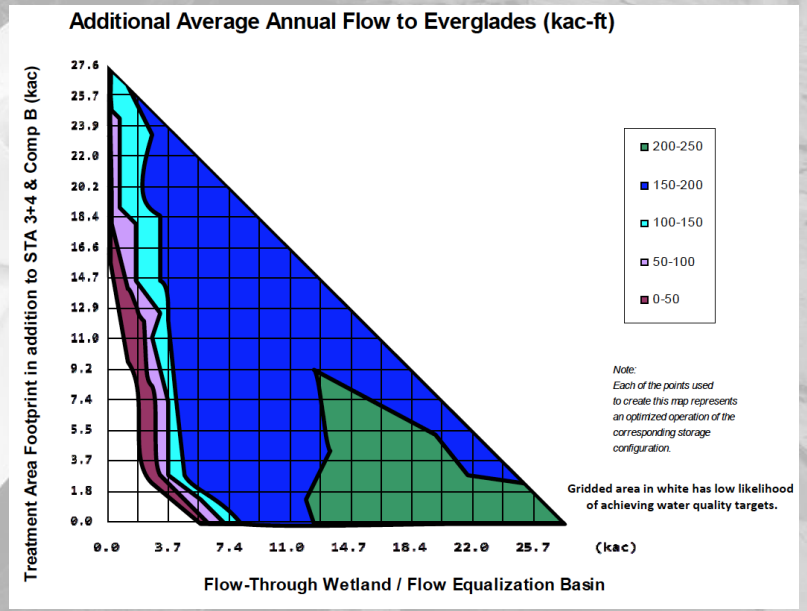
Screening: **additional flow**

DEEP RESERVOIR



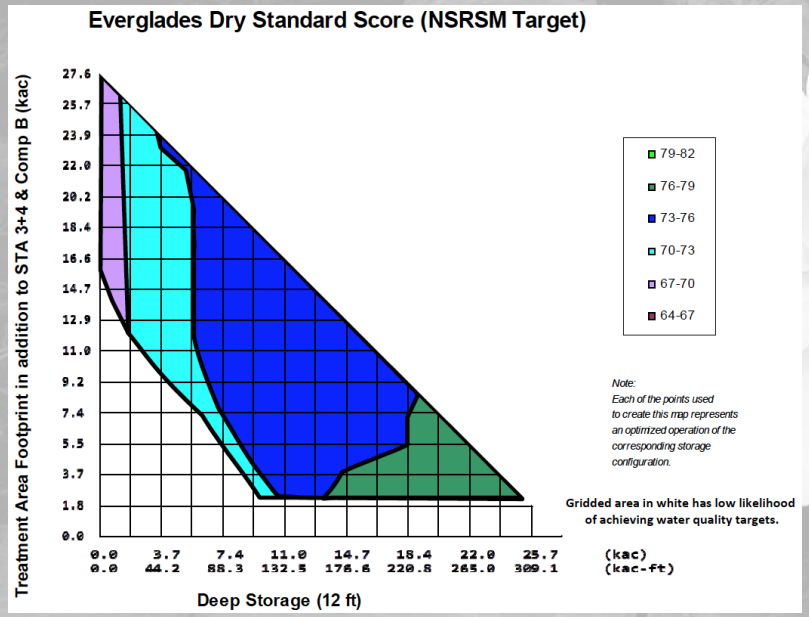
FLOW EQUALIZATION BASIN



EVERGLADES FOUNDATION

Screening: **dry standard score**

DEEP RESERVOIR



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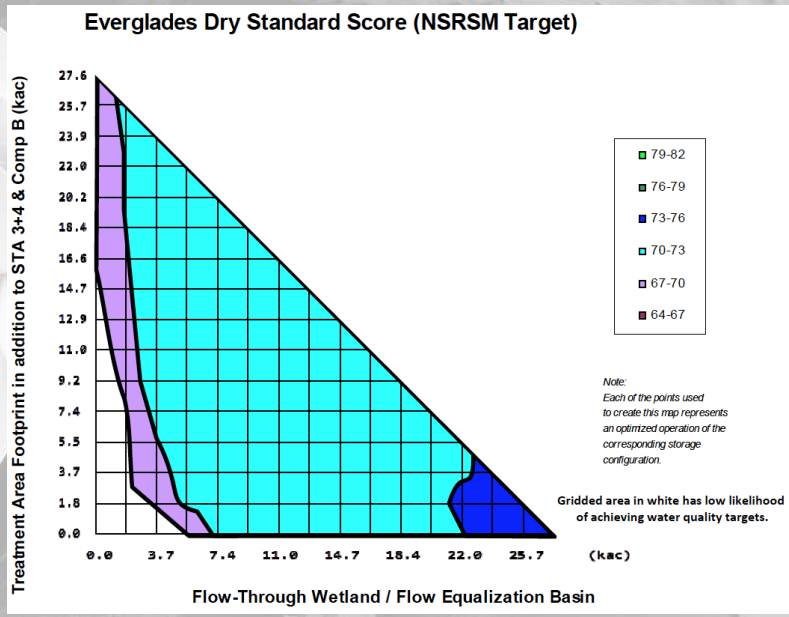

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Ridge-Slough: habitat vs. hydrology

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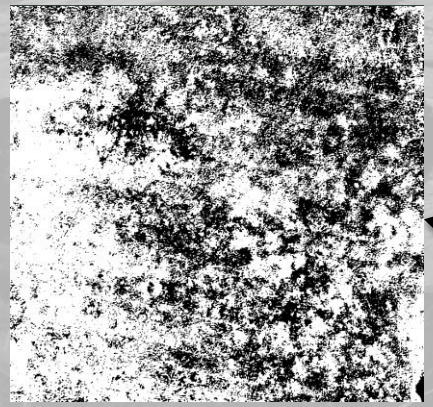
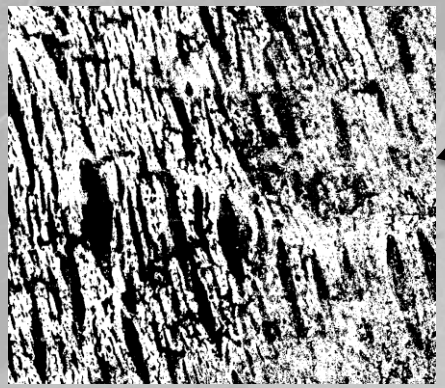
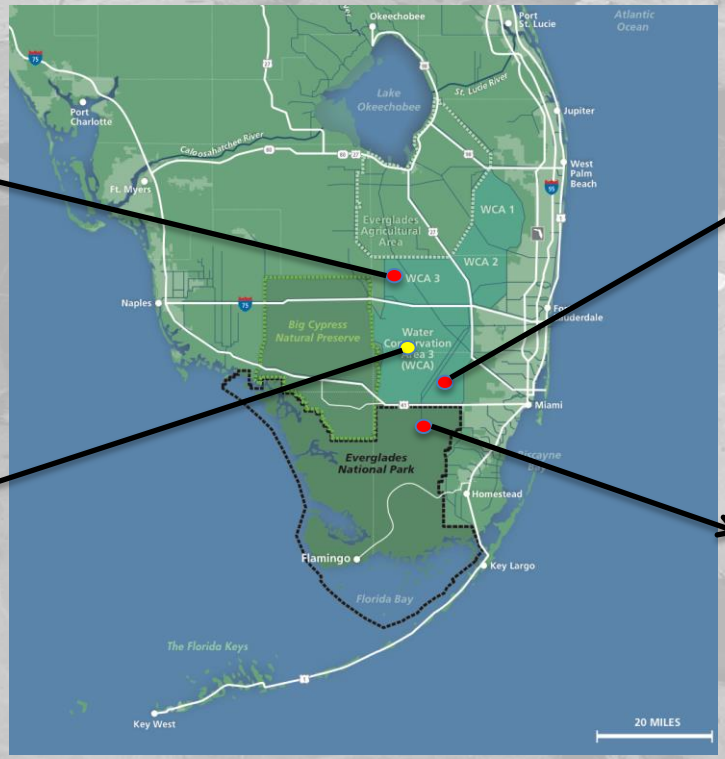
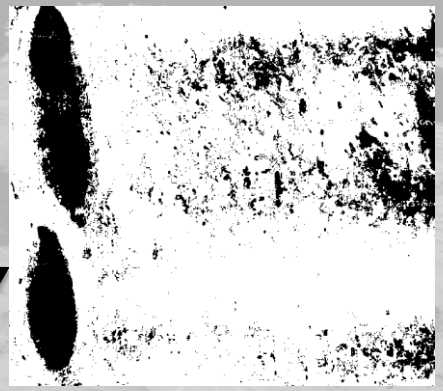
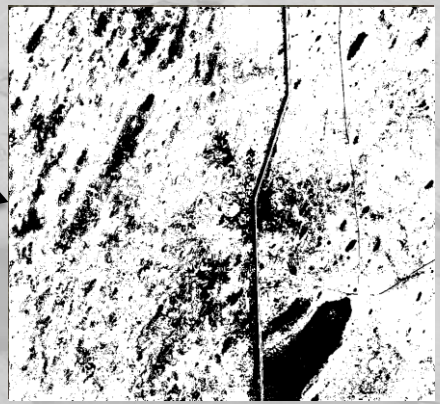
Losing landscape patterning











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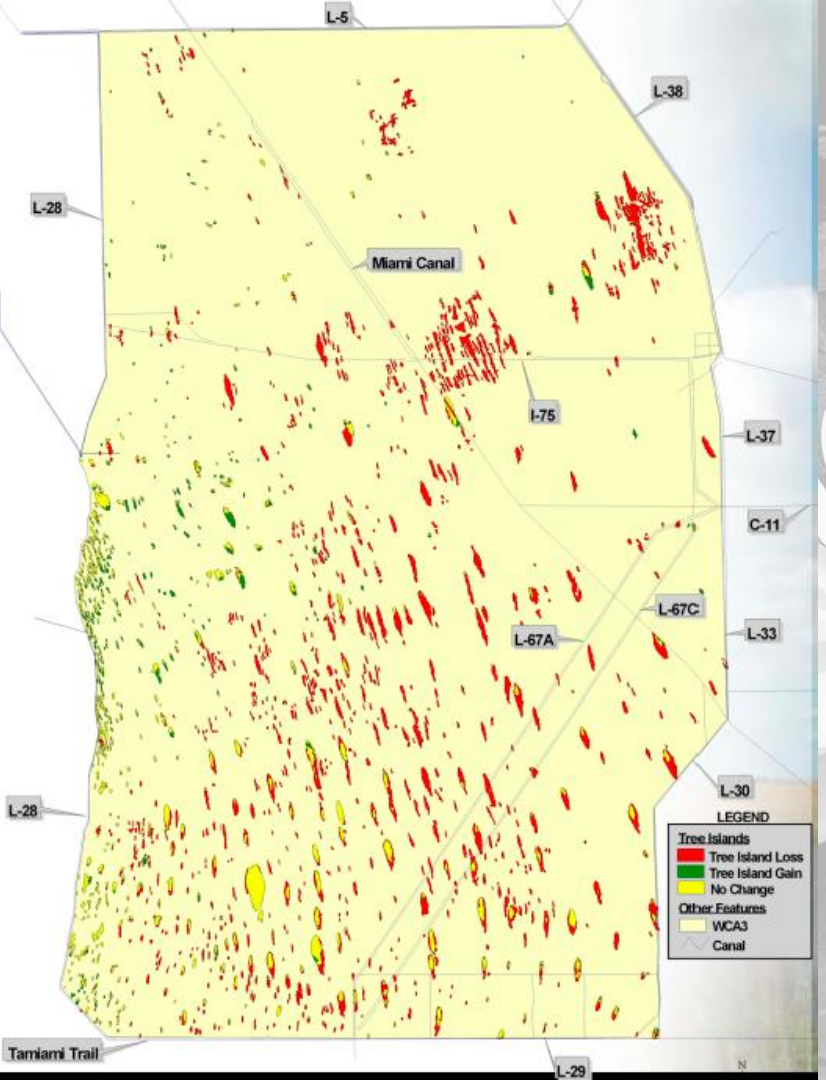
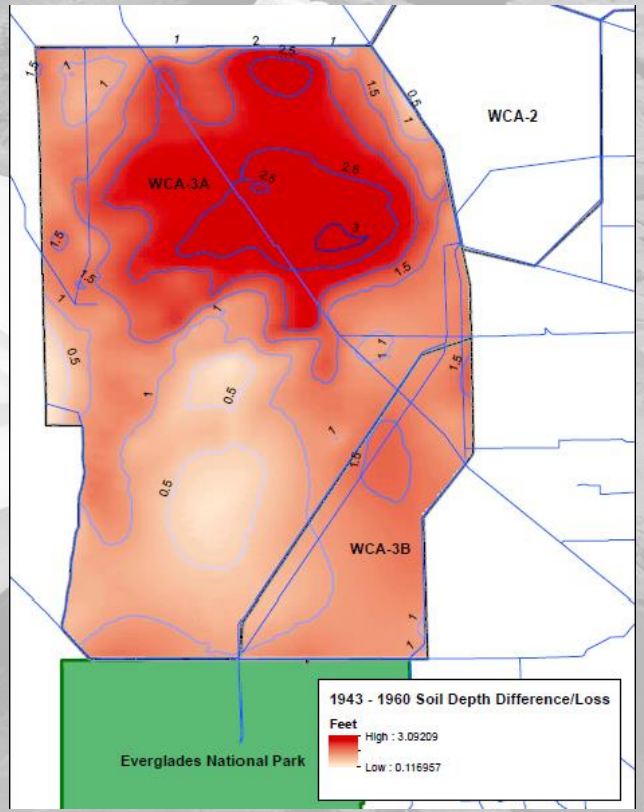
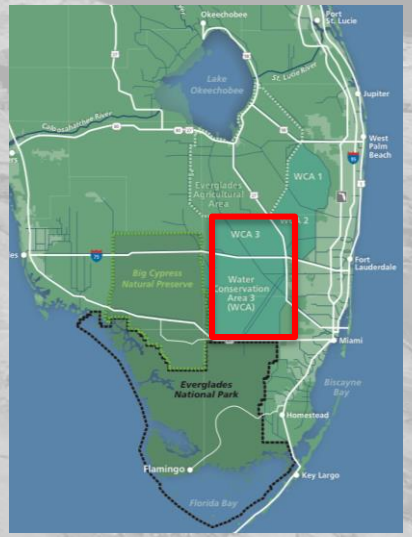
Tree islands and soil







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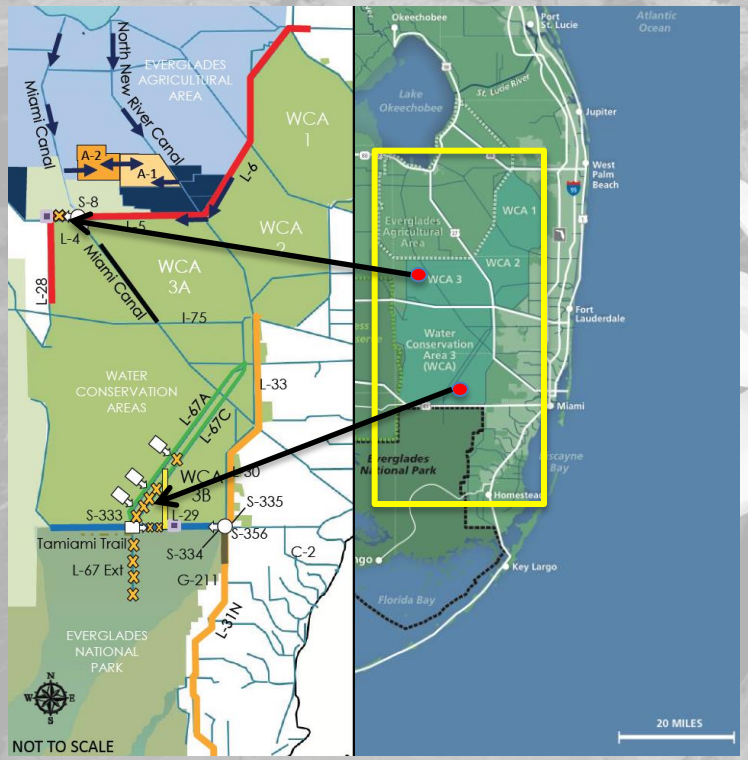
Restoring flow to re-shape landscape



- Removing barriers to flow
  - Bridge Tamiami Trail
  - Degrade/gap levees
- More flow, pulsed?
- Along historic flow path
- Seasonal depth and flow targets

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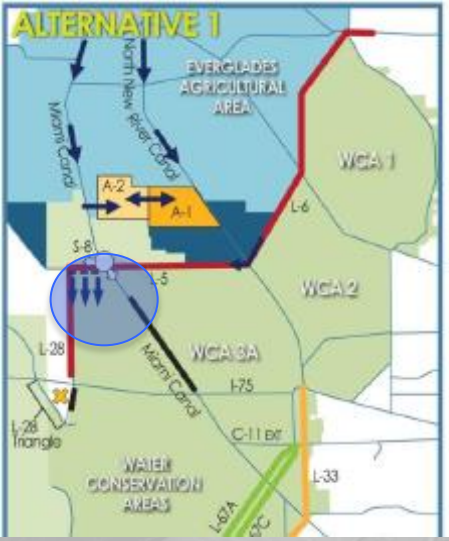
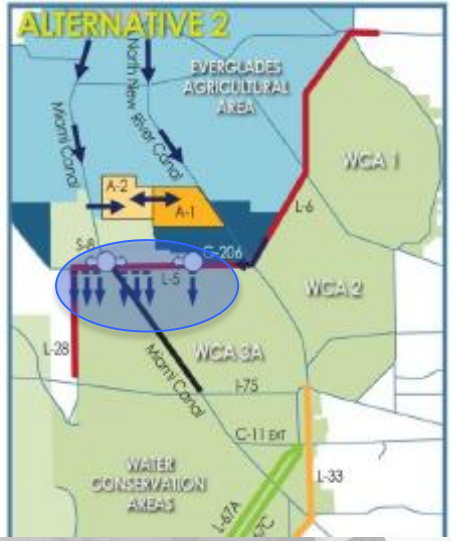
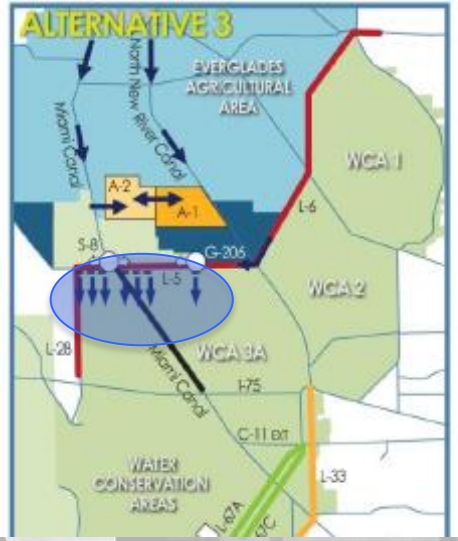
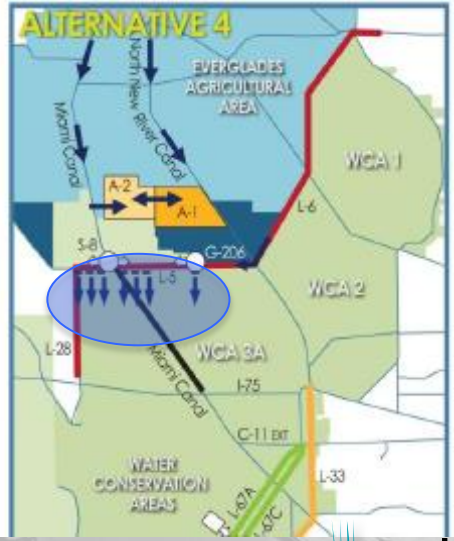
NW 3A: How much of a spreader?







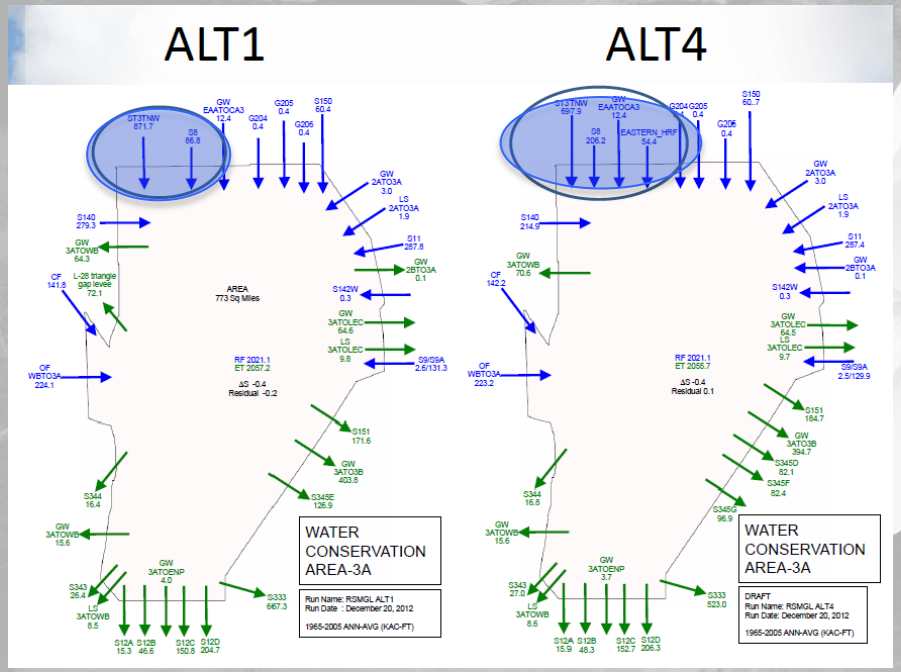


Partial (NW corner)

3 spreader features

EVERGLADES FOUNDATION

NW 3A: How much of a spreader?



Partial (NW corner)

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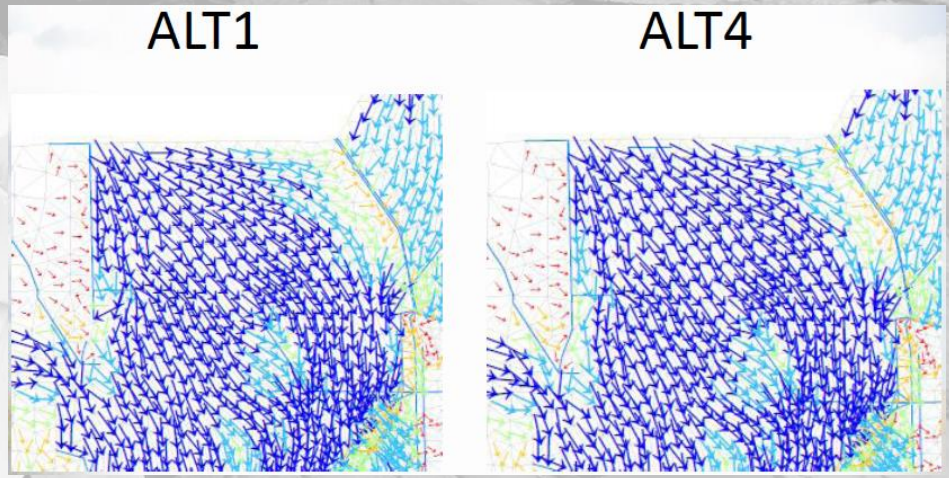
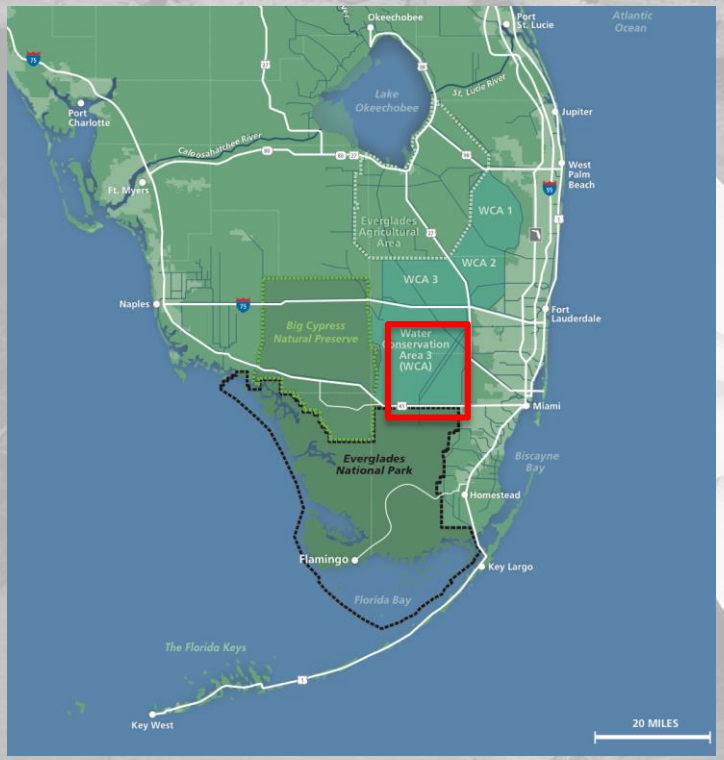
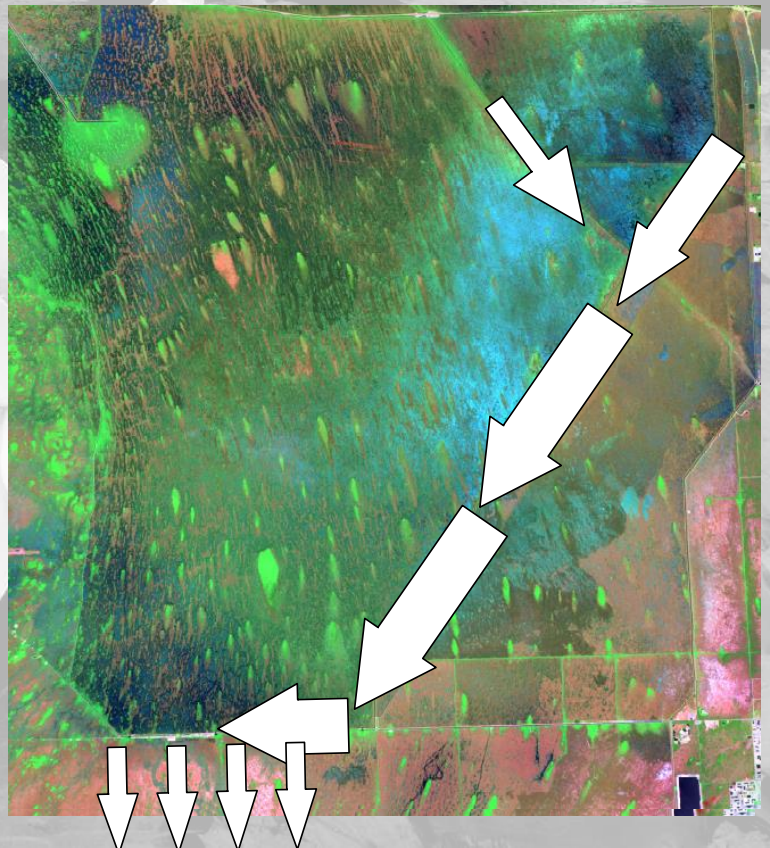


No significant difference

Decompartmentalizing the system





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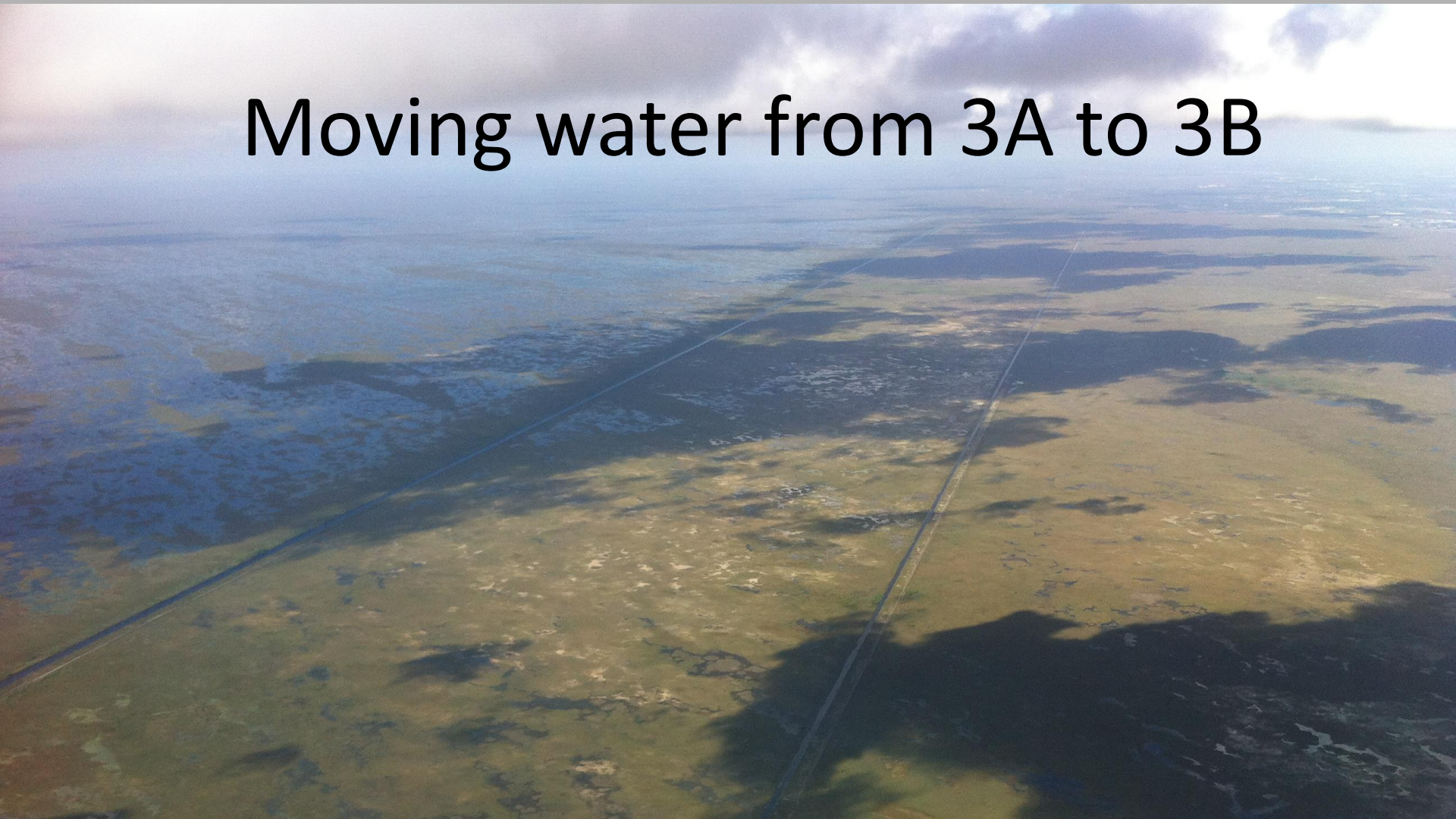
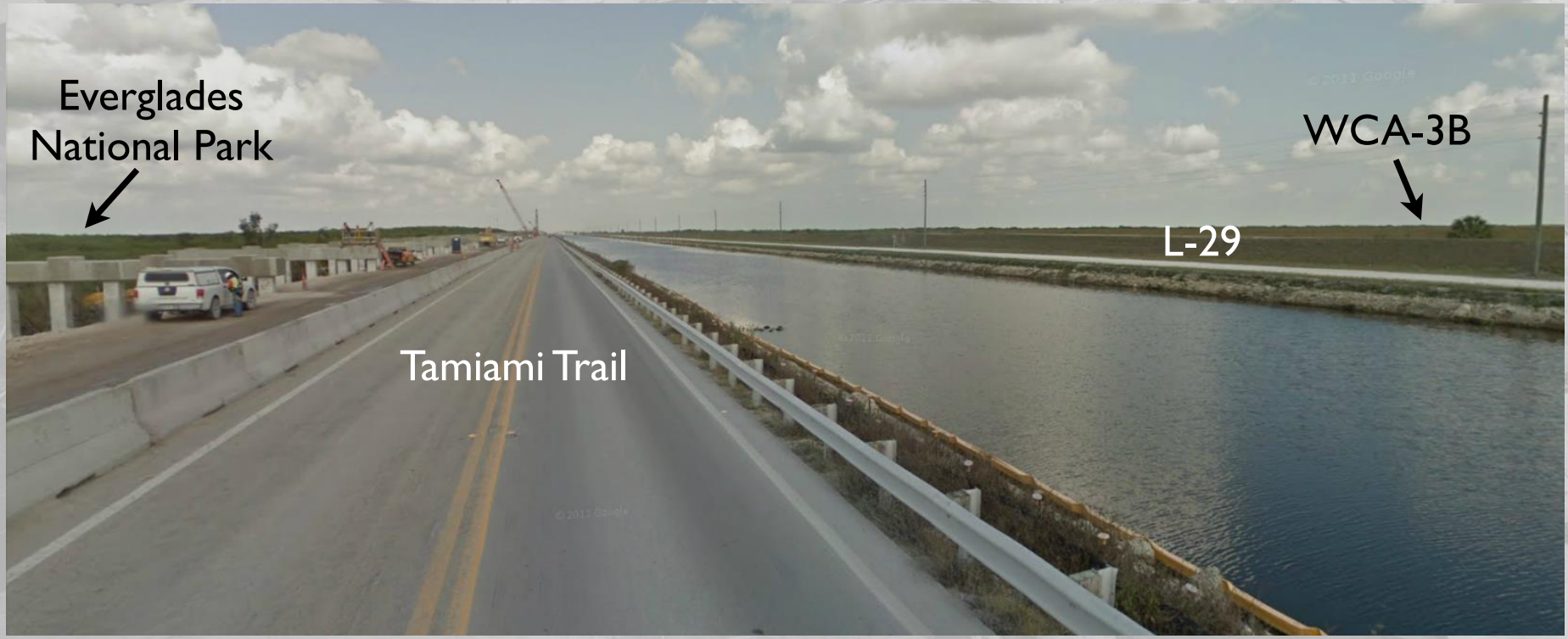
Moving water from 3A to 3B

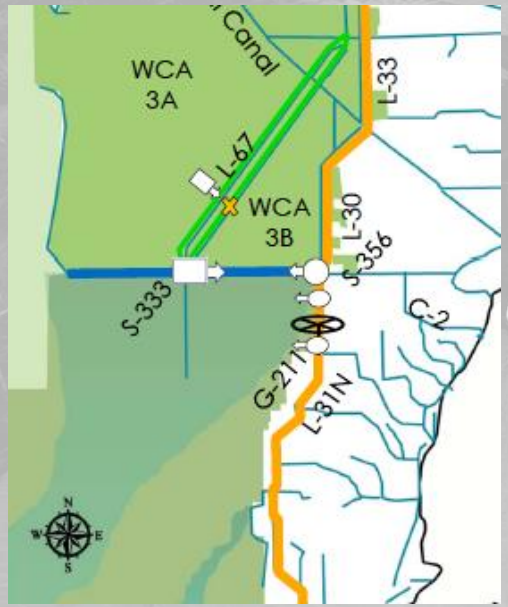


Moving water from 3B to ENP

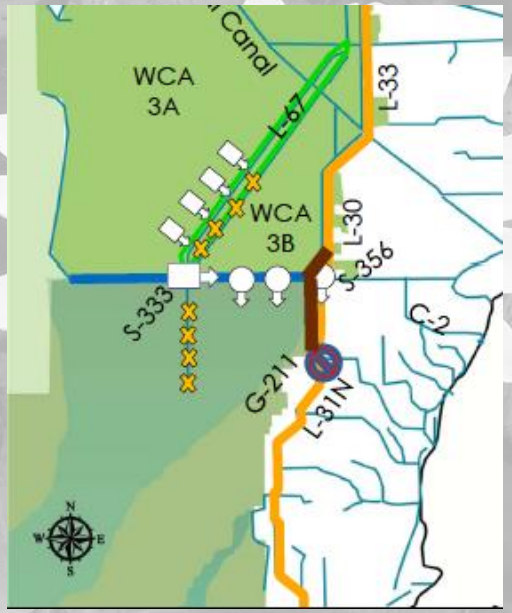


3A/3B/ENP: Flow it vs. pumping it

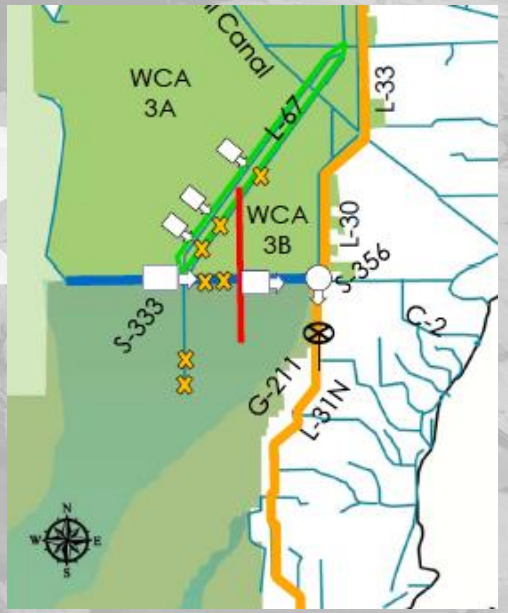
By-pass 3B



Pump from 3B



Flow through 3B



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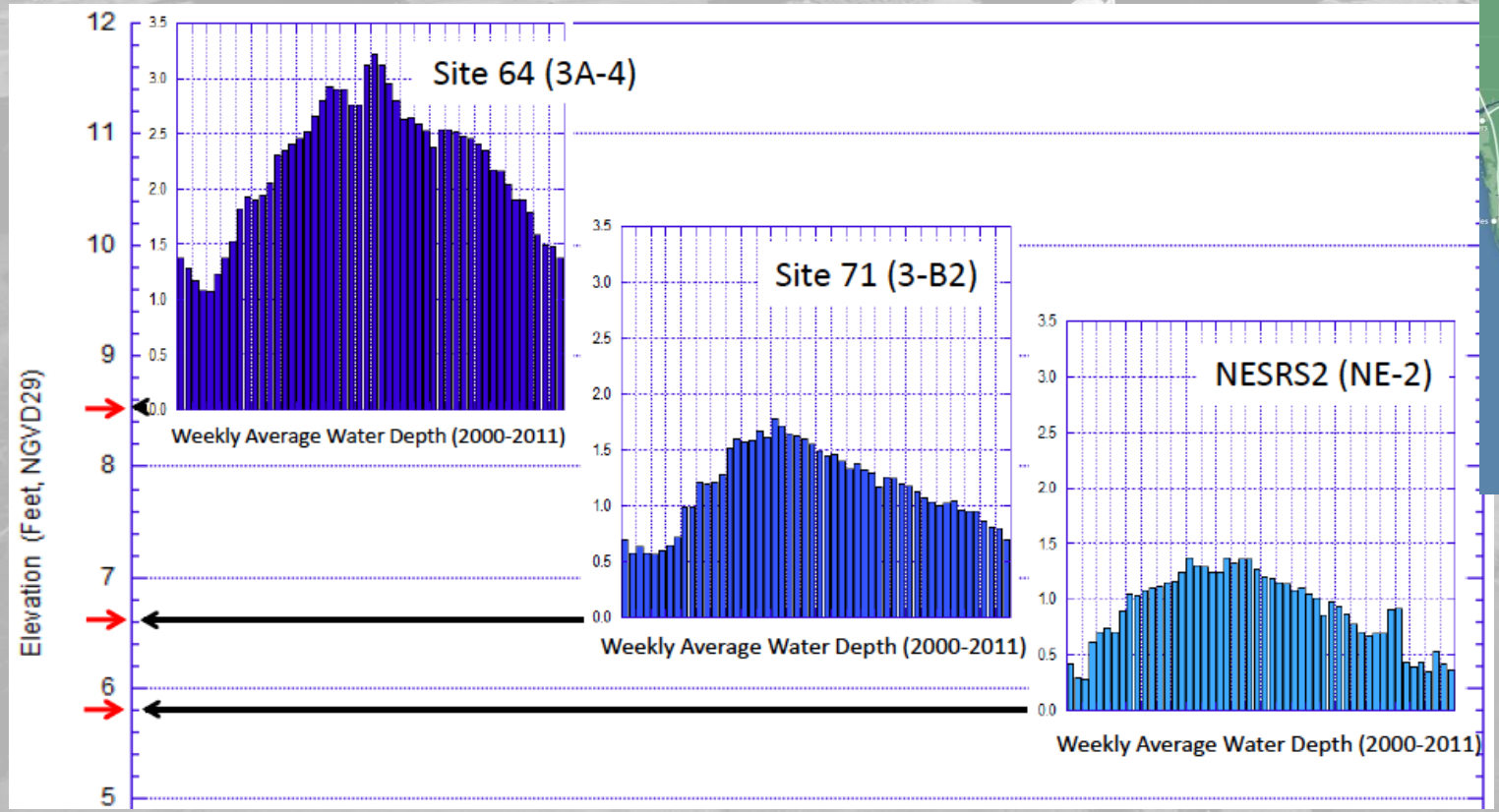
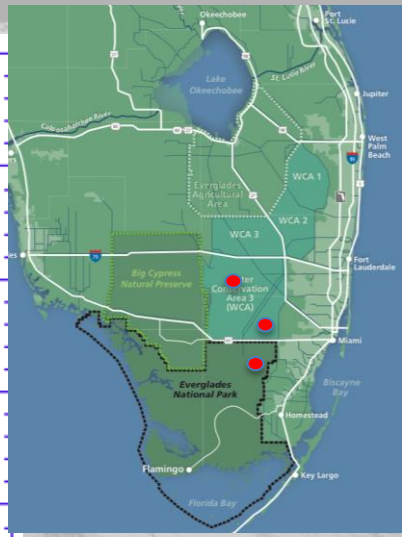
3A/3B/ENP: will it flow?





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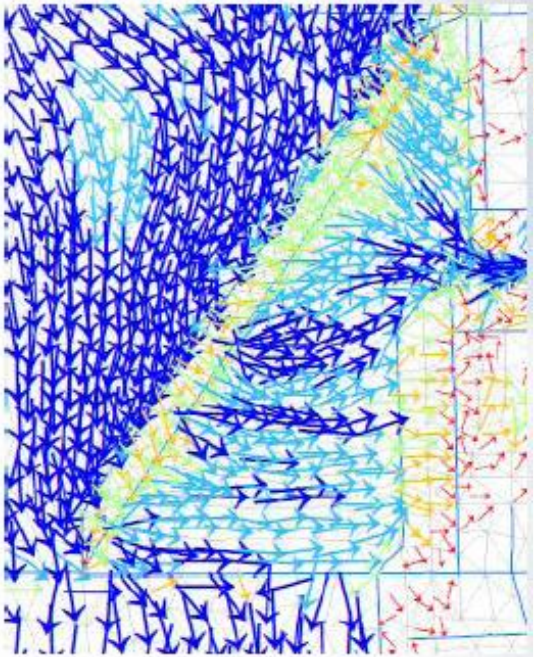
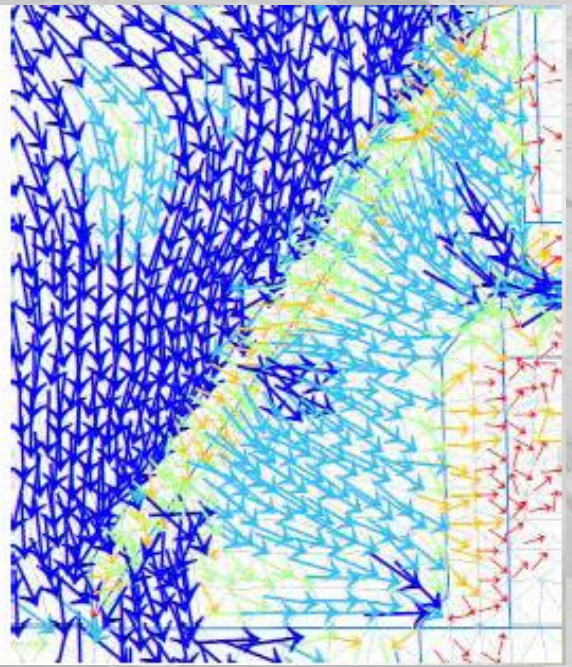
3A/3B/ENP: where will it flow?

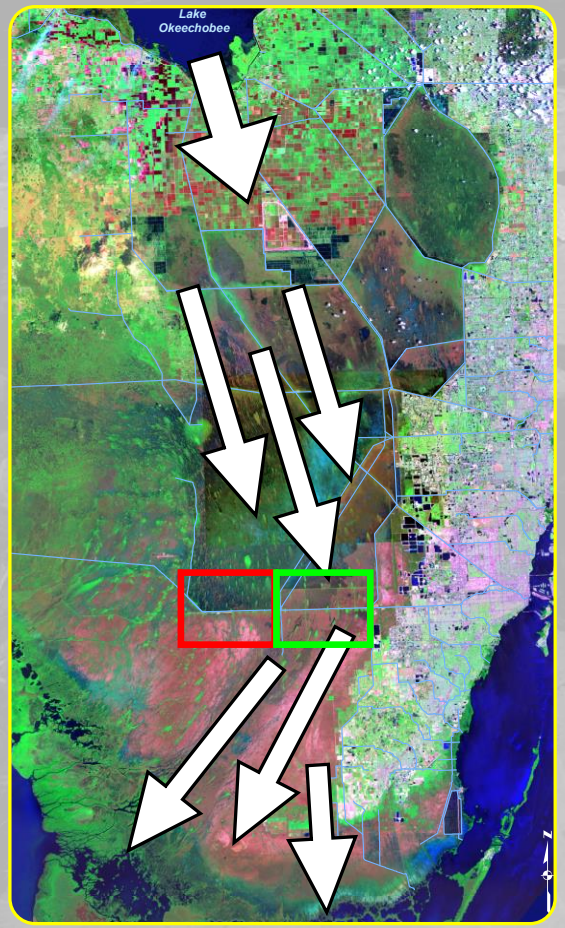
ALT2



ALT4



EVERGLADES FOUNDATION



Alt 4R: reaching a TSP

- New science facilitated screening process
- This is a first increment
- Benefits projected down to Florida Bay
- Cost-effective infrastructure
- Flood control and water supply
- We stand to learn a lot

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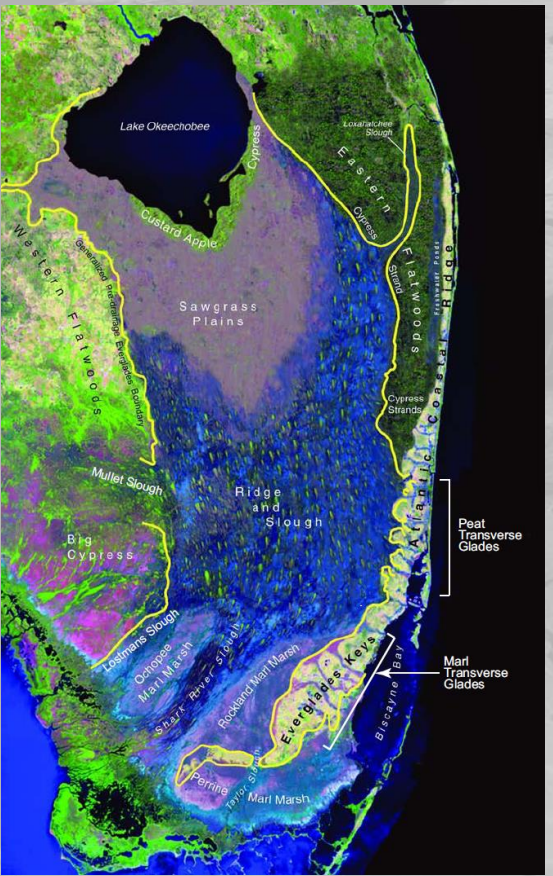
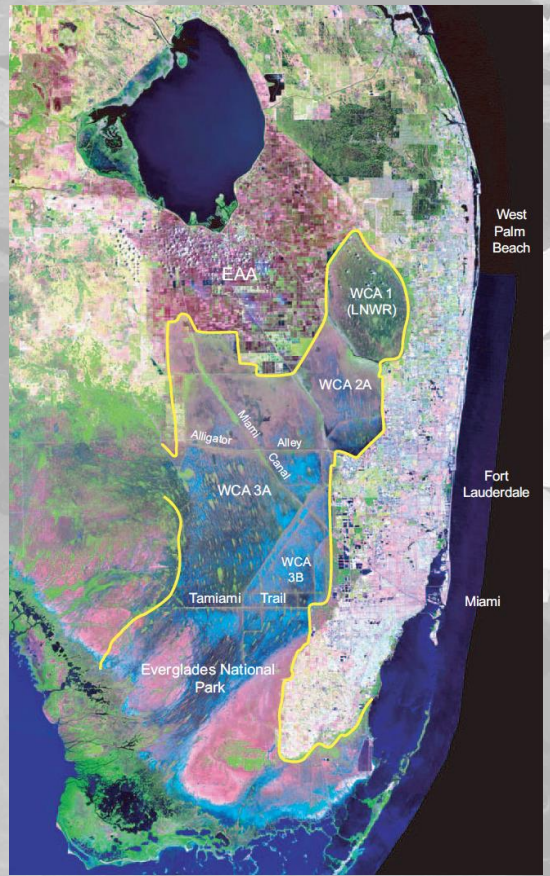
Acknowledgments

- Walter Wilcox (SFWMD) and the CEPP Modeling Group
- Fred Sklar (SFWMD) and Eco sub-team
- CEPP PDT: Matt Morrison (SFWMD) and Kim Taplin (USACE)
- Shannon Estenoz, Bob Johnson (US DOI)
- Kelly Keefe, Kevin Whitman and many others from USACE

EVERGLADES FOUNDATION

Everglades: then and now





- Central & South Florida Project
- Supports > 6 million
  - Water supply
  - Flood control
- Ecological collapse
- WRDA 2000: CERP

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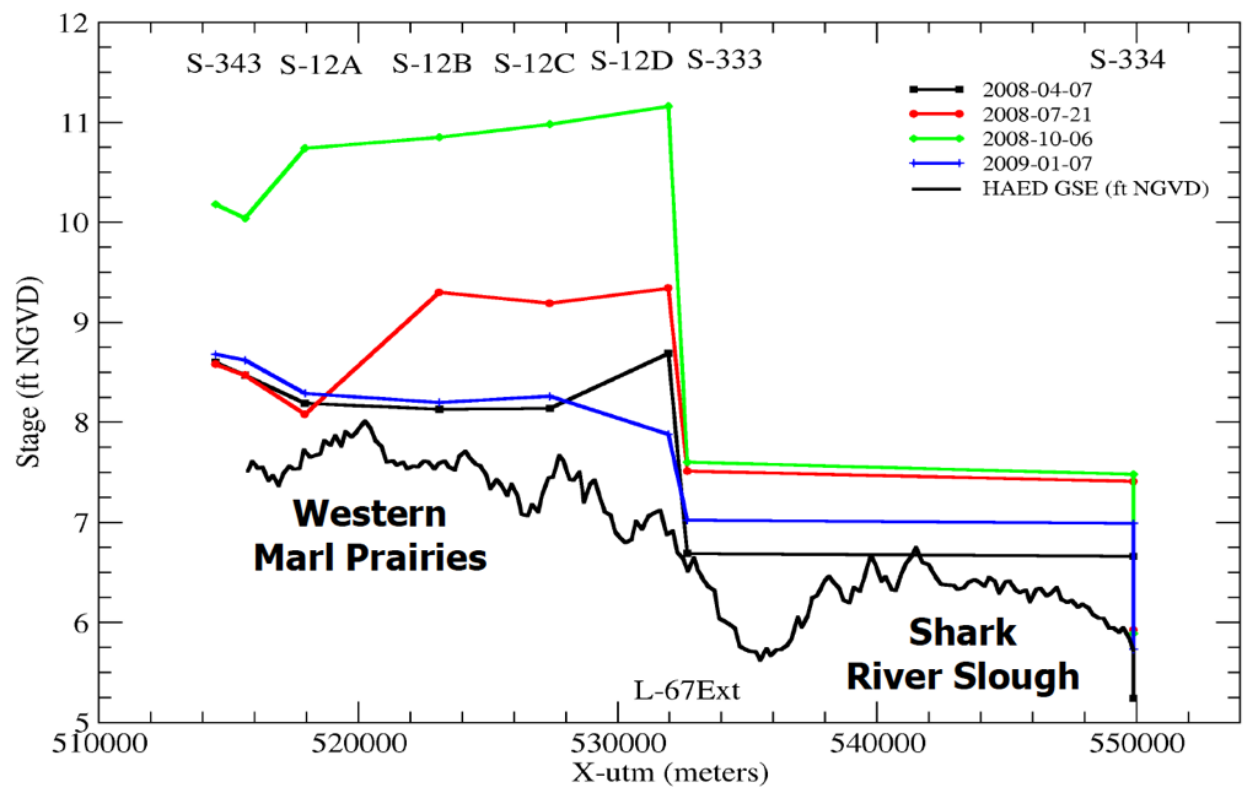
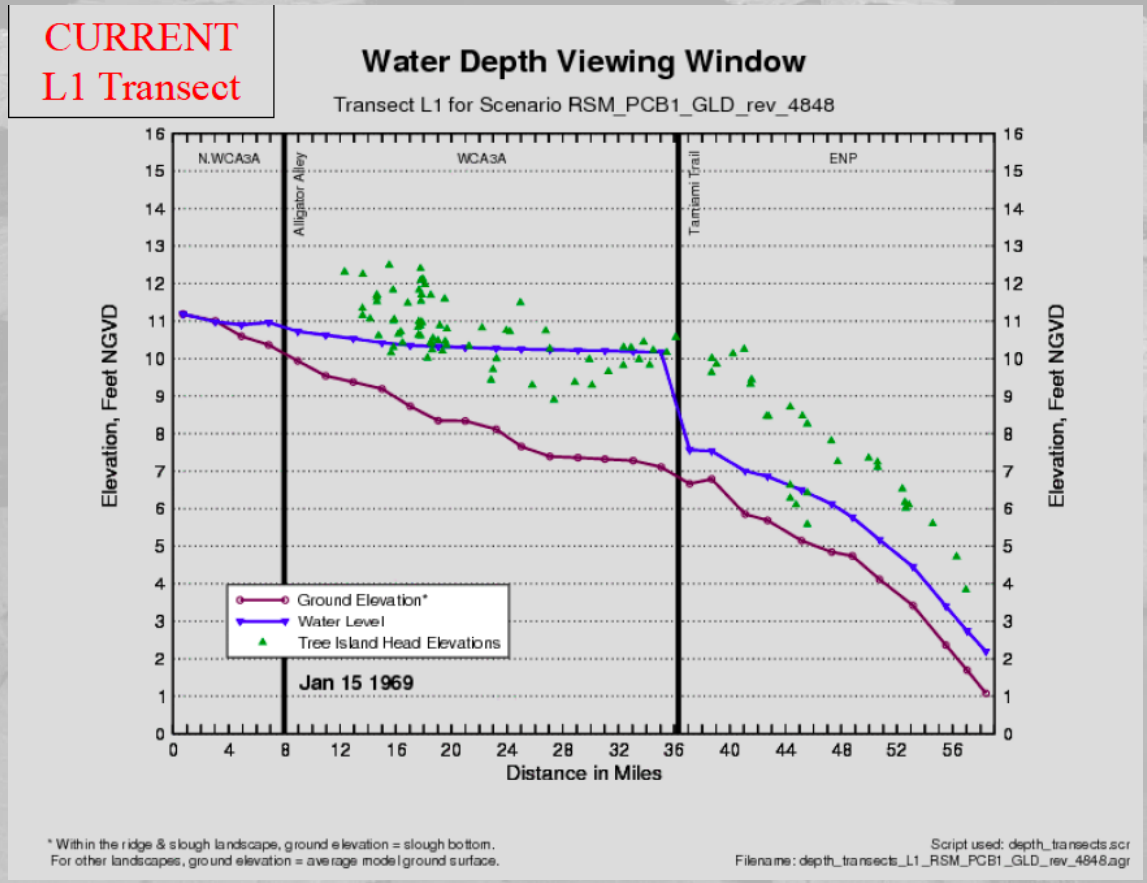
Decompartmentalizing the system



Revised hydrologic target

CURRENT
L1 Transect



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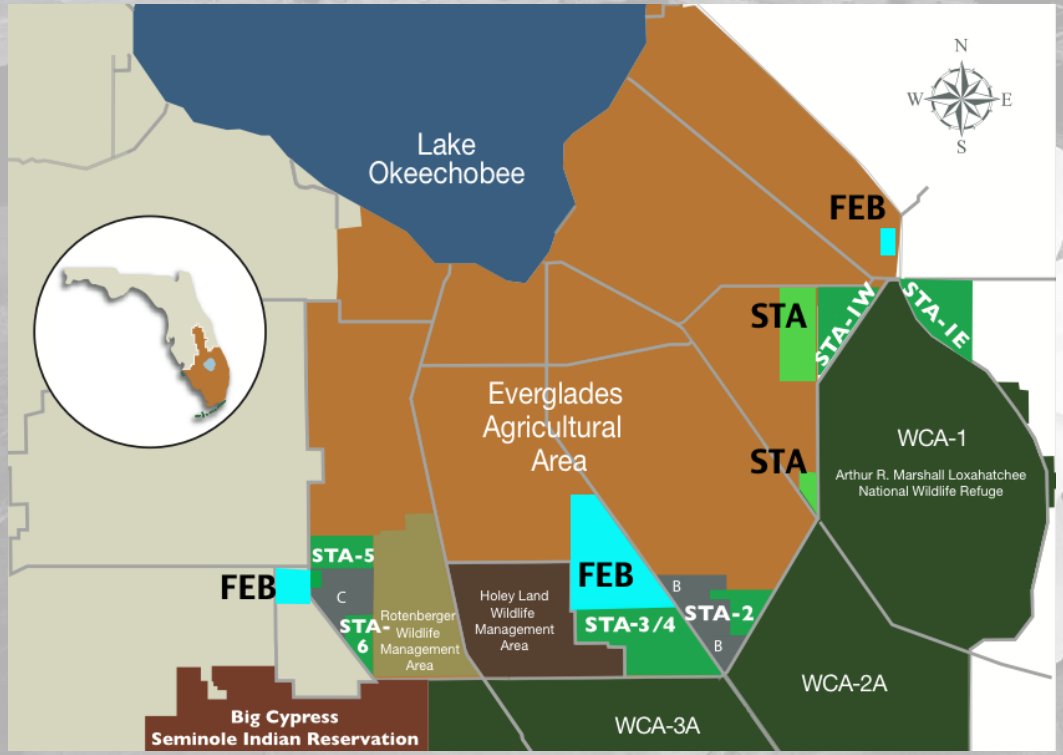
Restoration Strategies: 2012

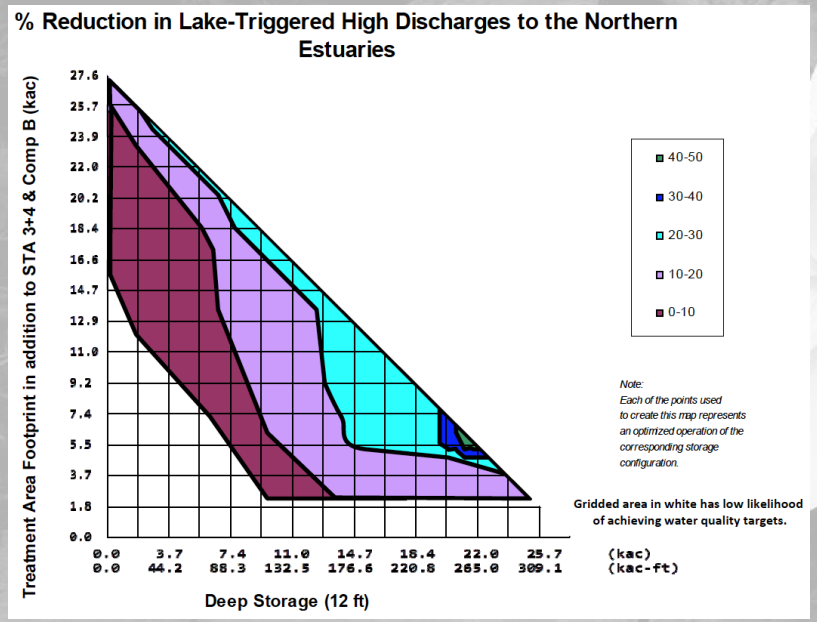


- WQBEL: 10 ppb P long-term geometric mean
- 6,500 acres new Stormwater Treatment Area (STA)
- 110,000 acre-ft of new storage as Flow Equalization Basins (FEB)
- 2025 completion at cost of $800 million

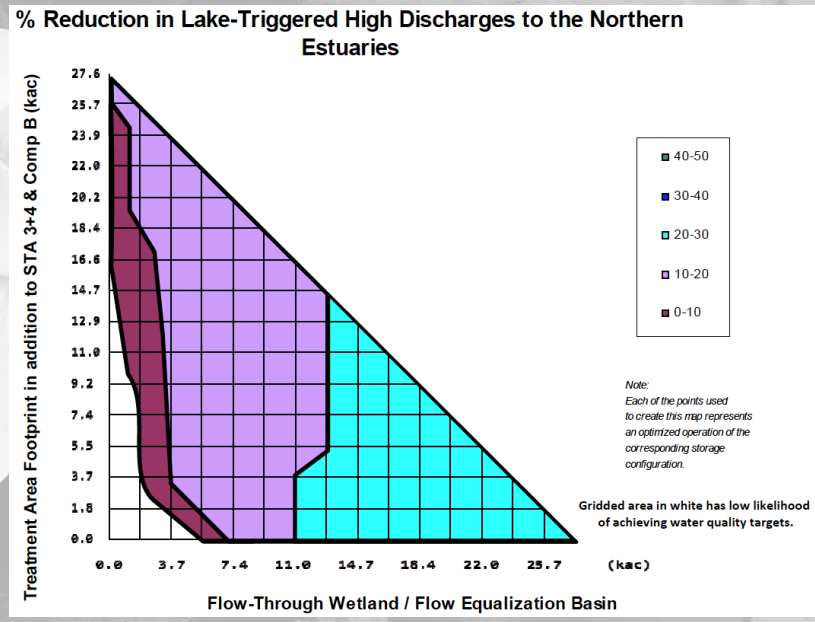
EVERGLADES FOUNDATION

Screening: **reduction in harmful discharges**

DEEP RESERVOIR



FLOW EQUALIZATION BASIN



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NW 3A: Screening to maximize benefit

Metric	Performance Measure Metric (Zone 3A-NW)	ECB	FWO	ALT 4R
1.1	Inundation Duration	63	61	94
2.1	Sheetflow -- Timing	20	19	34
2.2	Sheetflow -- Continuity	4	4	62
2.3	Sheetflow -- Distribution	24	22	67
3.1	Drought Intensity Index	63	63	96
5.1	Slough Vegetation Suitability -- Hydroperiod	46	46	79
5.2	Slough Vegetation Suitability -- Drydown	51	48	85
5.3	Slough Vegetation Suitability -- Dry Season Depth	22	19	38
5.4	Slough Vegetation Suitability -- Wet Season Depth	22	20	46
	Habitat Suitability Index (0 to 1 Scale)	**0.44**	**0.43**	**0.77**

EVERGLADES FOUNDATION

Challenges for Central Everglades restoration planning

- Shortened planning window: 2 years to plan
- Involving public throughout
- Dealing with uncertainty
- Constraints: available land, WQ, Herbert Hoover Dike, savings clause

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CERP Goals and Objectives

Ecological Values

- Increase total spatial extent of natural areas
- Improve habitat and functional quality
- Improve native plants and animals

Economic Values and Social Well-being

- Increase availability of freshwater supplies
- Reduce flood damages
- Provide recreational and navigation opportunities
- Protect cultural and archaeological resources

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