BBSEER AND BEYOND: PLANNING FOR RESILIENCE IN CHANGING SEAS

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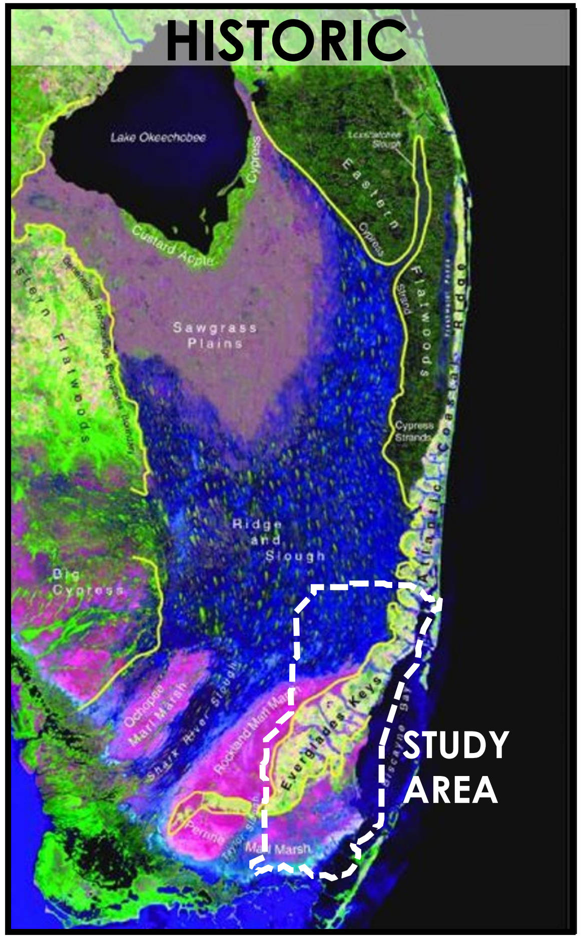
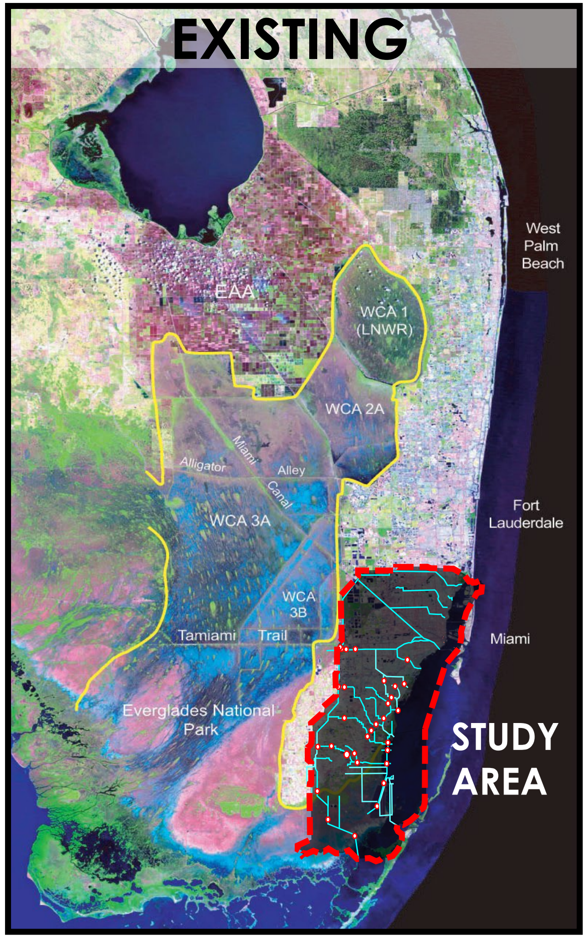
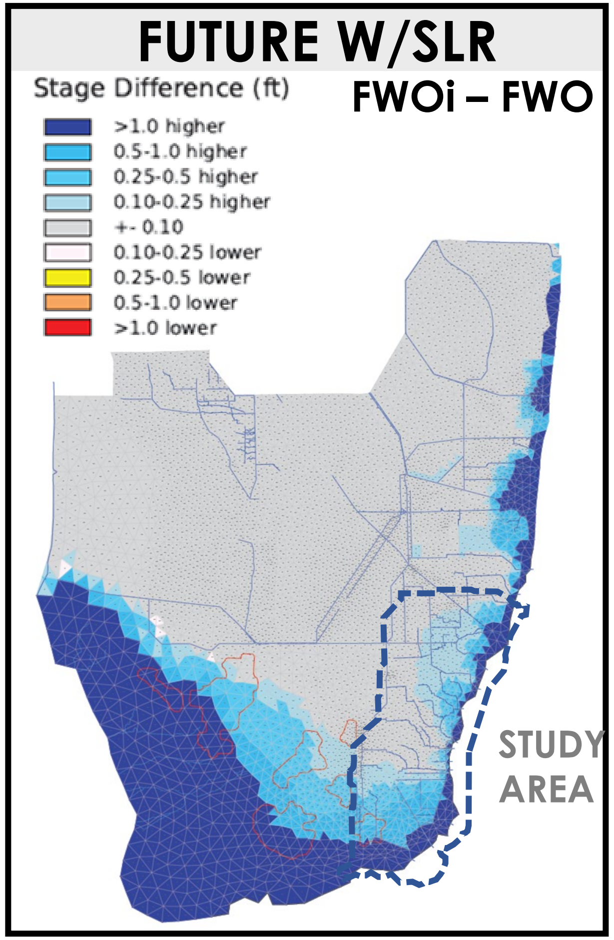
Greater Everglades Ecosystem Restoration (GEER) 2025

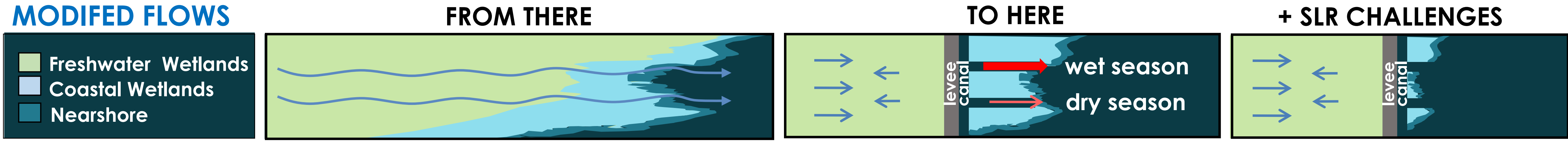
CONDITIONS
HISTORIC, EXISTING, FUTURE WITHOUT PROJECT







MODIFED FLOWS



RESTORATION RESILIENCE IN PLAN FORMULATION: A COMPREHENSIVE BENEFITS STORY

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PROJECT OBJECTIVES

1) RESTORE SALINITY REGIMES, MINIMIZE UNNATURAL CANAL RELEASES:

Improve quantity, timing, and distribution of freshwater to estuarine and nearshore subtidal areas, including mangrove and seagrass areas (500-meter zone).

2) FRESHWATER WETLAND WATER DEPTH, PONDING DURATION AND FLOW TIMING:

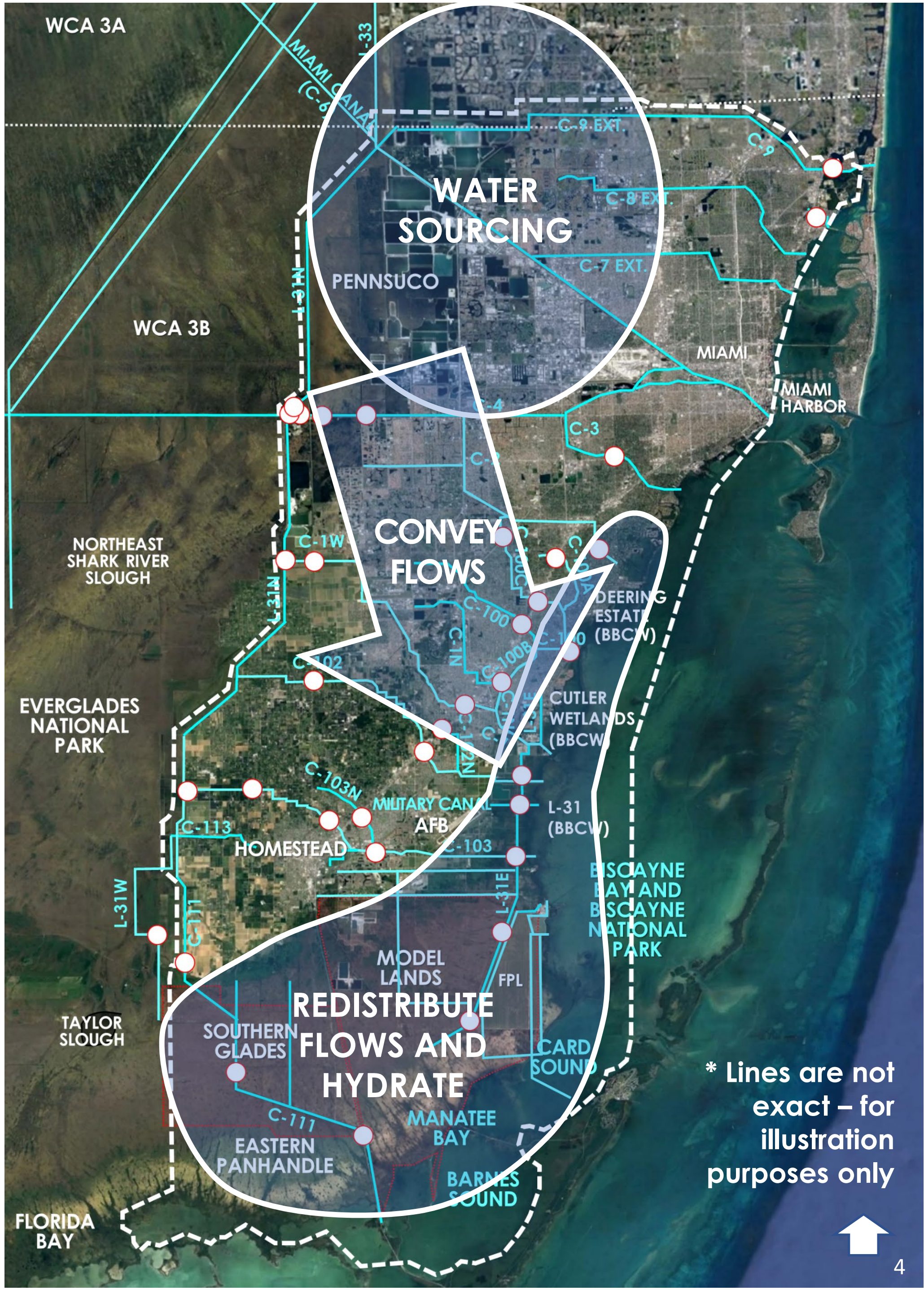
Restore freshwater depths, hydroperiods, and flows, for dry and wet seasons in terrestrial wetlands.

3) RESTORE NATURAL ECOLOGICAL AND HYDROLOGICAL CONNECTIVITY:

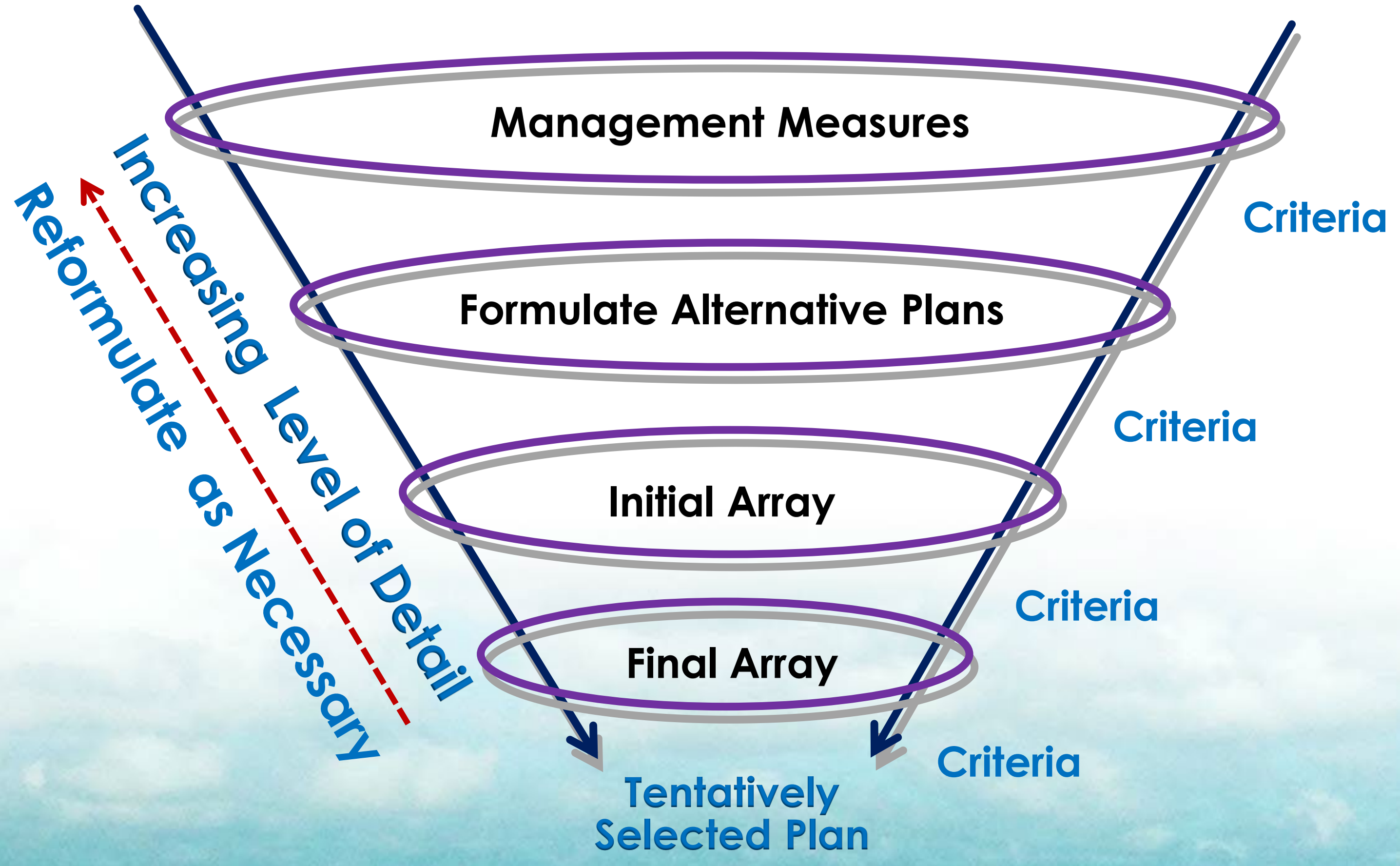
Restore connectivity and habitat gradients in areas compartmentalized by federal and state canal systems in Southern Everglades, Model Lands, Biscayne Bay Coastal Wetlands.

4) SEA LEVEL CHANGE RESILIENCY:

Increase and restore ecological resilience in coastal habitats in southeastern Miami-Dade County.



PLAN FORMULATION PROCESS



Step 1: *Specify Problems and Opportunities*

Step 2: *Inventory and Forecast*

Step 3: *Formulate Alternative Plans*

Step 4: *Evaluate Alternative Plans*

Step 5: *Compare Alternative Plans*

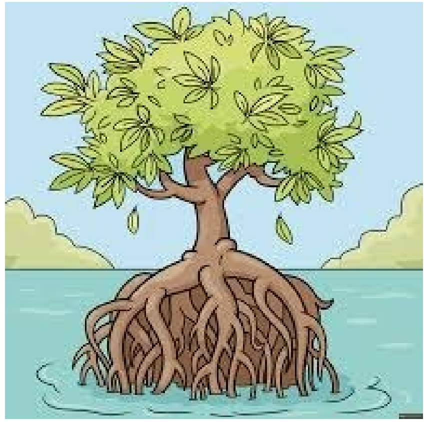
Step 6*: Plan selection*

"OLD SCHOOL" ECONOMIC EVALUATION

Economic evaluations of alternative plans based only on the study's primary purpose

Benefit Cost Ratio

Cost Effectiveness and Incremental Cost Analysis



"NEW SCHOOL" COMPREHENSIVE BENEFITS ANALYSIS

USACE Policy Directive, January 2021

National Ecosystem Restoration

- Non-monetary effects on ecological, cultural, and aesthetic resources including the positive and adverse effects of ecosystem restoration plans.

National Economic Development

- Increases in the economic value of the goods and services that result directly from a project.

Regional Economic Development

- Increases in the effect on employment and demand for local goods and services not captured by National Economic Development.

Other Social Effects

- Effects on societal and individual health and human safety.

COMPREHENSIVE BENEFITS ARE NOT...

Gathering data outside of the main project purpose.

Justification to select a non-cost-effective plan.

The need to quantify or capture every possible benefit from a project.

COMPREHENSIVE BENEFITS ARE...

Utilizing existing data from alternative plan modeling.

A more complete look at alternative plan outcomes.

A way to differentiate between similar alternatives.

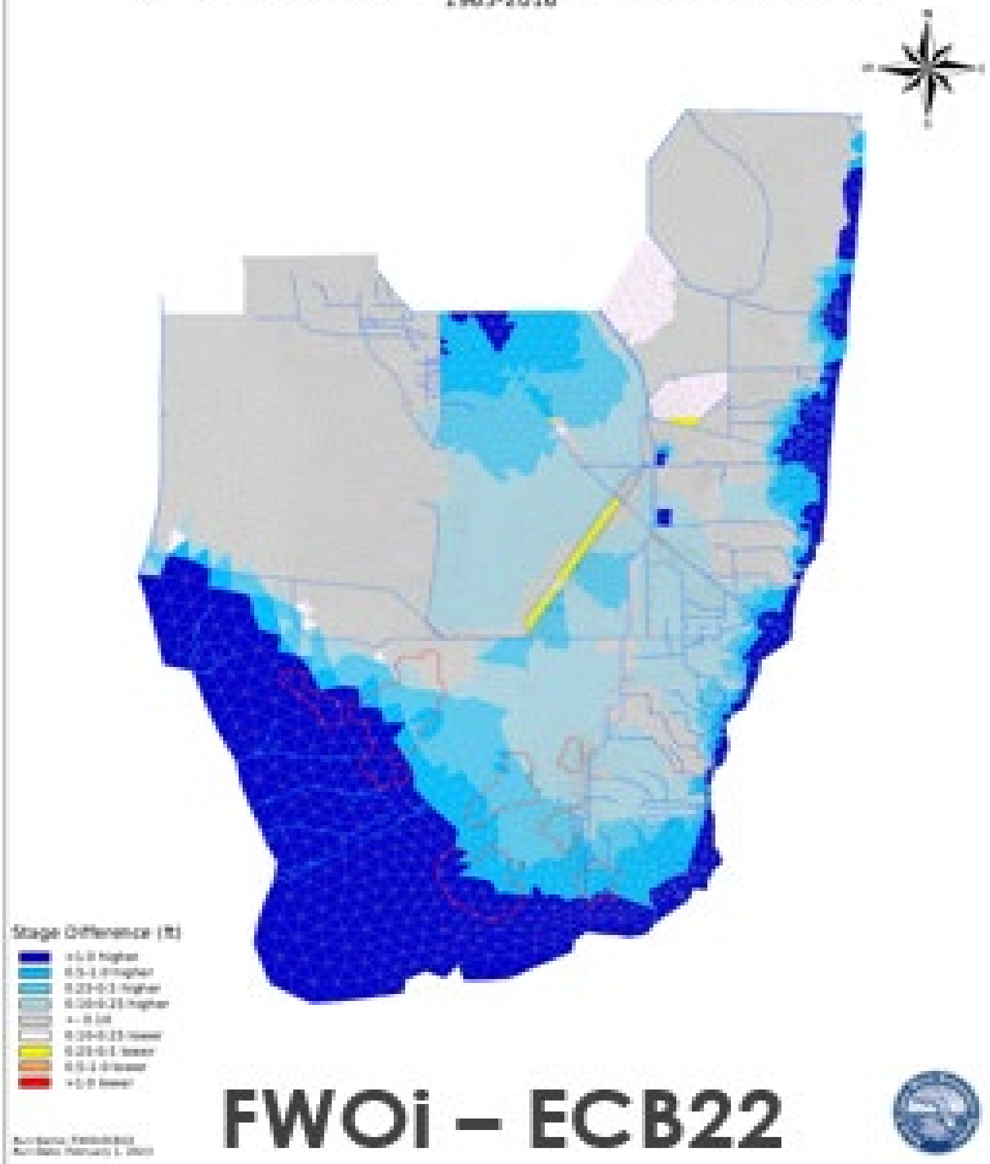
An opportunity to quantify outcomes that previously were not considered in alternative evaluations.

BBSEER COMPREHENSIVE BENEFITS

U.S. ARMY

Average Annual Stage Difference in POS

1965-2016



RSM GLADES (RSMGL)

Illustrates Hydrology (e.g.; durations/depths)

Answers how we can best capture excess water and get it to where it is needed

BISCAYNE BAY SIMULATION MODEL

How changes in hydrology affect nearshore salinity levels and habitat

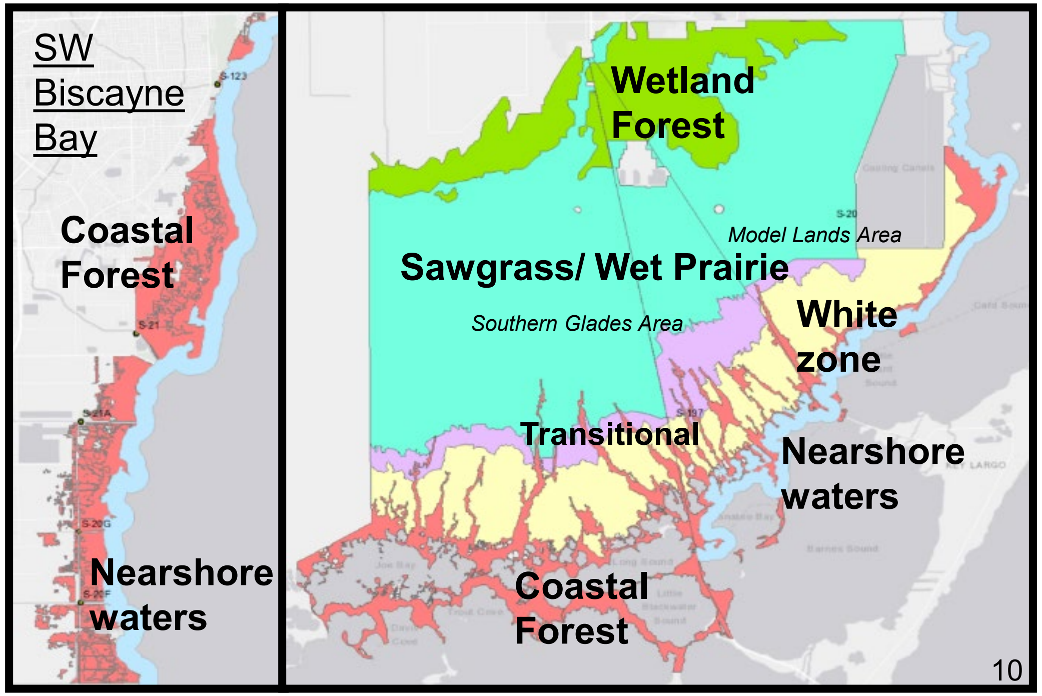
BISECT

How changes in hydrology affects salinity in the rootzone of wetland habitats

MD RSM

Provides assurances that we are maintaining savings clause levels of water supply & flood protection

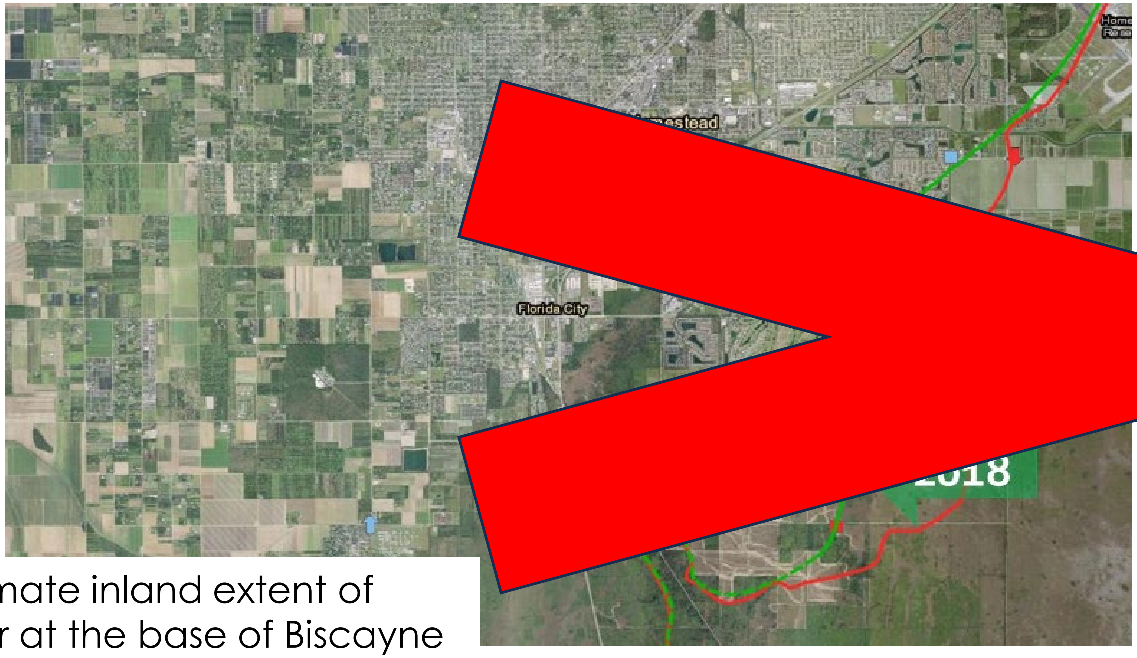
	HABITAT	POTENTIAL RESTORATION (ACRES)
	WETLAND FOREST	12,492
	SAWGRASS/WET PRAIRIE	54,810
	TRANSITIONAL ZONE	6,503
	WHITE ZONE	18,020
	COASTAL FOREST (MANGROVE)	18,619
	NEARSHORE WATERS	9,782 (SHORE TO 500 METERS)
	TOTAL	120,226



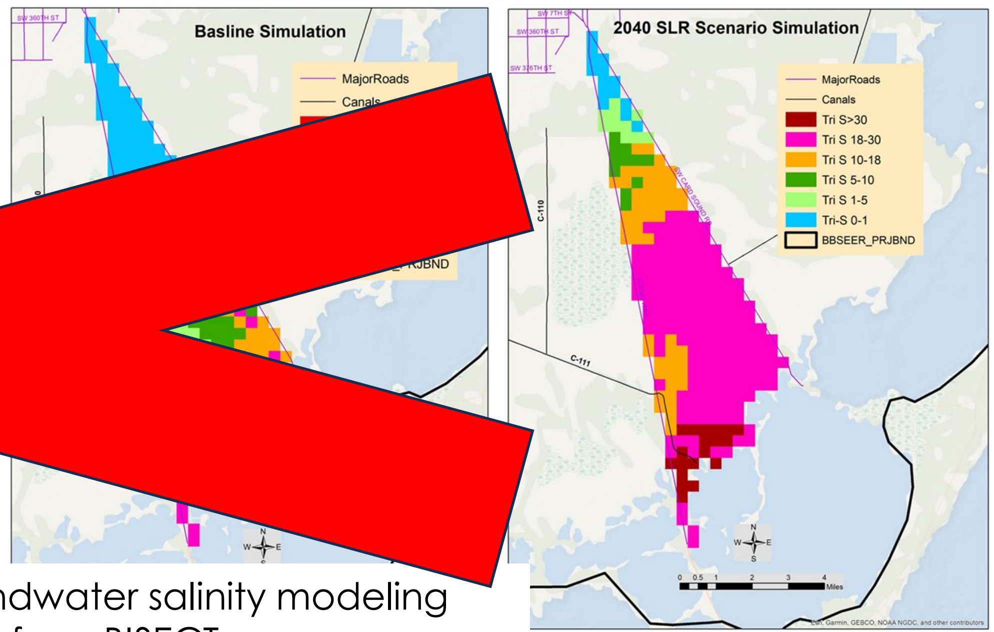
NATIONAL ECONOMIC DEVELOPMENT (NED)

What we thought we could evaluate:
(spoiler: it's not what we did)

Land remaining vegetated and not transitioning to open water.	Keeping agricultural lands and well water fresh.	Reducing storm damages with coastal vegetation and mangroves.



Approximate inland extent of saltwater at the base of Biscayne aquifer, courtesy USGS

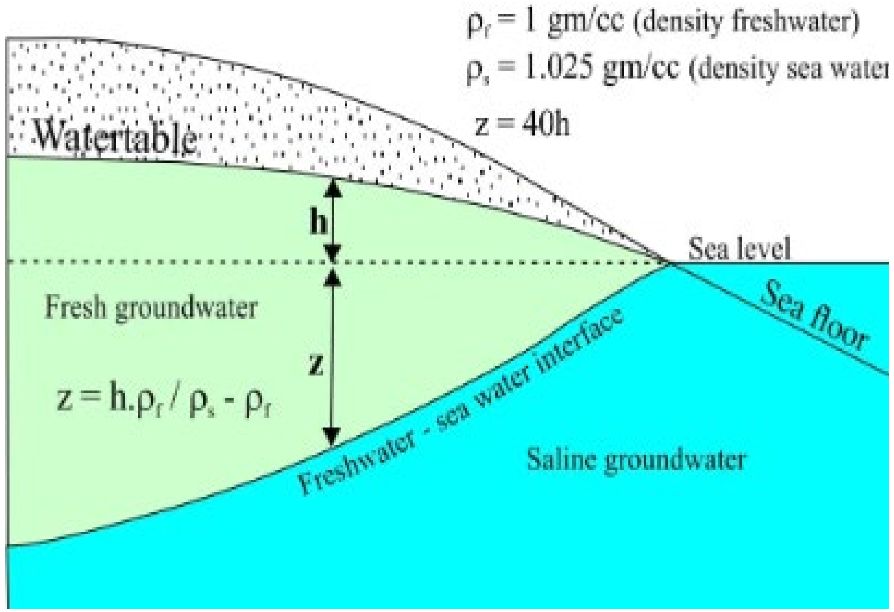


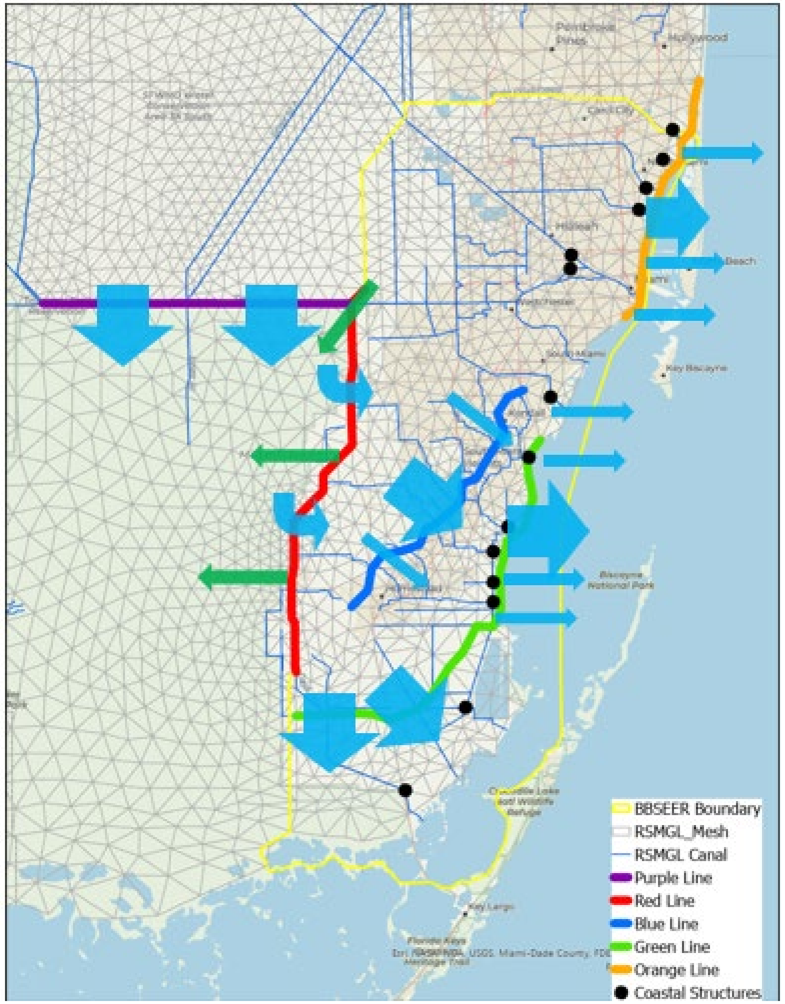
Groundwater salinity modeling results from BISECT.

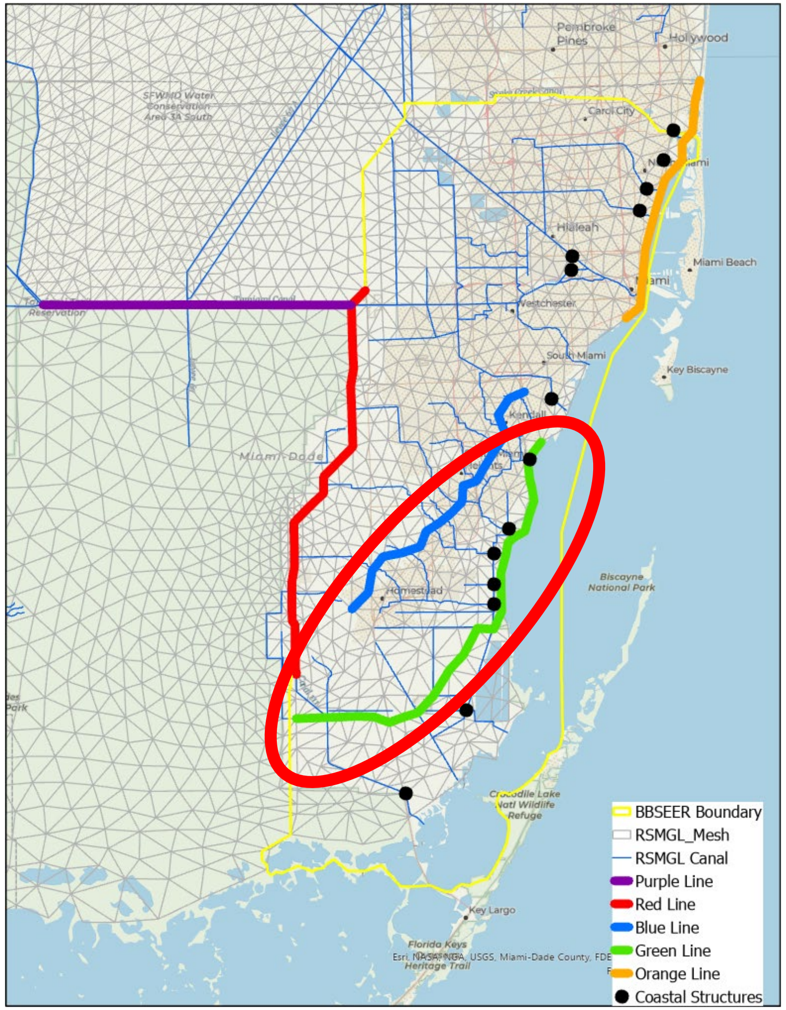
NATIONAL ECONOMIC DEVELOPMENT (NED)

What we could ACTUALLY evaluate:

Ghyben-Herzberg Principle







LESSONS LEARNED

- ALWAYS ask a modeler if data extraction or post-processing is available.
- Start brainstorm of ideas early.
- Be as creative as possible during brainstorming – no idea is a bad idea.

THANK YOU!!!

- Dr. Bradley Foster
- Robert Kirby
- Evan Jonson
- Andrew Coman
- Dr. Chloe Vorseth
- …and the whole BBSEER Team!