



RECOVER Science Meeting 1 March 2016



**NSRSM RESULTS: SIGNIFICANCE TO
EVERGLADES PLANNING,
IMPLEMENTATION, AND SCIENCE**

Agnes R. McLean, NPS/EVER

Introduction and Background

- Ecosystem restoration planning has long employed natural and managed system models for assistance in decision-making
- A new generation Natural System Model (NSRSM) has been developed at the SFWMD
- In the relatively recent past, ecological models have been developed and used to give insights into how ecological systems may respond to hydrological inputs from different restoration scenarios



Introduction and Background

- Model developers from the SFWMD requested that RECOVER test the application of NSRSM to assess its potential for use in the broad arena of restoration planning, analyses and implementation
- RECOVER chose to use ecological models to evaluate the NSRSM
- The ecological models were run using NSRSM hydrology, and were compared back to the NSM
- Models were also compared to CEPP; these results are not shown here



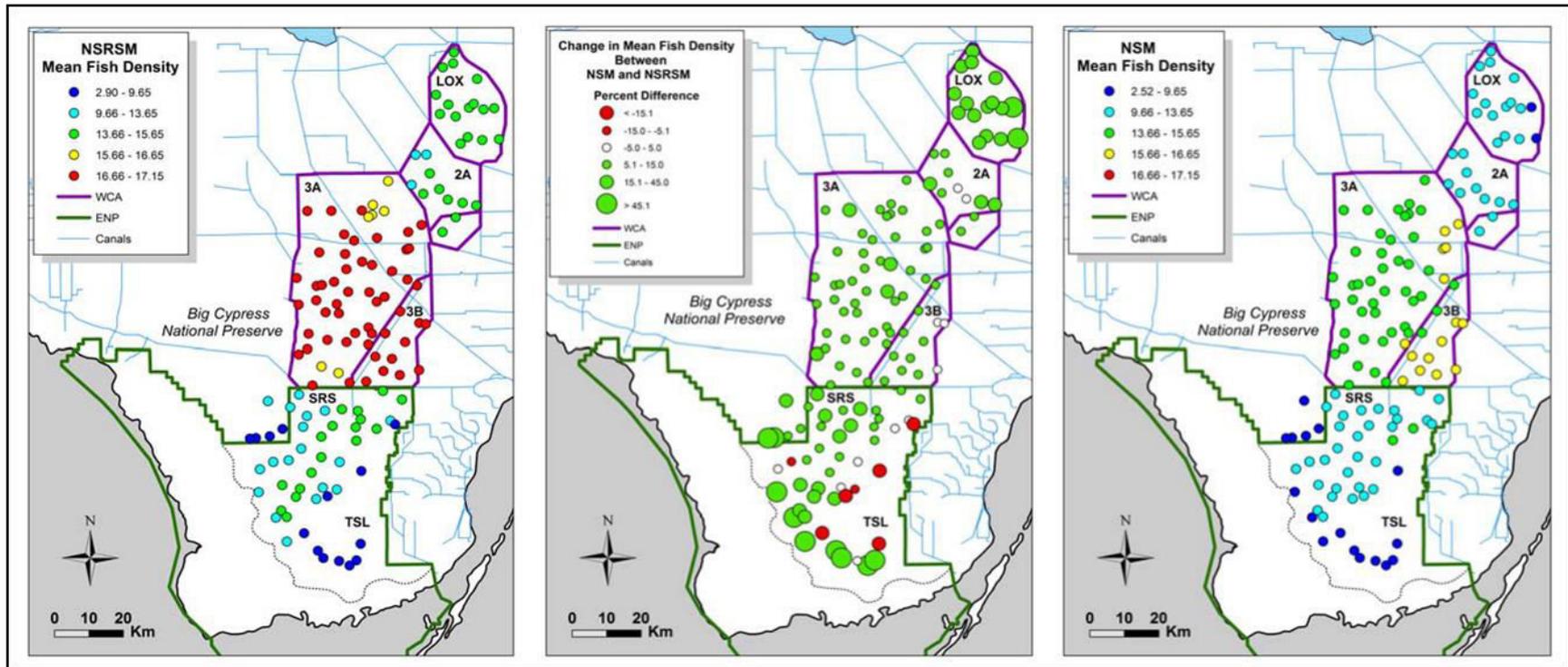
Ecological Models Applied

1. Freshwater fish densities (prey fish < 8 cm) (Trexler lab, FIU)
2. Wood Stork foraging index (SFNRC)
3. Alligator production suitability index (SFNRC)
4. Marl prairie habitat index (SFNRC)
5. Everglades Landscape Vegetation Succession (ELVeS) (SFNRC)
6. Wader Distribution & Evaluation Modeling (WADEM) (USGS)



Freshwater Fish Densities

Freshwater fish density – NSRSM (left) v NSM (right): Percent change (center) in average fish density*



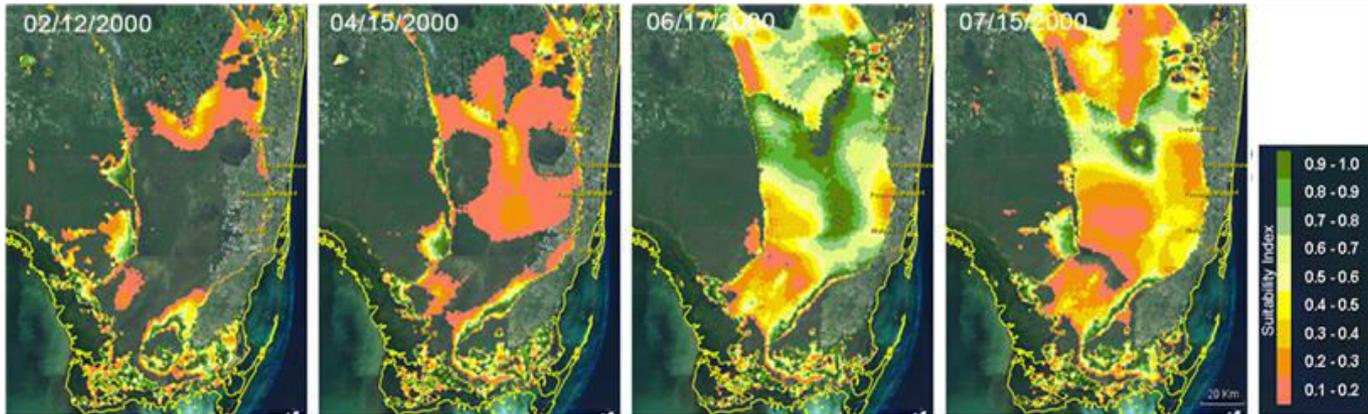
*Note the scale in left and right graphics; red denotes greater density, blue less



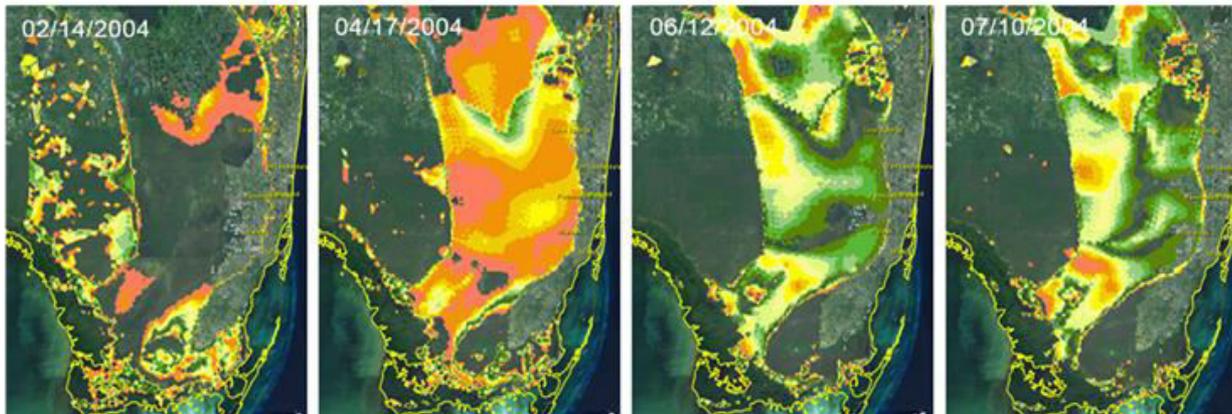
Wood Stork Foraging Potential

Wood storks shift foraging locations based on water depths across the landscape; depicted here are NSRSM wood stork foraging potential scores for February, April, June and July

2000

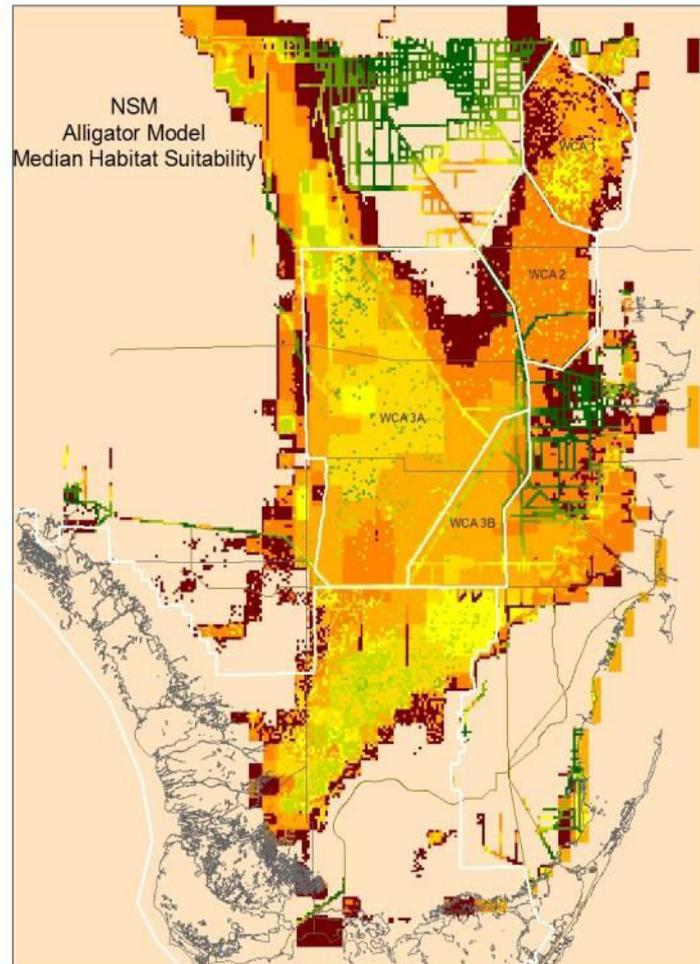
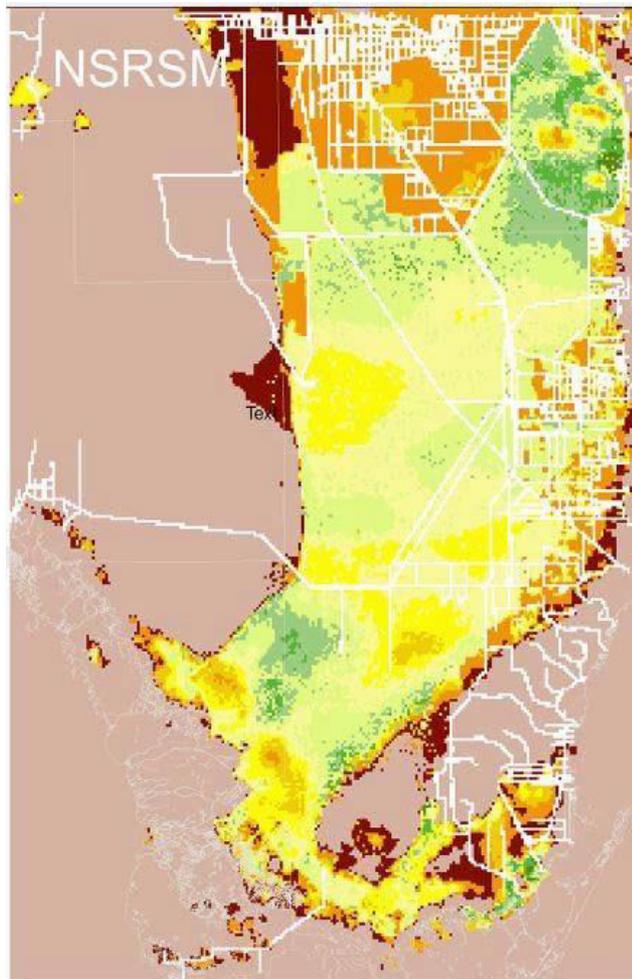


2004



Alligator Production Suitability

NSRSM (left) v NSM (right): all years

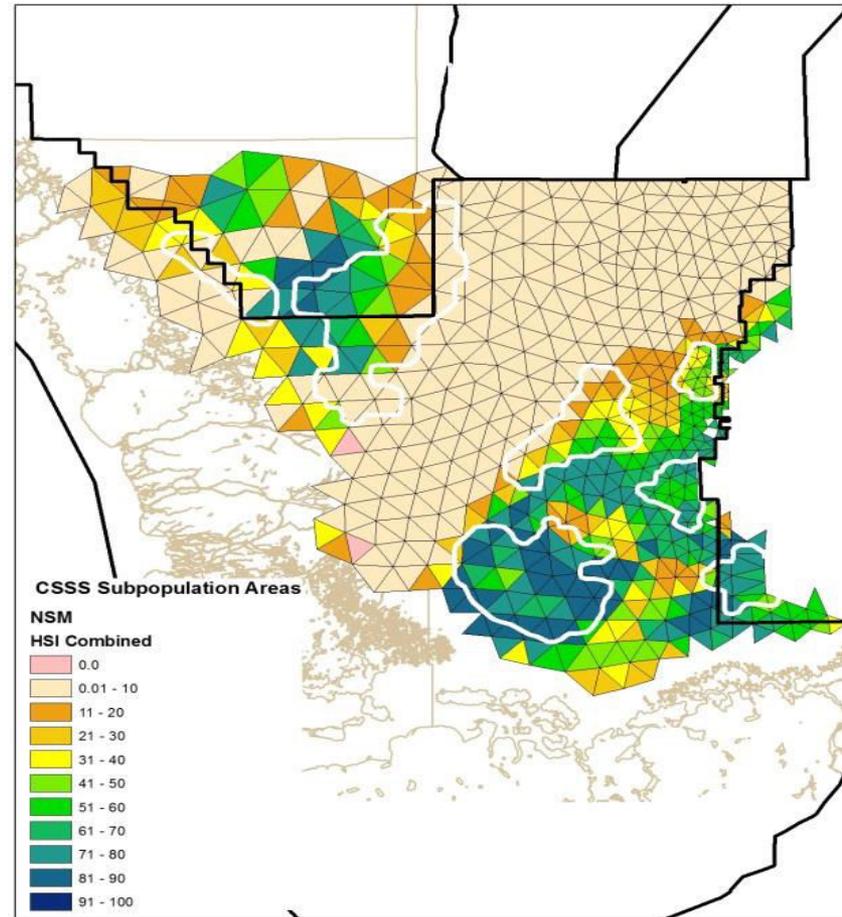
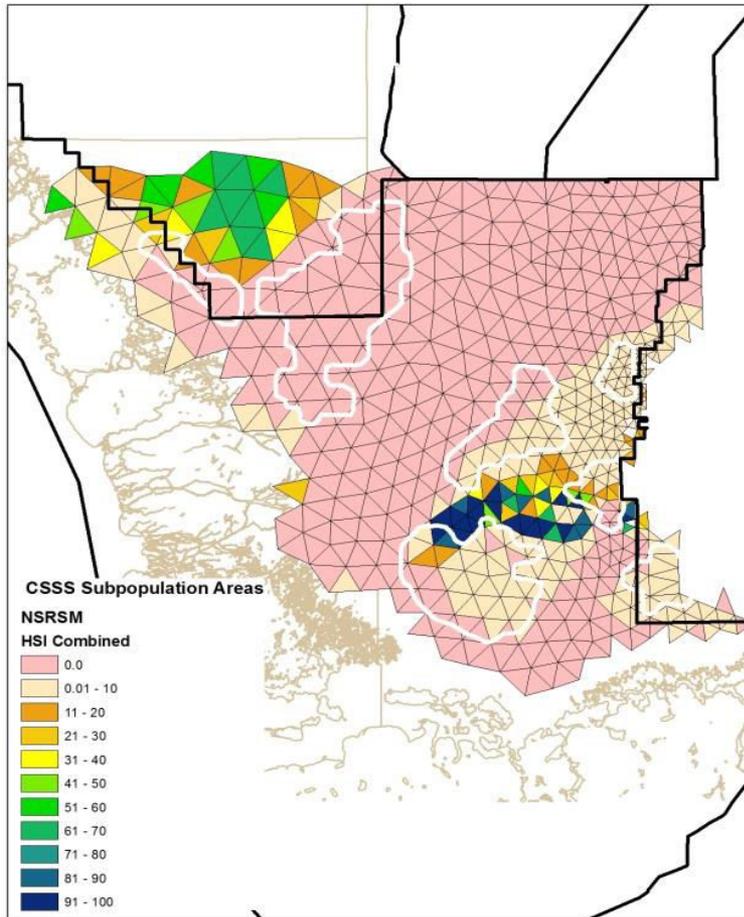


Habitat Suitability Index



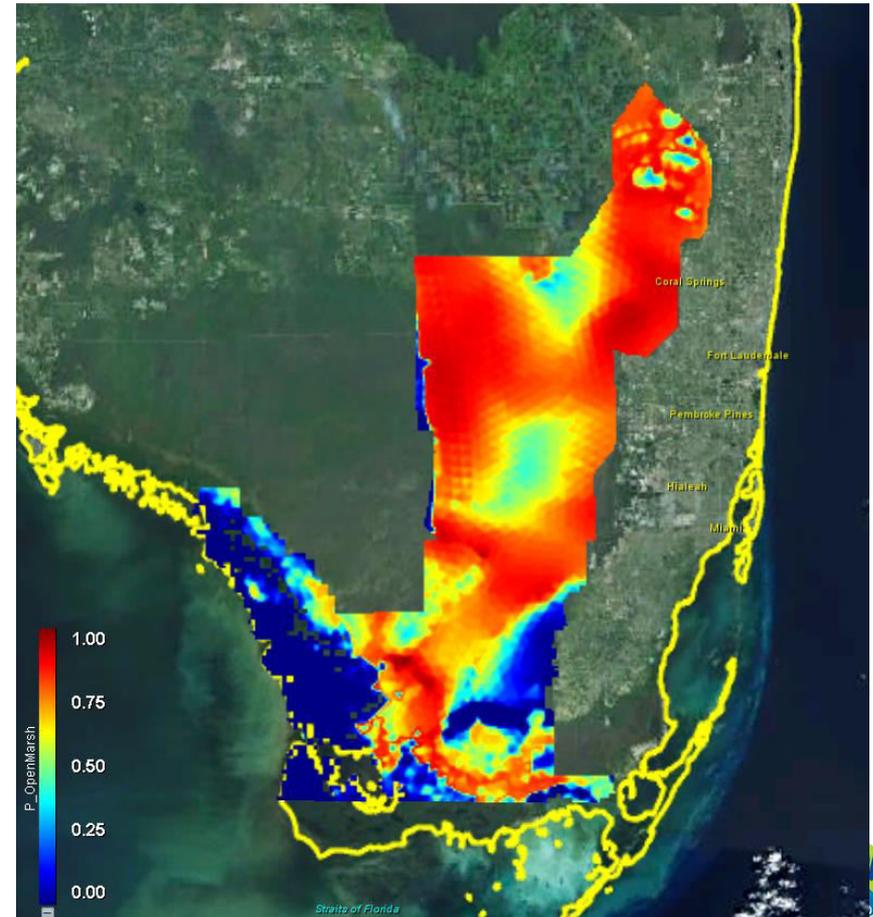
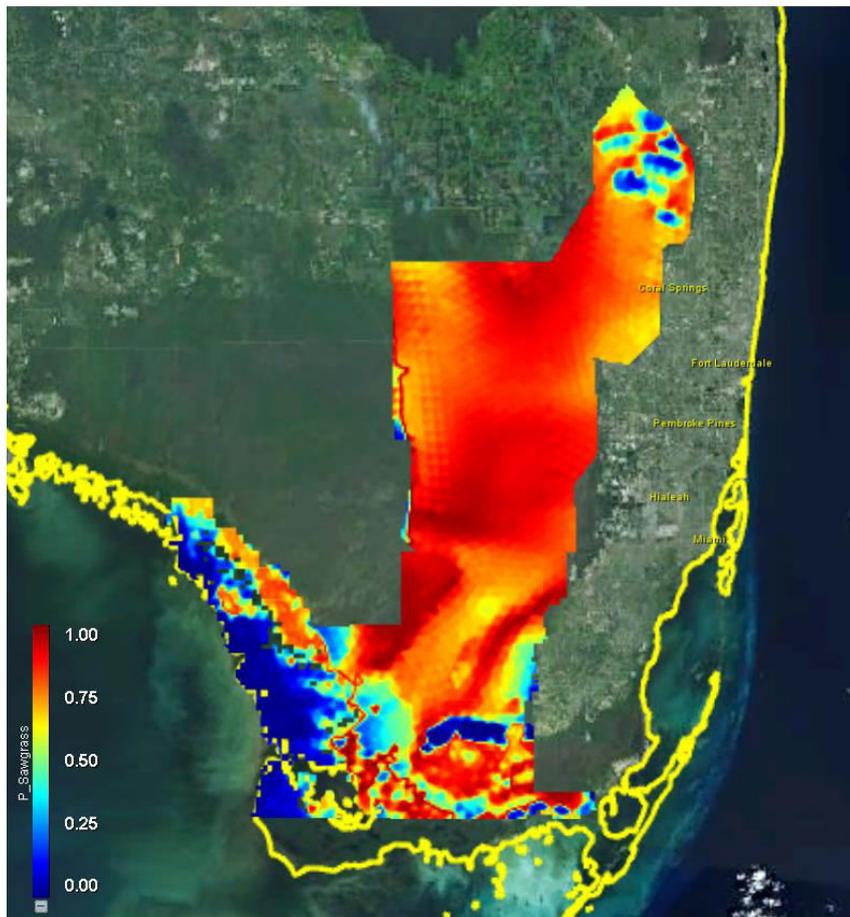
Marl Prairie Habitat Suitability

NSRSM (left) v NSM (right): all years



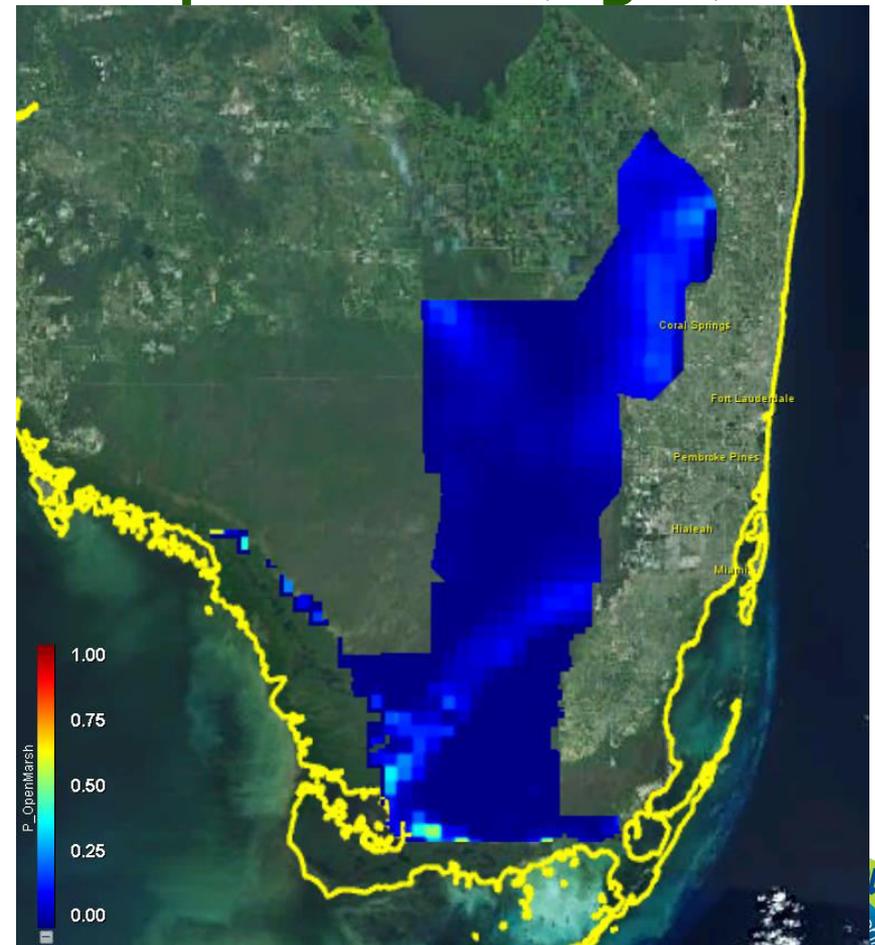
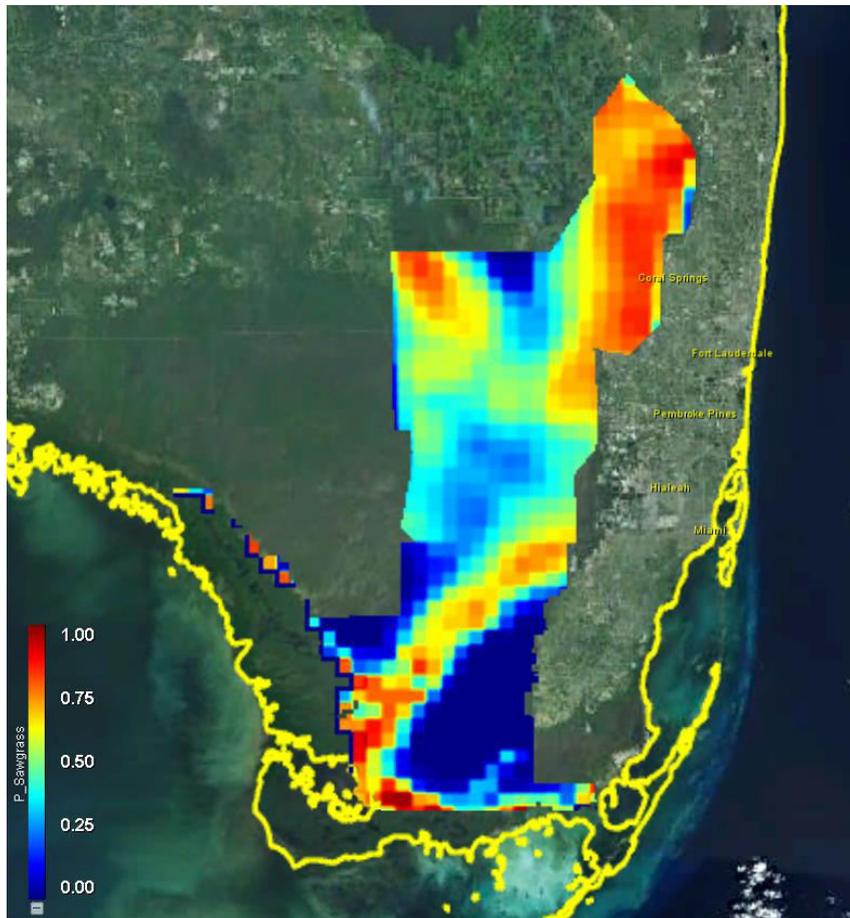
ELVeS Conditional Probabilities

NSRSM – Sawgrass (left) and Open Marsh (right)



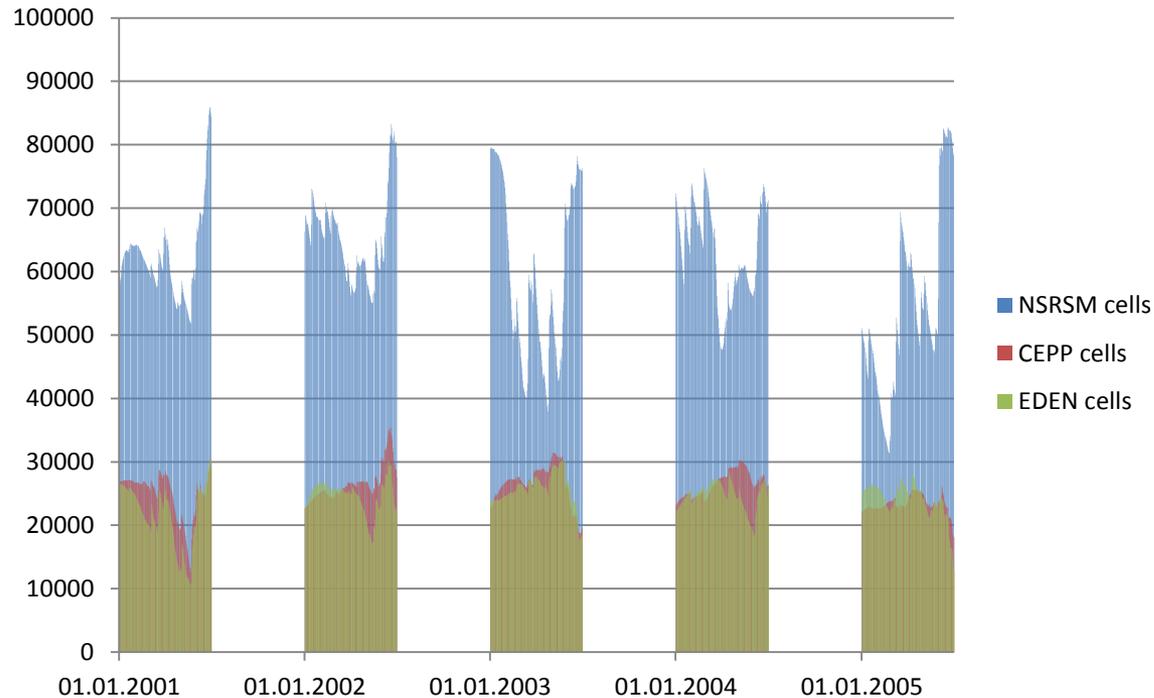
ELVeS Conditional Probabilities

NSM – Sawgrass (left) and Open Marsh (right)



WADEM — Depth Choices for Wading Birds

NUMBER OF CELLS WITHIN DEPTH RANGE



Discussion

- Overall, the NSRSM suggests that historical conditions were wetter than previously predicted under NSM
- The finer mesh of NSRSM (~1.6 sq mi) than the NSM (4 sq mi), better captures landscape features such as Shark River and Taylor sloughs
- The use of ecological models enhances our ability to visualize hydrologic effects on Everglades ecology



In Conclusion

- There is general concurrence with the NSRSM peer review panel (Bras, et. al. 2007), that the model should not be used in isolation to set performance measure targets for evaluating the strengths and/or weaknesses of restoration plans
- It can be used to inform such target-setting, along with other relevant scientific data and literature, and to guide inquiry into the historic ecosystem within an adaptive management framework



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- Mike Ross, Jay Sah, Joel Trexler, FIU





Coming soon...

Test Application for Migration from NSM to NSRSM

Report to the Interagency Modeling Center

REstoration Coordination and VERification

February 2016

THANK YOU

