

Reducing uncertainty of wading bird colony size predictions with the Everglades Vulnerability Analysis (EVA) tool

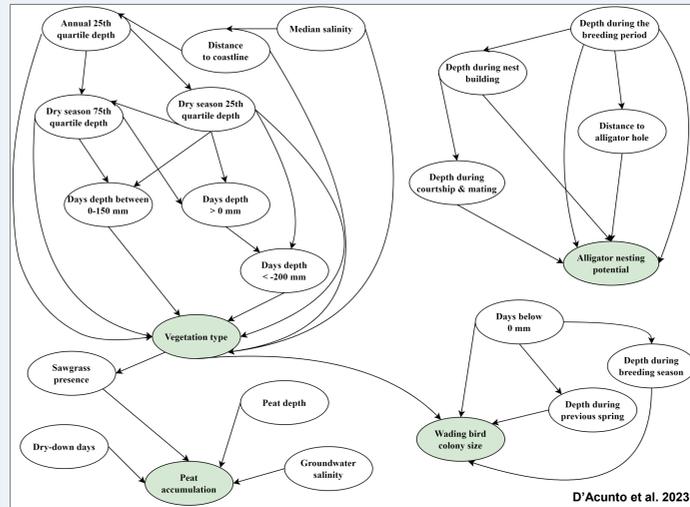
Marisa T. Martinez, Laura E. D'Acunto and Stephanie S. Romañach
U.S. Geological Survey, Wetland and Aquatic Research Center, Gainesville, FL, USA

Background

- The Everglades Vulnerability Analysis (EVA) tool models landscape-scale response of indicators of Everglades ecosystem health to changes in hydrology and salinity¹
- The wading bird submodel of EVA predicts the probability of colony size (i.e., number of nesting birds)
- Uncertainty is highest for larger size classes (>1,000 birds)** which are relevant to Everglades restoration goals

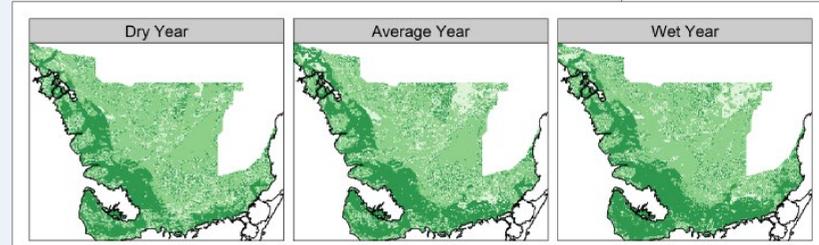
Reducing uncertainty in predictions of large colony can help:

- Address the mismatch between evaluation (i.e., simulation) tools and field monitoring data
- Directly predict wading bird performance metrics to monitor Everglades restoration progress



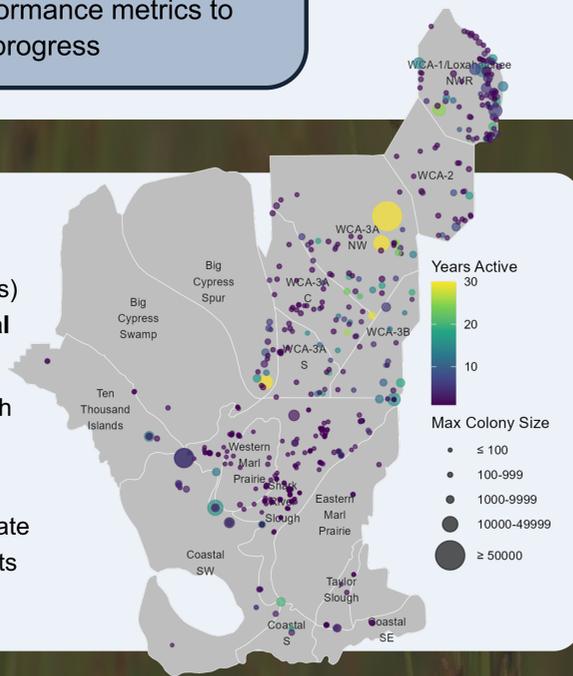
Left: Current EVA submodel structure for each Everglades indicator (green).

Bottom: Predicted colony size within Everglades National Park in three representative water years. EVA leverages colony size data collected as part of the CERP Monitoring & Assessment Plan and hydrologic outputs from Everglades Depth Estimation Network (EDEN) and Biscayne and Southern Everglades Coastal Transport (BISECT).

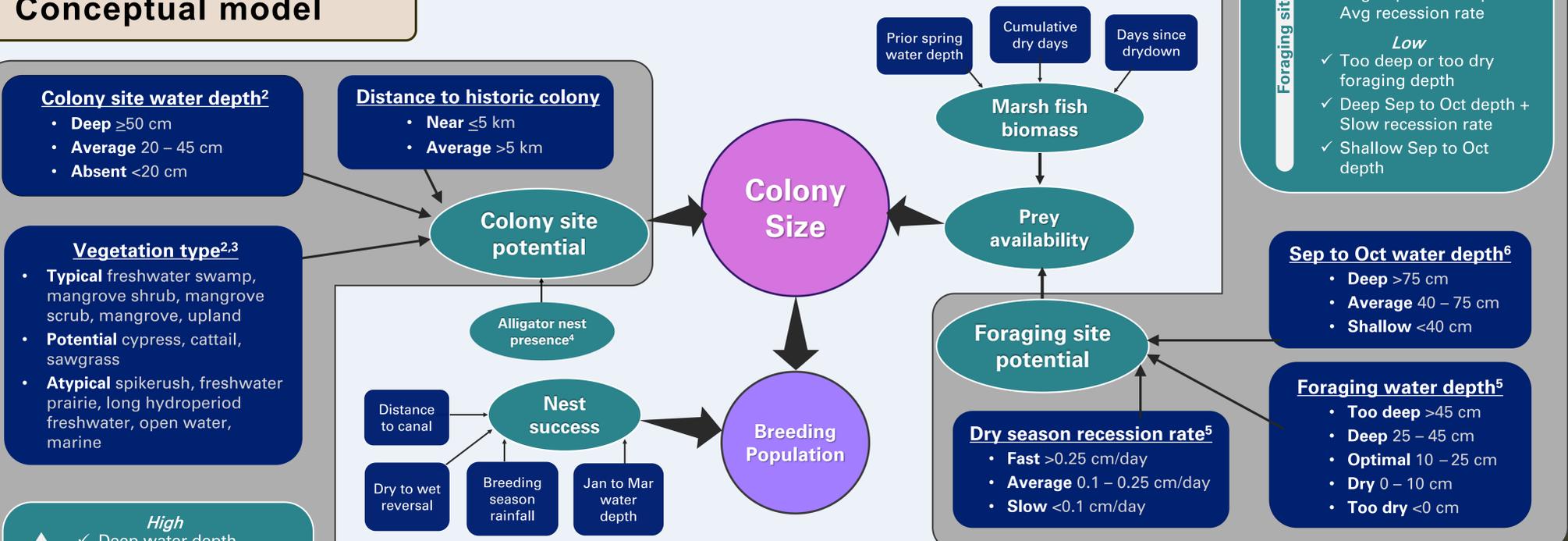


Methods

- Calculate new input variables (dark blue boxes) that represent **hydrologic and environmental conditions** of nesting and foraging habitats
- Evaluate bins for each variable associated with levels of **colony site potential and foraging site potential** (teal boxes)
- Incorporate **Everglades subregions** to evaluate spatiotemporal differences among model inputs and outputs (see map on right)



Conceptual model



- Foraging site potential**
- High**
 - Optimal foraging depth
 - Deep Sep to Oct depth + Fast recession rate
 - Avg Sep to Oct depth + Slow recession rate
 - Medium**
 - Deep or dry foraging depth
 - Avg Sep to Oct depth + Avg recession rate
 - Low**
 - Too deep or too dry foraging depth
 - Deep Sep to Oct depth + Slow recession rate
 - Shallow Sep to Oct depth

- Colony site potential**
- High**
 - Deep water depth
 - Near historic colony
 - Typical vegetation type
 - Medium**
 - Average water depth
 - Average distance
 - Potential vegetation type
 - Low**
 - Absence of water
 - Average distance
 - Atypical vegetation type

Next Steps

- Incorporate estimates of marsh fish biomass to **examine prey availability** as an additional predictor of colony size
- Integrate predictors of nest success to scale up from the colony level and **estimate breeding population size**



References

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