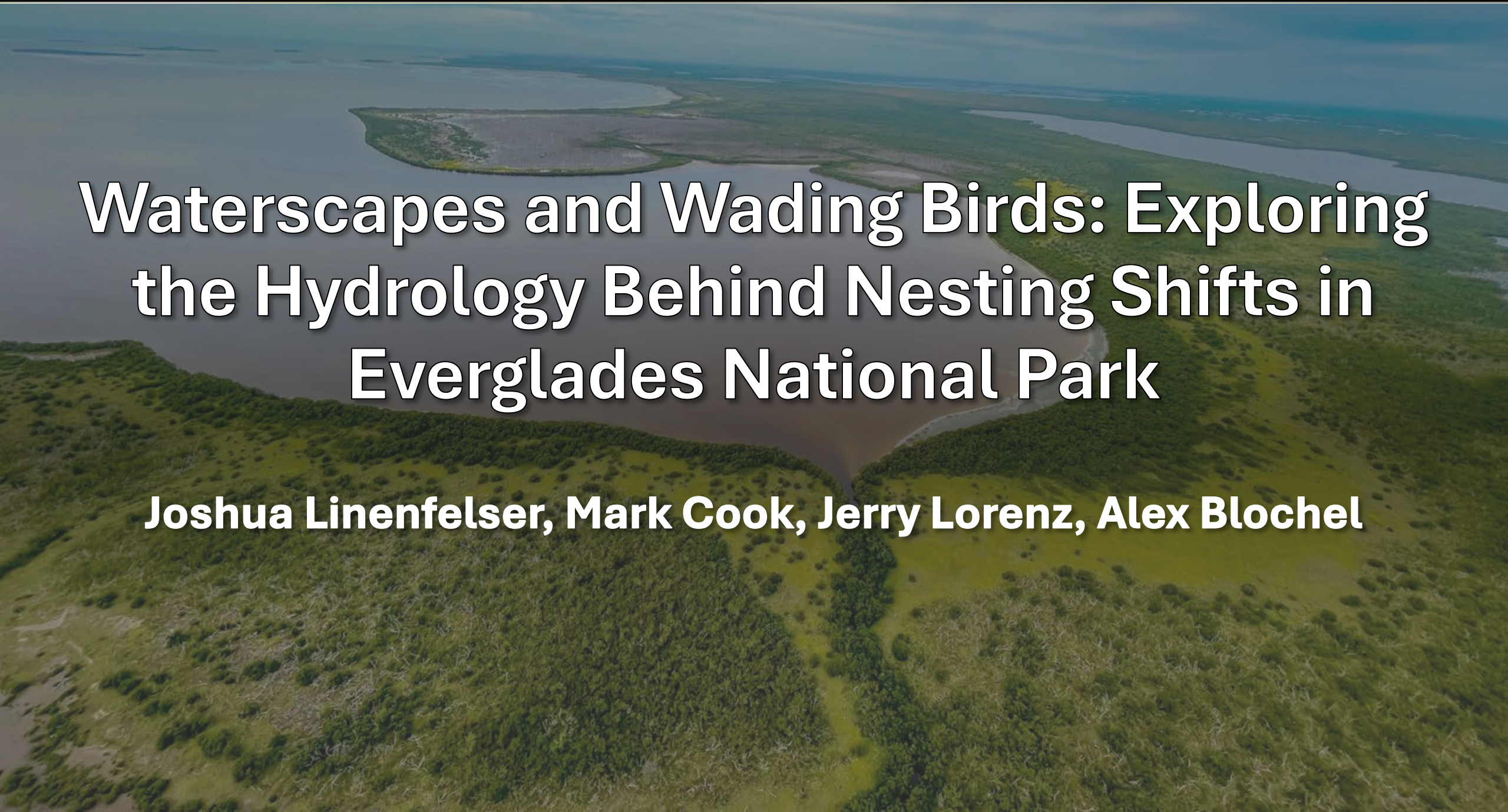


Waterscapes and Wading Birds: Exploring the Hydrology Behind Nesting Shifts in Everglades National Park

Joshua Linenfelser, Mark Cook, Jerry Lorenz, Alex Blochel

Roseate Spoonbill

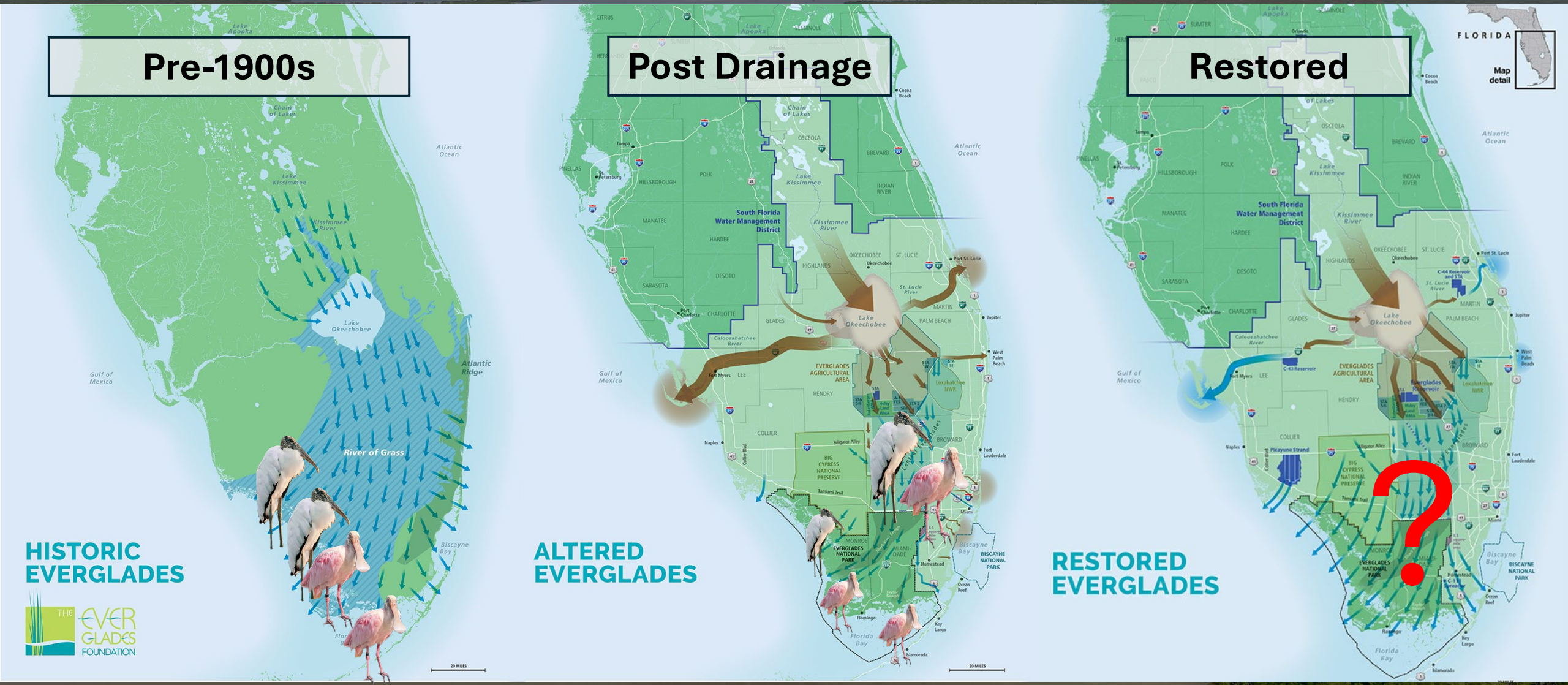
(Platalea ajaja)

Wood Stork

(Mycteria americana)

- Indicator species signaling hydrological and prey availability shifts
- Tactile foragers that require appropriate hydrology for successful foraging
- Vital for wetland ecosystem monitoring

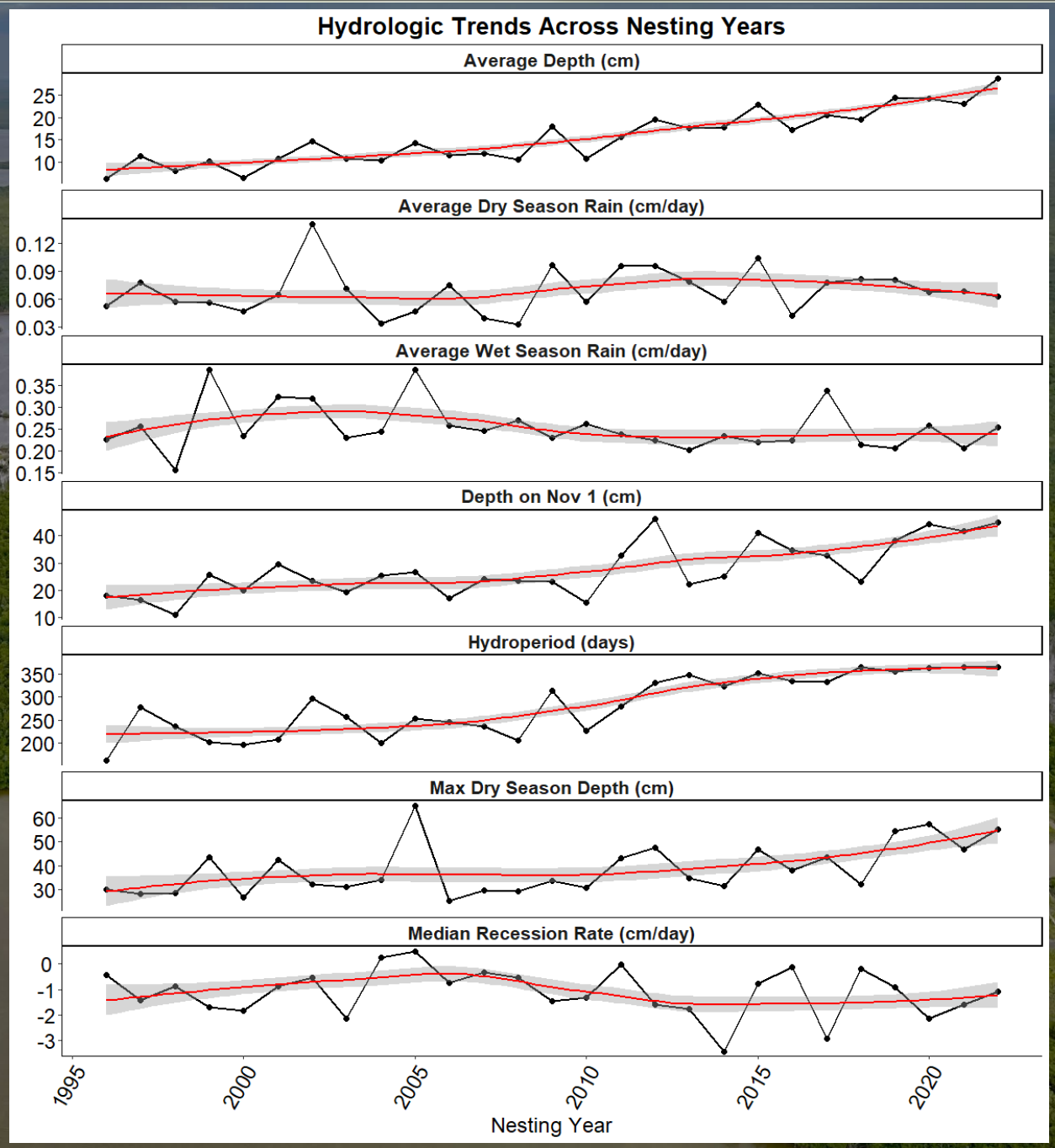
Hydrologically derived shifts in Nesting Locations



Shifting/Variable hydrology can drive shifts in Wading Bird Nest amounts and locations

Shifting Hydrology

↑ Average Depth
Hydroperiod
Depth at start of Nesting (Nov)
Recession in the dry season



Questions

Objective: Determine how hydrologic variability influences WOST and ROSP nesting trends in the Coastal Everglades.

Question 1: How have nesting locations and amounts shifted over the sampling period?

Question 2: What hydrologic conditions drive nest amount and location for WOST and ROSP?

Question 3: What coastal habitats need to be rehydrated for effective coastal foraging?

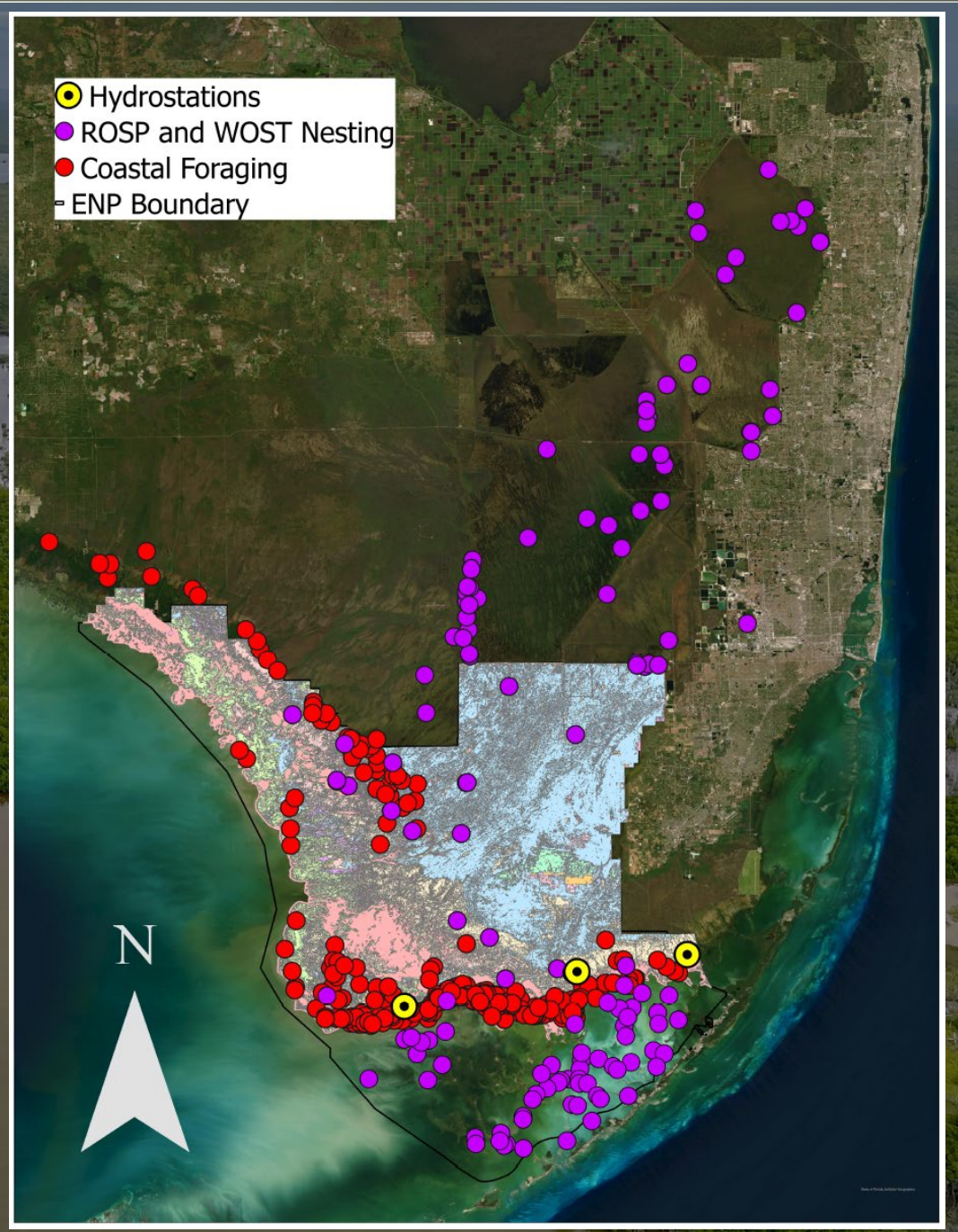
Outcome:

1. Assess whether current restoration efforts are successfully restoring historical nesting patterns and improving ecosystem function.
2. Provide refined hydrologic targets for managers to optimize water flow and enhance nesting success.

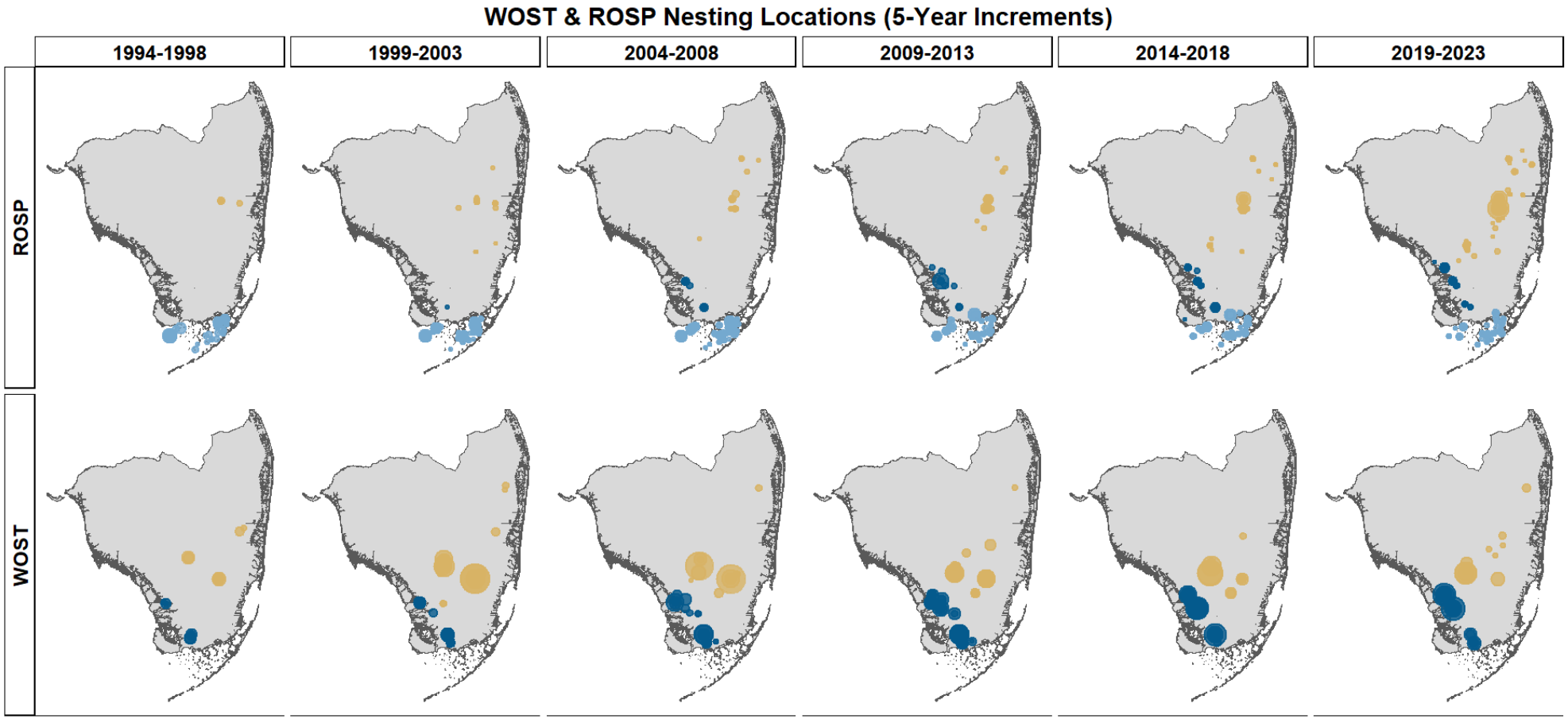
Methods

Data Collection

- Bird Surveys (NPS/UF/SFWMD)
  - Greater Everglades **Nesting data** from aerial surveys
  - **Coastal Foraging** Data from aerial Surveys (Mark Cook, SFWMD)
- Hydrologic monitoring stations (Audubon/DBhydro)
  - Surface Metrics
  - Precipitation
- Vegetation Survey Mapping Data (NPS)



Question 1: How have nesting locations shifted over the sampling period?



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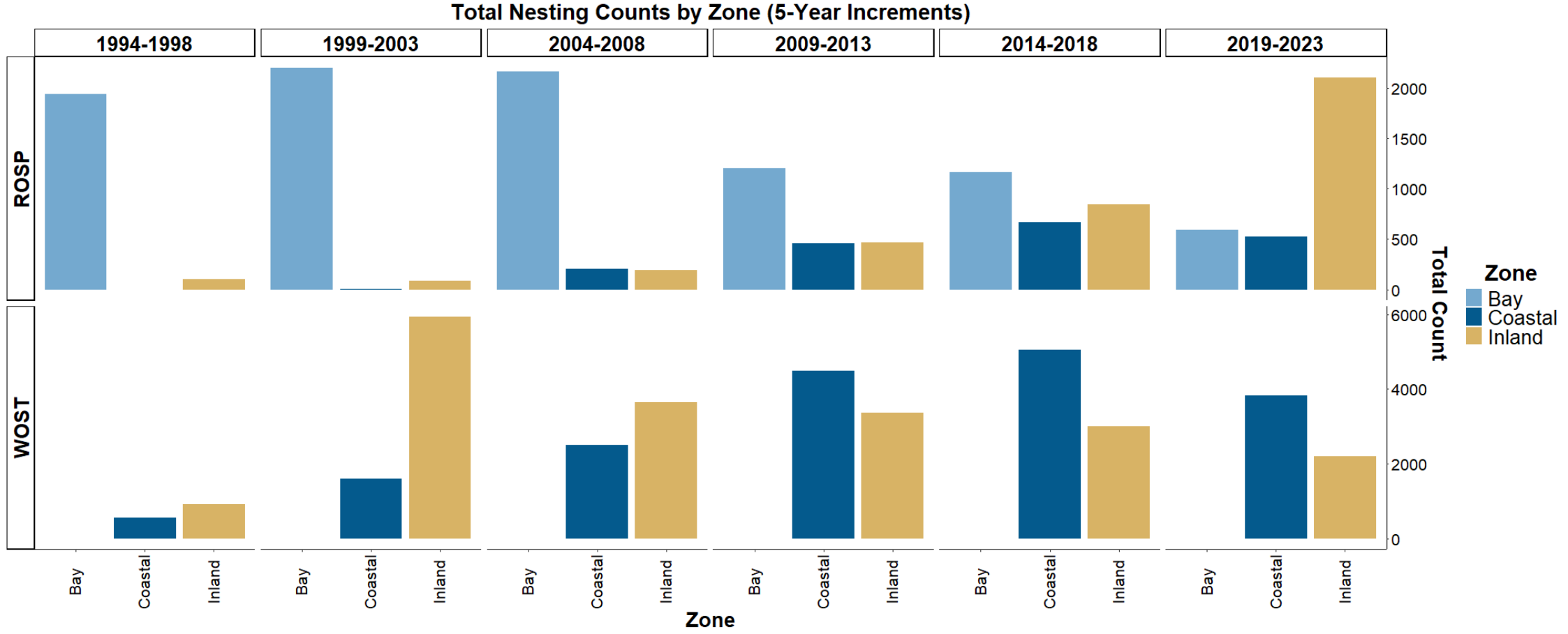

Question 2: What hydrologic conditions drive nesting events for WOST and ROSP in the coastal Everglades?

- **Model Type:** Generalized Linear Mixed Model (GLMM)
- **Family:** Negative Binomial (nbinom2, log link)
- **Response Variable:** Total Nest Count
- **Predictor Variables:**
  - Current Hydrologic Factors
  - Previous Year's Hydrologic Factors
  - **Zone (Coastal/Inland) – *Interaction Term***
- **Random Effect:** Nesting Year (to account for year-to-year variation)

$$\text{Total Nests} \sim (\text{Hydroperiod (Days)} + \text{Median Dry Season Recession} + \text{Max Dry Season Depth} + \text{Depth on Nov 1} + \text{Avg Depth} + \text{Prev. Hydroperiod} + \text{Prev. Recession} + \text{Prev. Max Dry Depth} + \text{Prev. Depth on Nov 1} + \text{Avg Rainfall} + \text{Prev. Avg Rainfall}) \times \text{Zone} + (1|\text{Nesting Year})$$

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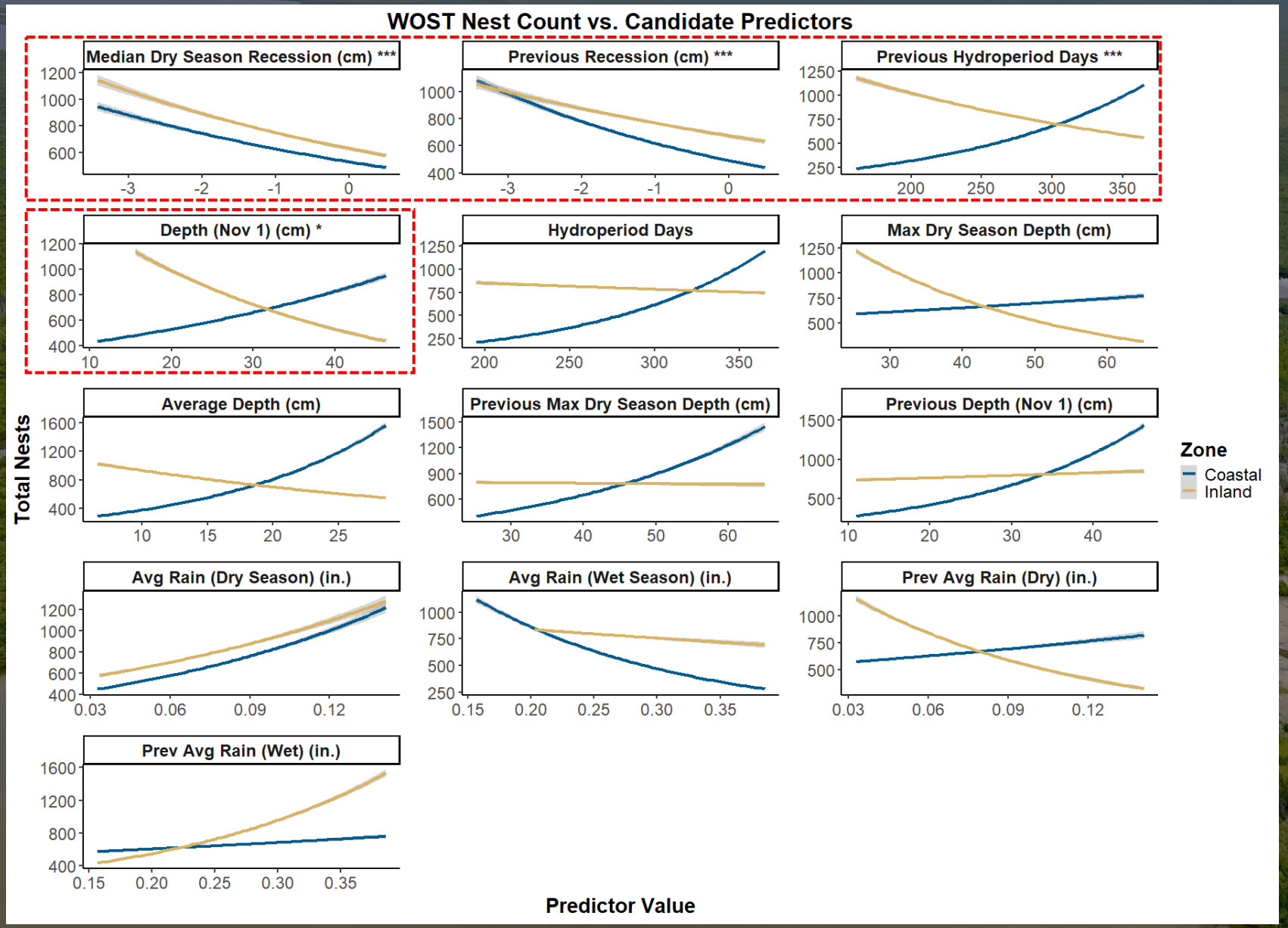

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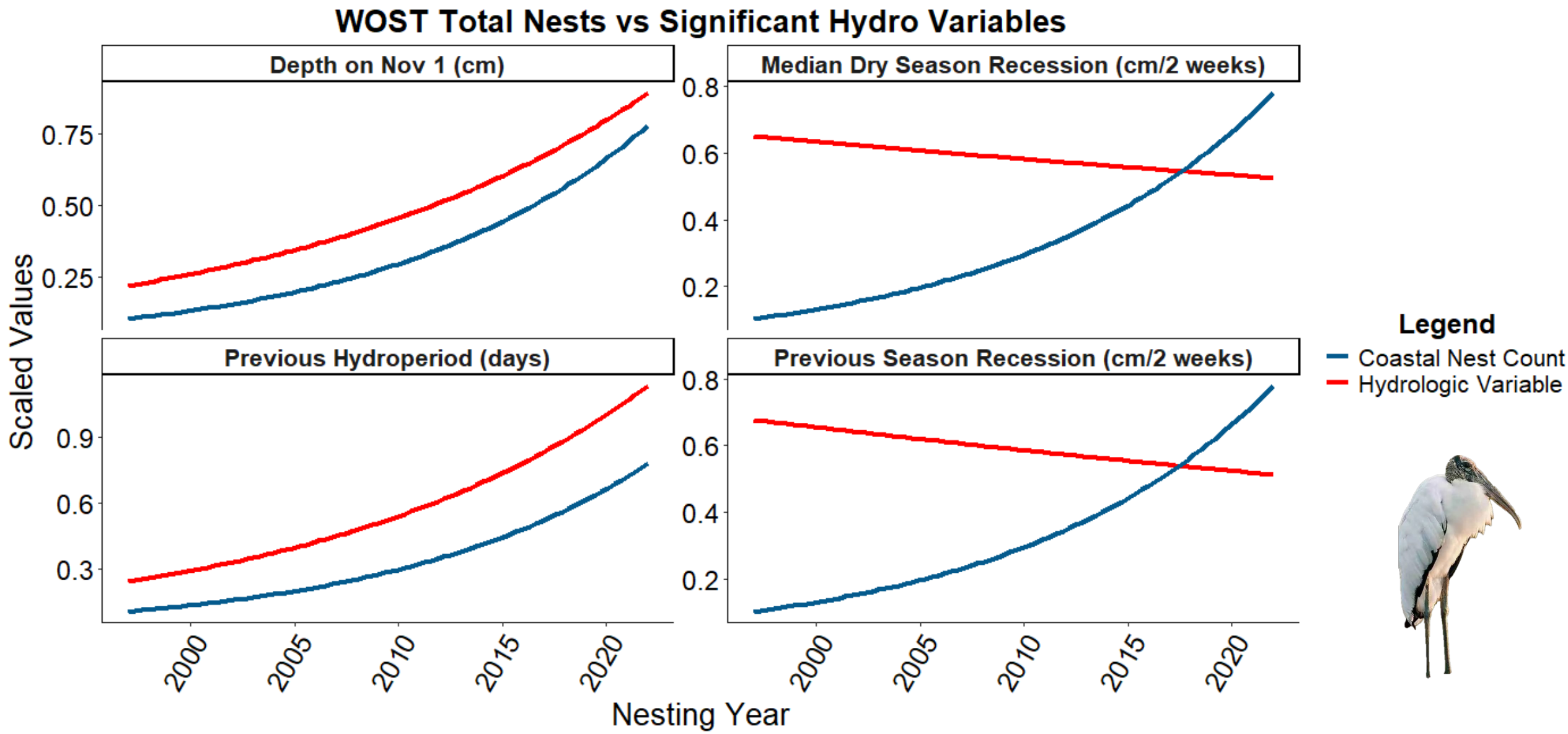

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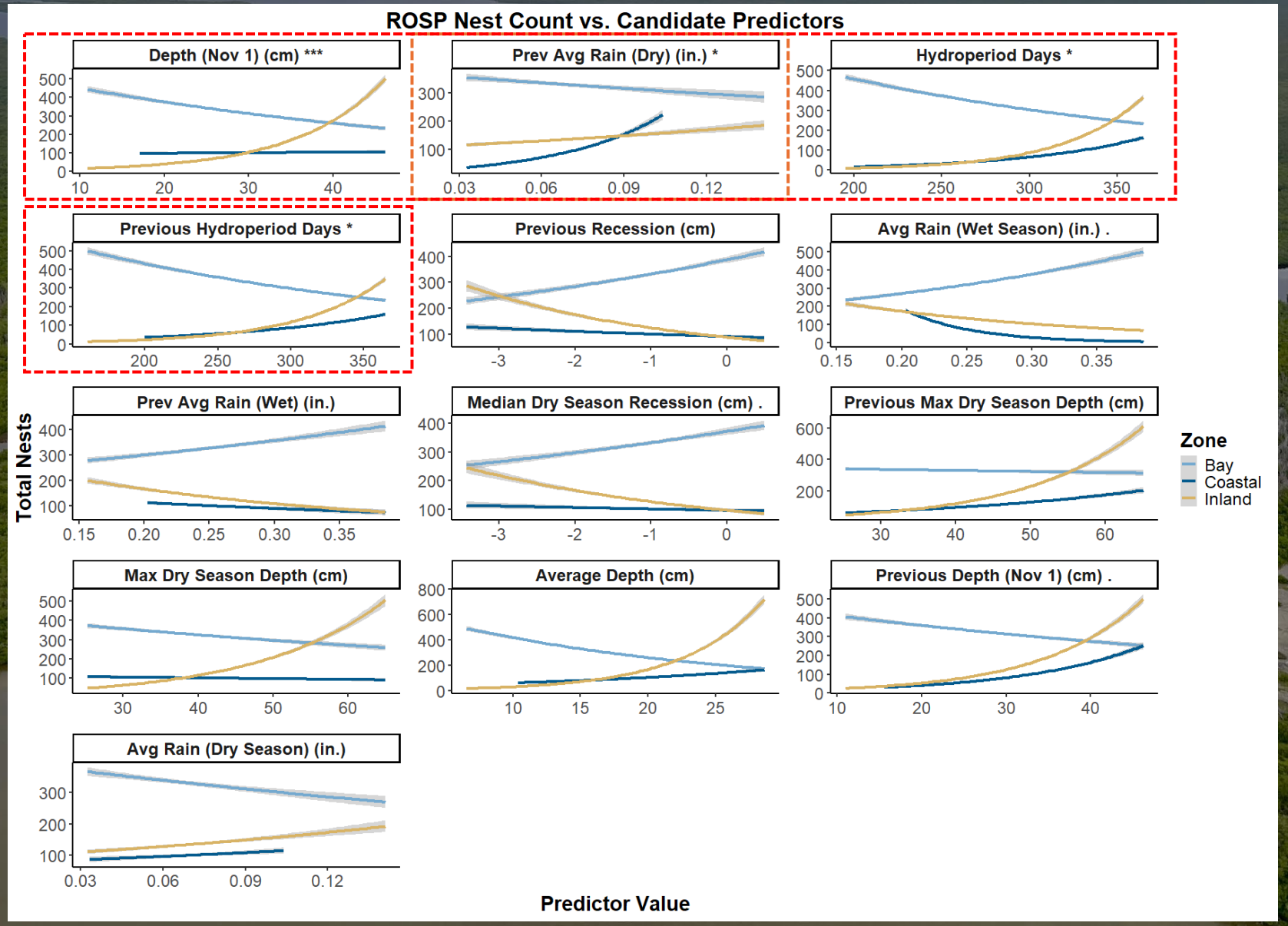

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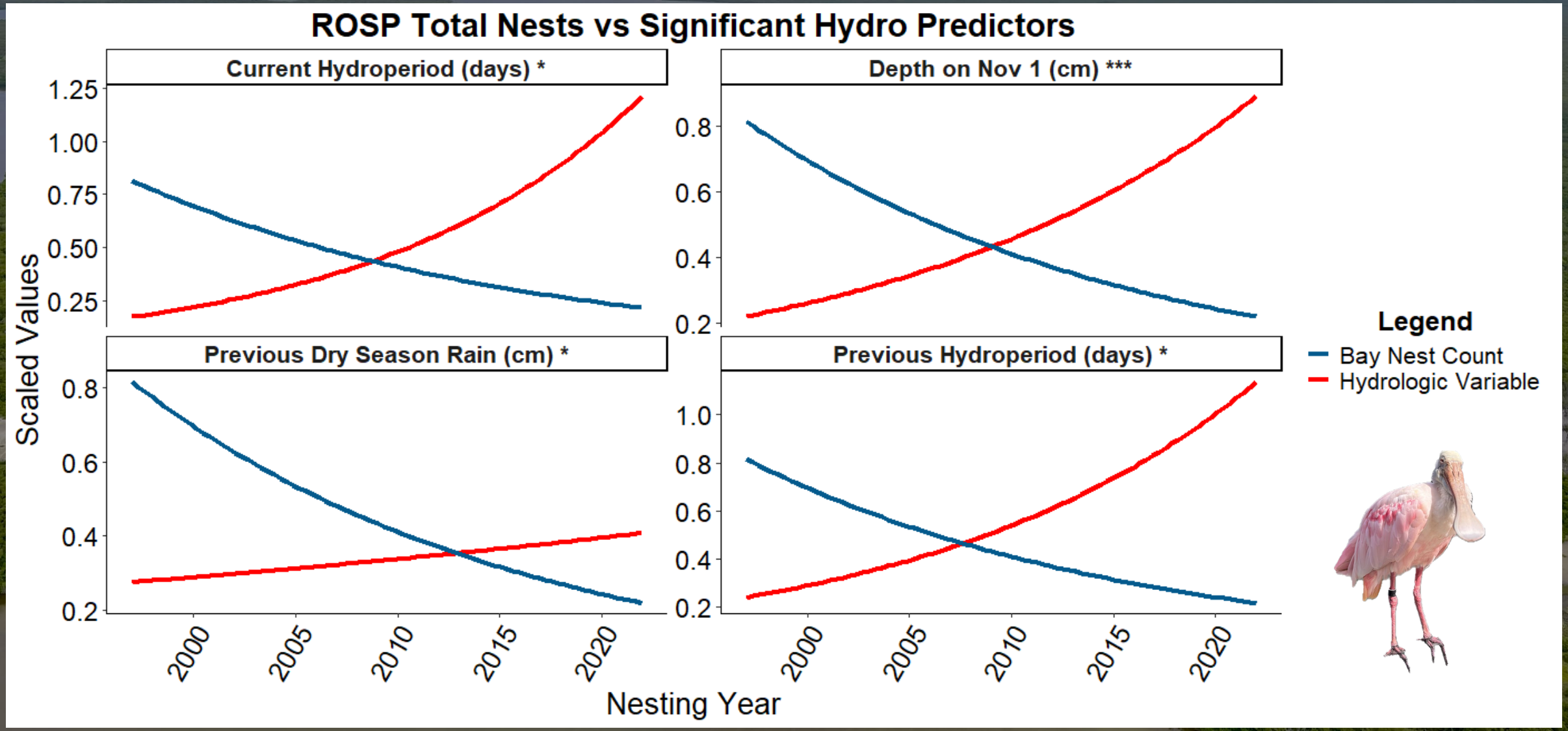
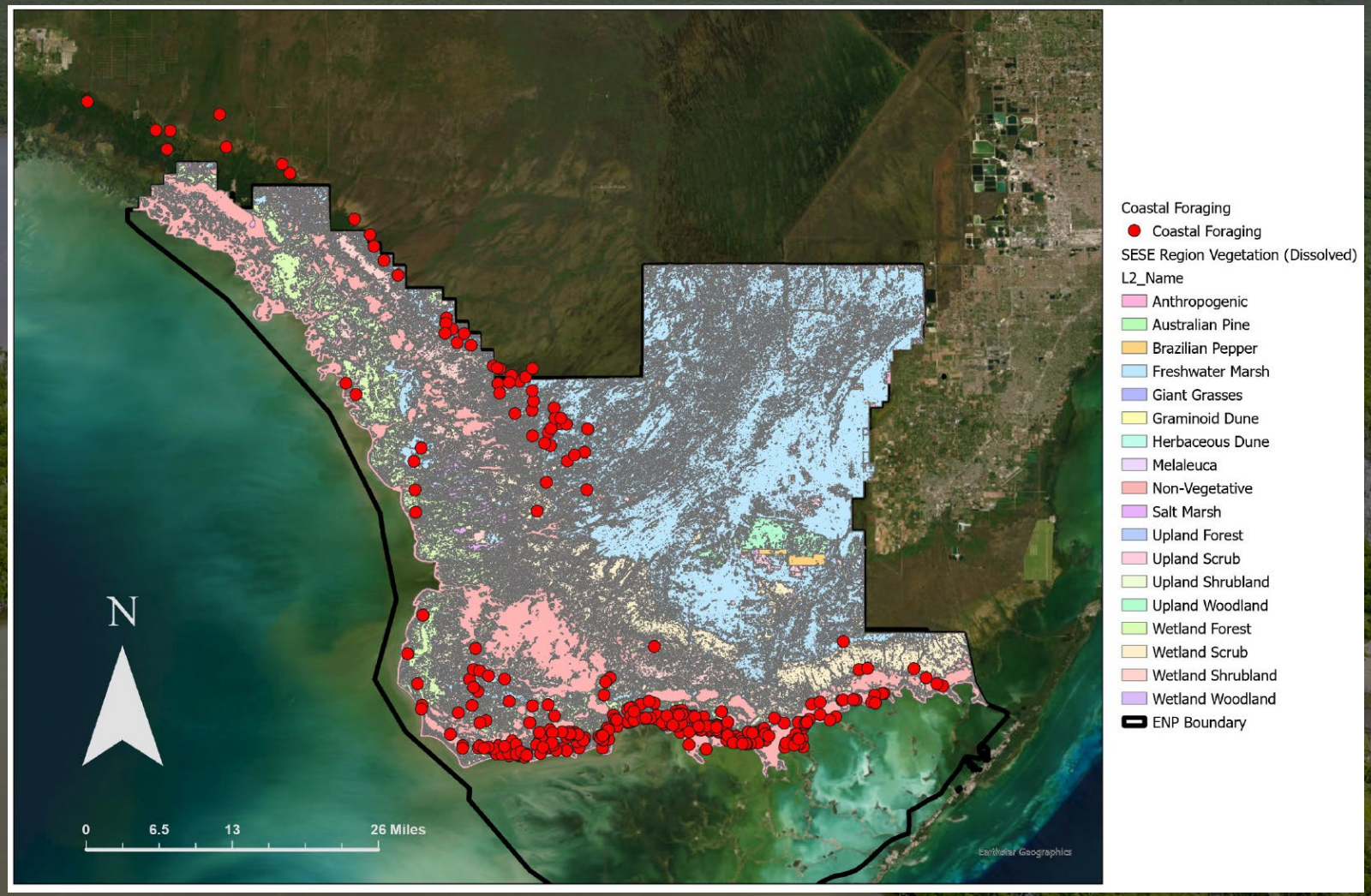


Question 3: What coastal habitats need to be rehydrated for effective coastal foraging?

- All coastal foraging locations along the coast
- Mainly Foraging along the Florida Bay Coast



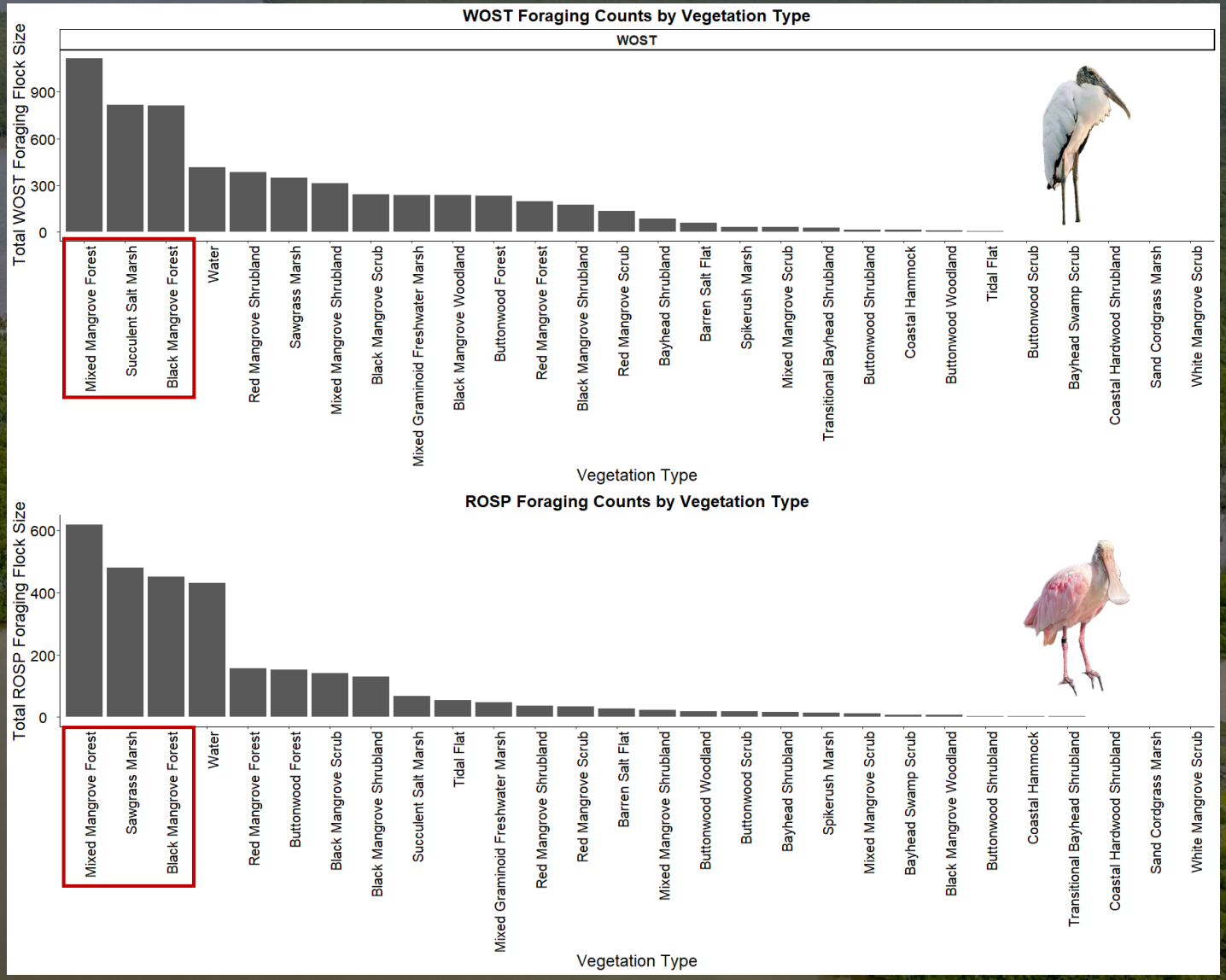
Question 3: What coastal habitats need to be rehydrated for effective coastal foraging?

WOST Preferred Foraging Habitat

1. Mixed Mangrove Forest
2. Succulent Salt Marsh
3. Black Mangrove Forest

ROSP Preferred Foraging Habitat

1. Mixed Mangrove Forest
2. Sawgrass Marsh
3. Black Mangrove Forest



Outcome:

1. Assess whether Everglades restoration efforts are successfully restoring historical nesting patterns and improving ecosystem function.

2. Provide refined hydrologic targets for managers to optimize water flow and enhance nesting success.

Hydroperiod
Depth at Start of Dry Season
Recession

Hydroperiod
Depth at Start of Dry Season
Previous Dry Season Rain

WOST ≠ ROSP

Management Needs Differ

Thank you!