FAU
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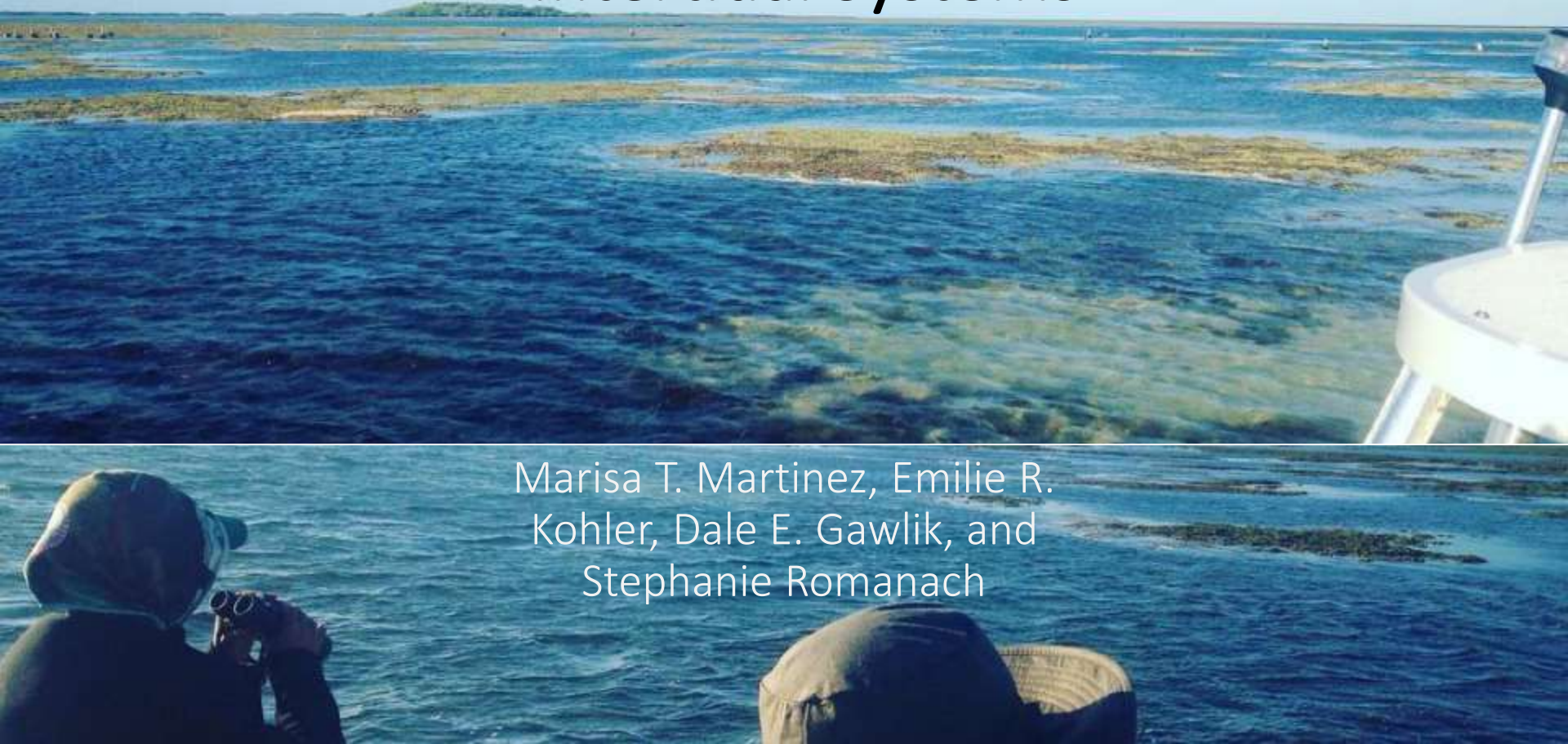
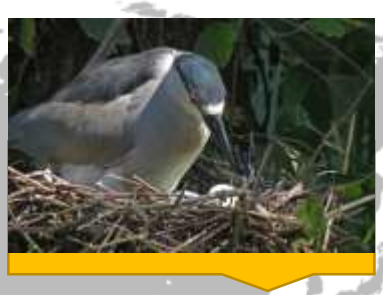
science for a changing world

Prey Availability of Wading Birds in Intertidal Systems



Marisa T. Martinez, Emilie R. Kohler, Dale E. Gawlik, and Stephanie Romanach

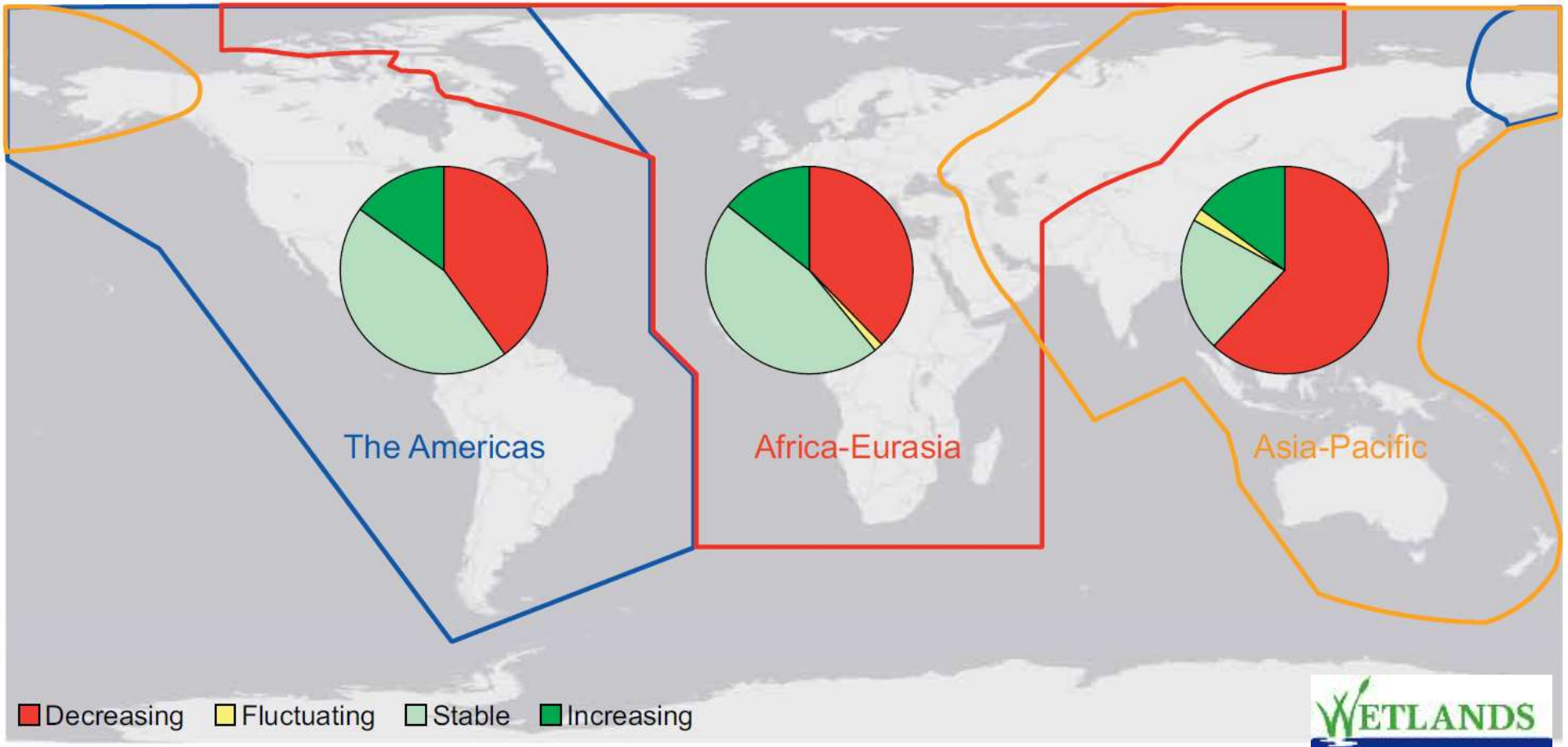
Birds as global marine ecosystem indicators



Global decline in waterbird populations

44% decreasing

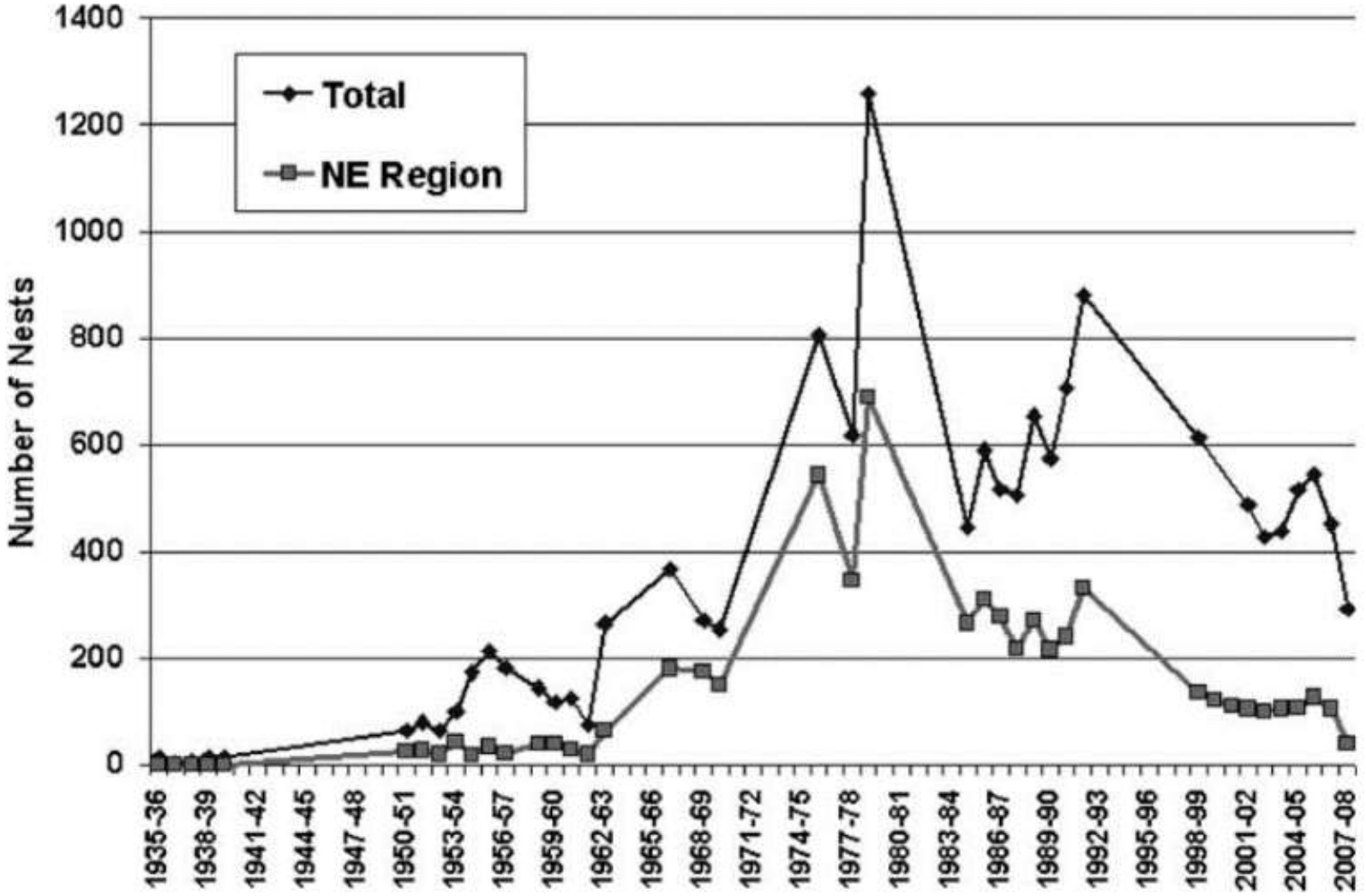
17% increasing



WETLANDS INTERNATIONAL

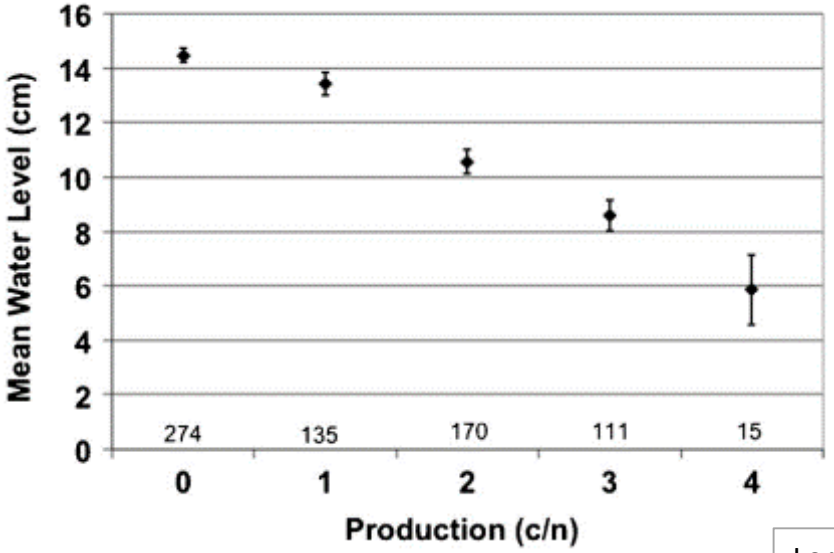
State-wide decline in waterbird populations

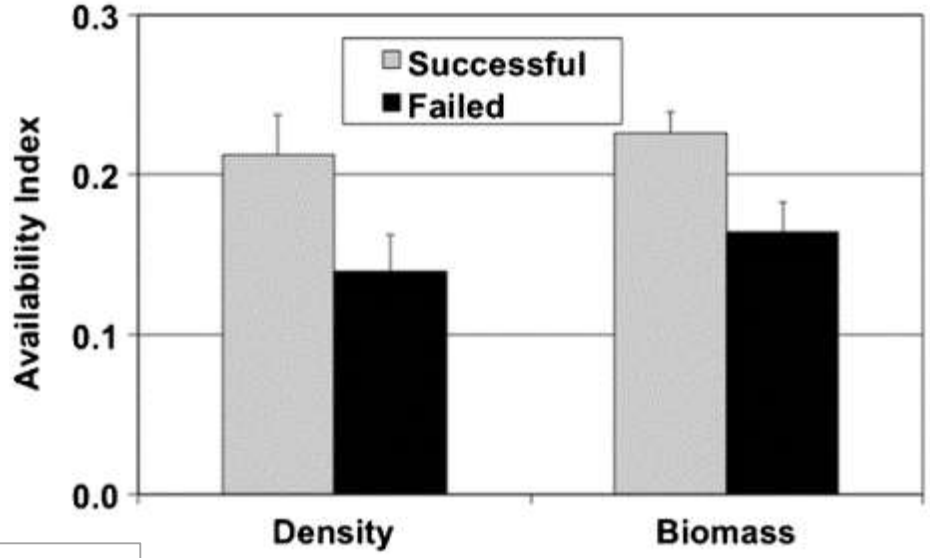
Lorenz et al. 2009



Effect of hydrology on wading birds

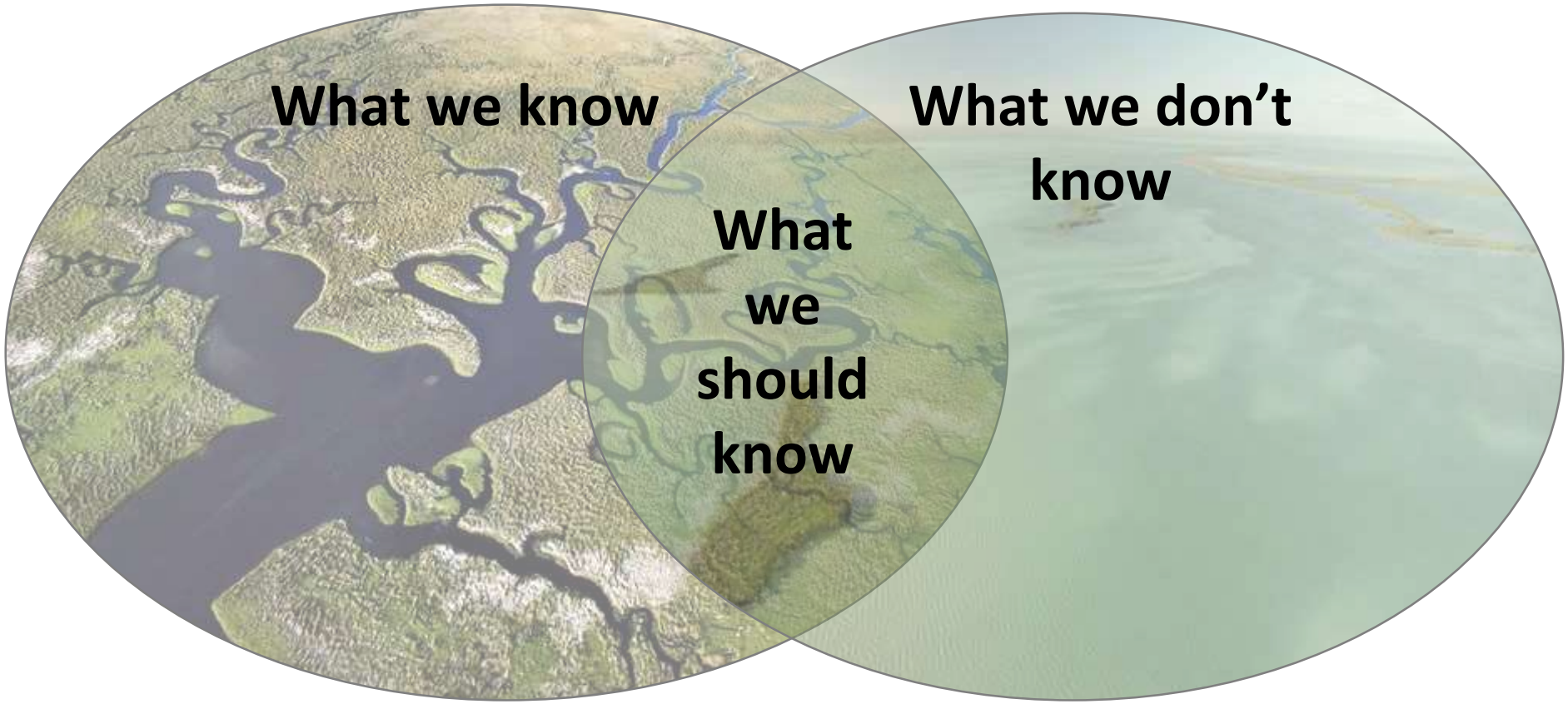
- Recent decline in Florida Bay caused by prey shortage from reduced freshwater flows
- Roseate Spoonbill (*Platalea ajaja*) chick production depends on water level-induced concentrated prey





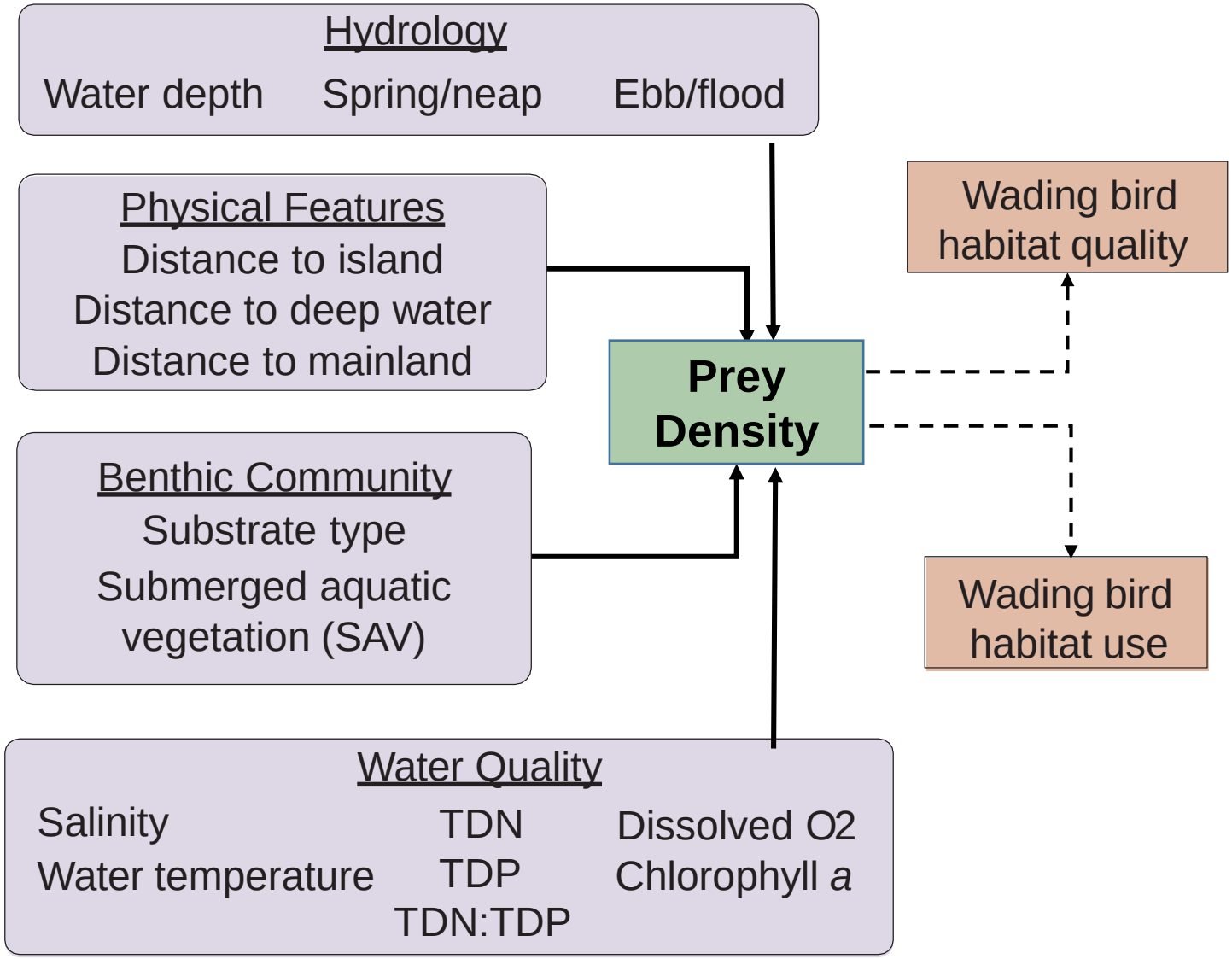
Lorenz 2013

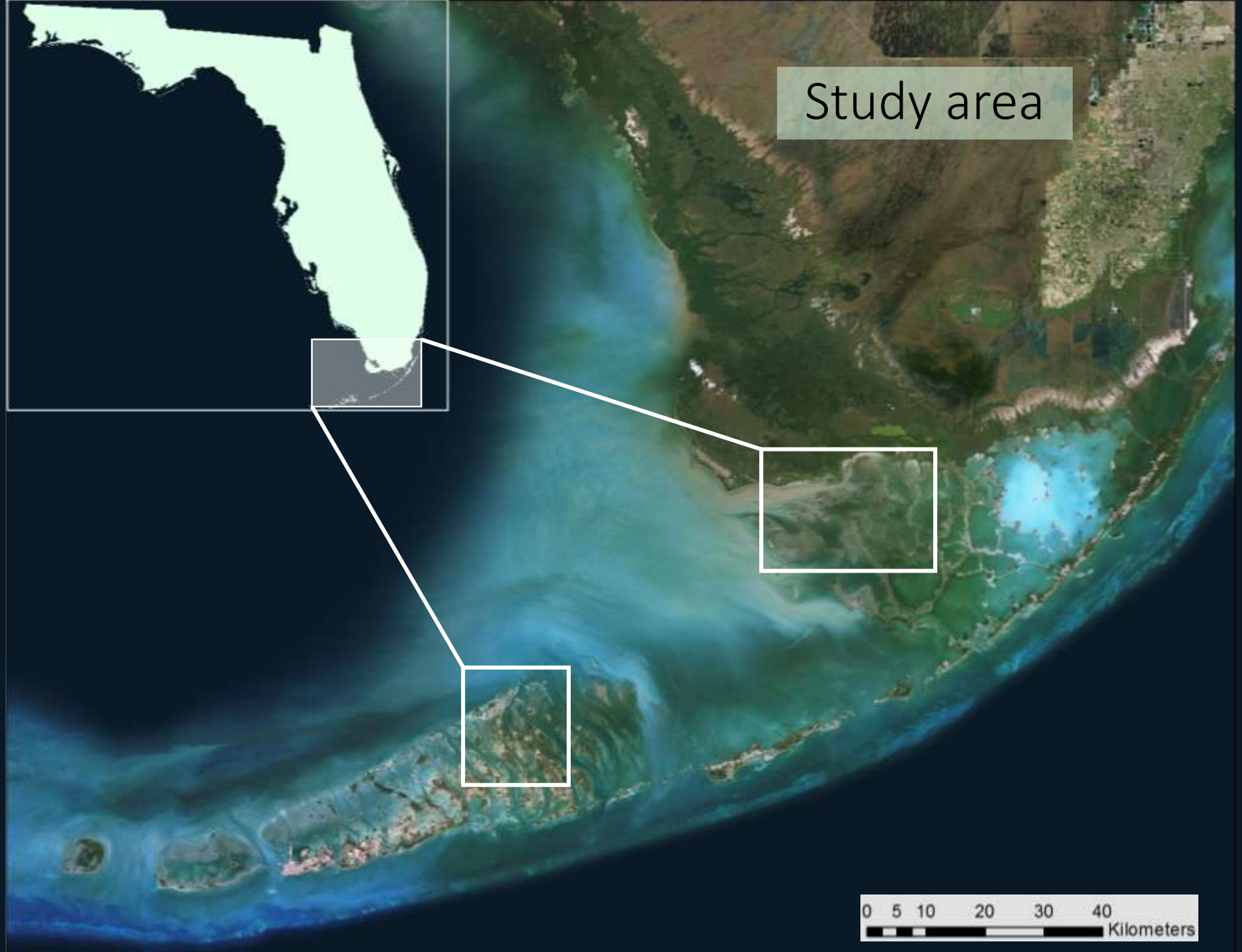
Wading birds as ecological indicators


What we know
What we don't know
What we should know

Objectives

- Quantify the community structure and abundance of aquatic prey for wading birds
- Quantify the hydrologic conditions, physical features, benthic community, and water quality of aquatic prey habitat
- Determine the key environmental variables that promote high densities of aquatic prey


Hydrology
Water depth
Spring/neap
Ebb/flood
Physical Features
Distance to island
Distance to deep water
Distance to mainland
Benthic Community
Substrate type
Submerged aquatic vegetation (SAV)
Water Quality
Salinity
Water temperature
TDN
TDP
TDN:TDP
Dissolved O2
Chlorophyll a
Prey Density
Wading bird habitat quality
Wading bird habitat use


Study area
0 5 10 20 30 40
Kilometers

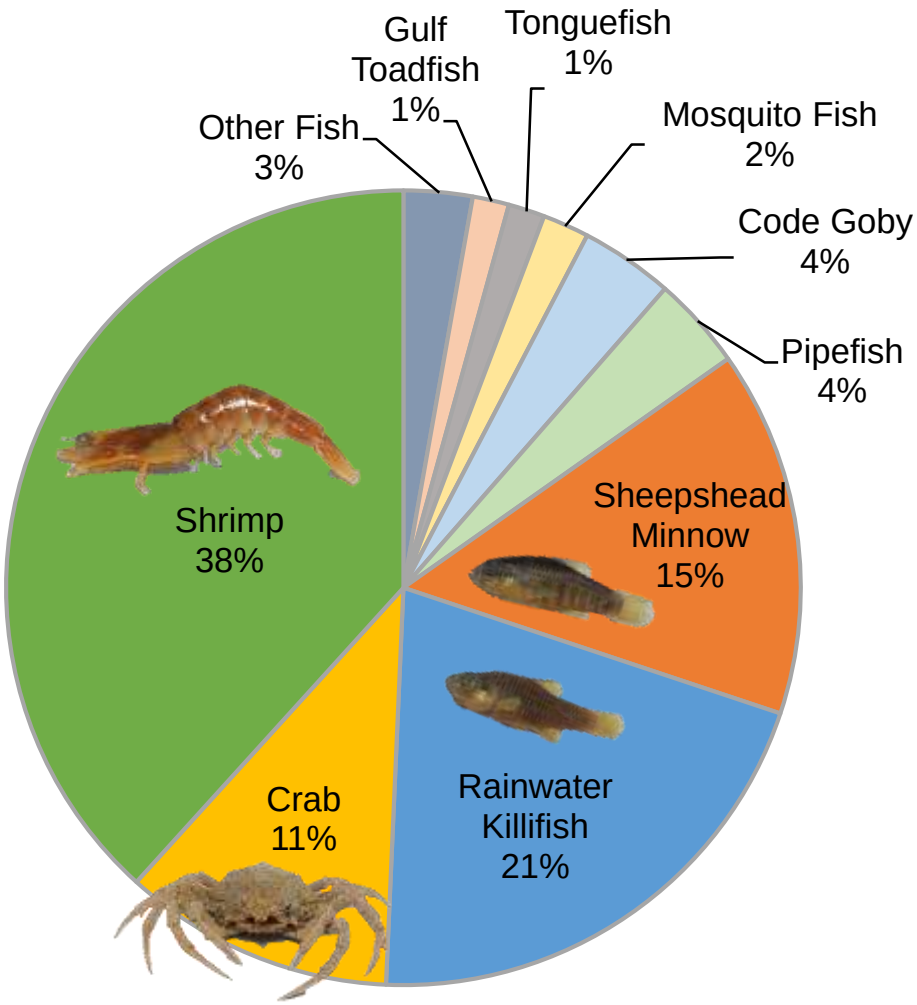
Field Methods

15 March - 07 July 2016

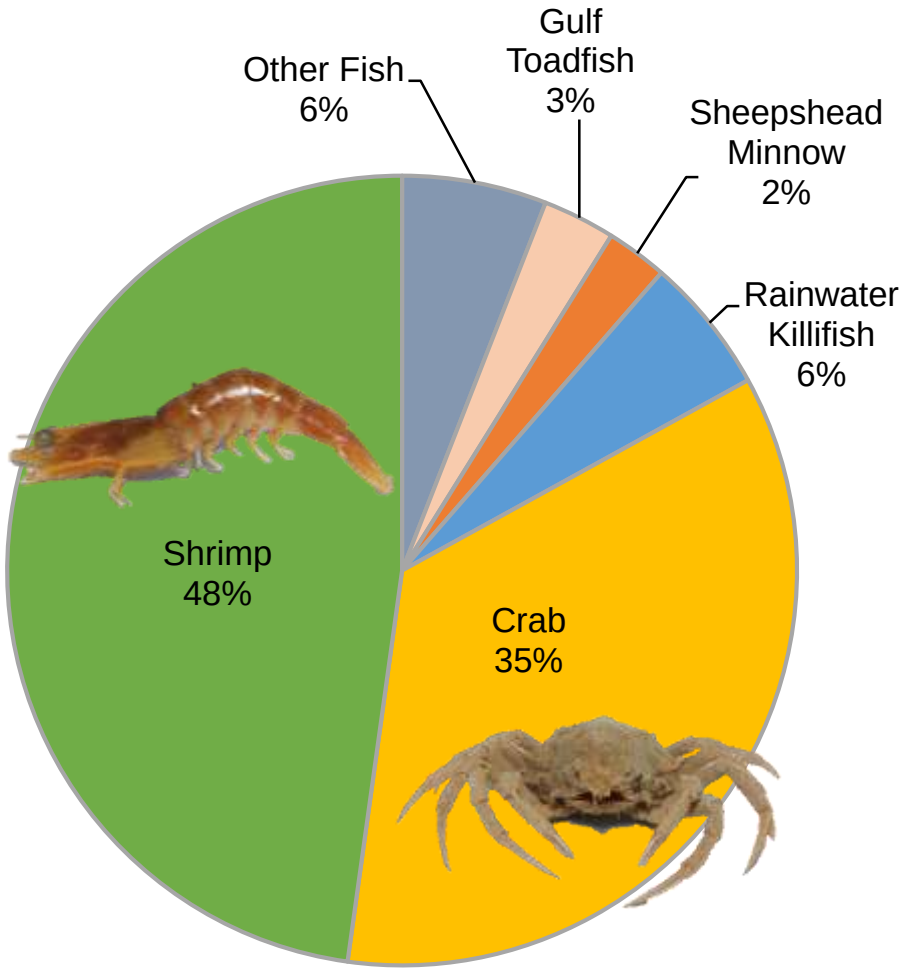
Sampled aquatic prey using 1-m^2 throw-trap at 125 locations

Recorded water depth (cm) and SAV cover (%)

Prey Availability by Species

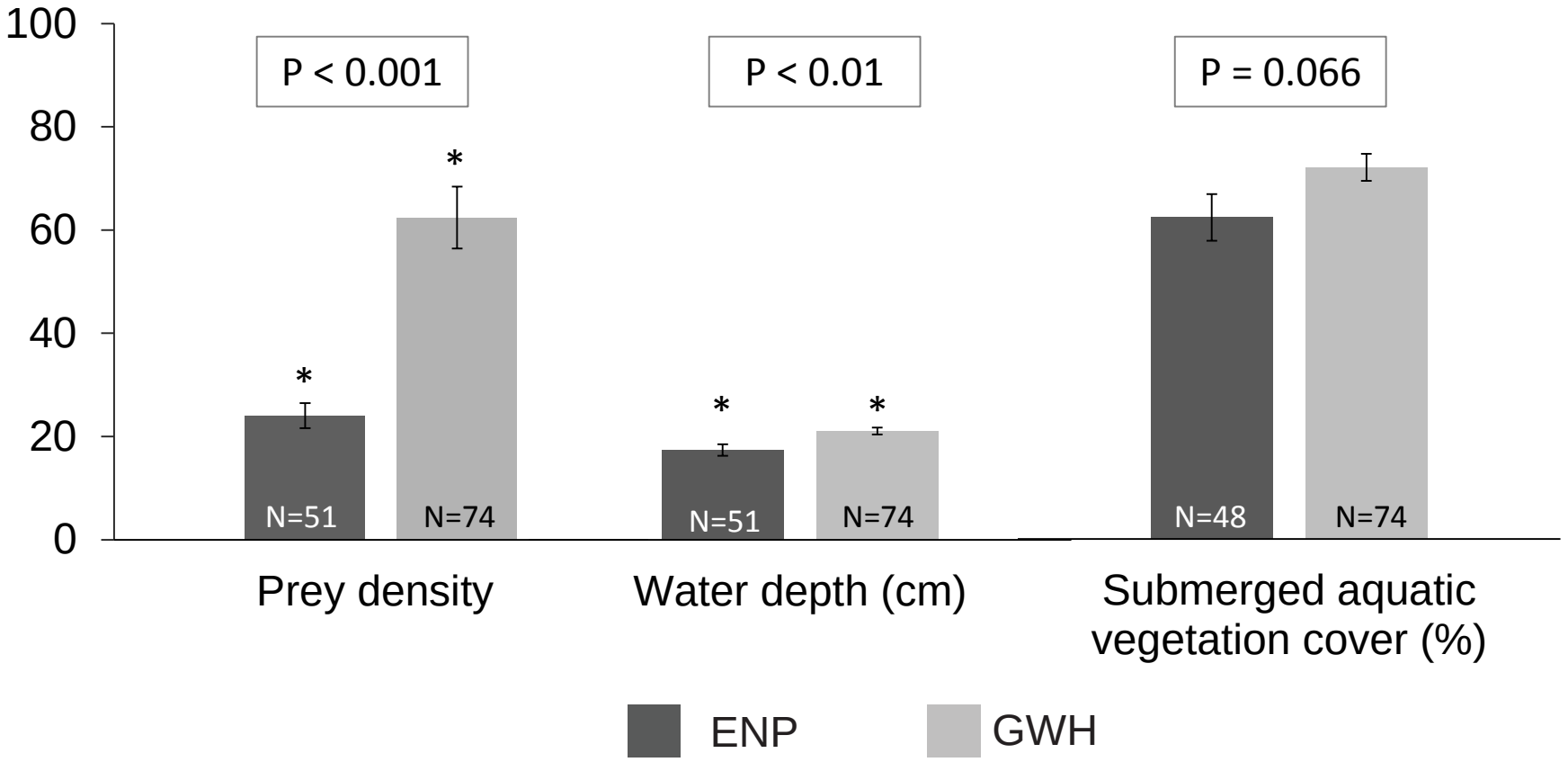


Florida Bay



Great White Heron

Differences in Average Prey Density, Water Depth, and SAV Cover



Prey Density with Water Depth

ENP:
y = 0.4943x + 15.573
R^2 = 0.05
P < 0.05

GWH:
y = 2.4728x + 11.254
R^2 = 0.07
P = 0.12

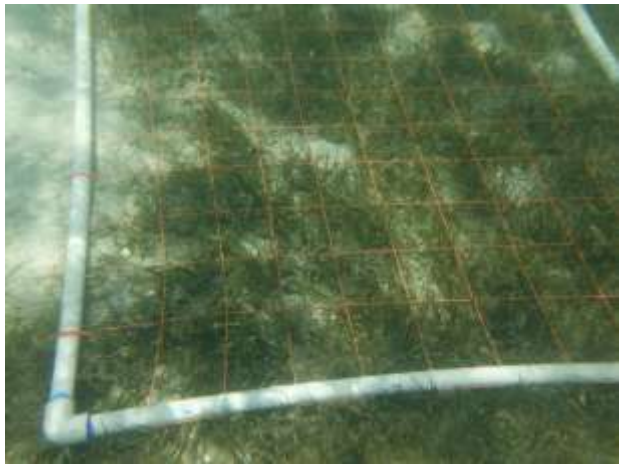
Prey density

300
250
200
150
100
50
0

0 5 10 15 20 25 30 35

Water depth (cm)

Prey Density with SAV



GWH:
$y = 0.5232x + 22.619$
$R^2 = 0.14$
$P < 0.05$

ENP:
$y = 0.1618x + 11.162$
$R^2 = 0.06$
$P < 0.01$

Prey density

300
250
200
150
100
50
0

0
20
40
60
80
100

Submerged aquatic vegetation cover (%)

Preliminary Conclusions

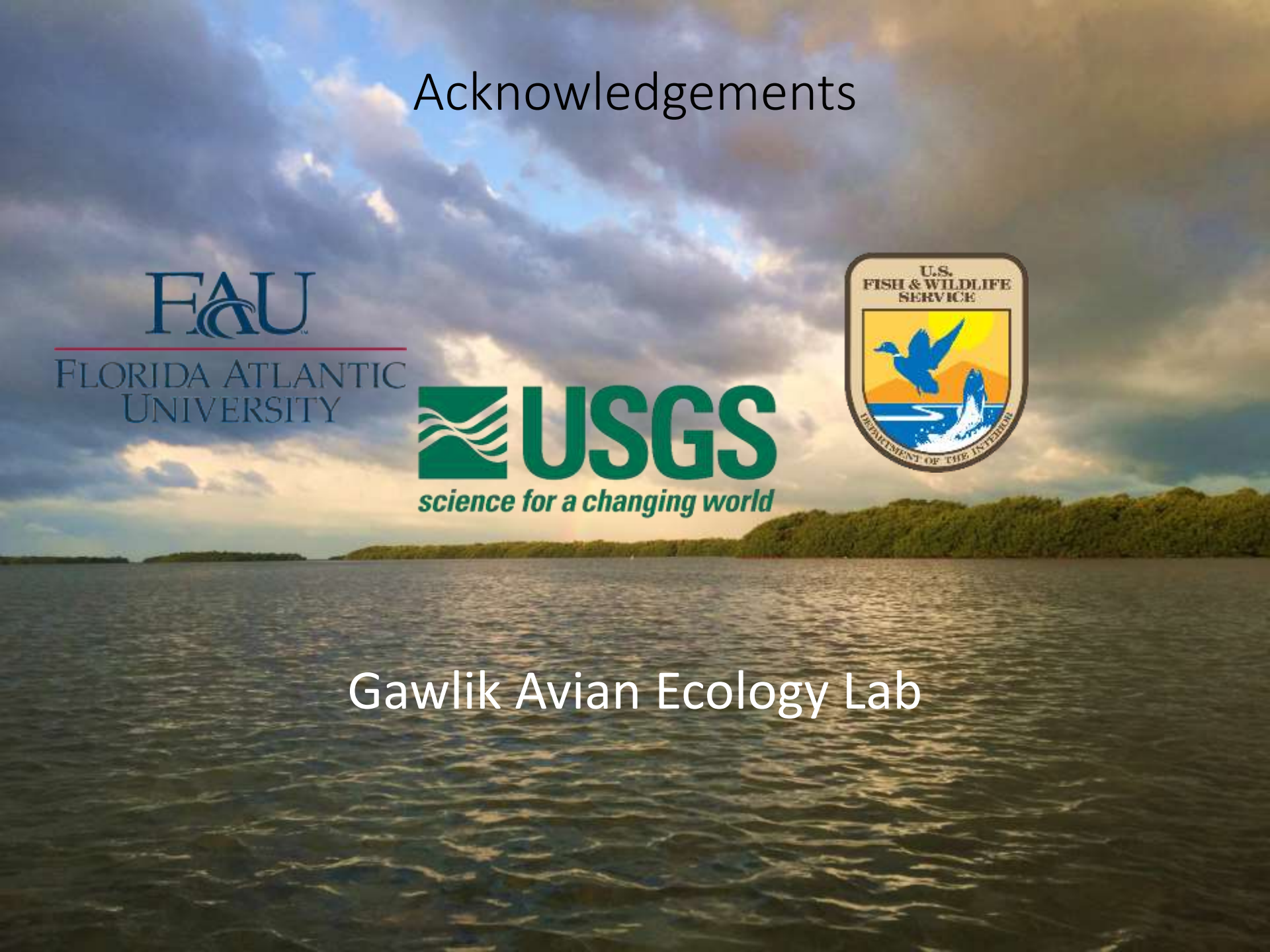
- Higher prey densities at GWH may indicate higher wading bird habitat use and higher wading bird foraging habitat quality
- Similar water depth and SAV cover between ENP and GWH suggests other environmental variables may be driving prey density
- Sites may be most profitable for wading birds when water depths reach maximum foraging depths
- Sites with greater SAV cover may provide higher quality habitat for prey

Broader Implications for Conservation

Broader Implications for Conservation

- **Management:** Aquatic fauna as indicators of suitable habitat for wading birds
- **Assessment:** Observe environmental variables that affect aquatic fauna to recognize stressors
- **Evaluation:** Long-term models to plan for future ecosystem changes

Acknowledgements



Gawlik Avian Ecology Lab