Trends in Relative Density and Body Condition of Alligators in the Everglades

Laura A. Brandt, **Jeff Beauchamp**, Frank J. Mazzotti, Brian M. Jeffery, J. Hardin Waddle, Michael S. Cherkiss, Kristen M. Hart, Kenneth G. Rice

Why Alligators?

What are our questions?

Relative Density (2-3 yrs)

How many alligators are we observing?
What are the local and regional trends?
What factors influence number of observed alligators?

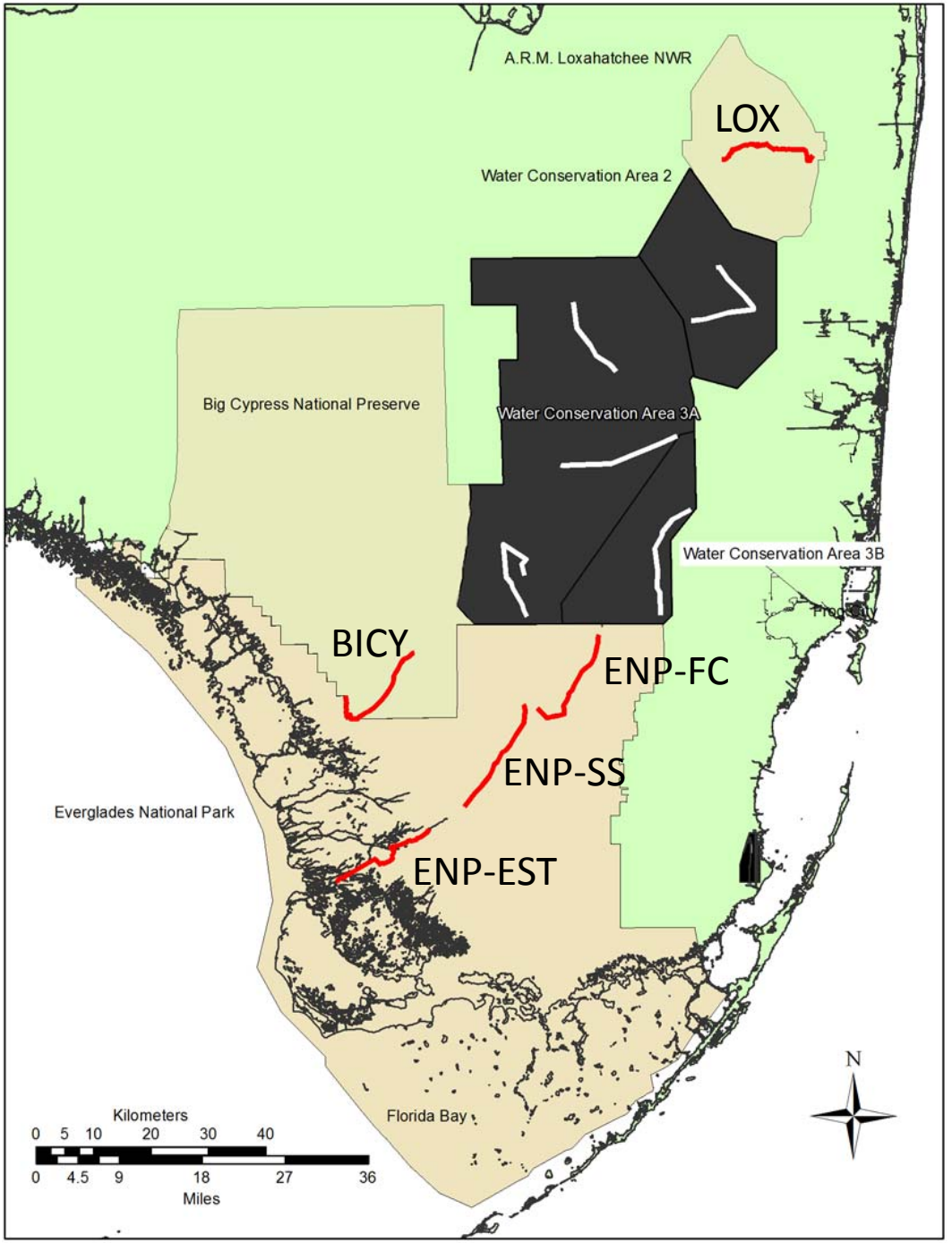
Body Condition (1 yr)

Are Everglades alligators healthy?
What are the local and regional trends?
What factors influence the health of alligators?

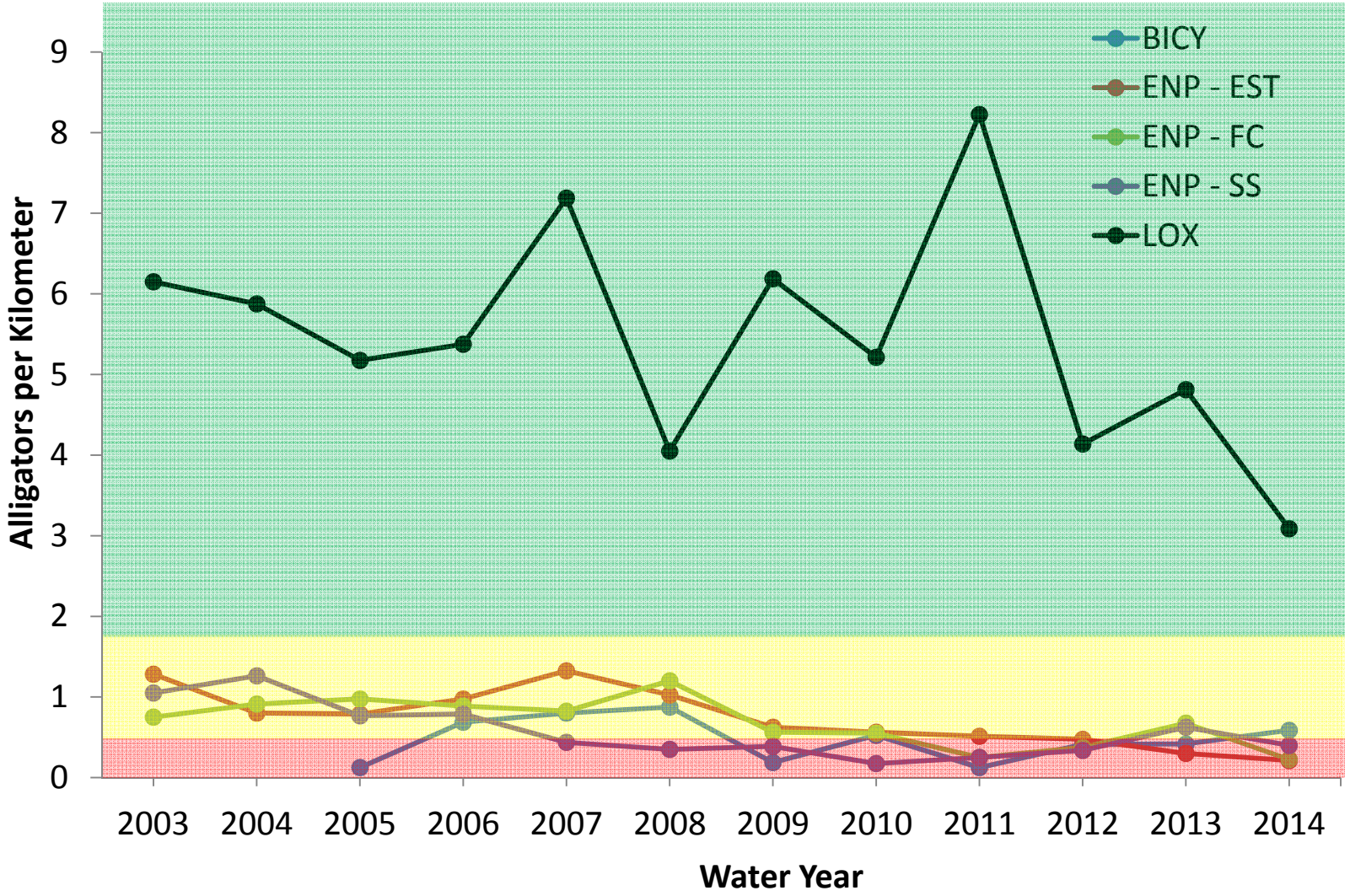
Sampling Regime

- Each route is surveyed twice in both spring and fall – alligators/km

- Capture 15 alligators adjacent to survey route in spring and fall – Fulton's K (mass and SVL)



Relative Density



Loxahatchee NWR currently meets restoration targets, BUT has a significantly ($p<0.000$) declining trend.

Relative Density in ENP

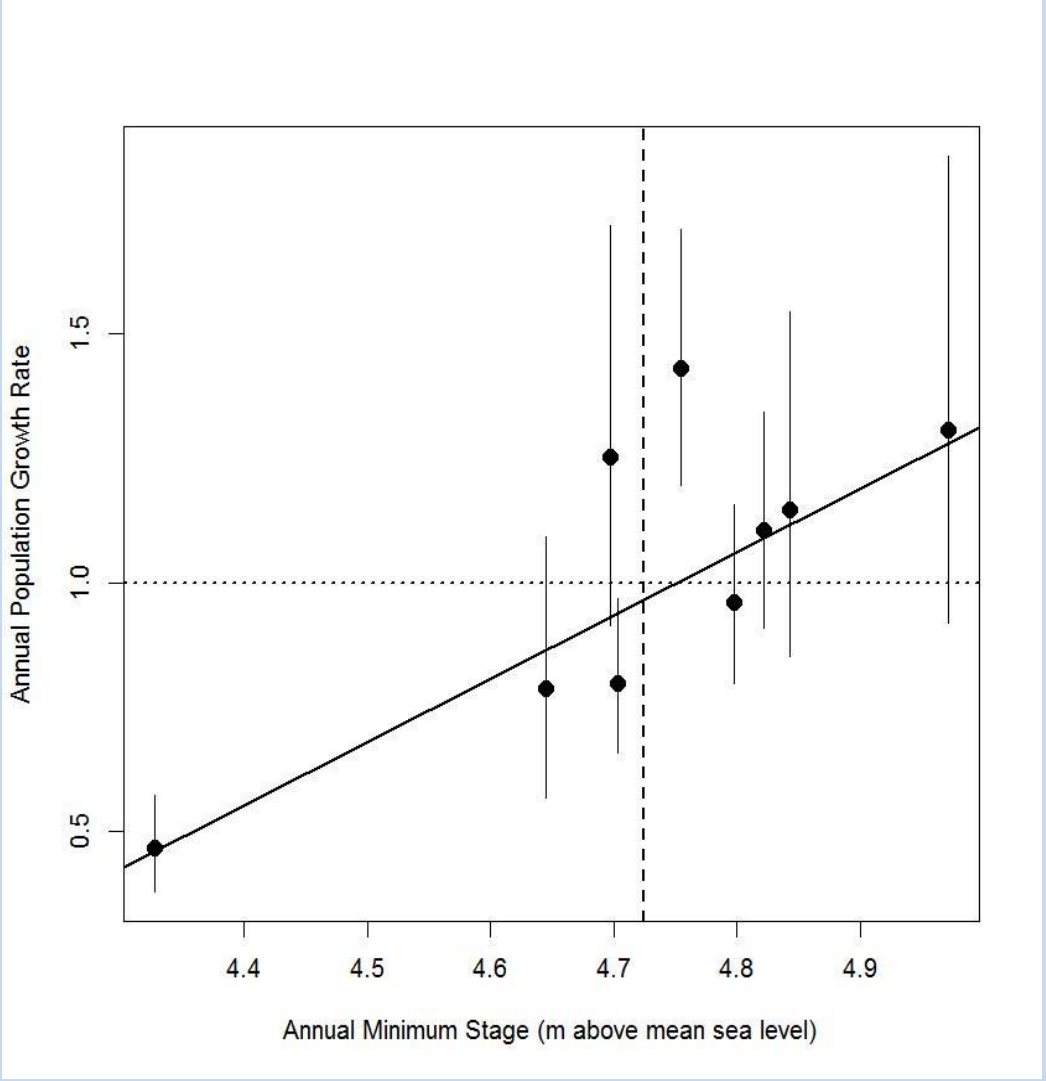
Significant declining trends in Frog City (p=0.003) and the estuary (p=0.038).

Alligator Abundance Responses to Environment

Generalized hierarchical *N*-mixture model

Covariates

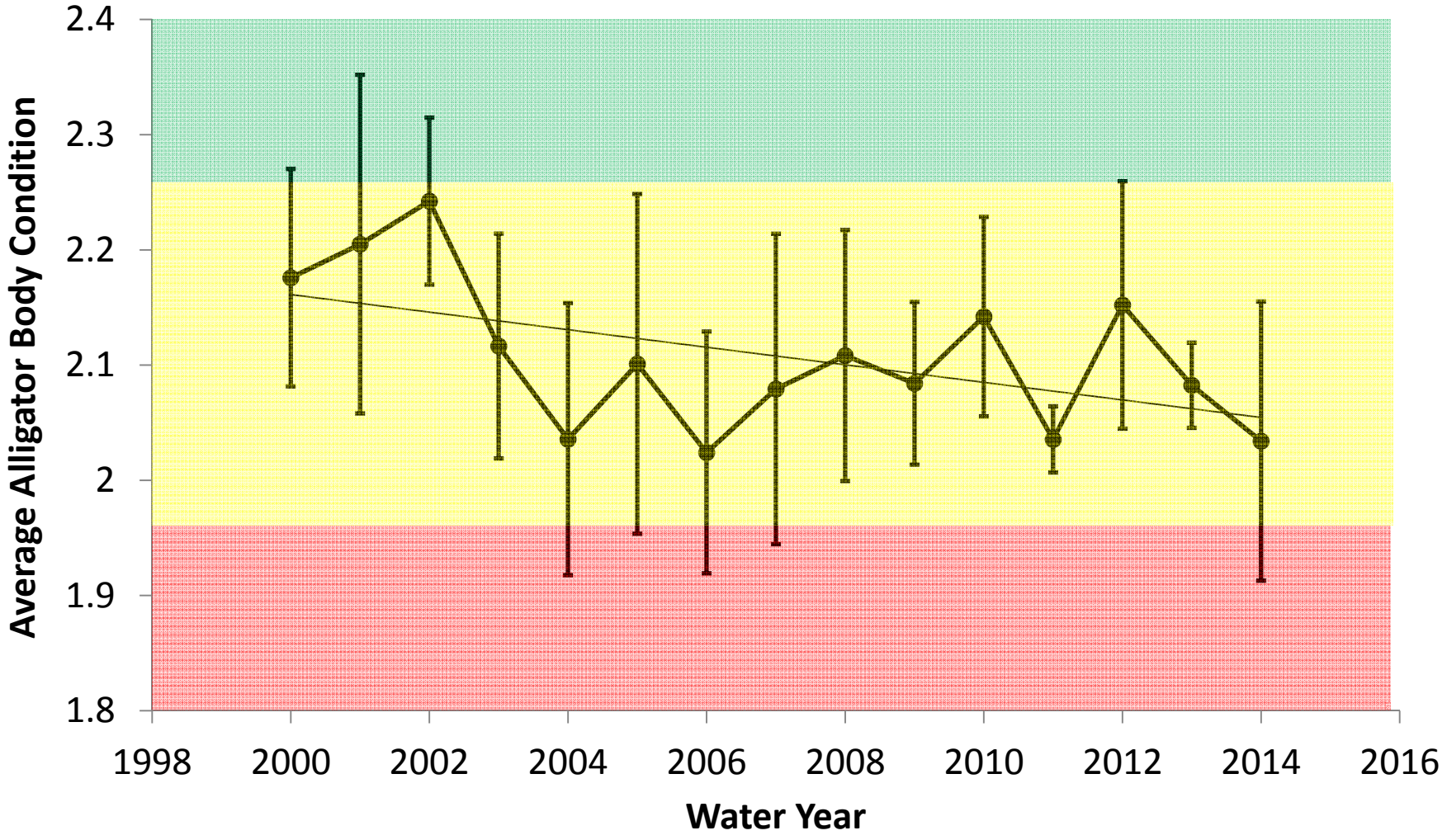
- Temp
- Stage
- Marsh or canal
- Dry or wet year
- Water Year



Yes, alligators showed population responses to hydrologic conditions

- Declines after dry years.
- Increases in subsequent years

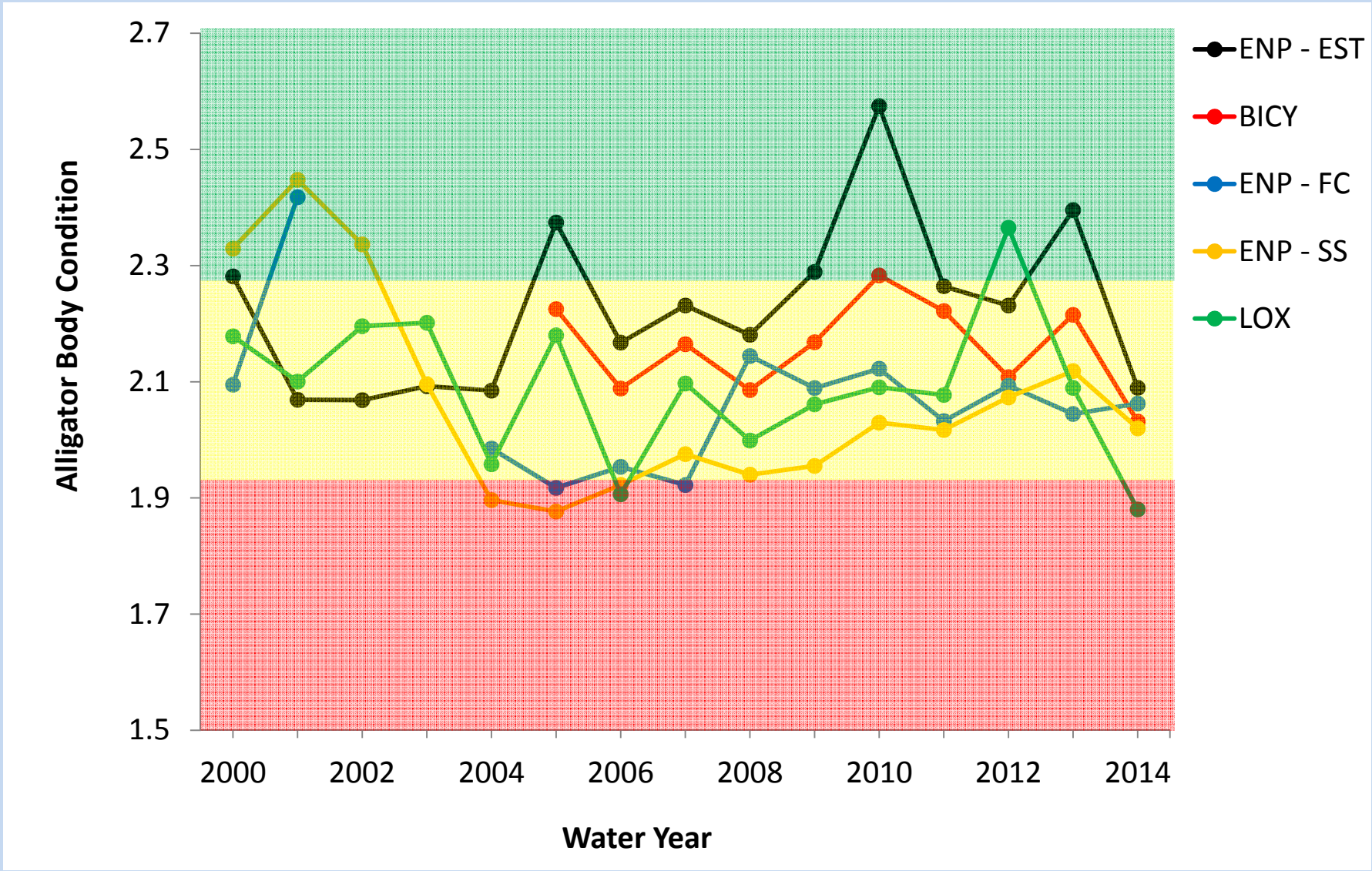
Body Condition



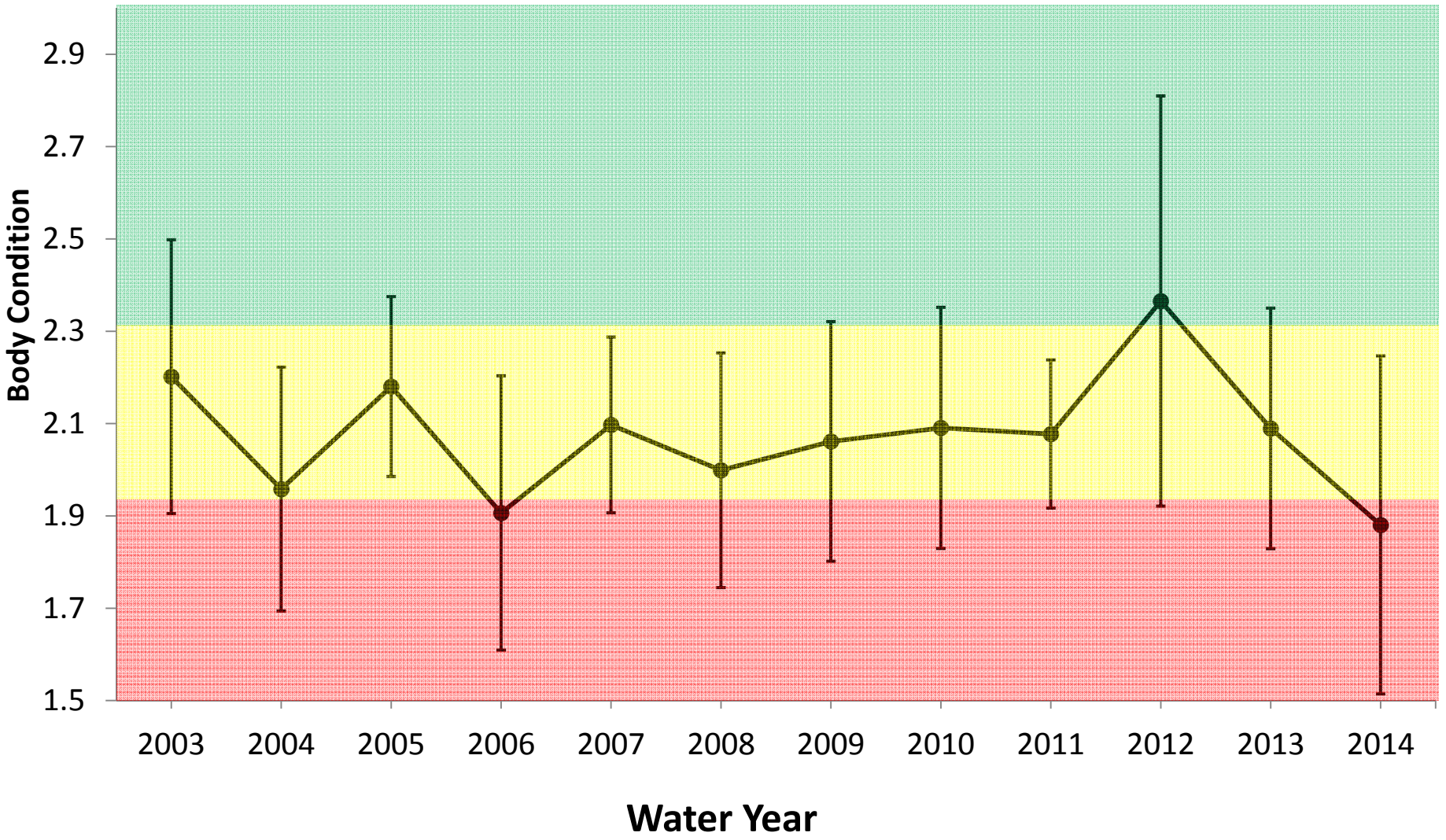
N = 2100, marsh gators, Total Length > 1.25 m

Significant declining trend across the Greater Everglades

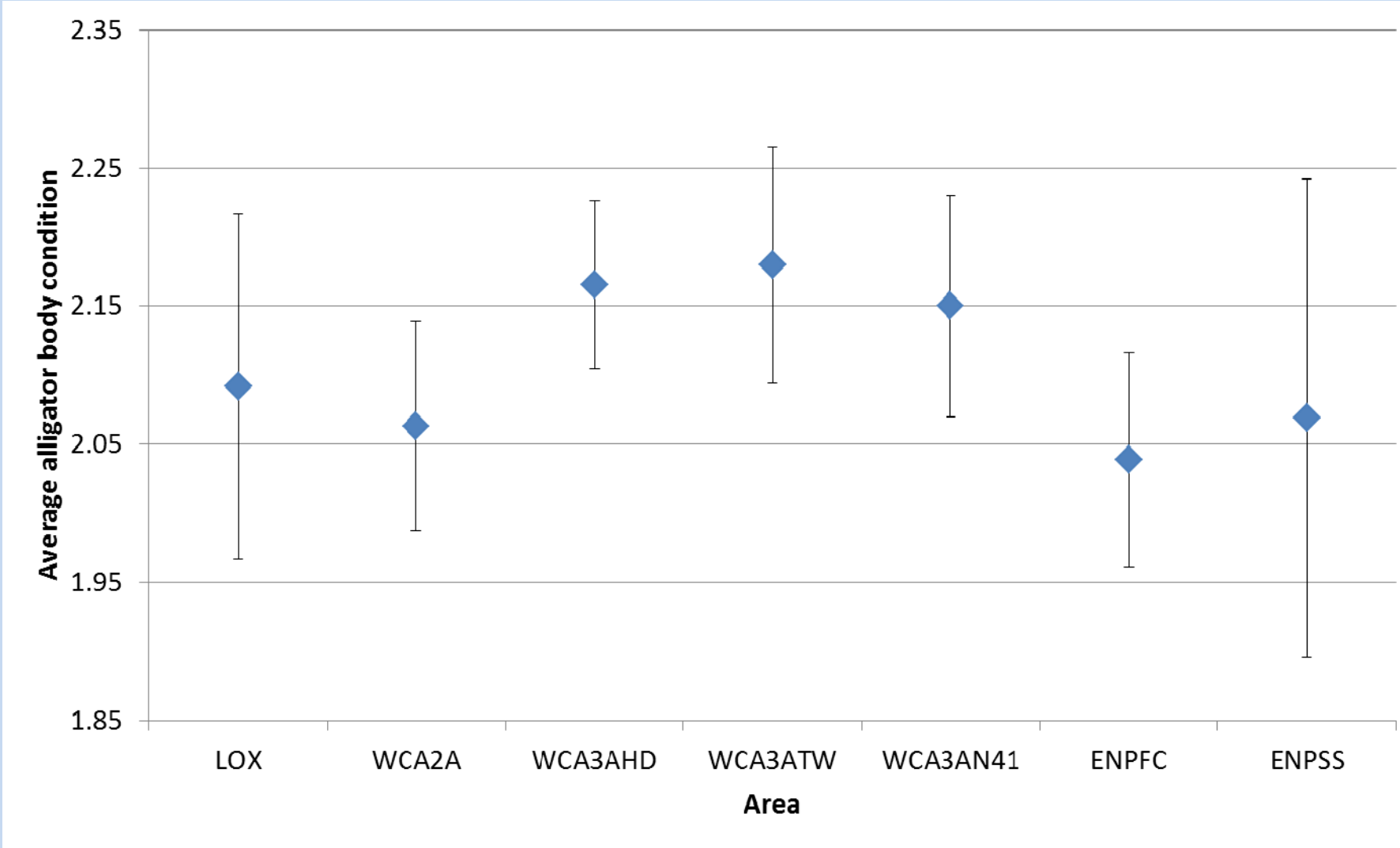
Body Condition at current sampling locations



Body Condition at Loxahatchee NWR



What are the spatial patterns?



ENP Frog City significantly lower body condition than WCA Holiday and WCA Tower

What hydrologic factors influence body condition?

17 biologically significant models

Generalized linear mixed effect models

Response Variable
Average Body Condition

Random Effects
Water Year
Area (i.e. Lox, ENP-SS)

Fixed Effects
Amplitude
Average Spring & Fall Water Depth
Hydroperiod
Days since last dry & days in last dry

Top Model

Parameters	Estimate	Standard Error	T-value
(Intercept)	1.80869	0.14228	12.712
Average Spring Depth	**0.40073**	**0.13873**	**2.889**
Average Fall Depth	-0.09547	0.27947	-0.342
Amplitude	**0.46166**	**0.18382**	**2.512**
Fall Depth*Amplitude	-0.25485	0.30410	-0.838

Summary

- We have documented both temporal and spatial patterns in relative density and body condition of alligators
- Using long-term data we have been able to link responses in body condition and relative density to Everglades hydrology
- Now beginning to investigate relationship between relative density, body condition, and individual health, as well as link with trophic hypothesis

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In memory of Rafael G. Crespo, Jr