

Coupling telemetry and stable isotope techniques to unravel movement: Common Snook habitat use across variable nutrient environments

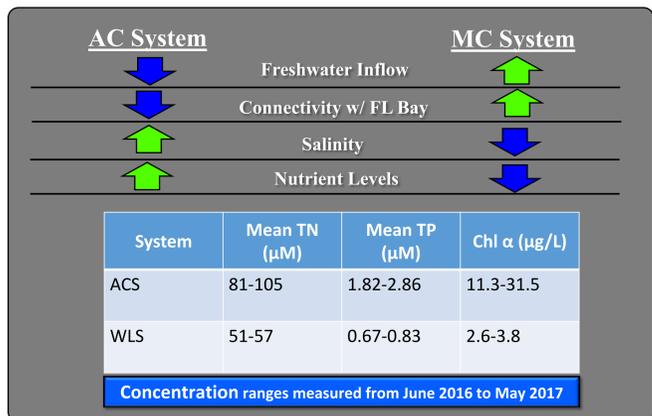
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Goals

- Determine if Common Snook (*Centropomus undecimalis*) habitat use differs within two neighboring, yet distinct estuaries.
- Add to the creation of a predictive framework for the impacts hydrologic variation, restoration, and climate change have on recreational sportfish in the coastal Everglades.



The Alligator Creek subestuary (ACS) and McCormick Creek subestuary (MCS) are two neighboring, yet distinct lake systems located in northcentral Florida Bay within Everglades National Park. The ACS has been more impacted from reductions in freshwater inflows to the Everglades than the MCS. This makes the two subestuaries ideal natural environments for comparing how varying abiotic conditions may be impacting recreational sportfish habitat use.

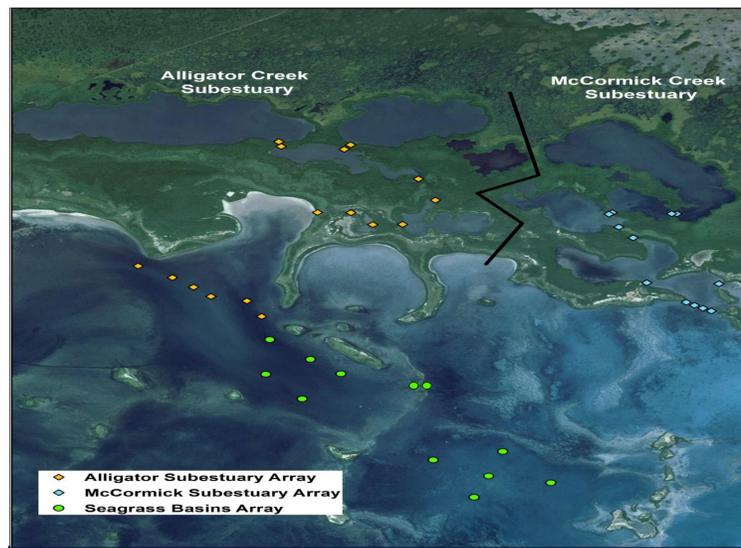
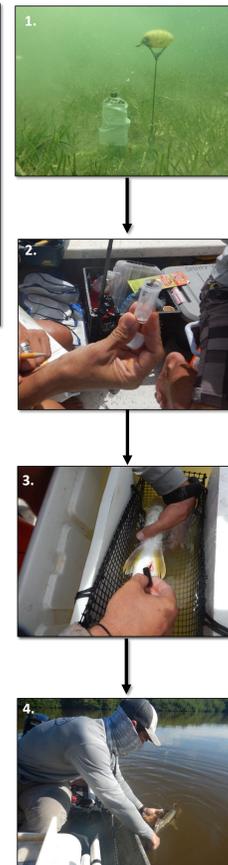


Research Methodology

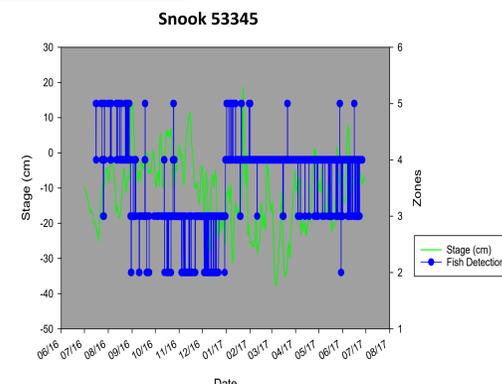
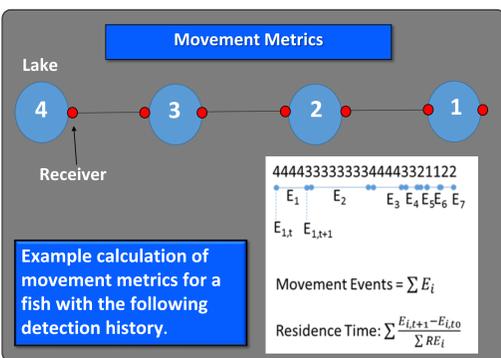


Focal fish species- Common Snook (*Centropomus undecimalis*)

- Sampling Protocol**
- Creation of acoustic array (CELA²).
 - Catch Snook and take fin clips for stable isotope analysis
 - Surgically implant Snook with acoustic transmitters.
 - Revive and release tagged Snook.
 - Download acoustic array every 4 months.



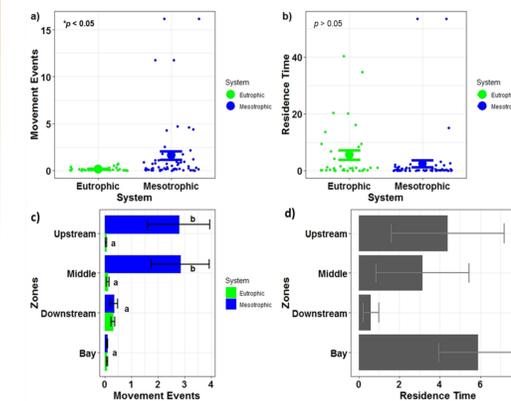
The Coastal Everglades Acoustic Receiver Array (CELA²) consists of 48 receivers and tracked the movements of 25 Snook (8 in ACS and 17 in MCS) from June 1, 2016 to May 31, 2017.



Movement track of acoustically tagged Snook, 53345, in MCS with stage data.

Results

- Eutrophication via effects on resource production can influence consumer movements.
- Snook moved more in the less enriched system.
- Snook relied on a greater diversity of basal resources in the more enriched system.
- Coupling movement and trophic ecology can be a powerful approach.

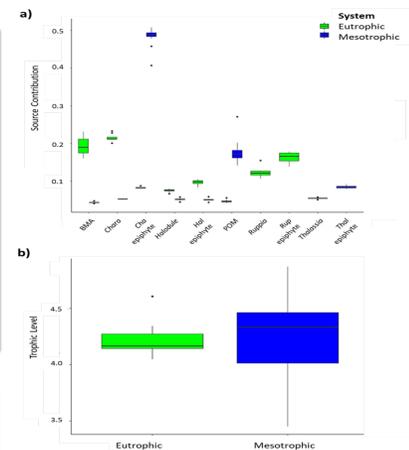


Movement metrics for Snook across systems and zones within systems

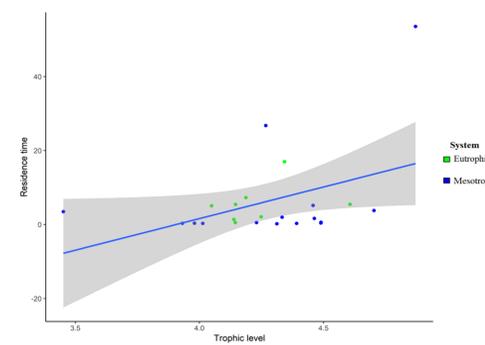
- movement events by system
- residence time by system
- movement events by zone and system
- residence times by zone

Snook had higher movement events in the mesotrophic system, but similar residence time, except for an overall trend for shorter residence times in downstream zones. Snook movements were particularly high in the upstream and middle zones of the mesotrophic system.

- Boxplots of the source contributions to Snook determined by MixSIAR. Snook in the enriched system have more diverse source contributions than those in the mesotrophic system. Bars = mean, boxes = standard deviation, whiskers = 95th and 5th percentiles. Abbreviations for basal resources: Hal = *Halodule*, Rup = *Ruppia*, Cha = *Chara*, Thal = *Thalassia*, POM = particulate organic matter, and BMA = benthic macroalgae.
- Boxplots of the trophic levels of Snook in the eutrophic and mesotrophic systems determined by MixSIAR. Results show no trophic level difference between Snook in the two systems.



Positive relationship between residence time and trophic level for all Snook tracked in both systems.



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