

# OVERWINTERING POPULATION DYNAMICS OF SNOOK IN ST. LUCIE RIVER



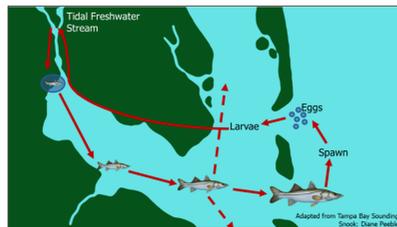
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## Introduction

### Snook (*Centropomus undecimalis*)

- Catadromous gamefish
- Contribute millions of dollars to Florida's economy<sup>1</sup>
- Sensitive to colder temperatures (<10 C)
- Protandric hermaphrodites (♂→♀)



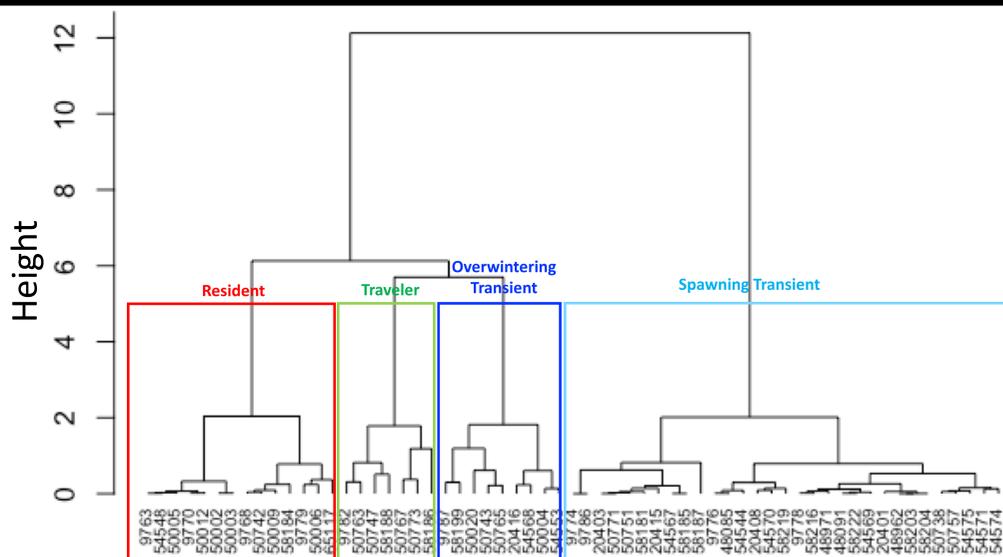
### St. Lucie River

- Brackish estuaries
- Flows out to Indian River Lagoon

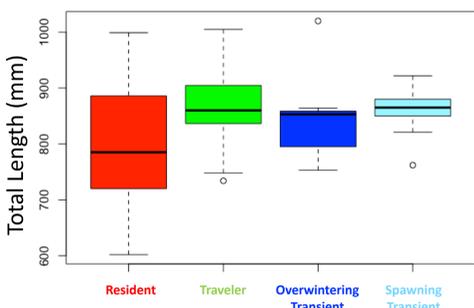
### Spawning

- Spawn in aggregations
- April 15th – October 15th<sup>3</sup>
- Exhibit Behavioral Contingents

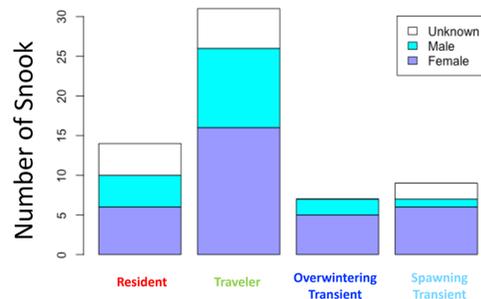
## Results



Total Length of Snook by Cluster



Sex of Tagged Snook by Cluster



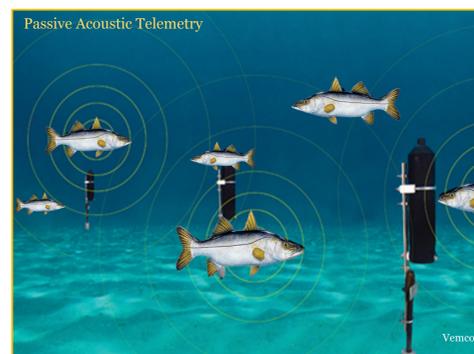
- Clusters were named according to the following:
  - **Resident:** Spent high proportion of time in STL during non-spawning and spawning season
  - **Overwintering Transient:** Spent low proportion of time in STL during non-spawning but were seen for high proportion of time during spawning
  - **Spawning Transient:** Snook were seen in St. Lucie for high proportion during non-spawning but low proportion during spawning meaning they overwinter in St. Lucie but spawn elsewhere
  - **Traveler:** Spend relatively little time in St. Lucie for both spawning and non-spawning season and seems to "travel" freely in and out of St. Lucie
- Most snook tagged in St. Lucie were Travelers
- Resident and Traveler snook had a more even sex ratio compared to Transients
- Resident snook had a higher variation of length
- Spawning Transient had the lowest variation in length but highest mean
- There was no significant difference in length between clusters ( $p = 0.0729$ )

## Objective

- St. Lucie hypothesized to be an important overwintering habitat
- Identify important areas that shelter large females to help with conservation and management of these habitats

## Methods

- 61 snook tagged in St. Lucie river, estuary, and inlet combined between February 2008 and January 2012 by Florida Fish and Wildlife
- We averaged proportion of days in St. Lucie over overall days of detection for nonspawning and spawning seasons to remove temporal bias
- Snook that had less than two seasons of spawning and nonspawning data were excluded
- Snook that were tagged late in the season were excluded due to low numbers of detections (e.g., If the beginning of the seasons' detections were less than the other seasons for the same fish).
- Hierarchical clustering was performed with R based on similarity between fish
- Methods were determined by agglomerative coefficient using agnes package in R
  - Used Euclidean dissimilarity matrix and Ward's linkage to cluster
- Four clusters were shown to be ideal using elbow and silhouette plots on our data



## Discussion

- Travelers could be traveling through St. Lucie, foraging, then moving on.
- Some snook spawn in multiple aggregations. For example, a snook could have come, spawn in an aggregation in St. Lucie, then moved on to spawn in another inlet elsewhere.
- (e.g., If the beginning of the seasons' detections were less than the other seasons for the same fish) Move this up to where you mention it in the methods
- Residents tended to be smaller
- A larger sample size could provide us more information on general snook behavior and could possibly show a significant difference in length of snook.

## References

- <sup>1</sup>Fedler, T. (2009). The economic impact of recreational fishing in the Everglades region. *Bonefish and Tarpon Trust, Key Largo, FL*.  
<sup>2</sup>Howells, R.J., Sonski, A.J., Shafland, P.L., & B.D. Hilton. (1990). Lower temperature tolerance of snook, *Centropomus undecimalis*. *Northeast Gulf Sci. Short Pap. Notes*. **11**, 155-158.  
<sup>3</sup>Taylor, R.G., Grier, H.J., & J.A. Whittington. (1998). Spawning rhythms of common snook in Florida. *J. Fish Biol.* **53**, 502-520.

## Acknowledgments

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