SPAWNING DYNAMICS
OF COMMON SNOOK

FL Fish and Wildlife Conservation Commission
Fish and Wildlife Research Institute
“It’s not the destination, it’s the journey.”

Scientist version: It’s the journey, destination, and what you do when you get there.
## Common Snook Spawning Dynamics

### Known

<table>
<thead>
<tr>
<th></th>
<th>West Coast</th>
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</thead>
<tbody>
<tr>
<td>Maturation</td>
<td>Males: 250 mm TL</td>
<td>same</td>
</tr>
<tr>
<td></td>
<td>Females: 500 mm TL</td>
<td></td>
</tr>
<tr>
<td>Obligate Marine Spawners</td>
<td>Males: 35‰</td>
<td>same</td>
</tr>
<tr>
<td></td>
<td>Females: 24‰</td>
<td></td>
</tr>
<tr>
<td>Spawning season</td>
<td>150 – 180 days</td>
<td>180 days</td>
</tr>
<tr>
<td></td>
<td>April to September</td>
<td>April to October</td>
</tr>
</tbody>
</table>

### Assumed

- All females migrate annually
- Population is synchronous

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Recent studies on movements of Common Snook during the spawning season
How do we track?

Streamer/ Conventional / Visual tags
HOW DO WE TRACK?

Coded tags

Radio tags

Data Storage (Archival) tags

Satellite tags

Acoustic transmitters
HOW DOES ACOUSTIC TELEMETRY WORK?
Acoustic telemetry

**Number of snook tagged:** 25

**Size:** 543 – 1085 mm TL

**Tracked for:** 3 years (2005-2007)

**Purpose:**

1) Identify areas used by snook within coastal rivers

2) To determine movement patterns and exchange rates of adult snook between river and the adjacent estuary.

Trotter et al. (2012) Migrations of common snook from a tidal river with implications for skip spawning.
Migration from the river to spawning sites

Trotter et al. (2012) Migrations of common snook from a tidal river with implications for skip spawning
WEST COAST – CALOOSAHATCHEE RIVER

But not all fish migrated....

Trotter et al. (2012) Migrations of common snook from a tidal river with implications for skip spawning
Residents were smaller than migrating fish

WEST COAST – CALOOSAHATCHEE RIVER

- Spawning 2005: Migrants 692, Residents 669
- Spawning 2006: Migrants 692, Residents 669
- Spawning 2007: Migrants 782, Residents 862

Residents were smaller than migrating fish.
## West Coast – Caloosahatchee River

### Conclusions

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<thead>
<tr>
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<td>Charlotte Harbor</td>
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<td>Y, non-sp site</td>
<td></td>
</tr>
<tr>
<td>Inter-annual site fidelity</td>
<td>Y, non-sp site</td>
<td></td>
</tr>
<tr>
<td>Skip spawning</td>
<td>Y, 40%</td>
<td></td>
</tr>
<tr>
<td>Migration type</td>
<td>Single</td>
<td></td>
</tr>
<tr>
<td>Behavioral contingents</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Spawning season length</td>
<td>78 (40-124 d)</td>
<td></td>
</tr>
<tr>
<td>Mean spawning start date</td>
<td>June 1st</td>
<td></td>
</tr>
</tbody>
</table>
Acoustic telemetry

Number of snook tagged: 30

Size: >450 mm SL

Tracked for: 2 years (2007-2008)

Purpose:
1) To determine the degree to which snook show fidelity to spawning grounds.

Adams et al. (2009) Fidelity to spawning grounds by a catadromous fish, *Centropomus undecimalis*
WEST COAST – CHARLOTTE HARBOR

- Exhibited high levels of intra and inter-annual site fidelity to spawning sites.
- Three levels of fidelity: one side of the island, whole island, more than one island.
- Of 19 fish, 10 were only detected on the island they were tagged.

Adams et al. (2009) Fidelity to spawning grounds by a catadromous fish, *Centropomus undecimalis*
### West Coast – Charlotte Harbor

**Conclusions**

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<td>Single?</td>
</tr>
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</table>
**West Coast – Tampa Bay**

**Acoustic telemetry and catch data**

**Number of snook tagged:** 31  
**Size:** 495 – 792 mm TL  
**Tracked for:** 3 years (2007-2009)  

**Purpose:**

1) To evaluate where Common Snook occurred in Tampa Bay and if it changed with the spawning season.  
2) To determine fine scale movement at spawning sites.

Lowerre-Barbieri et al. (2014) Spawning site selection and contingent behavior in common snook, *Centropomus undecimalis*
West Coast – Tampa Bay

Density of Common Snook in Tampa Bay

Spawning Season  Non-spawning Season

Lowerre-Barbieri et al. (2014) Spawning site selection and contingent behavior in common snook, Centropomus undecimalis
• Returned to same spawning within and between seasons.
• Spent an average of 39 days at spawning sites, but in less than 24 hr increments.
Individual differences in behavior

Lowerre-Barbieri et al. (2014) Spawning site selection and contingent behavior in common snook, Centropomus undecimalis
## West Coast – Tampa Bay

### Conclusions

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<td>Cape Canaveral to Palm Beach</td>
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<tr>
<td>Migration type</td>
<td>Single</td>
<td>Single?</td>
<td>Bouncing</td>
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<td>39 (1-102 d)</td>
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<td>Mean spawning start date</td>
<td>June 1\textsuperscript{st}</td>
<td>NA</td>
<td>May 22\textsuperscript{nd}</td>
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**W**est C**o**ast - **E**verglades

**Acoustic telemetry**

**Number of snook tagged:** 53

**Size:** >600 mm TL

**Tracked for:** 3 years (2012-2014)

**Objective:**

1) Do coastal river fish change movement tactics with freshwater flow?

2) Examine skip spawning in freshwater fish.

Boucek et al. (ongoing research) Effects of disturbance on sub-tropical communities and consumer mediated habitat linkages.
Migration to spawning sites

Proportion of population that left the river

Boucek et al. (ongoing research) Effects of disturbance on sub-tropical communities and consumer mediated habitat linkages.
• Fish migrated out of the river beginning of April.
• Spent an average of 40 days outside the river.

Boucek et al. (ongoing research) Effects of disturbance on sub-tropical communities and consumer mediated habitat linkages.
West Coast - Everglades

Site Fidelity
Some fish returned to Shark River after presumably spawning

Proportion of spawning fish that returned to rivers

Boucek et al. (ongoing research) Effects of disturbance on sub-tropical communities and consumer mediated habitat linkages.
## West Coast – Everglades

### Conclusions

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Acoustic telemetry

Number of snook tagged: 280  
Size: 538 – 1109 mm TL  
Tracked for: 7 years (2008-2014)  
Objective:  
1) Spawning traits  
2) Site fidelity
EAST COAST – CANAVERAL TO PALM BEACH

752 receivers
Southeastern U.S., Bahamas, and the U.S. Caribbean
**EAST COAST – CANAVERAL TO PALM BEACH**

- Over 12 million detections
- Detected in ALL habitats
- 7 inlets monitored
- Highest densities in Sebastian, St. Lucie, and Jupiter Inlets.

Young et al. (2014) Spatiotemporal dynamics of spawning aggregations of common snook on the east coast of Florida.
Asynchronous migration
Single and multiple inlets
Primary inlet used 6 times more often.
Primary inlet is within 40km and southeast of resident habitat
Aggregation is a revolving door
Whole spawning period 38 days.

Young et al. (2014) Spatiotemporal dynamics of spawning aggregations of common snook on the east coast of Florida.
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## EAST COAST – CANAVERAL TO PALM BEACH

Number of fish detected during the spawning season

<table>
<thead>
<tr>
<th>Year</th>
<th>Total n</th>
<th>Inlet 24-36.2 ppt</th>
<th>Offshore Full seawater</th>
<th>Estuary 0.6-35.6 ppt</th>
<th>River 0-27.5 ppt</th>
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</thead>
<tbody>
<tr>
<td>2008</td>
<td>88</td>
<td>69</td>
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<td>5</td>
<td>14</td>
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<tr>
<td>2009</td>
<td>133</td>
<td>92</td>
<td>20</td>
<td>14</td>
<td>7</td>
</tr>
<tr>
<td>2010</td>
<td>95</td>
<td>66</td>
<td>17</td>
<td>8</td>
<td>4</td>
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<tr>
<td>2011</td>
<td>81</td>
<td>53</td>
<td>24</td>
<td>2</td>
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<tr>
<td>2012</td>
<td>66</td>
<td>46</td>
<td>17</td>
<td>1</td>
<td>2</td>
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<td>2013</td>
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<td>2014</td>
<td>8</td>
<td>5</td>
<td>3</td>
<td>0</td>
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Young et al. (2014) Spatiotemporal dynamics of spawning aggregations of common snook on the east coast of Florida.
### East Coast – Canaveral to Palm Beach

#### Conclusions

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<td>June 1st</td>
<td>NA</td>
<td>May 22nd</td>
</tr>
</tbody>
</table>

*NA* indicates data not available or not applicable.
In Summary

We are:

…documenting, quantifying, and explaining aspects of Common Snook spatial ecology that user groups already know.

…expanding our current understanding of the spawning dynamics of Common Snook.

…learning what how the behavior of Common Snook may contribute to population resilience.

…applying these results to management.
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