GCRL’s
Catch More Fish with Science
Spotted Seatrout

Read Hendon
Center for Fisheries Research & Development
&
Capt. Matt Tusa
Shore Thing Charters
Spotted Seatrout, *Cynoscion nebulosus*

- a.k.a. “speckled trout”
- member of the drum family Sciaenidae
- common throughout southeastern U.S. bays and estuaries
- most popular inshore coastal species in MS
Current Fishery Information
Estimated NUMBERS of Fish Harvested in Mississippi Waters, MRIP, 2014 Data
Estimated POUNDS of Fish Harvested in Mississippi Waters, MRIP, 2014 Data

- Spotted Seatrout
- "White Trout"
- "Ground Mullet"
- Croaker
- Red Drum
Estimated Spotted Seatrout Recreational Harvest in Mississippi over Time, MRIP
Estimated Total Number of Recreational Trips in Mississippi (non-specific), MRIP
The Science Behind the Fishery
Fishery-Independent Data ("F-I")

GCRL Monthly Sampling Locations
F-I Annual Abundance

GCRL Fixed Stations
F-I Spatial Distribution

Total Number by Station for 2008-2014

Hancock

395

241 253

63

58

97 177 59

53 146

Jackson
F-I Monthly Distribution

Number of Spotted Seatrout

Month

- J
- F
- M
- A
- M
- J
- J
- A
- S
- O
- N
- D
Temperature Influence on Abundance

Number of Spotted Seatrout vs. Surface Water Temperature (F)

- The graph shows the number of spotted seatrout (ordinate) in relation to surface water temperature (abscissa), measured in Fahrenheit (F).
- The data suggests a cyclic pattern, with peaks around the mid-70s and mid-80s, and troughs around the mid-60s.
- The trend indicates that the abundance of spotted seatrout increases as the water temperature rises, up to a certain point where it begins to decline.
Salinity Influence on Abundance

- **Average Abundance**
- **Surface Salinity (ppt)**

The graph illustrates the relationship between surface salinity (in ppt) and average abundance. It shows fluctuations in abundance across different salinity levels, with notable peaks and troughs.
Age & Growth
Determining Fish Age

The most abundant fish in GCRL monitoring samples are ages 1 & 2.
Length at Age - Males

- **Males**

<table>
<thead>
<tr>
<th>Length at Age</th>
<th>0</th>
<th>2</th>
<th>4</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>12</th>
<th>14</th>
<th>16</th>
<th>18</th>
<th>20</th>
<th>22</th>
<th>24</th>
<th>26</th>
<th>28</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological Age TL (inches)</td>
<td>ObsTL</td>
<td>PredTL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.0</td>
<td>1.0</td>
<td>2.0</td>
<td>3.0</td>
<td>4.0</td>
<td>5.0</td>
<td>6.0</td>
<td>7.0</td>
<td>8.0</td>
<td>9.0</td>
<td>10.0</td>
<td>11.0</td>
<td>12.0</td>
<td>13.0</td>
<td>14.0</td>
<td>15.0</td>
</tr>
</tbody>
</table>

Graph:
- Diamond line: ObsTL
- Pink line: PredTL

- Biological Age: 8.0
- ObsTL: 22
Length at Age - Females

- **ObsTL**
- **PredTL**

TL (inches) - Biological Age

- Females
Length-Weight Relationship

![Graph showing the relationship between total length and total weight.](image-url)
Reproduction
Spotted Seatrout Reproduction

• Most females sexually mature by end of first year
  • 65% mature at 13-in and 100% at 14-in
• Spawning season in MS = April to September
• Seagrass beds, island passes, reefs ... but, little is known about local spawning habitat.
Using Courtship Sounds to Identify Spawning Habitat

- Male trout produce species-specific courtship sounds, i.e. drumming
- Acoustic receiver can detect and record the courtship sounds
Spawning Habitat Study Objectives

- Use male courtship sounds to identify spawning habitat in two Mississippi bays

Biloxi Bay – Impacted Estuary

Grand Bay NERR

Grand Bay – Pristine Estuary
Hydrophone Survey

• Conducted weekly passive acoustic survey
  • May to September 2008-09
  • 1830 - 0200 hr
• Estimated the group size and distance from hydrophone
  • Size: 1-2, 3-5, small group, large group
  • Distance to trout: On Top Of, Close By, In The Distance
Grand Bay Survey

Legend
- Oyster
- Seagrass

Legend
Size
- Large Aggregation
- Small Aggregation
- 3-5 Individuals
- 1-2 Individuals

Color
- "Directly On-Top Of"
- "Close-By"
- "In The Distance"
- No C. nebulosus Heard

348 Stations
Male Courtship Sounds

• Most prevalent in June and July
• More prevalent in Grand Bay than Biloxi Bay
• Preferred spawning habitat for males*: 
  • Depth >2 meters 
  • Temp >80°F 
  • Salinity >15 ppt 

* for “On Top Of” or “Close By” detections
Movements & Migrations
Movements & Migrations

• angler-cooperative tagging program
• 15,206 spotted seatrout tagged
• 408 (2.7%) recaptured
• 84% of fish = 10 - 14 inches total length
Where Were Fish Tagged?

Zone I = 45%  Zone II = 20%
Zone III = 33%  Zone IV = <1%
How Long Were Fish Out After Tagging?

Number of Spotted Seatrout

Weeks at Liberty (4-week Intervals)
How Far Did Fish Move After Tagging?

- 82% traveled less than 2 miles
- 92% traveled less than 6 miles
- distance not related to fish size or time at liberty
Longest Distances Traveled

Exceptions to the Rule

35 miles in 212 days; 12.0 in
Longest Distances Traveled

Exceptions to the Rule

40 miles in 138 days; 12.0 in
Longest Distances Traveled

Exceptions to the Rule

45 miles in 200 days; 14.0 in
Feeding
Feeding

- Overstreet and Heard (1982)
- 373 spotted seatrout; 340 contained food
- **Percent Occurrence** = the % of stomachs in which a particular prey type occurs

<table>
<thead>
<tr>
<th>Prey Type</th>
<th>Fish Size Range (Total Length, Inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4.0 - 11.75</td>
</tr>
<tr>
<td>Polychaetes</td>
<td>2.0%</td>
</tr>
<tr>
<td>Crustaceans</td>
<td>47.0%</td>
</tr>
<tr>
<td>Fishes</td>
<td>65.0%</td>
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## Feeding

<table>
<thead>
<tr>
<th>Category</th>
<th>Species</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polychaete</td>
<td><em>Neanthes succinea</em></td>
<td>5.6</td>
</tr>
<tr>
<td>Shrimp</td>
<td><em>Farfantepenaeus aztecus</em></td>
<td>7.4</td>
</tr>
<tr>
<td></td>
<td><em>Litopenaeus setiferus</em></td>
<td>3.8</td>
</tr>
<tr>
<td></td>
<td>unidenfied penaeids</td>
<td>7.1</td>
</tr>
<tr>
<td></td>
<td><em>Palaemonetes pugio</em></td>
<td>3.5</td>
</tr>
<tr>
<td>Crab</td>
<td><em>Callinectes sapidus</em></td>
<td>8.8</td>
</tr>
<tr>
<td>Fish</td>
<td><em>Anchoa mitchilli</em></td>
<td>14.4</td>
</tr>
<tr>
<td></td>
<td><em>Brevoortia patronus</em></td>
<td>11.8</td>
</tr>
<tr>
<td></td>
<td><em>Membras martinica</em></td>
<td>3.8</td>
</tr>
<tr>
<td></td>
<td><em>Microponias undulatus</em></td>
<td>2.9</td>
</tr>
<tr>
<td></td>
<td>unidenfied fish parts</td>
<td>38.8</td>
</tr>
</tbody>
</table>

Bay Anchovy

Gulf Menhaden

Clam Worm

Brown Shrimp

Blue Crab
Hooking Mortality
Hooking Mortality

• Do the fish that I release survive?
• 72-hour mortality study
Hooking Mortality

- Start No.
- 0 hours
- 24 hours
- 48 hours
- 72 hours

Number of Fish

- Live
- Dead

n = 88
Moving Forward ...

• Continue the monthly monitoring in conjunction with MDMR

• Stock assessment in progress with 2014 data being included

• Feeding analyses to begin this summer with implementation of new program

• Potential to expand acoustic network to better define habitat use
More fishing info can be found at:

http://www.usm.edu/gcrl/

Special thanks to our primary research sponsors!