Habitat Science and Management Applications in the Gulf of Mexico
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Current EFH Designations (Generic Amendment 3)

- Areas of higher species density, based on NOAA Atlas (1985) and functional relationships analysis
- Reef Fish FMPs:
  - all estuaries; the US/Mexico border to the boundary between the areas covered by the GMFMC and the (SAFMC) from estuarine waters out to depths of 100 fathoms
<table>
<thead>
<tr>
<th>Life stage</th>
<th>Eco-region</th>
<th>Habitat Zone</th>
<th>Habitat Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>eggs₁, 7</td>
<td>ER-1, ER-2</td>
<td>nearshore, offshore</td>
<td>WCA</td>
</tr>
<tr>
<td>larvae₁₂, 1₃</td>
<td>ER-1, ER-2</td>
<td>nearshore, offshore</td>
<td>WCA</td>
</tr>
<tr>
<td>postlarvae₁₂, 1₃</td>
<td>ER-1, ER-2</td>
<td>nearshore, offshore</td>
<td>WCA</td>
</tr>
<tr>
<td>early juveniles₁, 7, 8, 11</td>
<td>ER-1, ER-2</td>
<td>estuarine, nearshore</td>
<td>SAV, mangrove</td>
</tr>
<tr>
<td>late juveniles₁, 7, 8, 16</td>
<td>ER-1, ER-2</td>
<td>estuarine, nearshore, offshore</td>
<td>reefs, <em>hard bottom</em></td>
</tr>
</tbody>
</table>
Habitat types: Submerged Aquatic Vegetation/ Mangroves
Map generation
Early Juvenile Yellowtail Snapper

- Eco-regions: One and Two
Map generation
Early Juvenile Yellowtail Snapper

- Habitat Zones:
Final Product
Advantages and Disadvantages

**Advantages:**
- Not technically/computationally demanding (no modeling)
- Accommodating of level 1 (distribution) habitat data
- Inexpensive method (primarily compiled from literature review)

**Disadvantages:**
- Habitat type data quality
- Constrained by qualitatively established bins (eco-regions/habitat zones)
- Somewhat subjective designation
Incorporate environmental variables, spatial distribution, and CPUE to generate predicted densities

Examples:
- Generalized Additive Models
- Boosted Regression Trees
Pink Shrimp

Predictor Variables: Chlorophyll $a$, sediment type, DO, temp., depth

Predicted relative abundance

Brown Shrimp
Predictor variables: SST, DO, salinity, depth, Mud %, longitude, latitude, season
Predicted mean density (log-CPUE)

To The Web!

https://gulfcouncilportal.shinyapps.io/abundanceRaster/
To The Web!
To The Web!
http://portal.gulfcouncil.org/EFHreview.html
QUESTIONS?