The Shallow-Water Habitats of the Florida Keys National Marine Sanctuary: Their Ecological Importance and Sponge Restoration Efforts

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Overview

- Shallow water within FKNMS composed of different habitats important to fish and invertebrates many of which are commercially and recreationally valuable
- Habitat types include beaches, seagrass beds and nearshore hardbottom
- Talk will highlight the ecological importance of these habitats
Oceanside Beaches
Sand Habitat
Location of the beachside sampling sites in the lower and middle Florida Keys. Sites were sampled from July 1994 to July 1997.
Beaches are an important settlement habitat, 120 species including bonefish, snappers, & permit

Three species groups
Summer-recruiting species: snappers, grunts, & mojarras
Winter-recruiting species: bonefish, mullets, & drums
Nearshore pelagics: anchovies & herrings

Snodgrass, D and C. W. Harnden. 2009. Composition of Fish Species on Ocean-side Beach Habitats in the Florida Keys. Florida Scientist. Vol 72 #2 147-152
Beach-Side Seagrass Beds
Seining in Nearshore Seagrass Beds of the Middle Florida Keys

- Monthly since 2006
- Determine abundance & distribution of settlement-stage and juvenile snappers in shallow, nearshore seagrass beds in the middle Florida Keys

21.3m seine net with 3.2mm mesh
Recruitment pulses for young-of-the-year snappers peak in late summer/fall, after the spawning season in spring and early summer.
Highest young-of-the-year densities observed during the fall following the peak spawning season (April-Jun)
Near-Shore Seagrass Beds Are *Diverse!*
• Noticeable shift in density among several species
• Permit & Bonefish more commonly in sand
• Snapper & Grunts more commonly in seagrass

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>TOTAL DENSITY (#/100M²)</th>
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<tbody>
<tr>
<td></td>
<td>SAND</td>
</tr>
<tr>
<td>Anchovies</td>
<td>50.2</td>
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<tr>
<td>Mojarras</td>
<td>11.4</td>
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<tr>
<td>Herrings/clupeids</td>
<td>11.2</td>
</tr>
<tr>
<td>Mullets</td>
<td>7.9</td>
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<tr>
<td>Permit</td>
<td>7.7</td>
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<tr>
<td>Bonefish</td>
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<tr>
<td>Schoolmaster snapper</td>
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<tr>
<td>White grunt</td>
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<tr>
<td>Frillfin goby</td>
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<td>Grey snapper</td>
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<tr>
<td>Pinfish</td>
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<td>Bluestripped grunt</td>
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<td>Lane snapper</td>
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<tr>
<td>Yellowtail snapper</td>
<td>0</td>
</tr>
<tr>
<td>Mutton snapper</td>
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</table>
Shallow-Water Seagrass Beds
Study area and sampling sites by zone (n = 855)

- **Red: Upper Keys** (Gulf = 94, Ocean = 142)
- **Blue: Middle Keys** (Gulf = 324, Ocean = 102)
- **Green Lower Keys** (Gulf = 194, Ocean = 42)

- Sampled using otter trawls
- 3-min. bottom tows using a 20’ trawl with a 1/8” mesh cod-end liner

Lane Snapper

- Shallow water seagrass beds are an important habitat for lane snapper
- Lane Snapper -- Primarily juvenile habitat
Hard-Bottom Habitat
Near-Shore Hard-Bottom Habitat

Rocky bottom within 2 km of the shore on the Gulf and Florida Bay side or the Oceanside of the Florida Keys.

Covers about 67,000 ha or a little more than 30% of the entire nearshore habitat in the Florida Keys Marine Ecosystem.
Essential Fish Habitat

- We have identified 186 species of finfish
- Nursery habitat for many species of reef fish
Near-Shore Hard-Bottom Survey
Shallow water hard-bottom, a critical habitat for juvenile fish in the Florida Keys.
Many Invertebrate Species
Nursery Habitat For Spiny Lobster
Post-larvae preferentially settle into red algae that is abundant in the nearshore hard-bottom habitat.
Larger juvenile lobsters use many different shelter types abundant in the hard-bottom habitat; sponges, coral heads, rock ledges, & solution holes.
• Preferred structures are sponges, especially loggerhead sponges

• Larger juvenile lobsters begin using solution holes before moving to reefs as they mature
Sponges – Critical to the Coral Reef Ecosystem of the Florida Keys
• Sponges have associations with many microorganisms that produce chemical transformations in the water as it is pumped through their tissues
• Habitat for animals that live around sponges
• Habitat for many commensal animals
  • Shrimps, Worms, Brittle stars
Algae Blooms and Florida Bay’s Sponge Community
Loss of Ecosystem Function
Loss of Hard-Bottom Soundscape
Sponge Restoration
Volunteers Welcome

Goal: Late 2019, 15,000 Sponges to Outplant

Sponge Community Restoration

Sponges communities are a key component of the Florida Keys and Florida Bay nearshore marine environment. Unfortunately, these communities have become severely degraded in recent decades. Researchers with the Florida Fish and Wildlife Conservation Commission (FWC) are now testing the efficacy of sponge nurseries to support large-scale sponge community restoration...and you can help!

Join FWC biologists for a day on the water and take part in the effort to restore Florida Bay’s sponge community. (see reverse side for more info)

For more info and to be a part of sponge restoration, contact:

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**Summary**

**Beaches**: Important settlement habitat for many fishes including snappers & permit

**Shallow Water Seagrass Beds**: Important habitat for a diverse array of fishes, including juvenile snappers

**Shallow Water Hardbottom**: Essential juvenile habitat for many fishes, including many species of reef fishes and crustaceans

- Loss of sponge communities reduce their ecological function
- Larger-scale sponge restoration effort scheduled for 2019
Questions