Improving fishermen awareness to reduce the presence of lobster traps in MPAs of the Florida Keys

Spiny Lobster Advisory Panel Meeting
Key Largo, FL
April 25, 2016

Gabrielle Renchen & Tom Matthews
Florida Fish and Wildlife Conservation Commission
Fish and Wildlife Research Institute
South Florida Regional Laboratory
Project Information

• **Purpose:**
  - Evaluate fishermen compliance with MPAs that prohibit trap fishing
  - Evaluate marine debris accumulation inside MPAs that prohibit trap fishing

• **Funding:**

[NOAA CORAL REEF CONSERVATION PROGRAM]

[National Fish and Wildlife Foundation]
Study Location

- Marathon
- Key Largo
- Key West
- Miami

Legend:
- FKNMS Sanctuary Preservation Areas (Sanctuary)
- Pennekamp Lobster Exclusion Zones (State)
- NMFS Acropora Protection Zones (NMFS)
- Florida Keys National Marine Sanctuary Boundary
Florida Keys Coral Reef Decline

• Documented decline since 1970s
  o Live coral cover
    ▪ 1970s: ~40%
    ▪ Present: ~10%
  o *Acropora* spp.: ESA listed as “Threatened” in 2006

• Many natural and anthropogenic stressors
  o Our focus: lobster trap fishing

Photo Credits: Phillip Dustan in Jackson et al. 2014
Florida Spiny Lobster Trap Fishery

- Trap fishermen: ~540
- Traps: ~475,000
- Landings: ~6.2 million lbs
- Value: ~$53 million ex-vessel
Trap Impacts on Coral Reefs

- Trap hauling
- Wind driven trap movement
- Accumulation of trap debris

See Lewis et al. 2009 N.Z. J. of Marine & Freshwater Research
Study Sites

• **FKNMS Sanctuary Preservation Areas** (Sanctuary)
  - Designated in 1997
  - Marked
  - On navigation charts
  - \( n = 18 \)

• **Pennekamp State Park Lobster Exclusion Zones** (State)
  - Designated in 1993
  - Marked
  - Not on navigation charts
  - \( n = 8 \)

• **NMFS Acropora Protection Zones** (NMFS)
  - Designated in 2012
  - Unmarked
  - Not on navigation charts
  - \( n = 60 \)
Evaluating Fishermen Compliance

• Methods:
  o Counted the number of traps and trap owners in MPAs
    ▪ Pre and Post Education Effort (Fall 2014, Fall 2015):
      ➢ Sanctuary: n=18 out of 18
      ➢ NMFS: n=18 out of 60
      ➢ State: n=8 out of 8
      ➢ Controls (open fishing areas): n=18
  o Record GPS location of traps
Methods: Educational Effort

- Conducted in Year 1 (Fall 2014)
  - Attached courtesy notice to buoys
  - Mailed information to fishermen
  - Additional contact with fishermen:
    - Interactions on the water
    - Phone calls
Results

Trap set inside Sanctuary MPA boundary

Sanctuary MPA boundary marker
• Unmarked MPAs had highest density of traps
• Density of traps in MPAs decreased post education
Trap Locations in Sanctuary MPAs

Alligator Reef  Size: 0.84 km²
Trap Locations in State MPAs

Mosquito Bank South  Size: 0.52 km$^2$
NMFS 12 (Big Pine Shoal)  Size: 0.76 km²
Traps Inside MPAs: Distance from Boundary

- Traps concentrated near boundaries of marked MPAs
- Traps evenly distributed throughout unmarked MPAs
Trap Fishermen in MPAs

- **Number of fishermen**
  - Year 1: 32
  - Year 2: 20
    - 13 fishermen from Year 1
    - 7 new fishermen
  - 19 fishermen observed in Year 1 were not observed in Year 2

<table>
<thead>
<tr>
<th>MPA type</th>
<th>Fall 2014</th>
<th>Fall 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>NMFS <em>Acropora</em> Protection Zones (NMFS)</td>
<td>2.2 ± 0.3</td>
<td>1.7 ± 0.4</td>
</tr>
<tr>
<td>Pennekamp Lobster Exclusion Zones (State)</td>
<td>2.0 ± 0.7</td>
<td>0.3 ± 0.2</td>
</tr>
<tr>
<td>FKNMS Sanctuary Preservation Areas (Sanctuary)</td>
<td>1.2 ± 0.3</td>
<td>0.4 ± 0.2</td>
</tr>
<tr>
<td>Controls</td>
<td>2.3 ± 0.4</td>
<td>3.1 ± 0.4</td>
</tr>
</tbody>
</table>
Results Summary

• More traps in unmarked MPAs
• Most traps near boundaries in marked MPAs
• Improved compliance after education
  o 19 out of 32 fishermen removed traps from MPAs (~60%)
  o New fishermen in Year 2
Evaluating Marine Debris Accumulation

• **Methods:**
  - Summer 2015
  - Diver transects: 100 m long x 15 m wide (n=261)
    - Recorded:
      - Debris type
      - Habitat type
      - Distance on transect
Results: Types of Debris

- Trap Gear: 55.4%
- Other Debris: 28.7%
- Other Fishing Gear: 15.9%
Results: Trap Debris by Habitat

- Coral Reef: 54.3%
- Hardbottom: 22.5%
- Sand: 13.0%
- Seagrass: 8.6%
- Rubble: 1.6%
Results Summary

• Trap debris was most prevalent type of marine debris
  • Accumulated in coral reef habitat
  • Found in all types of MPAs
Conclusions

• Education effort improved compliance
• Marked MPAs had better compliance
• Area protected by MPAs is smaller than intended due to traps fished inside boundaries
• MPAs may not protect corals from trap debris because of wind-driven transport of traps
Thank You