Examining derelict trap impacts on harvest in the commercial blue crab (*Callinectes sapidus*) fishery

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Blue Crab in the Chesapeake Bay

• 30-40% of US commercial blue crab fishery
  • $80-100 million annual revenues

• Pot fishery
2008 Federal Failure

- $30 million
  - VIMS/VMRC Marine Debris Location and Removal Program
- Management Actions
  - VA Winter Dredge Fishery Closure
  - License buyback program

![Map showing crab pots removal](image_url)

Total lost and abandoned crab pots removed from the Chesapeake Bay 2008 - 2012

- ~12,000 pots removed from Maryland waters
- Over 32,000 pots removed from Virginia waters
Derelict Pot Impacts

Ecological

Economic
Harvest Impact

- Watermen well-being
- Maximizing profit
  - Increasing efficiency of fishery
  - VA: $22.6 million increase in harvest

![Graph showing harvest impact over years with and without removal programs.]

Table 3.6. Average harvest/pot during years of removals in areas with and without removals

<table>
<thead>
<tr>
<th></th>
<th>No Removals</th>
<th>Removals</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>VA 2009 – 2014</strong></td>
<td>1.45 (0.50)</td>
<td>2.17 (0.62)</td>
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<tr>
<td><strong>MD 2010 &amp; 2012</strong></td>
<td>1.88 (0.60)</td>
<td>2.18 (0.61)</td>
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Mobjack Bay, Virginia

- Summer/Fall 2017
- Two 11-day sampling sessions:
  - 10 control pots
  - 10 treatment pots – 2 derelict pots
Preliminary Results

- Mean harvest rates (crabs/pot/day)
  - Control = 5.51 (± 0.20)
  - Treatment = 4.33 (± 0.14)
  - Δ = 1.18, t = -4.85, p << 0.001
Preliminary Results

- Negative Binomial model
  - Legal Harvest ~ Session + Soak Time + Bycatch + Treatment
  - 1 crab harvested in the Control group,
    0.79 crabs are harvested in the Treatment group

<table>
<thead>
<tr>
<th>Predictor Variable</th>
<th>Estimate</th>
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<tr>
<td>Intercept</td>
<td>1.65 (0.07 SE)***</td>
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<tr>
<td>Session</td>
<td>-0.06 (0.05 SE)</td>
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<tr>
<td>Soak Time</td>
<td>4.61x10^{-5} (2.39x10^{-5} SE)</td>
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<tr>
<td>Bycatch</td>
<td>-0.03 (0.10 SE)</td>
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<tr>
<td>Treatment</td>
<td>-0.24 (0.05 SE)***</td>
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Summary

• 2016 Virginia commercial harvest = 26 million pounds
  + 20% = 31.2 million pounds

• Recommendations:
  • Targeted removal efforts
  • Improve spatial management

• Future work for success:
  • Survey watermen
  • Develop watermen buy-in
  • Incentivize derelict trap mitigation actions
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