Managing Recreational Fisheries in Maryland: Two Survey-Based Approaches Examining Harvest Rates and Participation

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Part One:
Brook Trout Creel Survey
Introduction

- Brook trout are a popular target for recreational fishing
- Regarded by conservationists as an indicator species
- Concern: population extirpated throughout most of Maryland
- Survey will help provide MD DNR with current population and fishing effort
Research Objective

Objective: Implement a creel survey to estimate brook trout fishing effort, catch, and harvest in a key watershed in Maryland
Methods

● Who?
  ○ Survey personnel: MD DNR
  ○ Target: recreational anglers

● What?
  ○ Access point survey

● Where?
  ○ Upper Gunpowder River

● When?
  ○ Implemented on randomly selected days and times
## Survey Methods and Focus

- **General Information**
  - Time
  - Method
  - Species targeted

- **Fish Catch**
  - Species caught
  - Number caught
  - Number harvested

- **Angler Information**
  - State
  - County

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### Upper Gunpowder Angler Survey

<table>
<thead>
<tr>
<th>ID</th>
<th>Time Started Fishing</th>
<th>Time Finished Fishing</th>
<th>Fishing Method</th>
<th>Primary Species Targeted</th>
<th>FISH SPECIES CATCH # 1</th>
<th>FISH SPECIES CATCH # 2</th>
<th>ANGLER INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Fly Fishing</td>
<td>Brook Trout</td>
<td>4 1</td>
<td>SM Bass</td>
<td>2 0</td>
</tr>
</tbody>
</table>

**Notes:** List other information here, including total # of anglers who refused interview, and catch & harvest figures for additional fish species. Refer to ID when necessary.
Results: Estimated Effort

- March
- April
- May
Results: Estimated Catch

<table>
<thead>
<tr>
<th>Number of Fish</th>
</tr>
</thead>
<tbody>
<tr>
<td>90</td>
</tr>
<tr>
<td>80</td>
</tr>
<tr>
<td>70</td>
</tr>
<tr>
<td>60</td>
</tr>
<tr>
<td>50</td>
</tr>
<tr>
<td>40</td>
</tr>
<tr>
<td>30</td>
</tr>
<tr>
<td>20</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>0</td>
</tr>
</tbody>
</table>

- March
- April
- May

- Brook Trout
- All Fish
Results: Estimated Harvest

- No anglers reported harvesting fish
- First glance: overharvest does not appear to be a concern
- However, fish mortality from live bait may be a potential problem
Part Two: Factors Influencing Angler Participation
Introduction

- 227,000 anglers hold licenses, and anglers spend 2.5 million days fishing in Maryland each year
- Maryland recreational fishing provides valuable revenue for the state
- Survey will help managers improve fishery quality by understanding preferences
- Better management has the potential to increase recruitment and retention
Research Objective

Objectives:

Quantify factors affecting angler participation in terms of license purchases and trips taken

Examine how these factors differ between demographic groups of interest
Survey Methods and Focus

● Methods
  ○ Survey sent to 4,300 anglers with current fishing licenses (25.1% response rate)
  ○ Conducted online and with mail (up to four contacts)

● My Focus
  ○ Examine factors influencing participation
  ○ How participation is affected by individual characteristics
Statistical Analysis

- **Methods**
  - Assign numerical values to priority responses
  - Determine means for each factor
    - Determine most important factors among respondents
  - Use two sample t-tests to compare importance between groups
    - Millennials vs other generations
    - Anglers who fished vs anglers who did not fish in 2015
## Results: All Respondents

<table>
<thead>
<tr>
<th>I WOULD GO FISHING MORE OFTEN IN MARYLAND NON-TIDAL WATERWAYS IF......</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>I was able to catch more fish</td>
<td>4%</td>
<td>10%</td>
<td>31%</td>
<td>36%</td>
<td>20%</td>
<td>3.57</td>
</tr>
<tr>
<td>access to fishing sites was better</td>
<td>3%</td>
<td>10%</td>
<td>32%</td>
<td>37%</td>
<td>18%</td>
<td>3.56</td>
</tr>
<tr>
<td>I knew when and where to fish</td>
<td>5%</td>
<td>10%</td>
<td>30%</td>
<td>38%</td>
<td>17%</td>
<td>3.51</td>
</tr>
<tr>
<td>environmental quality was higher</td>
<td>4%</td>
<td>10%</td>
<td>41%</td>
<td>32%</td>
<td>14%</td>
<td>3.43</td>
</tr>
<tr>
<td>regulations were less restrictive</td>
<td>9%</td>
<td>21%</td>
<td>45%</td>
<td>17%</td>
<td>8%</td>
<td>2.93</td>
</tr>
<tr>
<td>fishing areas were less crowded</td>
<td>5%</td>
<td>12%</td>
<td>37%</td>
<td>32%</td>
<td>14%</td>
<td>3.40</td>
</tr>
<tr>
<td>fishing was less expensive</td>
<td>9%</td>
<td>19%</td>
<td>44%</td>
<td>19%</td>
<td>9%</td>
<td>3.02</td>
</tr>
<tr>
<td>I had somebody to go with</td>
<td>9%</td>
<td>18%</td>
<td>38%</td>
<td>25%</td>
<td>10%</td>
<td>3.08</td>
</tr>
<tr>
<td>I was able to catch larger fish</td>
<td>5%</td>
<td>10%</td>
<td>35%</td>
<td>33%</td>
<td>17%</td>
<td>3.47</td>
</tr>
<tr>
<td>I had more leisure time</td>
<td>5%</td>
<td>7%</td>
<td>27%</td>
<td>29%</td>
<td>33%</td>
<td>3.79</td>
</tr>
</tbody>
</table>
Results: Millennials

- Very different priorities from other generations
- Observed that millennials placed a higher importance on the following factors:
  - The ability to catch more fish ($p<0.01$)
  - Crowding of fishing areas ($p<0.01$)
  - The expense of fishing ($p<0.01$)
  - The ability to catch larger fish ($p<0.01$)
  - Having more leisure time ($p<0.01$)
Results: Non-Fishing License Holders

- Similar priorities as respondents who did fish
- Observed that non-fishing anglers placed a lower importance on the following factors…
  - Catching more fish (p<0.01)
  - Catching larger fish (p<0.01)
- 2nd most important factor: accessibility to fishing sites
Recommendations to Management

- Results may indicate a need to increase the number of fishing options close to cities
  - Less time needed to take trips
- Work to appeal to millennial anglers
  - Increase stocking
- Work to appeal to anglers who did not fish
  - Increase accessibility
    - More paths, ramps
- Evaluate the most important factors to maintain and increase license purchases and trips
Thank you!