Collaborative Research in the Port Orford Live Fish Fishery

Lessons Learned

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- Fishing community on the southern OR coast
- ~40 vessels, 30% of workforce involved in the fishing industry
- Limited length, weight by hoist; day boats
- Diverse portfolios; homogenous fleet
- Site of Redfish Rocks Marine Reserve
Live Fish Fishery

Commercial Landings (%) by port for 2000
History of Live Fish

Landings History of commercial groundfish species, 1985-2006

- YELLOWTAIL ROCKFISH
- YELLOWEYE ROCKFISH
- VERMILION ROCKFISH
- SMALL ROCKFISH
- SLOPE ROCKFISH
- SHELF ROCKFISH
- NEARSHORE ROCKFISH
- LINGCOD
- LARGE ROCKFISH
- CANARY ROCKFISH
- CABEZON
- BLUE ROCKFISH
- BLACK ROCKFISH

Disaster
Limited Entry
Local conservation strategy

- Voluntary conservation effort campaign by POORT in 2004
- BOFFFF’s produce more, and more viable offspring (Berkeley)
- Survival? Venting? Reproduce?
- Quota system
- More harm than good?
Collaborative Tagging Study

- 6 fishermen, 3 scientists, 1 graduate student
- Combine science, industry knowledge
- Access to boats, time on water, and local knowledge
- Explore possibilities/limitations of collaboration in Port Orford
Reef Areas
Fishing Methods

- 2008: Hook and line (jig) and Longline
- 2009, 2010: Hook and line
Venting

- Fish suffering from barotrauma cannot submerge without assistance
- Fishermen use a 16 gauge hypodermic needle
- Fish were landed, measured, assessed for reproductive and barotrauma condition, vented*, and tagged
- We used five external symptoms of barotrauma noted (SE, EX, CB, SB, PC; adopted from Jarvis 2006)
- Hooking or deck injuries were also recorded

* Barotrauma guide

<table>
<thead>
<tr>
<th>LEVEL 1 Barotrauma</th>
<th>Description</th>
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<tbody>
<tr>
<td>SE</td>
<td>Stomach eversion: Stomach/oesophagus is coming out of the mouth of the fish, either visibly out of the mouth or inside the mouth</td>
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<thead>
<tr>
<th>LEVEL 2 Barotrauma</th>
<th>Description</th>
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<tbody>
<tr>
<td>EX</td>
<td>Eye eversion: Eyes are protruding from the eye cavity, not flush with the body of the fish</td>
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<thead>
<tr>
<th>LEVEL 3 Barotrauma</th>
<th>Description</th>
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<tr>
<td>CB</td>
<td>Eye gas bubbles: Eyes have gas bubbles or are milky white colored (mark if one or both eyes are affected)</td>
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<thead>
<tr>
<th>LEVEL 4 Barotrauma</th>
<th>Description</th>
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<tr>
<td>SB</td>
<td>Gas bubbles under skin: Fish has gas bubbles under scales along the body</td>
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<tr>
<th>LEVEL 5 Barotrauma</th>
<th>Description</th>
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<tr>
<td>PC</td>
<td>Protruding cloaca: Anus of the fish is protruding from the body</td>
</tr>
<tr>
<td>Species</td>
<td>Fishermen</td>
</tr>
<tr>
<td>------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>black fish</td>
<td>15</td>
</tr>
<tr>
<td>blue fish</td>
<td>1</td>
</tr>
<tr>
<td>quillback fish</td>
<td>40</td>
</tr>
<tr>
<td>tiger fish</td>
<td>1</td>
</tr>
<tr>
<td>striped fish</td>
<td>1</td>
</tr>
<tr>
<td>dark tiger fish</td>
<td>4</td>
</tr>
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Capture locations
Discussion

- Largest movement 3.34 miles by black rockfish (52 DAL)
- Least movement .02 miles by cabezon (28 DAL)
- Average 1.09 miles after 143 DAL
- All but one (Copper) moved inshore
- No movement between reef systems
- Recapture rate black 1.0%, cabezon 7.8%, copper 9.1%, China 1.6%

Pathways to Success Conference

10/12/2012
Meeting objectives

To determine the feasibility of fishermen collaborating in local science of their fisheries, evaluated by the use of permits by year and by the number of fish tagged by year.

- Fishermen tagged 53 fish under their permit (4.9% of total)
- Secured 10 research charters from 2008-2010, 8 of which were with collaborators
- Fishermen were involved in study design, fishing vessel logistics, contributed local knowledge, volunteered time and resources for charter, and communicated to other fleet members about the project

To gather supporting evidence that the local conservation effort to release gravid female fish is a valid tool for sustainability of the nearshore stocks, measured by the recovery rate of tagged fish for the timeframe of the project.

- 15 recaptures to date, recovery rate of 1.3% for 2 years
- 6/10 recovered rockfish were vented
- One gravid fish captured

To determine the level of contribution and feasibility of NOAA-NMFS observer participation in the tagging study, measured by the number of observers that performed tagging and the number of fish tagged by observers each year.

- 2/3 observers participated in tagging
- Observers tagged 12.3% of the total number of fish tagged
Conclusions

- Fishermen are invaluable for traditional knowledge, but not independent data collection.
- Interesting movement information from simple tagging methods.
- Inconclusive evidence that the local conservation effort is an effective measure.
- Venting does help fish submerge and may improve survival after release.
- Observers should be included in collaborative research in fisheries.
Strong Push for collaboration

• “Cooperative research involving the fishing industry and native communities, that offer valuable experiential and traditional knowledge, should be a central element of a number of these new scientific programs” – Pew Ocean Commission, 2003

• “Scientists can also benefit from the knowledge and experience gained by fishermen during years at sea. Cooperative research programs also provide an appropriate mechanism to incorporate traditional indigenous or tribal knowledge into useful information for managers.” – US Commission on Ocean Policy, 2004
Collaborative Research

“fishermen and scientists working together as equal partners, each using their unique knowledge and expertise to better understand the marine environment, fisheries, marine communities, and fish capture systems and to promote effective and equal use of marine resources for all” (Feeney et al 2010)
Recommendations from fishermen collaborator interviews

- There needs to be validation from management and researchers that the work being done is useful and legitimate. Along with validation, this requires management and researchers to ensure standards are communicated and that actual work is credible.

- Expectations for the project should be clear to all collaborators from the start to prevent perceived failure.

- Most fishermen are very interested in the health of the fishery. These concerns should be connected with projects to create common themes of interest between all stakeholder groups.

- There must be continued motivation for participation.

- Fishermen found major obstacles for conducting tagging and collecting information during normal fishing practices. Data collection must be simplified to obtain accurate and quantifiable information from commercial fishermen.

- Have clear and achievable goals with SMART objectives. Make sure that all collaborators agree on these goals and objectives at the start of the planning phases of the project.
Recommendations from fleet survey

- Incorporate a “mechanism for regular communication” with the affected community of interest in the design of the study (Conway and Pomeroy 2006)

- Do not limit opportunity to only those involved in collaboration. If there is opportunity for others to participate, ensure that their interest is given equal weight to collaborators interest.

- Show how results of the project can address issues of concern to the fleet.

- Find ways to build trust in the community.

- Be completely transparent. There is often negativity that develops from lack of transparency during project development.

- Close the loop of communication.
Questions?