June 9, 2015

Project:

“Testing of a Modified Groundgear to Reduce the Catch of SNE Winter Flounder in the Large Mesh Groundfish Fishery”. Project Team: Pingguo He, Natalie Jones, Christopher Rillahan, SMAST, UMASS, Dartmouth; Tor Bendiksen, Reidar’s Trawl Gear and Marine Supply; Aaron Williams, F/V Tradition

Review Comments:

After reviewing the final report, reviewers are asked to respond to the following:

1. How closely did the research team follow the original planned scope of work?

Reviewer 1:

The researchers followed the plan as it evolved, and should be credited for adapting their plan to address low cod catches and for trying to improve upon the original design.

Reviewer 2:

There were deviations. The two-site, bottom type design element was not conducted. Sea trials were spread across two years (2013-2014). Tows were conducted off Massachusetts that were not useful. The experimental net was modified midway through 2013 (Rig 1 vs. Rig 2).

Reviewer 3:

Given that the original proposal was modified because of two factors, 1) the lack of adequate targeted fish and 2) the reduction of the catch of primary species (cod) in the modified net (Rig 1), the original and approved modifications in the scope of work were properly followed.

Reviewer 4:

The researchers followed the plan with modifications due to the lack of targeted species and fine tuning of the trawl.

2. If there were differences between the scheduled tasks and the completed tasks, did the project team address these and explain why there were differences?
Reviewer 1:

Again, the team modified the project plan to accommodate changes in the plan as requested by the advisory board and to attain better data by conducting the project in times and areas where there were appropriate numbers of fish.

Reviewer 2:

Partially. Low catch in 2013 explains why 2014 was needed and cod escapement explains why the Rig 2 modification was done. It was not clear in the report why the bottom type test was eliminated and why tows were attempted off MA in 2014.

Reviewer 3:

No differences so much in the tasks except in regard to the means to increase the catch via more productive fishing locations and time periods. Differences focused mainly on some of the modified rigging and these changes were based on prior discussion with the review panel.

Reviewer 4:

Modifications were made to the trawl, through suggestions and recommendations from the review panel and Owner/Captains Tom & Aaron Williams in order to catch more cod and continue to allow the escapement of winter flounders and all other demersals. Due to the selective time of year and area the project was extended from 2013 to 2014. With consideration to make tows east of the Cape where historically higher concentrations of Cod and Flounders exist.

3. In the results, analysis, and discussion sections of the report, did the team answer the original research question(s)?

Reviewer 1:

I think they did. The original question was does this design work to reduce flatfish, especially winter flounder bycatch, and retain targeted cod. The results suggest that it does reduce flounder bycatch but also reduces the targeted catch of Atl. cod. I hope that this design might be tested on haddock (or other species), which tend to swim up, as opposed to cod that swim down, when approached by the trawl gear.

Reviewer 2:
Partially. The question of reducing flatfish bycatch was conclusively answered with bycatch of multiple species significantly reduced in the test net. The question of retention of commercial cod was more equivocal with only the larger cod retained but legals still escaping.

Reviewer 3:

To the best of the circumstances, they did. The two key research elements of the proposal were to reduce the catch of flatfish while retaining the cod catch. Although the results were fraught with a low catch of the targeted species, the team’s analyses and discussion addressed the research questions to the best of their ability.

Reviewer 4:

Yes, the original question was to reduce winter flounders and retain Cod. The gear design demonstrated substantial reductions in winter flounders and all other demersals. However, there was a reduction in Codfish. Positive sign was the almost 100% reduction of juvenile cod and retention of larger cod. It is my belief that this gear in marginal bottom with adjustments towed on schools of codfish may harvest fewer codfish, but what is harvested will be larger cod of higher value. Fishing with limited quotas this gear may be economically viable as fishermen fish for dollars, not quantity.

4. Were analytical techniques appropriately used? Was the experimental methodology statistically sound and supportive of the conclusions drawn?

Reviewer 1:

I defer to other Reviewers on this. The statistics seem to be getting past a comparison of the differences of the means, and I am not comfortable commenting on this.

Reviewer 2:

Yes, the GLMM was effective in teasing out length based effects in cod retention and differences by species for length effect in flatfish.

Reviewer 3:

I thought the analytical techniques were well applied. The limiting factor in this research was the paucity of targeted species. The research principals did make attempts to locate more fish by seeking knowledge from active fishing, better possible fishing times and locations. I commend them for those efforts.

Reviewer 4:
I agree with Reviewer 1 and defer to other Reviewers. One additional factor was that in the Rig 2 experiment the control net harvest large amounts of skates which will reduce escapement in the codend. The experimental net eliminated the retention of skates, possibly skewing the GLMM.

5. Was the raw data included in the appendix complete?

Reviewer 1:
I liked the inclusion of the PowerPoint presentations. It appears that the raw data is complete, but the method of presentation makes it difficult to compare/track. It is raw data and it is included, which is what was required.

Reviewer 2:
Yes.

Reviewer 3:
The raw data as presented in the appendix appeared complete.

Reviewer 4:
The Raw Data seemed complete. Had some difficulties with Table 1 page 20. Tow duration, tow speed, tow depth and bottom temperature. Difficult to comprehend for the average fishermen, no bottom temps and concerned about the lack of consistency in Tow Duration and Tow speeds.

6. Was the information clearly presented? Were graphs/figures/diagrams/tables of information appropriately used?

Reviewer 1:
Yes, the data were presented clearly. I would have liked to see all the data together by species and the 2013-2014 data side by side, but their method of displaying the data is effective.

Reviewer 2:
Yes.

Reviewer 3:
The information was clearly presented and the tables, graphs, and figures complementary. However, the information on the number of tows per year and per rig did require some additional attention.

Reviewer 4:

Somewhat clearly, speaking as the voice of a fishermen reviewing this project. Agree with Reviewer 3 that the number of tows/yr and /rig did require more attention and Graph on page 36, 41, 52 etc. on length are difficult to understand.

7. **In the discussion section, did the team include adequate comments on the following:**
   - General observations made while conducting the research;

Reviewer 1:

Yes. Their observation about skates masking the meshes is interesting and it would be fascinating to look at the data and see if there is a relationship between the number of skates and the catch rates in both the <60 and >60cm size classes. It was also interesting that the control and experimental caught similar numbers of cod over the size of ~60cm, suggesting either that the cod are behaving differently or that the selectivity of the meshes is changed, perhaps by the presence of skates who clogged the meshes.

Reviewer 2:

Yes.

Reviewer 3:

The team did adequately provide comments, especially regarding the reduced cod catch in the experimental nets. The comments did focus on possible causes.

Reviewer 4:

Yes, they did produce comments that seemed plausible for the reduced catch in the experimental net.

   - **Explanation of why the modified gear may or may not have worked as anticipated to reduce winter founder bycatch while retaining targeted catch;**

Reviewer 1:
If the selectivity of 6.5” mesh truly selects for a ~60cm cod, the mesh size may have resulted in the loss of the Reviewer 2etable cod that were retained by the control gear. Unfortunately, I did see that when skate catches were low, there was still a reduction in cod. Again, an analysis of skate catch versus retention of smaller but legal cod would be interesting.

The paper below supports that a 6.5 in mesh will select for a cod between ~ 63-67cm as described in Halliday et. al., (1999) signifying that the mesh size may have influenced the retention of the cod in the experimental gear if the selectivity of the control gear was reduced through masking or some other mechanism.


Reviewer 2:

Yes.

Reviewer 3:

The reduction in flatfish catch and specifically winter flounder catch was pleasantly acceptable. The reduction in cod catch especially in rig 2 was disappointing. However, this did relate mainly to smaller retainable cod.

The apparent masking of the mesh openings by skate is a problem and will probably need further attention to attempt to reduce this impact.

The lack of underwater camera footage is disappointing, but not surprising. The team attempted to get the footage, but weather and underwater visibility did not cooperate. The availability of underwater visual observations, I believe, would have provided some important additive information on behavior. The use of mensuration gear on the net and particularly on the sweep were appreciated.

The conclusion about further work on the codend is sound and may provide a means to better understand the reduction in smaller yet legal cod.

Reviewer 4:

I agree with Reviewer 3 and Reviewer 1’s comments as stated in my prior comments. The lack of underwater camera coverage is unfortunate, to provide the fish behavior. Understanding the behavior of the codfish may have prompted a few minor adjustments, thus providing a
significantly different outcome. They should have made every effort to select a day for use of the camera, especially once they saw the reduction in cod. Time constraints.

- **How project research results may have advanced the knowledge base about this type of gear modification approach;**

Reviewer 1:

Several questions were answered, and others are now on the table. This project advanced the understanding of this sweep design’s ability to reduce flounder bycatch. This may still be a viable conservation-engineering tool for other fisheries (e.g., haddock, pollock, etc) where the targeted catch behaves differently. We know from previous work that cod tend to dive or stay low and haddock tend to rise when approached by trawl gear. There is still a question of why it retained the larger cod and if this was a selectivity issue (skate masking the meshes of the control net).

Reviewer 2:

Yes.

Reviewer 3:

This research has addressed our understanding of retaining cod while significantly reducing the bycatch of flatfish. It has produced some questions of groundgear rigging and fish behavior that warrant further attention. Further work with this gear under circumstances where targeted fish are in decent numbers to address the questions, further (probably smaller) modifications to Rig 2, and underwater visual observations are with merit.

Reviewer 4:

This trawl design will definitely reduce winter flounders and all other demersals especially in marginal broken and lumpy bottom. I agree with Reviewer 1 that this gear may prove effective in the Haddock fishery in the Gulf of Maine, George’s Area II and SNE.

- **How project results may relate to other research projects or ideas about follow up research?**

Reviewer 1:

See above –
Reviewer 2:

Yes.

Reviewer 3:

This may foster further ideas and work toward more successful modifications. I do wonder whether a rig modification can be constructed that will meet commercial needs and be acceptable to management. I say this partly from the standpoint of consistent gear performance and the possible ability of some to subtly modify the rig to further increase the retained catch and this modification will technically make the gear non-compliant legally.

Reviewer 4:

As expressed in prior comments.

Other Comments:

Reviewer 1:

1. What were the numbers for Rig #2? Page 6 states 78 hauls in 2014 plus 10 days in 2013. Page 10 states 80 hauls in year 1, Page 8 has 68 hauls in 2014 and 12 in 2013.

2. Objectives changed from the proposal to the final report. The objectives in the final report seem to be modified to attribute greater success to the project. My opinion is that a negative result attained using good science should still be lauded as a success. The change seems disingenuous.

Objective [Taken from proposal]
The primary objective is to reduce the catch of SNE winter flounder and sub-legal Atlantic cod while retaining commercial catches of cod through conservation engineering techniques:
  • Continue testing a modified groundgear with “escape windows” to reduce the catch of SNE winter flounder and sub-legal cod while maintaining catch rates of legal cod; and
  • Promote the gear as an alternative to the traditional gear through outreach to the industry, management council, and NOAA Fisheries.

Goals and Objectives [taken from final report]
• In collaboration with industry partners (Aaron and Tom Williams, F/V “Tradition” and Tor Bendiksen, Reider’s Trawl Gear and Marine Supply), develop a modified groundgear consisting of escape windows to facilitate flatfish escapement.
• Conduct sea trials onboard a commercial fishing vessel comparing catch and operational characteristics of the experimental gear with a commercial rockhopper groundfish trawl.
• Conduct analysis of catch and bycatch of both gears and make recommendations for further modifications and/or commercial implementation.

Reviewer 3:

In the summary (page 3), size is mentioned. Size is a factor, but also body shape (flatfish vs. cod). This may be obvious, but body shape is an important factor to mention. Also the date regarding ten tows in 2012, I believe is incorrect.

Page 17, para 2, line 4: “larges cod”?

The pictures of the groundgear changes and the delta plate in the sweep were very good and visually illustrative.

Reviewer 4:

Again in terms of a layman or fisherman reviewing this I find it difficult to understand the reference of “The mean (catch rate, i.e. 22.4 ± 4.5 kg/h). Case of simple is better.