



COMMERCIAL FISHERIES
RESEARCH FOUNDATION

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“The reduction of butterfish and scup bycatch in the inshore *Loligo* squid fishery.”

Lead PI: Laura Skrobe—University of Rhode Island

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

The researchers followed the original scope of work very closely with only one deviation. The trawl modification was changed throughout fall testing to improve performance. This allowed for testing of the final prototype during spring sampling in 2010. In addition, researcher’s attempts to collect fish behavior video were unsuccessful during fall testing due to turbidity problems caused by Hurricane Irene. I assume turbidity was also an issue during spring sampling since no video was collected.

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

The researchers adequately addressed the reasons why there were differences in scheduled and completed tasks with regard to the number of days of testing in the fall and attempts to collect behavior video.

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

The original questions identified in the proposal were adequately addressed in the final report. I don’t think the data should have been pooled across fall and spring testing because the gear was changed throughout the fall testing. Since numerous changes were made during the four days of fall testing all the data collected during that portion of the study are invalid for comparisons due to potential confounding variables caused by the changes. The fall data should have been dropped from the final analysis completely.

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

The experimental method of two vessel sampling was great for this type of study and the analysis techniques used were appropriate. I question whether the Bison and Tyboron doors used by each vessel had identical spread and the authors only cited a personal communication to justify the use of the different doors. After going through all the trouble to match vessels and gear, matching doors would have been a logical thing to do to remove all question of variability between vessels.

The analysis done to determine if there was a vessel effect and the subsequent removal of several species from the final analysis was an especially good aspect of the analysis. However, I did not see a test for normality done before conducting the ANOVA for this portion of the analysis. If the data were not normal a transformation should have been done or a non-parametric Kruskal–Wallis one-way analysis of variance test conducted. Also, as I mentioned in question 3, I don’t think the data should have been pooled across fall and

spring testing because the gear was changed throughout the fall testing. Since numerous changes were made during the four days of fall testing all the data collected during that portion of the study are invalid for comparisons due to potential confounding variables caused by the changes. The fall data should have been dropped from the final analysis completely.

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

The raw data was included in the appendix and appears to be complete.

6. Was the information clearly presented? Were figures and tables appropriately used?

The tables and figures were clearly presented along with great figures of towing locations and net diagrams. All tables and figures were appropriately used. However, I would have liked to see figures that specifically looked at comparisons for fall and spring testing. Fall testing could have been displayed with the caveat that gear changes were made preventing statistical comparisons, while spring testing diagrams would have illustrated the results of statistical tests.

7. In the discussion section, did the team offer comments on results including observations made while conducting the research; explanations of why a particular gear, sampling strategy, or laboratory technique may or may not have worked as anticipated; how project research results may have advanced the knowledge base about the research topic area; and ideas about follow up research?

The discussion section of the report was good and addressed the shortcomings of the study. However not enough information was provide about gear changes that were made during fall testing and how the changes improved the final design that was tested in the spring. The researchers did explain how the results of the study advanced the knowledge base with regard to the squid fishery in the region and provided good points about the importance of collaborative research. No specific ideas for follow up research were listed but the potential for new ideas from the industry based on the results of the study was identified as a potential future work.



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

The planned work was performed in accordance to proposal

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

Yes, modification of the gear was acceptable and a result of collaborative efforts with net builder and fishing industry cooperators. This is something that one could expect and a positive dynamic of this type of research.

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

The team did in fact provide results and analysis of what was discussed in the proposal. The results were not what was sought or wanted, but the discussion clearly brought this out.

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

Analytical techniques were sound and supported by applicable statistical approaches. It was noted that there was no mean effect of vessels utilized in the study, with the exception of flounder. I acknowledge that this was addressed and clearly discussed and appears to be acceptable. I would urge that in the future, vessels be equipped with identical otter doors whether they be purchased through the project or borrowed from another fisherman. Through decades of performing this type of work, I have found that it is highly desirable to minimize variables.

A short discussion regarding trawl speeds would have enhanced the report. I feel certain that the industry collaborators towed at acceptable speeds. However, for those of us that are not familiar with the fishery, what were the speeds used and what is the range in the fishery, i.e. 2.5 – 3.3 knots as an example? I point this out because in other fisheries, trawl speed impacts fish ability or behavior regarding exclusion. Were the gear towed at the low, medium or high range of speeds utilized in the squid fishery? Is there just one universal speed used by all? Again, it is likely that speed was of a standard nature, but an explanation would have been useful to the reviewers.

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

Yes

6. Was the information clearly presented? Were figures and tables appropriately used?

The report was concise and informative. It was well written. Data and analytic results were clearly provided in useful tables.

7. In the discussion section, did the team offer comments on results including observations made while conducting the research; explanations of why a particular gear, sampling strategy, or laboratory technique may or may not have worked as anticipated; how project research results may have advanced the knowledge base about the research topic area; and ideas about follow up research?

It was pointed out that there was a relative paucity of butterfish in the catches which could well account for some of the disappointing results. No discussion of what might be accomplished to potentially improve the gear was included in the report. As mentioned, the use of video may have provided some vital indications regarding modifications of the gear.

Good work. I would hope that the collaborators continue to move forward with future ideas and efforts.



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

The original planned scope of work identified 5 key components of the collaborative research project. Flume tank testing of the model net; 5-one day fishing trips each during spring and fall with 6 tows per day using a side-by-side towing method; data analysis on catch weights; data analysis of length frequencies; video recording of fish behavior and subsequent analysis. With the exception of video-recording of fish behavior all other components were conducted as proposed. The authors provided reasonable explanation for this modification although it is not clear from the proposal how any video material might have been analyzed or how it might have added to the overall project.

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

See comments above regarding video recording and analysis.

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

The original research questions were quite simple: Did the modified net reduce bycatch of scup and butterfish while maintaining target catch of *Loligo* squid? Through reasonable and sensible analysis, the researchers did answer these simple questions namely that the modified net did not lose target catch. The results however indicated there was no significant difference for catch of scup discard or butterfish between the modified and standard nets.

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

The use of paired t-test to test for difference of the mean weight of catch between the standard fishing net and modified fishing net is adequate as is the use of the Kolmogorov-Smirnov test for analyzing length-frequency differences between the two nets. However, given the statement that the investigators find the

inconclusive nature of the results disappointing, I might have expected to see a more probing investigation into the data to try to identify potential reasons for lack of significance and to look for trends in the data that might identify how the study might be improved in the future.

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

The raw data in the appendix appears complete.

6. Was the information clearly presented? Were figures and tables appropriately used?

For those conversant with technical net drawings, the net diagrams are fully explanatory, however a schematic diagram of the modified net would also be instructive to a general reader. In general the figures are adequate although in the case of figures 8 and 9 the legends are not particularly descriptive of the content of the figure. The legend included with Figure 1 is minimalistic and if the images serve any purpose then there is an opportunity to describe them in some detail so that they help inform the reader.

7. In the discussion section, did the team offer comments on results including observations made while conducting the research; explanations of why a particular gear, sampling strategy, or laboratory technique may or may not have worked as anticipated; how project research results may have advanced the knowledge base about the research topic area; and ideas about follow up research?

The work that was proposed has high relevance to the fishing industry and the investigators articulated the relevance and need for this research very clearly in their introduction. The research protocols were sound and straightforward. The relevance of the work in the flume tank is not immediately clear other than simply observing what the net might look like under different towing scenarios and this is accentuated by the fact that modification to the full scale experimental net continued during the study itself. The net design used for the second sampling trip was modified and therefore different (slightly) from the design used in the first sampling period. While this may not have had any affect on catch it might have been instructive to compare both designs, particularly as the results overall were inconclusive.

In dealing with the inconclusive findings, the investigators highlight limited sampling size and “less than ideal” species composition as potential reasons as to why the design did not perform as expected. While these are reasonable observations, the investigators do not elaborate on these or indeed other potential confounding factors and they miss an opportunity to explore how follow up research might be improved and ultimately successful.