

## **Joint Mid-Atlantic and New England Council SSC Review of Recreational Fisheries Management Decision Support Tool**

A panel consisting of SSC members representing both NEFMC and the MAFMC and an outside expert was convened to review a bioeconomic model developed by the NEFSC's Social Sciences Branch to estimate the impacts of recreational management measures. This approach was taken based on one of the recommendations coming out of the National SSC workshop held during 2010. Specifically, it was noted that most SSCs lack critical mass of social science expertise. On occasions where social or economic issues come before an SSC the appropriate expertise may be found by "borrowing" expertise from other Council's SSCs. This was such an occasion; the first time that a joint SSC panel has been used by the NEFMC. Panelists from the NEFMC SSC included Chris Legault (NEFSC), Dan Georgianna (SMASST), and Eric Thunberg (NMFS/OST). Panelists from the MAFMC SSC included Cynthia Jones (ODU) and Doug Lipton (UMD). Because of the specialized nature of the economic methods underlying the modeling of recreational preferences Dr. Ted McConnel (UMD); a recognized expert in recreational fisheries economics was added to the panel.

The review took place in Woods Hole on September 7, 2012. Review panelists were provided with technical documentation describing the simulation model that had been developed to estimate the impact of recreational management measures (size and bag limits) for Gulf of Maine cod and Gulf of Maine haddock. Documentation of the survey administered during 2010 to elicit recreational angler preferences for scup, black sea bass, and summer flounder was also provided. These documents were made available to the review panel a week in advance of the review meeting. During the meeting presentations were given by Scott Steinback and Min-Yang Lee and the review panel was afforded the opportunity to ask questions and comment on the review materials that were provided and the material presented during the meeting.

### **General Findings**

The review panel commends both Scott and Min-Yang for clarity of the documentation that they had prepared and for the overall quality of their presentations. The review panel finds that the overall modeling approach is technically sound and represents a substantive improvement over prior methods used to estimate impacts of management measures on recreational anglers. The model provides economic and biological outputs that may be used to inform management decisions. The review panel notes, however, that the model is based on a number of assumptions that should be noted when presenting the results. Specific caveats are noted below as they relate to each of the terms of reference.

### **TOR 1: Was the conjoint survey instrument and sampling design for the surveys implemented during 2009 and 2010 conducted in a manner consistent with professional standards?**

- a. Other than the species included in each survey, were there notable differences between the two surveys either in terms of survey instrument or sampling design?**
- b. If so, do these differences affect the use of the data collected in 2009 and 2010 for analysis?**

The review panel finds that the survey instrument and experimental design for both the 2009 and 2010 surveys were consistent with professional standards. The response rate for the 2009 survey was 33% while the response rate for the 2010 survey was 30%. The review panel notes that these response rates are within the range of other recreational fishing surveys and that survey response rates in general have been declining due to survey fatigue among the general population. The question of representativeness of the sample was raised including the potential for avidity bias. Participation in the survey was requested of anglers during the MRFSS intercept survey. It was suggested that the investigators could evaluate the representativeness of the sample by testing for differences in catch rates and other statistics collected between anglers that agreed to participate in the follow-up survey and those that refused. It would also be possible to test for differences in catch rates between participants that were mailed and completed the survey and those that did not. With respect to avidity bias, the review panel had no specific recommendations, but cautioned the investigators to be aware of the potential implication of the issue for interpreting the results.

The presentations highlighted the following differences between the choice experiment surveys administered during 2009 and 2010. In terms of the 2010 survey these differences included: 1) an on-line version of the 2010 was made available, 2) there was no distinction between shore and boat anglers, 3) trip length was dropped, 4) anglers were asked to evaluate ranges of catches in the trip descriptions, 5) anglers were given a choice between three trips plus an opt-out with the third trip alternative designed to measure switching behavior to other recreational fisheries. The review panel finds that none of these differences would affect the ability to use the 2010 survey to evaluate management alternatives for the species of interest (scup, black sea bass, and scup) in that survey. The review panel noted that having three trip choices with an opt out was an improvement over the 2009 survey design although the panel felt that in future surveys the third trip alternative should be more completely described. The review panel also noted that while describing a trip in terms of ranges of catch was becoming increasingly common and agreed with the investigators reasoning that it may be more realistic to the respondent, the statistical estimation procedures are more complex. This means that the econometric procedures used to estimate the RUM model for GOM cod and GOM haddock would need to be revised for scup, black sea bass, and fluke.

**TOR 2: Was the link between the Random Utility model and the conjoint model done in a manner consistent with professional standards?**

The review panel finds that the RUM model and the choice experiment were integrated in a manner consistent with professional standards. No issues were raised by the review panel.

**TOR 3: What recreational management measures does the survey design and data collection method support?**

- a. **Are there limits in terms of magnitude of change beyond which use of the model would not be recommended?**
- b. **Are there specific recreational fishing measures for which use of the model would not be recommended?**

The review panel finds that management measures that are within the range of the experimental design would be most appropriate for evaluation with the decision support tool. Management measures that are marginally outside the range of the experimental design may be evaluated although the results should be interpreted with caution. The review panel recommends that the most appropriate use of the model would be to evaluate management changes that were included in the choice experiment. These measures are limited to changes in bag and size limits including slot limits. Since the investigators assume that measures such as hook size or bait do not change, it would not be possible to evaluate these types of measures absent additional information on how these measures would affect selectivity. The review panel does not recommend that the model, as is, be used to evaluate closed seasons or closed areas. Careful modification of the choice experiments in the model would be needed for its application to season or area closures.

**TOR 4: What are the implications of basing the simulated catches on MRFSS data? Can the model be used to support management decisions or should the use of the model be deferred until MRIP data are available?**

The review panel finds that the use of the MRFSS still represents the best available data to be used in the simulation model. The panel notes that the survey data was collected during years in which MRIP intercept survey protocols had already been implemented. The panel also notes that relative performance among policy choices is unlikely to be affected by whether MRFSS or MRIP data are used. The panel also recognizes that the simulation model relies on catch per trip and not total catches. While, differences in total catches between MRFSS and MRIP are known to exist, it is uncertain whether catch per trip would be similarly affected. The review panel recommends that MRIP data should be used when it does become more accessible.

**TOR 5: Are the simulated catches properly linked to the underlying information and data on the underlying stock dynamics? Are there key assumptions that affect interpretation of the model results? If so, how should these uncertainties be presented or characterized?**

The review panel found no substantive issues with the manner in which the stock assessment data had been incorporated into the model. The panel noted that the implication of the assumption of holding selectivity constant should be further examined via sensitivity analysis or else examination of data from time periods with different size and bag limit regulations to see whether selectivity did remain the same. The panel also noted that truncation of the catch distribution may affect estimated catch that would explain the tendency for predicted catch to be below observed levels in the calibrated model. Another possibility is that the model assumed no high grading and perfect compliance with all size and bag limits.

The review panel noted that the 2013 stock structure for GOM haddock shown during the meeting appeared to depict a size structure that was inconsistent with contemporary assessment information. In investigating this issue Min-Yang Lee found that the presentation was in error and the correct 2013 size

structure had been used in the analysis. The review panel also noted a number of potential ways to improve the efficiency of the simulation methods.

The investigators noted that they plan to use the model to provide multi-year evaluations of recreational fishery management regulations. The review panel noted that the reliability of the model results for any particular management change is affected by the uncertainty in the projections of stock size and numbers at age along with the ability to predict size at age in the future. This is of particular concern for the GOM cod and GOM haddock model results since recent analyses conducted by the groundfish PDT have shown that near to intermediate term projections have tended to be overly optimistic. The review panel notes that these findings may or may not be generalized to assessments that are not managed under the groundfish FMP, but that the reliability of projections derived from an assessment model should be evaluated before using the recreational simulation model for making multi-year specifications. Additionally, the model assumes no major changes in the overall population abundance during the projection period. If large changes are expected, then the model results may be less reliable.

The investigators noted that the simulation results were sensitive to the assumed discard mortality. The review panel noted that this conclusion needs to be tempered somewhat as the sensitivity has more to do with the minimum size than it does with the bag limit. Not surprisingly, model sensitivity runs at low minimum sizes demonstrated that the assumed discard mortality had only a small affect on estimated mortality even at comparatively low bag limits. By contrast, at high minimum sizes, the discard mortality had a significant effect on estimated mortality even at comparatively high bag limits. As a practical matter, the review panel noted that the effect of assumed discard mortality would need to be evaluated on a case-by-case basis, depending on the management objective. In general, for any given population size structure, uncertainty in estimated mortality may be expected to increase with the size limit.

**TOR 6: Given the fact that the recreational preferences for Atlantic cod were elicited in 2009 can the model be applied to contemporary conditions? What criterion should be applied or developed to test for changes in underlying recreational fishing preferences that may limit the reliance on data collected in 2009?**

This TOR is noted as being largely speculative and nothing that was provided or presented to the panel readily informed coming to any specific conclusions or recommendations. The panel noted that in general, recreational surveys are rarely replicated usually due to a lack of funds. Nothing further was offered to address TOR 6.