

Joint Council Science and Statistical Committee Review of

The Analytic Component to the Standardized Bycatch Reporting Methodologies Omnibus Amendment: Sampling Design, and Estimation of Precision and Accuracy

by

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Attendance

Committee: Dr. W. Gabriel, Dr. E. Gilfillan, Dr. M. Prager, and Dr. P. Sullivan (Chair)

Review

The Joint Council (New England and Mid-Atlantic) SSC reviewed the draft manuscript by Wigley et al. and heard a presentation by Wigley and Rago on Standard Bycatch Reporting Methodologies (SBRM). The Northeast Fisheries Science Center scientists did a commendable job of formulating a comprehensive approach to the problem of assessing bycatch rates in multiple fisheries. As stated in their report, the SBRM can be viewed as a combination of sampling design, data collection and analysis for estimation of bycatch. As such, it will form an important component of monitoring in compliance with Federal Fishery Management Plans and may also be useful for monitoring in conjunction with the Marine Mammal Protection Act and Endangered Species Act. The overall consensus of the reviewers is that the program, as outlined, provides a rigorous objective framework for addressing the problem of bycatch monitoring while allowing for some flexibility in prioritizing needs and allocation of sampling effort. We organize our comments into two sections. The first deals with general comments and recommendation that the Councils should consider when viewing this approach. The second deals with more technical comments that are directed towards the authors in their implementation of this work.

General Comments

Achieving specified levels of precision: The stated goal of this approach is to achieve a coefficient of variation (CV = standard error divided by the mean) on discard estimates of 30% for species groups within a fleet sector. While this would seem a reasonable objective from a statistical perspective the Councils should recognize that it may not be possible to achieve this objective for all species and fleet sectors simply by reallocating the present number of trip days observed. Additional observations may be needed. Note, in particular, that the CV will likely go up (and the precision will go down) as species or fleet demarcations are further subdivided. For example, while a CV of 30% might be

achieved for a combined turtle group it might not be achieved for individual categories of turtle species within that group. So some prior specification of categories and development of goals related to precision may be needed.

Imputation: The imputation method, which borrows information from neighboring cells to fill in missing cells, seems appropriate although one should be aware that seasonal trends may influence results.

Species - fleet cells: Identification of which species-fleet categories are to be included and which are not is an important step in making the design table manageable and representative of the process. Center scientists demonstrated how cells with low or no bycatch can be effectively eliminated from consideration when certain combinations of species and fleet are seen to have little or no interaction (e.g. gillnets and scallops). However, other cells may be eliminated statistically based on some threshold of what would be considered a negligible level of bycatch. What may be considered to be negligible (e.g. 1 squid or 1 marine mammal per 100 tows) may be subject to debate. Therefore, the mechanism (rule) that is used to include or exclude species-fleet cells should be made clear so that all parties may understand what is at stake.

Sample size estimates: The design framework presented in the document is a reasonable one for determining appropriate sample sizes for species-fleet combinations, but as we've pointed out, policy decisions must be made at various steps along the way. We've suggested to the Center scientists that several sample size design tables be computed using clearly specified decision rules pertaining to cell inclusion. So, for example, the Center scientists or plan team members might sit down with the matrix of strata and see which ones could be excluded on the grounds of practicality. Once this is done, look at the properties of the potentially excluded strata. There should be enough common threads that they can arrive at a quantifiable definition of an excludable stratum. The grayed out (excluded) elements of the sampling matrix provided in the manuscript are a good start in this direction. This should help clarify for the Councils what determines exclusion, what the consequences are of various decisions made along the way and how the approach might be best used. Recognize as well that the allocation of observation days will need to be updated periodically as new information becomes available.

The SSC would be happy to review the SBRM again if need be as the process continues to evolve and develop.

Technical Comments

1. As noted at the meeting, the equation deriving required sample sizes (equation 4) needs to be corrected.
2. It probably would serve the calculation well to include the finite population correction, as samples may constitute a sizable fraction of the population (of

fishing trips).

3. The CV of the estimator will depend on the estimator itself (as well as the data and sampling plan). Bias in the estimator cannot be determined by comparing variances among alternative estimators.
4. It might be useful to adopt the MRFSS terminology of “proportional standard error” (PSE) or find another way to emphasize that the CV discussed is based on the estimated mean and its standard error.
5. Further work is encouraged on a formal method to set the target CV (PSE) for each cell (defined by gear type and bycatch species). At present, a blanket 30% target is taken, except for some cells, which have been colored gray to indicate that the realized PSE is of no consequence (equivalent to infinite target PSE). This is effectively a binary prioritization (cells are either important or completely unimportant). Discussions at the meeting suggested that further degrees of prioritization could be made. A formal rule for doing this would be useful, along with a rule for mapping the resulting priorities to target PSEs.
6. If bycatch is near zero, no CV-like measure will be useful, because division by a small number will inflate PSEs. This is probably dealt with by the “gray or not gray” scheme, but some additional analysis should be done to be sure that no sample sizes are artifacts of the measure used.
7. The work is rather technical and is aimed at a management audience. It would be useful to do the following:
 - a. Make sure the introduction clearly describes the objectives of the study in nontechnical terms.
 - b. Make sure the report clearly distinguishes between what is already known and what results from this report.
 - c. Make sure that the conclusions of the report include the authors’ recommendations on methodology (and any other matters).
 - d. Revise the Summary so that it describes objectives and main conclusions, especially those that are useful to managers. At present, it resembles the sort of abstract that is written before a study has been undertaken.
 - e. Tables might include days needed as well as days currently allocated per cell to identify differences.
 - f. Table 2 and Table 8 might be put in the same units (number of trips or number of sea days) so that they might be compared.
 - g. It might be useful to have a rank summary as in Table 7 only across species as opposed to across gear type.
 - h. Figures should be on nominal scale to understand the effect that large

bycatch values have on calculations.

8. Before the report goes to the Councils, it should include several typical analyses. Given various determinations of importance (that is inclusion or exclusion) of cells, how many observer days would be necessary? Under what conditions could observer days be limited to the present number or some fixed increase from that number? If the work suggested in comment #5 can be completed and the rules devised to have a small number of understandable parameters, the Councils will have the chance to explore the sensitivity of number of days required to that small number of parameters.