SEDAR 39 HMS Smoothhound Complexes

Benchmark Assessment Terms of Reference

March 2014

Data Workshop Terms of Reference

1. Characterize stock structure and develop a unit stock definition. Provide maps of species and stock distribution.

2. Review, discuss, and tabulate available life history information.

   - Evaluate age, growth, natural mortality, and reproductive characteristics

   - Provide appropriate models to describe growth, maturation, and fecundity by age, sex, or length as applicable.

   - Evaluate the adequacy of available life history information for conducting stock assessments and recommend life history information for use in population modeling.

   - Evaluate and discuss the sources of uncertainty and error, and data limitations (such as temporal and spatial coverage) for each data source. Provide ranges and/or distributions of uncertainty for data sources used in the stock assessment models[1].

3. Recommend discard mortality rates.

   - Review available research and published literature

   - Consider research directed at these species as well as similar species.

   - Provide estimates of discard mortality rate by fishery, gear type, depth, and other feasible or appropriate strata.

   - Include thorough rationale for recommended discard mortality rates.

   - Evaluate, discuss, and characterize the sources of uncertainty, and data limitations (such as temporal and spatial coverage) for each data source. Provide ranges and/or distributions of uncertainty for data sources used in the stock assessment models[1].

4. Provide measures of relative population abundance that are appropriate for stock assessment.

   - Consider and discuss all available and relevant fishery-dependent and -independent data sources.

   - Document all programs evaluated; address program objectives, methods, coverage, sampling intensity, and other relevant characteristics.

   - Provide maps of fishery and survey coverage.

- Develop fishery and survey CPUE indices by appropriate strata (e.g., age, size, area, and fishery) and include measures of precision and accuracy.

- Discuss the degree to which available indices adequately represent fishery and population conditions. Consider implications of changes in gear, management, fishing effort, etc. in relationship to the different indices

- Recommend which data sources adequately and reliably represent population abundance for use in assessment modeling.

- Evaluate and discuss the sources of uncertainty and error, and data limitations (such as temporal and spatial coverage) for each data source. Provide ranges and/or distributions of uncertainty for data sources used in the stock assessment models[1].

- Complete the SEDAR index evaluation worksheet for each index considered.

- Rank the available indices with regard to their reliability and suitability for use in assessment modeling.

5. Describe any environmental covariates or episodic events that would be reasonably expected to affect population abundance.

6. Provide commercial catch statistics, including both landings and discards in both pounds and number. Provide average weights used by gear type to convert landings and discards between pounds and numbers.

   - Evaluate and discuss the adequacy of available data for accurately characterizing harvest and discard by species and fishery sector or gear. Provide estimates of landings and dead discard proportions by fishery and other strata as appropriate or feasible.

   - Evaluate and discuss the sources of uncertainty and error, and data limitations (such as temporal and spatial coverage) for each data source. Provide ranges and/or distributions of uncertainty for data sources used in the stock assessment models[1].

   - Provide length and age distributions for both landings and discards by gear type if feasible.

   - Provide maps of fishery effort and harvest by species and fishery sector or gear.

7. Provide recreational catch statistics, including both landings and discards in both pounds and number. Provide average weights used by gear type to convert landings and discards between pounds and numbers.

   - Evaluate and discuss the adequacy of available data for accurately characterizing harvest and discard by species and fishery sector or gear.

   - Evaluate and discuss the sources of uncertainty and error, and data limitations (such as temporal and spatial coverage) for each data source. Provide ranges and/or distributions of uncertainty for data sources used in the stock assessment models[1].

   - Provide length and age distributions for both landings and discards if feasible.

   - Provide maps of fishery effort and harvest by species and fishery sector or gear.

8. Provide recommendations for future research in areas such as sampling, fishery monitoring, and stock assessment. Include specific guidance on sampling intensity (number of samples including age and length structures) and appropriate strata and coverage.

9. Prepare the Data Workshop report providing complete documentation of workshop actions and decisions in accordance with project schedule deadlines (Section II of the SEDAR assessment report).

[1] In providing ranges for uncertain or incomplete information, data workshop groups should consider and distinguish between those ranges and bounds that represent probable values (i.e., likely alternative states) to be included in structured uncertainty analyses, and those that represent extreme values to be considered in evaluating model performance through sensitivity analyses.

Assessment Process Terms of Reference

1. Review any changes in data following the data workshop and any analyses suggested by the data workshop. Summarize data as used in each assessment model. Provide justification for any deviations from Data Workshop recommendations.

2. Develop population assessment models that are compatible with available data and document input data, model assumptions and configuration, and equations for each model considered.

3. Provide estimates of stock population parameters, including:
   - Fishing mortality, abundance, biomass, selectivity, stock-recruitment relationship, and other parameters as necessary to describe the population.
   - Appropriate measures of precision for parameter estimates.

4. Characterize uncertainty in the assessment and estimated values.
   - Consider uncertainty in input data, modeling approach, and model configuration.
   - Consider and include other sources as appropriate for this assessment.
   - Provide appropriate measures of model performance, reliability, and 'goodness of fit'.
   - Provide measures of uncertainty for estimated parameters.

5. Provide estimates of yield and productivity.
   - Include yield-per-recruit, spawner-per-recruit, and stock-recruitment models if the modeling platform allows.

6. Provide estimates of population benchmarks or management criteria consistent with available data, applicable FMPs, proposed FMPs and Amendments, other ongoing or proposed management programs, and National Standards.
   - Evaluate existing or proposed management criteria as specified in the management summary.
   - Recommend proxy values when necessary.

7. Provide declarations of stock status relative to management benchmarks or alternative data poor approaches if necessary.

8. Provide uncertainty distributions of proposed reference points and stock status metrics that provide the values indicated in the management specifications. Include probability density functions for biological reference point estimates and population metrics (e.g., biomass and exploitation) used to evaluate stock status.

9. Project future stock conditions (biomass, abundance, and exploitation; including probability density functions) and develop rebuilding schedules if warranted; include estimated generation time. Develop stock projections for the following circumstances, in accordance with the guidance on management needs provided in the management history:

   A) If the stock is overfished, then utilize projections to determine:
      - Year in which F=0 results in a 70% probability of rebuilding (Year $F=0_{p70}$)
      - Target rebuilding year (Year $F=0_{p70}$ + 1 generation time if Year $F=0_{p70}>10$) ($Year_{rebuild}$)
      - F resulting in 50% and 70% probability of rebuilding by $Year_{rebuild}$
      - Fixed level or removals (TAC) allowing rebuilding of stock with 50% and 70% probability

B) Otherwise, utilize a P* approach to determine:
- The F needed and corresponding removals associated with a 70% probability of overfishing not occurring (P* = 0.3)

C) If data-limitations preclude classic projections (i.e. A, B above), explore alternate projection models to provide management advice.

10. Provide recommendations for future research and data collection.
- Be as specific as practicable in describing sampling design and sampling intensity.
- Emphasize items which will improve future assessment capabilities and reliability.
- Consider data, monitoring, and assessment needs. Suggest the interval needed for future assessments taking into consideration the scientific needs of the stock including life history and stock status.

11. Complete the Assessment Workshop Report in accordance with project schedule deadlines (Section III of the SEDAR Stock Assessment Report).

Review Workshop Terms of Reference

1. Evaluate the data used in the assessment, including discussion of the strengths and weaknesses of data sources and decisions, and consider the following:

   a) Are data decisions made by the DW and AW sound and robust?

   b) Are data uncertainties acknowledged, reported, and within normal or expected levels?

   c) Are data applied properly within the assessment model?

   d) Are input data series reliable and sufficient to support the assessment approach and findings?

2. Evaluate and discuss the strengths and weaknesses of the methods used to assess the stock, taking into account the available data, and considering the following:

   a) Are methods scientifically sound and robust?

   b) Are assessment models configured properly and used consistent with standard practices?

   c) Are the methods appropriate for the available data?

3. Evaluate the assessment findings and consider the following:

   a) Are abundance, exploitation, and biomass estimates reliable, consistent with input data and population biological characteristics, and useful to support status inferences?

   b) Is the stock overfished? What information helps you reach this conclusion?

   c) Is the stock undergoing overfishing? What information helps you reach this conclusion?

   d) Is there an informative stock recruitment relationship? Is the stock recruitment curve reliable and useful for evaluation of productivity and future stock conditions?

   e) Are the quantitative estimates of the status determination criteria for this stock reliable? If not, are there other indicators that may be used to inform managers about stock trends and conditions?

4. Evaluate the stock projections, including discussing strengths and weaknesses, and consider the following:

   a) Are the methods consistent with accepted practices and available data?

   b) Are the methods appropriate for the assessment model and outputs?

   c) Are the results informative and robust, and useful to support inferences of probable future conditions?

   d) Are key uncertainties acknowledged, discussed, and reflected in the projection results?

5. Consider how uncertainties in the assessment, and their potential consequences, are addressed.

   - Comment on the degree to which methods used to evaluate uncertainty reflect and capture the significant sources of uncertainty in the population, data sources, and assessment methods.

   - Ensure that the implications of uncertainty in technical conclusions are clearly stated.

6. Consider the research recommendations provided by the Data and Assessment workshops and make any additional recommendations or prioritizations warranted.

   - Clearly denote research and monitoring that could improve the reliability of, and information provided by, future assessments.

   - Provide recommendations on possible ways to improve the SEDAR process.

7. Consider whether the stock assessment constitutes the best scientific information available using the following criteria as appropriate: relevance, inclusiveness, objectivity, transparency, timeliness, verification, validation, and peer review of fishery management information.

8. Provide guidance on key improvements in data or modeling approaches which should be considered when scheduling the next assessment.

9. Ensure that stock assessment results are clearly and accurately presented in the Stock Assessment Report and that reported results are consistent with Review Panel recommendations. If there are differences between the AW and RW due to the reviewer's request for changes and/or additional model runs, etc. describe those reasons and results.

10. Prepare a Peer Review Summary summarizing the Panel's evaluation of the stock assessment and addressing each Term of Reference.