

Summary of Reviewer Comments
TOR #3 – Gulf of Maine
SAW/SARC 65

Scallop TOR #3:

Summarize existing data, and characterize trends if possible, and define what data should be collected from the Gulf of Maine area to describe the condition and status of that resource. If possible provide a basis for developing catch advice for this area.

[From Summary Report of the 65th Northeast Regional Stock Assessment Review Committee \(SARC 65\)](#). July 20, 2018. SARC 65 members: Patrick Sullivan (Chair), Cathy Dichmont, Coby Needle, Geoff Tingley.

The panel report was prepared by Dr. Patrick Sullivan.

“3. Summarize existing data, and characterize trends if possible, and define what data should be collected from the Gulf of Maine area to describe the condition and status of that resource. If possible provide a basis for developing catch advice for this area.

- This TOR was fully met.
- Consider what data are needed to run the SAMS model in the immediate future and then prioritize the collection of the information needed through surveys and fishery monitoring. Plan to expand information collection to support other applications, including the CASA model at a later date.
- Evaluate the cost-benefits of developing research surveys and monitoring the fishery (landings and discards) relative to the net socio-economic benefits.
- Historically a number of different survey approaches have been applied. From this point, a single survey methodology should be selected and applied to create a single, informative and consistent abundance time series. Consideration of fishery-dependent data should explicitly include options for using the available VMS data to provide a usable measure of effort. Consider using an optical survey, while obtaining the required biological information from the fishery.
- An outline approach for informing management for this area was presented. For the immediate future, consider a data-limited method for informing management (such as that proposed), with further development of fishery-dependent (e.g. CPUE) and fishery independent (survey) derived abundance indices to inform adjustment of the ABC (up and down) in proportion to change in the most informative index.
- With limited research options available, collation and use of appropriate and informative fishery-dependent information to support assessment should be fully explored. This should include approaches to quantify metrics for catches, discards and landings (i.e. to give representative CPUE and LPUE) and also patterns of spatial density distribution.
- Due to the range and scale of uncertainties, multi-year projections are unlikely to be sufficiently accurate at this point and therefore not useful at the moment. One year projections may still be useful.”

[Dr. Cathy Dichmont comments](#), including recommendations from Section 6 of her report.
Pp.24-26

“5.1.3.1 Overall response

This TOR was fully met.

5.1.3.2 Background

The Gulf of Maine (GoM) is a patchy resource area that does not have a consistent scallop dedicated survey time series. The landings in the area are not large relative to the other main scallop areas, but these catches are regionally important. A few approaches were used to set past TACs, including using historical catch, exploitation rates applied to survey estimates and forward projecting survey data.

5.1.3.3 Assessment and projection options

Several GoM scallop surveys (dredge and drop camera) have been undertaken since 2009, but these have concentrated on different regions over time. Only two areas have been reasonably consistently sampled, but not in 2017. Although these different surveys would have had merit for biological sampling and understanding where the resource can be found, this does not assist in developing a consistent index of abundance for an assessment.

Three options for setting TAC were proposed for possible use in the GoM:

- a) expanding the CASA model to include the GoM area, and estimating Yield per Recruit (SYM);
- b) expanding SAMS to cover a portion of the GoM region; and
- c) other approaches such as depletion analyses.

Given the lack of a survey index time series, CASA would not be a recommended option unless there is large overlap with the data rich resource dynamics and recruitment between the regions (which seem at this stage unlikely). For this reason, the better option is to consider what additional inputs one would need to run the SAMS model to assist in identifying and prioritizing what information is required. CASA is more likely the best longer-term option.

Recommendation (High) 6. Focus on initially using SAMS to prioritize data and information needs.

Given that SAMS requires a biomass distribution map or index, a socio-economic cost-benefit analysis of survey requirements per region within the GoM is recommended. The ideal would be regular and consistent whole of GoM surveys using the best (for scallops) survey technique (most likely the optical surveys) to develop an index of abundance time series, and use the industry platforms to obtain key biological data.

Recommendation (High) 7. Undertake a cost-benefit analysis of the survey requirements for the GoM with a focus on creating a tool to set TACs. This should include considering the ideal option which would be regular GoM wide surveys.

Another option that should be considered in the cost-benefit analysis is to undertake regular, but not annual, scallop specific surveys within the GoM and use this to project the TAC for the years where no survey will be undertaken. This means that the interval between the surveys would need to be considered in terms of adjusting for increased uncertainty. This option is not ideal, but may be cost-effective.

In the short term, there are several data moderate approaches that could be considered in place of CASA. These would initially need to rely on fishery dependent information for the longer-term index of abundance (LPUE) with the recent surveys providing additional information. Given the data rich nature of neighbouring regions, Bayesian hierarchical models are likely to perform well, e.g. a multi-stock Bayesian biomass dynamic hierarchical model (Zhou et al., 2009) or a Robin Hood approach modified for hard to age species (Punt et al., 2011). These are the recommended approaches as a first step towards ultimately running CASA.

Additionally, catch only (e.g., Carruthers et al., 2014) approaches that include survey data could be considered, but these usually have wide confidence intervals and can be quite uncertain.

Recommendation (High) 8. Investigate the use of data moderate models. Amongst these, concentrate on Bayesian approaches where hyper-priors can be informed by the data rich regions.

Similar to the other regions, model-based estimates of biomass indices and maps are likely to be beneficial.

Recommendation (Medium) 7. Move towards model-based estimates of biomass indices and maps as an option. This may be best to be either undertaken at the same time as the other regions or thereafter and so will need to be determined.”

From p.39:

“In the Gulf of Maine several alternative approaches are suggested (ToR 3). The key to this region is to collect information required to ultimately undertake a SAMS model. Investigating what data are needed would help prioritize the data needs. A single survey is required and suggestions are made in ToR 3 on how to approach this going forward, which includes undertaking a cost-benefit analysis of survey scope, regularity and scale as a priority.”

[Dr. Coby Needle](#) comments:

p.5

“This ToR was fully completed, and I concur with the conclusions of the SARC panel.

The Gulf of Maine scallop fishery and stock are relatively data-poor, and it proved difficult to determine how to approach the assessment from the perspective of a review (although we are expected to comment as it is specified in a ToR). Certainly the area is not as important economically as the MA and GB areas, but there is still an increasing LPUE in recent years and the question is: is the Gulf of Maine sufficiently important to consider resourcing more extensive data collection? The relative landings proportions in the three areas would suggest probably not, unless it is critical for local coastal communities, and we were told that the area is an important consideration at the relevant Management Council. In terms of importance to the stock and the economy, however, I would conclude that it would be more beneficial to seek to incorporate the Canadian part of Georges Bank into the overall assessment.

The Gulf of Maine seems to be very data limited and there is no assessment yet. It is a patchy area for scallops, with a very heterogeneous distribution, although density seems high (compared to Georges Bank levels) where there are scallops. The area is not regularly surveyed and there are no discard observations, although there are quite detailed VMS data, with pings every 30 minutes for all vessels. I also note that Appendix B3 is well-written and contains many impressive data summaries (although derived from relatively few data).

The key point of the ToR was to look for a ranking of the three management approaches used or proposed recently:

- Assessing using CASA, estimating YPR, and determining reference points.
- Expanding the SAMS model to include the Gulf of Maine area.
- Other methods: catch-based advice, depletion modelling.

Of these, probably only the third has much chance of success, given the current level of data availability. There are quite detailed data on scallop distribution and biology from the area (and the relevant Appendix is one of the longer ones as a consequence), but such data are generally from snapshot surveys that are not then continued, and there is unlikely to be sufficient data yet to inform either of the first two approaches.

Whether the fishery is deemed important enough to warrant increased resources for data collection, collation and assessment is a matter for fisheries managers, and that decision will need to be taken before the required data gathering process can begin in earnest.”

[Dr. Geoff Tingley comments:](#)

p.7

“This ToR was fully met.

The data available from the stock and fishery in the Gulf of Maine (GoM) are not currently adequate to enable the Scallop Area Management Simulator (SAMS) model to be applied for this area. A review of precisely what data would be needed to enable the SAMS model to be run should be conducted.

Biological data that will be required but are not currently collected in a consistent manner specifically include size frequency, growth and age data. These data should be collected from the fishery (e.g., at-sea observers and port sampling) and during any future surveys as a matter of urgency and priority. These data will be required and as each season passes the opportunity to build up an informative time series of data passes too, so there is some urgency to begin data collection.

With no adequate fishery-independent abundance index available for the GoM, there should be a focus on developing a single survey time series for use as an abundance index to inform assessment models. This should be developed to be proportionate to the current and likely future size and scale of the fishery in this area. Combinations of surveys and fishery monitoring should be fully considered, e.g., using an optical survey with biological data coming from the fishery.

Improved and cost-effective collection of fishery monitoring data, including catch (landing and discard) data, should be explored. With limited research options available, this will assist in the development of appropriate and informative fishery-dependent information to support assessment, including approaches to give representative LPUE as well as patterns of spatial density distribution.

The range and scale of uncertainties for the stock in this area suggest that multi-year projections are unlikely to be sufficiently accurate to be reliable at present. Single year projections may still be informative until the uncertainties can be better defined and reduced.”

p.22 – Reviewer Researcher Recommendations

“3. Collect appropriate quantities and frequencies data to enable the further work on the gonad weight-based SSB approach to assessing stock status and the associated biological reference points to proceed. This should specifically include more information on the shell height-to-gonad weight relationship for all areas, and especially for those areas with inadequate data currently (GoM and SNL areas). The timing of the collection of these data and the implications for the reliability of the estimation of stock status should be fully addressed in the sampling program.

4. Gulf of Maine: (i) start collecting key biological information now, using an observer program, port sampling and any available research surveys. Review the approaches used in other areas for

suitability and use the SAMS model to prioritize the most important information to be collected where appropriate.

5. Gulf of Maine: (ii) identify a single biomass survey design and methodology from which to build a new and consistent time series. The reviewer suggests that a future-proofed optical survey using a current or future Habcam is likely to be the best approach, with biological data coming from the fishery.”