

## C-3 Scallop SAFE

The SSC received a presentation on the 2022 Scallop SAFE from Scallop Plan Team (SPT) co-chairs Sarah Rheinsmith (NPFMC) and Tyler Jackson (ADF&G), and economist Scott Miller (NOAA-AKRO). There was no public testimony.

Under the FMP, the scallop stock assessment is developed by ADF&G with input from the National Marine Fisheries Service. The Stock Assessment and Fishery Evaluation Report (SAFE) is compiled by the Council's SPT. The SPT meets annually, and specifications are set annually, but the stock is assessed biennially. This is a full assessment year.

Currently, there is no stock assessment model for weathervane scallops in Alaska, although efforts to develop an age-based assessment are ongoing. In the absence of a formal stock assessment, ADF&G sets guideline harvest levels (GHLs) using data gathered through the scallop fishery observer program as well as fishery-independent scallop dredge surveys. In addition to trends in nominal CPUE, standardized CPUE indices are estimated to account for variations by depth, month, vessel, bed, and season. Estimates of the spatial scale of fishing effort and catch are also used to interpret trends in CPUE.

New information in the 2022 SAFE Report includes: 2021 fishery-independent dredge and trawl survey results, State management region-specific discard estimates, fishery CPUE, landings for 2020/21, and preliminary landings and CPUE estimates for 2021/22. The 2021 dredge survey was conducted in scallop beds in the Yakutat and Prince William Sound (PWS) registration areas. Abundance and biomass of small and large scallops increased in the two PWS outside district beds (WKI and EKI) and decreased in Yakutat districts beds. Meat weight to shell height and round weight decreased in all areas. In 2020, the SPT recommended that the dredge survey be implemented with broader spatial coverage at the potential cost to precision. The increased spatial coverage in 2021 had a modest impact on CVs which were all less than 0.35, except for the largest scallop bed off Yakutat (YAK3) where CVs were much higher.

Scallop abundance is estimated for portions of three of the nine registration areas only. Therefore, in the absence of stock-size estimates, the status of the scallop stock relative to overfished is unknown. The total catch estimate for the 2020/21 was 238,551 lb. (108 t) of shucked meats. This is 20.6% of the ABC (1.156 million lb.; 524 t) and 18.6% of OFL. Scallop landings in 2021/22 are estimated to be 298,755 lb. (136 t), and discard estimates are not yet available.

Consistent with assessments since 2011/12, the SPT recommends that the 2022/23 OFL be set equal to the Optimum Yield (1.284 million lb.; 582 t) as defined in the Scallop FMP and the 2022/23 ABC be set equal to the maximum ABC control rule value (90% of OFL or 1.156 million lb.; 524 t). **The SSC supports the SPT's OFL and ABC recommendations and concurs with the SPT's perspective that the management of the scallop fishery via GHLs continues to be very conservative with recent harvest levels at less than 20% of OFL.** Overfishing did not occur in 2020/21 and overfishing cannot be assessed for 2021/22 because estimates of discards are not yet available.

Given the conservative GHLs for scallops and stable harvest specifications over time, the SSC, in its June 2021 minutes, discussed whether a decrease in assessment frequency would reduce burden on staff and review resources and provide more time for development of new assessment methods. The FMP requires that a SAFE report be produced annually, and an FMP amendment would be required to accommodate an alternative assessment cycle. **The SSC reiterates its support for such an amendment to the extent that it allows greater flexibility in scheduling the SAFE report cycle.** Pending an FMP amendment, the SSC reiterates its past recommendation that the Executive Summary SAFE format be used in assessment "off" years.

The SSC appreciates the concerted efforts of the analysts to provide responses to the SSC's June 2021 and earlier comments. Responding to the SSC request to better document the fraction of the area or population being exploited, the analysts reported an index of the spatial extent of fishing, which was helpful in interpretation of the observed CPUE; however, this did not address the larger question of the scope of exploitation. **The SSC requests that in the future, a map be produced of all beds that have been surveyed or fished (even if only historically).** From this map, the footprint of the current fishery relative to the extent of the overall historical distribution should be provided in each SAFE.

The SSC recognizes that the management approach, allowing modest harvest on only a fraction of the known beds, appears to be inherently conservative with regard to limiting fishery yield and the probability of overfishing; therefore, the stock is likely to be underutilized. Based on the data collection program at present, there appears to be little avenue for improved information on total stock productivity in the future. If there is interest in improving the understanding of stock distribution and productivity in order to allow for the potential of an expanded fishery in the future, the **SSC recommends that the State consider allocating some portion of the annual survey effort to mapping of scallop beds to better define the boundaries of existing beds.**

The SSC commends the authors on the preliminary modeling work completed for the Kamishak and Kodiak districts. The SSC agrees with the author and SPT conclusions that a statewide assessment model is too large a project to complete at present given data and resource limitations, particularly the lack of survey information for many beds. **The SSC recommends that future modeling efforts be focused on an age-structured model (and/or other models for data-limited situations for comparison) for a single district, perhaps Yakutat where the recent fishery has been active.** The goal of this effort may be best focused on assessing the productivity and yield (both short and longer term) under the current status quo management approach.

For future age-structured modeling efforts, the SSC has the following recommendations, in addition to those provided by the SPT:

- The models should include discard mortality.
- If survey dredge efficiency is assumed to be known, include this information as a prior in catchability and force selectivity to be 1.0 for a reasonable range of sizes rather than allowing dredge selectivity to be less than 1.0 across the entire size range.
- Consider dropping the trawl survey index as it is highly uncertain. If the trawl index is retained, provide justification for the implausibly small  $\log(\text{SE}) = 0.01$  for several of the observations.
- As recommended by the SPT, further work on standardizing the fishery CPUE index will be needed, including a careful evaluation of its suitability as an index of abundance by region or overall.
- Provide an explicit basis for data weighting. Recent groundfish assessments may be helpful to assess the range of approaches commonly employed.
- Provide a basis for the selection of the variance in recruitment deviations.
- Provide a graphical summary of the fits to size-at-age data.

The SSC appreciates the work of the SPT and offers the following comments on the SPT Report:

- The SSC appreciates the work of the state-wide scallop survey team and notes that, while constrained to a limited number of scallop beds, the survey provides valuable information to inform both in-season ADF&G district-level management as well as the development of a formal stock assessment model. Going forward, the SSC recommends that the survey team consider adjusting the survey plan to include key beds in the Yakutat Area annually rather than in alternating years. The goal would be to produce a consistent survey time series to inform the development of the assessment model and allow important comparisons between fishery-independent abundance and biomass estimates and fishery-dependent nominal and standardized CPUE estimates. The SSC recognizes that this may limit survey effort in the Cook Inlet and Kodiak regions.
- The SSC recommends the SPT and ADF&G survey team consider the value of re-deploying the ADF&G CamSled optical sampling platform relative to the current sampling methods. A recent publication (Batter et al. 2021, Journal of Shellfish Research) demonstrates the efficacy of this sampler to support abundance and biomass estimation. Importantly, the local scallop density and distribution information captured in the seabed imagery would provide independent estimates of abundance and biomass, insights into the planned dredge calibration study, and potentially support direct estimates of natural mortality (e.g., ratio of live to dead scallops), as well as support essential fish habitat assessments. If the CamSled tool is deployed, the SSC considers mapping of scallop bed boundaries to allow comparison between scallop distribution and fishing footprint to be a high priority.
- The SSC notes the importance of the dredge calibration experiment in interpreting the time-series in the near future until the new gear has its own series. The SSC looks forward to seeing the details of the calibration study, including bulk catchability and size-selectivity when the experiment is complete.
- The SSC recommends that the survey team consider documenting uncertainty associated with time on bottom for the survey dredge and methods used to estimate area swept.
- The SSC appreciated the analysts' efforts to examine scallop data collected in the westward region large-mesh trawl survey. Scallop catches in this gear were small and highly variable, likely due to the survey gear not being designed for scallops. The SSC concurs with the SPT's assessment that these data provide little additional information to inform the age-structured modeling work and continued efforts are unlikely to be fruitful. However, examination of scallop catches outside the known beds may provide insights into the locations of scallop beds not currently detected in the fishery or state-wide survey.
- **The SSC recommends that the SPT consider whether the OFL levels are appropriately set using the current reference period from 1990-1997, given the more recent CPUE trends and biological information (e.g., average weight) available.**
- The SSC encourages the continued monitoring of weak meats and supports the SPT recommendation to improve collection of quantitative data for monitoring individual scallop condition indices and stock health trends. The SSC recommends the analysts and SPT consider additional observer training and other more objective sampling protocols to standardize and improve weak meat detection.
- The SSC was pleased to see that CTD data were collected during the 2021 survey reported in this SAFE Report. To the extent possible, the SSC recommends continuing this sampling in subsequent surveys.

- The SSC encourages continued investigation of trends in meat weight and whether these may be driven by environmental factors, such as temperature, in addition to the timing of the survey.
- Regarding the change in the shell height definition from the ‘top shell’ to ‘outer shell,’ the SSC appreciated the brief analysis of paired valve measurements provided. The SSC concurs with the analysts that redefining the shell height from “top valve” to “outer shell margin” is appropriate without using a conversion for survey data, given the mixed history of data collection. The analysts indicated that there are plans to conduct a similar analysis on shells collected during the fishery. The SSC looks forward to seeing this analysis.
- The SSC noted that although the scallop fishery has a small spatial footprint, scallop fishing should be included in future fishing effects modeling because of the bottom-tending characteristics and rigid nature of the gear.
- The SSC suggests that the SPT and ADF&G survey team may benefit from a deeper examination of recent and ongoing science and management efforts for Atlantic sea scallops, including development of appropriate survey designs, cooperative survey data collection, and ecosystem interactions and effects, particularly with regard to management in the context of choke species, as well as invasive species such as the tunicate *Didemnum vexillum*.
- **The SSC recommends that the SPT consider whether there would be value in conducting an analysis that would assess whether or not this fishery is underutilized and, if so, identify barriers to increased participation in this fishery.**
- The SSC recommends that the SPT consider the value of a study on the genetics of scallops to help define stock structure.
- The SSC is encouraged to see that its multi-year comments on socioeconomic considerations in the scallop SAFE are in the process of being addressed and looks forward to continued work in this area as described in Appendix 1. This fishery is important from a socioeconomic analytic perspective in that the National Standard 8 goal of providing for the sustained participation of fishing communities does not appear to have been met over time. It has the potential to serve as a case study including lessons learned that would be of benefit to future management program design and application in other fisheries. The SSC requests that the analyst carefully examine the text regarding fishery taxes and crew-shares to ensure accuracy and remove speculative content.
- The SSC supports the SPT recommendations to streamline the SAFE document by including the survey history and methods via references to the appropriate ADF&G documents. In addition, reductions in the area-specific fishery performance sections may also be warranted as these do not directly inform stock status determination. Finally, several minor editorial issues should be reconciled if these sections continue to be included:
  - Table 2.2 headers missing for 'total' and 'sampled' stations.
  - Tables 4.4, 4.5, 4.6: why are there no discard mortality estimates?
  - Table 4.11, 4.12 report an order of magnitude lower discard mortality rates – are these correct? If so, perhaps include a comment on why this is the case.
  - If trawl data are to be reported, please convert to lb/nm<sup>2</sup> instead of kg/km for

comparability with dredge data.

- Check accuracy of numbers presented for OY and OFL on page 6 section 1.1 and MSST on page 8.
- In Table 2.1, separate landings and discards so trends can be discerned.