



# North Pacific Fishery Management Council

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## SCIENTIFIC AND STATISTICAL COMMITTEE FINAL REPORT TO THE NORTH PACIFIC FISHERY MANAGEMENT COUNCIL April 5<sup>th</sup> – 8<sup>th</sup>, 2021

The SSC met remotely from April 5<sup>th</sup> – 8<sup>th</sup>.

Members present were:

Anne Hollowed, Co-Chair  
*NOAA Fisheries – AFSC*

Sherri Dressel, Co-Chair  
*Alaska Dept. of Fish and Game*

Alison Whitman, Vice Chair  
*Oregon Dept. of Fish and Wildlife*

Milo Adkison  
*University of Alaska Fairbanks*

Chris Anderson  
*University of Washington*

Amy Bishop  
*University of Alaska Fairbanks*

Curry Cunningham  
*University of Alaska Fairbanks*

Mike Downs  
*Wislow Research*

Jason Gasper  
*NOAA Fisheries–Alaska Region*

Dana Hanselman  
*NOAA Fisheries—AFSC*

Brad Harris  
*Alaska Pacific University*

George Hunt  
*University of Washington*

Andrew Munro  
*Alaska Dept. of Fish and Game*

Matt Reimer  
*University of California, Davis*

Chris Siddon  
*Alaska Dept. of Fish and Game*

Ian Stewart  
*Intl. Pacific Halibut Commission*

Patrick Sullivan  
*Cornell University*

Tien-Shui Tsou  
*Washington Dept. of Fish and Wildlife*

### SSC Administrative Discussion

Diana Evans (NPFMC) informed the SSC that the June 2021 SSC meeting will be held virtually. In recognition of the Memorial Day holiday, the meeting will start on Tuesday June 1 and will end on Friday June 4. She also informed the SSC that the October and December meetings could potentially be held in person. If one or both of these meetings are held in-person, the NPFMC requests that SSC members attend in-person.

Ms. Evans also reminded the SSC that the NPFMC is hosting the seventh national meeting of the Scientific Coordination Subcommittee (SCS7) the week of August 9th, 2021 (virtually). Anne Hollowed noted that all SSC members are encouraged to participate and that key leads will be identified to represent the NPFMC. Proposed themes for this meeting are listed on the NPFMC April Agenda under item B1.

Ms. Evans also noted that requested edits to the SSC Handbook will be reviewed by the Council's Executive Committee during this meeting, after which the document will be finalized.

## **B-3 Seabird Status**

The SSC received a presentation from Joe Krieger (NOAA-AKRO) and Elizabeth Labunski (USFWS) on seabird bycatch, recent die-offs and seabird monitoring efforts. There was no public testimony.

### **Bycatch**

Seabirds are caught in fishing gear when the birds come close to vessels seeking food in the form of bait from longline operations or scraps from nets during retrieval. Seabird mortality from longline operations declined significantly with the introduction of Tory lines or streamers starting in 2001, and streamer regulations in 2004. Seabird mortality can be of conservation concern if high numbers of birds are killed, or if threatened or endangered species of seabirds, such as short-tailed albatross, are involved.

The present indications are that the numbers of bycaught seabirds in general, and albatrosses in particular, declined somewhat in 2020. As longline fisheries shift to pots to avoid whale depredation, there may be further decreases in seabird bycatch on longline gear. Two short-tailed albatrosses were killed in 2020, the first recorded bycaught since 2014. The take must not exceed six short-tailed albatrosses within a two-year period, or a consultation under Section 7 of the Endangered Species Act will result. **The SSC suggests that future presentations on seabirds include time series of short-tailed albatross population size and numbers caught**, as the numbers caught may be the result of an increasing albatross population.

There were also two threatened eiders bycaught: one was a Steller's eider in 2019 north of St. Lawrence Island, and the other, a spectacled eider in 2020 just north of False Pass. At least in the case of the Steller's eider, it was apparently attracted to a fishing vessel's lights at night. A new biological opinion completed in 2021 allows take of 25 spectacled eiders in a floating 4-year period, but only 3 Steller's eiders in a floating 3-year period. If these numbers are exceeded, a consultation under Section 7 will be required.

There was some evidence of increased seabird bycatch in years with large seabird mass mortality events. Further exploration of this pattern would be helpful to identify if mass mortality events are indicators of potential direct interactions with fisheries. The SSC noted that analysts should explore whether observers could record weights of bycaught birds to determine if emaciation is correlated with increased likelihood of seabird encounters with fishing vessels.

### **Deck Lights and Seabirds**

The issue of the nighttime attraction of seabirds to vessel deck lights has not been of concern to the Council to date. However, it is known that high numbers of seabirds may die when they land on a well-lit vessel at night and cannot take flight from it. The issue becomes a concern to the Council when this involves endangered or threatened seabirds that are attracted to fishing vessels in the federal waters off Alaska. The 2021 biological opinion mentions that there will be a request for vessels to employ minimal deck lighting, within the limits of safety, to avoid attracting seabirds to fishing vessels at night. **The SSC requests that an effort be made by observers to record the date, time of day, general location, numbers, and species of seabirds landing on vessels.** The SSC expects that attraction of seabirds onto vessels at night is generally not a problem, except under limited circumstances. To minimize conflicts in the future, it would be helpful to identify when and where problems have occurred.

### **Shifts in Distribution/Abundance**

The SSC received a report of shifts in seabird distributions recorded in the northern Bering Sea and Chukchi

Sea during 2017–2019. It is likely that these reflect changes in the availability of preferred prey. Several papers were recently published in a special volume of Deep-Sea Research II (vol. 181-182, December 2020) on the effects of reduced sea-ice cover on the northern Bering Sea ecosystem. Collectively, these papers show a major shift in the pelagic ecosystem in the warm years of 2018 and 2019, including changes in the distributions of commercially important fish. **The SSC supports continued efforts to place seabird observers on research vessels in the federal waters off Alaska.**

### **Mass Mortality Events/Beach-caste Seabirds**

There were several major die-offs of seabirds in 2018 and 2019, but fewer birds dying in 2020. It is hypothesized that these die-offs have been the result of starvation, as beach-caste carcasses have been emaciated. In 2018, there was also a report of a beach-caste thick-billed murre on St. Lawrence Island that tested positive for an Asian strain of avian influenza. In 2018 and 2020, most beach-caste seabirds were encountered along the coasts of the Chirikov Basin and north into Kotzebue Sound. In 2019, not only were there many beach-caste birds in the north, but also high numbers were encountered in the Bristol Bay region.

Most of the beach-caste seabirds in the northern Bering and Chukchi Seas were planktivorous alcids, whereas most of those that were encountered in the Bristol Bay region and at the Pribilof Islands were short-tailed shearwaters that migrate from Australian breeding grounds to the Bering Sea to feed on euphausiids in the Austral winter. These die-offs signal that crustacean zooplankton, in particular large copepods and the Arctic, ice-associated amphipod, *Themisto libellula*, were in short supply for seabirds in the northern Bering Sea. These zooplankton are also major prey for fish. In the southeastern Bering Sea (Bristol Bay region), the die-offs of shearwaters were probably due to difficulty in obtaining their preferred prey, euphausiids (krill). This information is of relevance to fisheries, as age-0 pollock depend on euphausiids in years with little sea-ice (e.g., 2018, 2019) when the preferred large lipid-rich copepods are scarce or unavailable. **The SSC requests an examination of the historical frequency and magnitude of seabird die-offs in the waters off Alaska.** It will be important to attempt to relate these die-offs to the dietary preference of the seabird species involved and to events in the marine environment, as well as to account for observation effort in trying to assess the numbers of birds involved. Thus, not only the raw totals are needed, but also numbers adjusted for survey effort.

## **B-3 Essential Fish Habitat 2022 Planning**

The SSC received a presentation from Dr. Gretchen Harrington (NOAA-AKRO) on a discussion paper that describes the progress and upcoming plans for the 2022 five-year review of essential fish habitat (EFH) for the North Pacific, including the BSAI, GOA and Arctic regions. Oral public testimony was provided by Jon Warrenchuk (Oceana), Jaime Goen (Alaska Bering Sea Crabbers), and John Gauvin (Alaska Seafood Co-op). The SSC thanks them for their testimony, which provided helpful feedback with regard to the process and substance of this review. There were written comments submitted on this agenda item as well. Additionally, the SSC thanks the presenter for an informative presentation, and other contributors for making themselves available to answer specific SSC questions.

The document provides an update on each of the ten EFH components, with a focus on six that were prioritized for this particular cycle by NMFS. These six include:

- Component 1) EFH descriptions and identification
- Component 2) Fishing activities that may adversely affect EFH
- Component 4) Non-fishing activities that may adversely affect EFH
- Component 6) EFH conservation and enhancement recommendations

- Component 7) Prey species list and locations
- Component 9) Research and information needs

In addition to providing details on how each of these components will be advanced, the plan and timeline for review are also described. It is anticipated that a summary report will be presented to Council in June 2022.

With regards to Component 1, EFH descriptions and identification, the objectives from the updated Alaska EFH research plan included: 1) developing level 1 or 2 EFH information where missing from the 2017 review (including new species and life history stages) and 2) raising EFH information to level 2 or 3 where possible. These objectives lead to the development of four research projects that are in progress, and which the SSC reviewed in June 2020. These projects include:

- Development of new species distribution models (SDMs) with new data and a refined methodology in Laman *et al.* (in prep.).
- Novel SDMs for several Arctic species in Marsh *et al.* (in prep.)
- Development of spatially explicit vital rates for juvenile pollock in the GOA in Copeman *et al.* (in prep.)
- Use of individual-based models or IBMs to describe EFH for early life history stages of sablefish and Pacific cod in Shotwell *et al.* (in prep.)

The SSC provided a detailed review of these four projects in their June 2020 report. A list of SSC recommendations and the analyst responses to these are included in the current document. The SSC appreciates the responsiveness of the analysts to multiple recommendations and suggestions for improvements of EFH identification and description. As noted in June 2020, there continues to be substantial progress on this front, and the analysts and contributors should be commended for their efforts. Items addressed since June 2020 include the use of more appropriate error distributions and alternative modeling approaches, where GAMs and negative binomial models are included in ensembles that are appropriately weighted proportional to out-of-sample predictive performance, and explicit definition of regions where SDM uncertainty is high relative to expected biomass.

There are multiple responses to recommendations that were not finalized or developed during this review cycle to which the SSC continues to call attention. As an example, the SSC is pleased to hear about the exploration of more dynamic time scales to evaluate EFH in the Barnes *et al.* (in prep.) study and looks forward to seeing this develop further in the future under changing climate conditions. Other efforts to expand the data incorporated into EFH descriptions beyond traditional large-scale fishery-independent data sources or development of covariates for habitats that are under-represented in current datasets, as suggested in the June 2020 SSC minutes, would be critical to continue in the future. Overall, the SSC is supportive of the use of this package of products for the advancement of EFH in the 2022 cycle, which will advance the objectives of the Alaska EFH research plan and lead to improved definitions of EFH in the BSAI, GOA, and Arctic.

For Component 2, Fishing activities that may adversely affect EFH, the plan for the 2022 EFH is to run the Fishing Effects (FE) model with updated inputs from the Catch-in-Areas (CIA) database and updated SDMs. During the previous 2017 EFH review, the SSC reviewed this novel model and provided recommendations for improvements. The FE model has been published (see Smeltz et al. 2019, Can. J. Fish. Aquat. Sci.), and many of these recommendations have apparently been addressed, though the EFH planning document was not very detailed in this regard. The SSC requests clarification about whether any

outstanding comments, relevant to this EFH review cycle, remain unaddressed.

For Component 4, Non-fishing activities that may adversely affect EFH, the Limpinsel *et al.* (2017) report on non-fishing activities' impacts to EFH will be updated and this effort is already underway.

There are annual reports that inform Component 6, EFH conservation and enhancement, and updated information from the FE model will be considered as well.

For Component 7, Prey list and locations, the 2022 review will focus on nearshore habitats for prey species. As clarified during the presentation, information on prey will be updated in each Fishery Management Plan (FMP) during this EFH cycle. An updated AFSC Nearshore Atlas (Gruss *et al.* 2021) and the Shorezone database are available to inform this effort. The application of SDMs for prey species is an encouraging avenue of development to improve the information related to this EFH component. This would also be another component where the SSC suggests the exploration of alternative or more localized datasets that may be helpful, similar to a previous recommendation with regard to Component 1.

Finally, for Component 9, Research and information needs, the SSC notes the impressive list of EFH-related projects funded since the 2017 review. For those projects that do not have a peer reviewed publication associated, it may be useful to review funding reports or other grey literature to fully incorporate the information provided in all of these projects into the body of EFH knowledge. A new Alaska EFH research plan will be developed and provided as a part of the 2022 review. This is to be developed by habitat and ecological processes research (HEPR), with participation from AKRO and AFSC scientists. The SSC suggests that outside expertise may be beneficial to this update. As the analysts suggest, it may be helpful for the SSC to review the draft research plan in late 2022 for the next review cycle.

The SSC has a number of process-related recommendations and suggestions. The SSC believes the timeline on this agenda item is ambitious and is concerned with the lack of an iterative review process under the tight timeline presented. The SSC notes that transparency was also a concern brought forward in public testimony. Products from this EFH process are hierarchical in nature, and inform Council actions beyond EFH reviews. The SDMs are an integral component of the FE model, which, in turn, now inform multiple products, from EFH conservation and enhancement efforts (Component 6) and future EFH cumulative impact analyses to indicators of habitat disturbance levels in the annual Ecosystem Status Reports. **While the SSC greatly appreciates the analysts' responsiveness to previous reviews, the SSC recommends that additional opportunity for SSC review is necessary prior to the presentation of a final product, currently planned for June 2022, and suggests a two-part approach. First, the SSC requests to review the SDM model results and to receive an overview of discussions or recommendations from stock assessment authors at the October 2021 SSC meeting.** The presentation in October 2021 would ideally include pertinent summary information that allows the SSC to review the predictive capacity of different model types and ensemble models across species and life stages. To be clear, the SSC is not requesting an exhaustive presentation of all SDM results and the identified core areas. Rather, the SSC is requesting to receive a summary of model performance issues for the species examined, modeling methodology, and quality of the underlying data (especially for models deemed to provide Level 3 or 4 information). For example, the SSC is interested in analytical elements such as: a summary of important covariates across species; a report on model convergence issues and how these were addressed; a summary report on data limitations that created important model performance issues; a summary of results from the skill testing and resulting ensemble member weights, by species; a summary of potential seasonality issues and large changes in core areas when compared to previous results; a discussion on weighting issues encountered with the ensemble modeling; and any other pertinent issues identified by the stock assessment and EFH authors.

**Second, an additional review that would be focused on the FE model is requested during spring of**

**2022, to take place at either the February or April SSC meetings.** The SSC suggests this include analysts' responses to the October 2021 review, as well as a review of the FE model structure and parameterization, model inputs, a summary of methodological changes to the FE model since the 2017 EFH review, and preliminary results, which should also be available at this time. The SSC had previously noted during the 2017 review that a Center for Independent Experts (CIE) review of the FE model was planned; the SSC requests a summary of the CIE review be brought forward during this second review, if it did occur. These additional opportunities for SSC review will ensure a fully vetted product is presented in June 2022.

There was some confusion on the role of the PTs and the timeline of their review of EFH products. Clarifying this for future EFH review cycles would be helpful. **The SSC considers consultation with assessment authors to be a critical link in evaluating model configuration and output, and was pleased to hear the EFH team was involving assessment authors early in the EFH review process.**

The SSC is encouraged to see substantial progress in the consideration of EFH in the NPFMC fishery management system, and looks forward to continuing to participate in the 2022 EFH review process.

## **C-1 Scallop SAFE**

The SSC received a presentation on the 2021 Executive Summary Scallop SAFE from Scallop Plan Team (SPT) co-chairs Jim Armstrong (NPFMC) and Tyler Jackson (ADF&G), and economist Scott Miller (NOAA-AKRO). During its June 2020 meeting, the SSC recommended an executive summary of the SAFE be prepared biennially. This is the first SSC review of the Executive Summary SAFE in this revised format. No public testimony was provided.

### **2021/2022 Harvest Specifications**

**The SSC supports the SPT's recommendation to set the OFL for the 2021/22 season equal to maximum OY (1.284 million lb; 582 t meat weight) as defined in the Scallop FMP, which applies a 20% mortality rate to discards. The SSC also supports the SPT's recommendation to set the 2021/22 ABC for scallops consistent with the maximum ABC control rule (90% of OFL), which is equal to 1.156 million lb (524 t meat weight).** Management of the scallop fishery appears to be conservative, and recent harvest has been less than 20% of the identified OFL based on the best available science, justifying these identified harvest maxima. **Overfishing did not occur in 2019/20 and overfishing cannot be assessed for 2020/21 because estimates of discards are not yet available.**

### **Assessment Schedule**

The OFL/ABC specifications for scallop have not changed since the 2011/12 season, and harvest amounts during this period have been well below the ABC. Given the low exploitation of scallops, slow development of new assessment methods, and stable harvest specifications, the SSC discussed whether further simplification of the SAFE review process is possible by replacing the current Executive Summary format with a multi-year specification with "off-years" (i.e., no SAFE produced). A decrease in assessment frequency would reduce burden on staff and review resources, noting that a multi-year assessment schedule would allow the SPT, SSC, and agency staff to focus on research and assessment development during the off-cycle rather than producing a SAFE. The off-cycle schedule would not preclude SPT or SSC review of important issues and research. However, during discussion, Council staff noted that the FMP requires that a SAFE report be produced annually and that an FMP amendment would be required to accommodate an off-year assessment cycle. The SSC supports 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 every other year.

As this was the first use of the Executive Summary format, the SPT requested the SSC provide input on the format. **The SSC recommends that the Executive Summary should be as abbreviated as possible, and offers the following specific recommendations for content:**

- highlight important changes in ownership, community engagement, and general performance of the fishery relative to the GHL;
- highlight any social, economic, and biological issues that are of concern;
  - include a figure showing the time series of survey abundance and biomass indices, with associated uncertainty, by scallop bed. This should be included in addition to Table 2.

The SSC also received detailed responses by the SPT to SSC comments from its June 2020 meeting. The report was responsive to comments and the SSC offers the following recommendations and requests for the 2022 SAFE report.

- The SPT response did not include responses to the SSC comments from April 2018, April 2019, and June 2020 on outstanding social and economic issues. Scott Miller noted these comments will be addressed in the 2022 full SAFE and the SSC looks forward to responses to its comments.
- The SSC notes the two-stage design equations provided by the SPT in response to comments did not include a gear efficiency term ( $q$ ), and there was general confusion about the equation notation and methods. Due to the abbreviated executive summary format used this year, the SSC did not have the benefit of receiving documentation describing the dredge survey methodology nor details on the new estimation methodology. Thus, for the next full SAFE presentation, **the SSC recommends the authors provide a detailed overview of the hierarchical sample design for the dredge survey and the new two-stage estimation methodology described in the response to comments.**
- **The SSC recommends the authors check the Executive Summary SAFE document to ensure units of meat weight versus round weight are consistently applied in the report and clearly defined.**
- The SSC encourages continued research on scallop stock structure to improve the understanding of the scallop metapopulation and its relationship to Alaska-wide specifications (i.e., MSST, OFL and ABC) and bed-specific GHL management. Consideration should be given to the fraction of the area or the population that is being exploited relative to the total area/population available. The SPT response to comments indicated that a fishery extent index has been developed that evaluates the spatial extent of the fishery. The SSC looks forward to seeing details and results in the upcoming SAFE, and is interested in whether this method could be adapted to quantify the area exploited versus the total population area.

### **Scallop Plan Team Report**

The SSC appreciates the overview of recent work provided in the SPT Report and offers the following comments:

- The SSC supports additional research to evaluate the current survey sample design and whether oceanographic and other environmental features are associated with scallop abundance, growth, and reproductive potential. The SPT report indicated that ADF&G is collecting in-situ environmental data at the scale of the survey. The SSC notes several existing data sources that may

also be of use: the Gulf of Alaska Regional Ocean Modeling System (ROMS, contact Al Hermann, University of Washington), GOA Integrated Ecosystem Program and GOA biennial surveys, satellite derived oceanographic information (available via the NOAA ERDDAP server-<https://coastwatch.pfeg.noaa.gov/erddap/index.html>), and 50 m resolution bathymetry GIS (contact Steve Lewis, NOAA-AKRO). The SSC notes that the ROMS output may provide information on oceanographic conditions that influence larval dispersal relative to scallop bed location and physical oceanographic processes. **The SSC requests future progress reports on this research as it becomes available.**

- The SSC appreciates ongoing research to explore the inclusion of the ADF&G bottom trawl survey data within the assessment. The SSC agrees with the SPT that incorporating large-mesh ADF&G bottom trawl data into the assessment is complicated by unknown selectivity of the survey gear with respect to scallops. However, the SSC notes that these data may still be useful as a relative abundance index and to provide an informative historical time series. **The SSC recommends inclusion of these data in the SAFE if available.** The SSC notes, however, prior to their use in a formal stock assessment (e.g., age- or length-based assessment), further research on selectivity and catchability, leveraging existing observations or side-by-side effort standardization studies, is required.
- Progress on assessment modelling remains a priority for this species. The SSC reiterates its request from June 2020 to review the age-structured model for Kamishak Bay and encourages the authors to bring forward draft models, even if early in development, to facilitate iterative model development with SSC input.
- The SSC is highly supportive of the work being done by ADF&G to error check and make fishery-dependent and -independent data electronically available for authors and all users. The SSC notes that in June 2019 it recommended the SPT *“elucidate a framework for the data and steps needed to improve the assessment and potentially move to an age- or length-based assessment model in the future”*. This effort by ADF&G will provide access to previously unavailable fishery-dependent and -independent data and is responsive to data needs identified by the authors response to the SSC comments in the 2020 SAFE report.
- Investigations of recent trends in meat weight using both fishery and survey data are underway, and the SSC looks forward to seeing that work in the future. The SSC discussed whether trends in meat weight could be driven by environmental factors, such as temperature, versus the timing of the survey. **The SSC recommends the authors consider including appropriate environmental, seasonal, and survey-timing variables in their analysis.**
- The SPT noted a change in the shell height definition from the ‘top shell’ to ‘outer shell’. The change is driven by new measuring board technology and would result in a consistent definition with federal regulations for Atlantic sea scallops. **The SSC looks forward to a report on this research, wherein the authors compare the measurements under the new and old definitions and historical data used in the assessment.**

## C-2 Halibut Abundance-Based Management Initial Review

The SSC received a presentation of the Draft Environmental Impact Statement (DEIS) for abundance-based management (ABM) of BSAI halibut prohibited species catch (PSC) limits from Diana Stram (NPFMC), Jim Ianelli (NOAA-AFSC), and Anna Henry (NPFMC). Mike Downs (Wislow Research Associates, LLC) presented the Draft Social Impact Assessment (DSIA).

Oral public testimony (primary topics noted below) was provided by:



- Mark Fina (US Seafoods) – 2015 PSC use estimate, assumption of full use in impact estimation, aggregation of data across years
- John Gauvin (Alaska Seafood Cooperative) – indices and lack of correlation with encounter rates, climate change
- Heather McCarty (Central Bering Sea Fishermen’s Association) – impacts specific to 4CDE, concerns with the simulation model
- Linda Behnken (Alaska Longline Fishermen’s Association) – measurement of impacts especially on small communities, concerns with the simulation model
- Mateo Paz-Soldan (City of St. Paul Island) – social impacts, issues with the simulation model, climate change
- Chris Woodley (Groundfish Forum) – national standards, food production and product use of each fishery
- Peggy Parker (Halibut Association of North America) – concerns over simulation model
- Lauren Divine (Aleut Community of St. Paul Island) – importance of halibut in the Bering Sea and on St. Paul

The SSC also received written public testimony in the form of a letter from Alaska State Representatives Sarah Vance and Ben Carpenter, a letter from Alaska State Representatives Jonathan Kreis-Tomkins, Sarah Hartman, Dan Ortiz and Andi Story, and comments submitted through the SSC’s agenda (<https://meetings.npfmc.org/Meeting/Details/1944>) provided by: Lauren Divine (Aleut Community of St. Paul Island), Chris Woodley (Groundfish Forum), Heather McCarty (Central Bering Sea Fishermen’s Association), Mark Fina (US Seafoods), John Fortuna (King & Spalding LLP), Harry and Elizabeth Holt, Darrin Watson, Linda Behnken (Alaska Longline Fishermen’s Association), John Murray (F/V Seabear), Theresa Peterson (Alaska Marine Conservation Council), Lauren Divine (Aleut Community of St. Paul Island), Tory O’Connell Curran, John Gauvin (Alaska Seafood Cooperative), Julie Raymond-Yakoubian (Kawerak Inc.), Mateo Paz-Soldan (City of St. Paul Island) and Linda Larson (Nossaman LLP).

The SSC considered the wide range of topics and perspectives raised through both oral and written testimony, all of which highlighted the importance of the Council’s consideration of ABM. Submitted testimony identified many complexities in ABM that have served to make simple conclusions about likely impacts challenging. The SSC recognizes that these complexities include: potential lack of correlation between indices and halibut encounter rate in the Amendment 80 (A80) fishery; complex, variable and uncertain halibut population and fishery dynamics; uncertain conditions in the BSAI due to climate change and species distribution shifts; and fundamental differences in the measures of social and financial impact between the A80 and halibut fisheries, and many others.

### **General comments**

At its October 2020 meeting, the SSC was not afforded sufficient time to review the revised model results and their impacts on all aspects of the DEIS, and as such, was not able to fully comment on the analyses nor determine if the DEIS was acceptable to advance for final action at that time. Therefore, this review again includes all aspects of the documents, analysis, and simulation model.

The DEIS analyzes proposed management measures for the A80 sector to index Pacific halibut PSC limits in the BSAI groundfish fisheries to halibut abundance. The DSIA describes community and regional participation patterns in the BSAI A80 groundfish fishery and the BSAI/Area 4 halibut commercial fishery. It further evaluates potential community level impacts among the four alternatives.

The SSC has provided comments on versions of this analysis several times. After each iteration, the Council

has adjusted the alternatives for analysis, and the specific guidance for the analysts, such that each SSC evaluation has focused on a differing set of topics most relevant for the analysis presented at that time. The SSC highlights that this has led to shifting technical demands as well as large changes in the relevant focus points for detailed evaluation. **The SSC wishes to recognize the extensive work completed by the analysis team and their efforts to adapt during the evolution of the DEIS.**

### **Draft Environmental Impact Statement**

The DEIS presents a thorough description of the alternatives and options requested for consideration by the Council. The DEIS also provides an excellent background for the relevant groundfish and halibut fisheries, including a valuable historical summary of the magnitude, distribution and value of these fisheries over the last decade. The DEIS, along with the presentation material and referenced material from the SSC's October 2020 meeting, were provided for review of the simulation model and the results based on this model. Thus, the April 2021 SSC item represents a full review. As the document moves forward, the SSC provides the following comments and suggested revisions.

#### *Closed-loop simulation model*

The SSC recognizes that any simulation model will require many simplifying assumptions and approximations that may make it suitable to address some, but not all, potential questions. In previous presentations, the SSC has focused discussion on those aspects of the simulation model most relevant to the set of alternatives under evaluation at that time. In the current DEIS, the three important results for comparing alternatives that are specifically based on the simulation model are:

- The simulated effects on future spawning biomass.
- The simulated probabilities of future states occurring in each cell of the lookup tables (e.g., Figures ES-3 and ES-6).
- The estimated ratios of change in halibut fishery limits to change in PSC (e.g., Tables ES-5 and ES-6).

The SSC notes the considerable challenges inherent in projecting the halibut spawning biomass under variable biological and fishery conditions. Similar to the Council's Tier system, the IPHC's SPR-based management approach is expected to conserve spawning biomass across differing patterns in fishery selectivity and/or allocation among different fisheries. The SSC notes this type of response occurs each year in the groundfish assessments as the estimated  $F_{SPR}$  and ABC values adjust to meet fixed SPR reference points, and therefore maintain the same magnitude of effect on spawning biomass. Although a closed-loop simulation is helpful to understand the effects of potential lags in information use and observation uncertainty, even without this information, **the SSC supports the general conclusion that there is likely to be little difference among the average future halibut spawning biomass under different levels of PSC, except under extremely high PSC.**

The probabilities of future states occurring in each cell of the PSC lookup tables depend heavily on the way the population dynamics for halibut are modelled. The SSC is concerned that the use of a single future time series for the Pacific Decadal Oscillation (PDO) may under-represent the potential variability in future states. In addition, beginning with a positive phase (as modelled) may underestimate the likelihood of low stock sizes in the near future. Variability in weight-at-age represents one of the two most important drivers of productivity for the halibut stock (alongside recruitment), and is not included in the simulation of future states, which used fixed values from 2019. **Therefore, the SSC does not support using these probabilities as estimated by the simulation model to compare alternatives. Further, in light of the dynamic changes observed in recent years in the BSAI due to climate change, the SSC cautions that the predictability of the spatial and biological behavior of the fish stocks in this region is very low and**

**suggests that the Council does not base its evaluation of the alternatives on the relative likelihood of future states.**

The estimated ratios of change in PSC to change in halibut fishery limits depend directly on the methods used to model the scale of the simulated halibut fishery, and the allocation between the BSAI and the ‘other’ area. In addition to the concerns about the treatment of the PDO and weight-at-age in the simulation model, the SSC recognizes that the approximations in the simulation model have led to important differences in the magnitude and allocation between the recent and simulated halibut fishery. Specifically, the current simulation suggests a low probability that the halibut fishery in the BSAI will ever be as low as 2019 in the future, but a very high probability that it will be below 2019 levels outside the BSAI. This illustrates a large difference between recent observations and the simulated allocation of coastwide yield. These conditions occur abruptly at the beginning of the simulated time-series, suggesting that the modelling of halibut fishery limits may differ appreciably from recent observations. The SSC therefore has concern that the current simulation model configuration is unable to reliably estimate the degree of change in the BSAI halibut fishery per unit change in PSC. **The SSC therefore does not support the use of these estimated ratios to compare among proposed alternatives.**

The SSC recognizes that actual ratios of change in PSC to change in halibut fishery limits will be variable over time, reflecting changing fishery selectivity (e.g., relative fraction of O26 vs. U26 in the PSC) and biological processes. Through several iterations of the ABM analysis, these factors, and the variability inherent in them, have become more clear. This variability suggests that a single most likely value cannot represent the year-to-year differences in the relationship between these two sources of fishing mortality. **For this reason, the SSC recommends that the Council compare alternatives (as in Table ES-5) based on a range of plausible ratios (0.0-1.0) without an implicit or explicit likelihood assigned to each.** The SSC suggests that since O26 is deducted at a rate of 1.0 in the annual halibut calculations, this would be a logical upper bound in the case that all PSC in a particular year was O26. U26, calculated to have an effect on halibut yield that is greater than 1.0 is deducted from individual IPHC areas in proportion to stock abundance, for which recent historical values have been in the range of 20% for the sum of the BSAI areas. Thus, ratios from 0.0-1.0 should logically encompass a sufficiently broad enough range for comparison of the alternatives that is consistent with recent management.

In this iteration of the analysis, the SSC appreciates the Working Group’s responsiveness to the Council’s revised Purpose and Need statement and, in particular, the articulation with competing objectives of the National Standards provided in Section 7 of the document. In considering whether the analysis is adequate to allow the Council to understand the impacts of the alternatives, the SSC’s role is to consider these with emphasis on NS2 (Best Scientific Information Available; BSIA). It is worth noting that the analysts concluded that the information in the DEIS analysis represents the most current, comprehensive set of information available to the Council and is therefore the BSIA. Public testimony highlighted concerns about the degree to which the simulation model represents the BSIA. The SSC concurs.

The SSC noted that guidance regarding the evaluation of BSIA is presented in a publication entitled “Defining and Implementing Best Available Science for Fisheries and Environmental Science, Policy, and Management” (Sullivan et al. 2006), which is very helpful. In particular, the use of conceptual and simulation models for informing management by providing an objective exploration of possible consequences and risks associated with alternative scenarios. The closed-loop simulation is presented here as contextual, but used prescriptively in the look-up table process. Key factors such as weight-at-age were fixed for computational efficiency and to focus on alternatives. This approach is understandable but runs counter to the contextual use of the closed-loop simulations. **As currently employed, the SSC finds that the simulation does not provide an objective exploration of possible consequences and risks associated with the alternative scenarios before the Council.**

Despite these issues with the current analysis, **the SSC recognizes the value in performing closed-loop simulation analyses for informing decision-making. The concerns noted here should not be taken as**

**discouraging of this type of analysis. The SSC recognizes the efforts of the working group throughout this process.**

#### *Revenue impact estimation*

Revenue impacts to both the A80 sector and the directed halibut commercial fishery sector are estimated in the DEIS in Section 5.5. Briefly, a resampling approach is used to estimate the revenue impacts on the A80 sector, whereby observed hauls from previous years (2010-2019, minus 2015) are sampled from the empirical distribution, and the cumulative sum of groundfish catch and halibut mortality are compared against groundfish catch and halibut PSC limits, respectively. Once either of these two limits is reached, sampling stops and revenues from groundfish catch are calculated. To calculate revenue impacts to the directed halibut commercial fishery sector, the analysts used the estimated relationship between PSC limits and projected BSAI directed halibut catch limits from the closed-loop simulation to calculate potential changes in directed halibut catch resulting from changes in the PSC limit.

The SSC reviewed the analysis of revenue impacts of halibut PSC limits to the A80 sector in the October 2020 meeting and made several recommendations for how the analysis could be improved. The SSC recognizes that the analysts have, by and large, addressed each of the SSC's comments, and finds the analysis to be much improved, with a few caveats outlined below. The SSC has not reviewed the analysis of revenue impacts to the directed halibut commercial fishery sector before, and finds the analysis to be less compelling (see more detailed comments below).

More generally, the SSC cautions against making any comparison of the revenue impacts across the two sectors to form a basis for decision making in regards to this action. Even if the revenue impacts to each sector were estimated with certainty (which they are not), a comparison of such revenue impacts is not equivalent to a comparison of the value of such impacts. The analysts note several reasons why comparing revenue impacts across sectors is likely inappropriate. First, the A80 sector revenues are measured in wholesale value while the directed halibut fishery sector revenues are measured in ex-vessel value. Second, all revenue impacts are measured in gross revenues and do not consider costs, which is a critical consideration given the significant differences in the operational scale of the two sectors. Lastly, the revenue impacts do not explicitly consider the broader contributions that each sector makes to the economies of Alaska and other parts of the US. **The SSC concurs with the analysts' assessment of the inappropriateness of comparing revenue impacts across the two sectors and recommends that estimated revenue impacts only be used for comparing across alternatives for a given sector, and not for comparing across sectors.** The SSC is concerned that, in its current form, reporting revenue estimates for each fleet will invite readers to make inaccurate comparisons across fleets, and suggests analysts consider whether it may be better to provide no estimate than a misleading one.

#### *Revenue impacts to the A80 Sector*

The analysts made several revisions and additions to the model used to estimate revenue impacts to the A80 sector. First, in addition to a random resampling procedure, which assumes that the A80 sector would scale down its fishing effort proportionally across the entire year, a stratified random resampling procedure is used to represent a "business-as-usual" benchmark for comparison. The usefulness of this benchmark is that it provides an upper bound on revenue impacts, conditional on the environmental conditions in which they are estimated, since the A80 sector would presumably only deviate from a "business-as-usual" strategy if it improved profitability. Second, the analysts also calculated revenue impacts across alternatives relative to the status quo, greatly improving the comparison of impacts across alternatives. Finally, the analysts included two additional "year-combinations" within the random resampling procedure to represent a "best-case" scenario, in which revenues are high and PSC is low (2017-2018), and a "worst-case" scenario, in which revenues are low and PSC is high (2013-2014). **In general, the SSC finds that these additions greatly improve the DEIS.**

While the random and stratified-random resampling procedures result in different magnitudes of revenue impacts, the analysts conclude that differences between the two approaches are minimal when making comparisons across alternatives. There are, however, two important exceptions to this conclusion. First, as the analysts point out, there are differences in the estimated relative impacts at lower PSC limits (e.g., for PSC limits 960 mt and 1047 mt, Table 5-6)—namely, the stratified random sampling approach produces larger relative impacts than the random sampling procedure. This is not unexpected, as low PSC limits are precisely when these two approaches would be expected to deviate—as PSC limits decrease, observations from the stratified-random-sampling approach are increasingly concentrated in the beginning of the year, resulting in a sample that is less comparable to the sample generated from the random-sampling procedure. Second, even when the means are similar between the two approaches, it appears that the variance of revenue impacts tends to be larger under the stratified-random-sampling approach. Based on public comment from the October 2020 meeting, the variance of the impacts is also important to consider. For these reasons, the SSC finds the stratified-random sampling procedure to be more representative of an upper bound for revenue impacts. The random sampling procedure should instead be viewed as an estimate of revenue impacts should the A80 sector change their fishing operations to proportionately adjust their fishing effort across the year in response to binding PSC limits.

The SSC also finds section 5.5.2.3 of the DEIS to be an adequate discussion of the important assumptions that underlie the analysis and their implications for interpreting the estimated revenue impacts. The analysts correctly note that the choice of dataset used for the resampling procedure is the most important factor in determining the estimated revenue impacts. Thus, perhaps the most important question for this analysis is: *which dataset is the most relevant for estimating revenue impacts that could result from this action?* It is important to note that each year of data represents a host of different factors, including environmental conditions, markets, fishing behavior, sampling procedures (e.g., deck sorting), etc. It seems reasonable that for estimating short-run revenue impacts, the most recent years of data are probably the most relevant. However, it is important to note that deviations in any one factor would likely result in revenue impacts that differ from those predicted from this analysis. This is particularly important to consider given the lack of correlation between A80 halibut encounter rates and the halibut abundance indices, which means it is equally likely that for any given combination of survey states, the A80 sector could face high or low halibut encounter rates. Thus, the range of revenue impacts may be considerably larger than those estimated and reported in the analysis. Finally, while the revenue impact estimates from the stratified-random-sampling approach may represent an upper-bound, the extent to which the A80 sector can adapt their fishing behavior in response to PSC limits is largely unknown.

As noted above, an important consideration in the efficacy of the look-up tables considered under this action, and their potential impacts on A80 revenue, is the degree to which halibut abundance indices reflect halibut encounter rates experienced by the A80 sector in any given year. The SSC has previously expressed concern over the possibility that PSC catch is independent of the abundance indices (see the October 2019 and October 2020 SSC Reports). **The SSC finds the current DEIS to fall short in its consideration of this possibility, and recommends that the DEIS be revised to include more empirical evidence to clarify this issue.** The existence of a positive relationship between the halibut abundance indices and A80 halibut encounter rates is a key premise underlying this action. In the event that this relationship is in fact nonexistent (or negative), additional options that allow for flexibility to smooth out PSC catch across years, such as the rollover considered in Option 4, become increasingly relevant.

#### *Revenue impacts to the directed commercial halibut fishery sector*

The analysts use the change in BSAI directed halibut catch per change in PSC limit, as predicted by the closed-loop simulation model, to estimate potential catch and revenue impacts in the directed halibut commercial fishery sector. The analysts consider the median, minimum, and maximum changes in BSAI directed halibut catch and PSC limits over the simulated years 2021–2030. These ratios are then used to convert the changes in the PSC limit under consideration in this action to changes in the directed halibut

fishery catch limit (Tables 5-7 and 5-9) and revenues (Table 5-8).

As noted above, the SSC does not recommend using the closed-loop simulation model to estimate potential changes in the directed halibut catch per change in the PSC limit. Instead, the SSC recommends exploring the potential impacts on directed halibut catch limits (as in Table ES-5) using the plausible ratios of change in PSC to change in halibut fishery limits (0.0-1.0) discussed above. The SSC also notes that if the impacts on directed halibut catch are converted into impacts on revenue, such revenue impacts should be used only to compare across alternatives for the directed halibut fishery sector and not be used for comparing revenue impacts among sectors.

### **Other comments**

The SSC notes the importance of the current analysis and alternatives covering all of the BSAI (IPHC Areas 4A, 4B, and 4CDE) and previous concerns focused primarily on the directed halibut fishery in IPHC Area 4CDE specifically. Small geographical shifts in the groundfish fisheries that move PSC from one IPHC Area to another (e.g., 4A to 4CDE, the boundary representing a contiguous fishing ground) are not addressed by the current alternatives or accounted for in the analysis but can have large effects on the halibut mortality limits set for a single area. This may be particularly important in terms of year-to-year variability in directed halibut fishery mortality limits and in the perception of the scale of impacts relative to the directed fishery limits in Area 4CDE specifically. **The SSC recommends additional discussion be added to the document on the interannual variability in PSC use among IPHC areas and how it has and may affect directed halibut fisheries.**

The SSC notes that the Council has framed the lookup tables for each alternative for evaluation in terms of absolute levels for the two indices of halibut abundance, the IPHC modelled setline survey index and the Bering Sea trawl survey. **The SSC strongly cautions against using indices of abundance couched in absolute units for lookup tables.** The IPHC's survey index is based on a spatio-temporal model, meaning the scale of the entire time series can change during any update to the data or modelling methods. This could lead to unintended and changing relationships between the scale of recent years, the status quo and the specified absolute levels in the table. Specifically, the state of the PSC lookup value could change location in the tables due to methodological changes rather than actual changes in the survey observations. Similarly, model-based estimators are now used for both Pacific cod and pollock in order to include the northern Bering Sea as the distributions of these species shift northward; a similar approach for halibut would lead to model-based estimators on both axes of the lookup tables. The SSC notes that the analysts have cautioned against using absolute indices from the beginning of halibut ABM and used primarily relative indices in their earlier alternatives. **The SSC recommends treating the indices of abundance as relative values compared to a specific year (or years) in order to eliminate this potential scaling problem and ensure that future use of the tables remains consistent with their intent at the outset.**

The SSC also noted disagreement over the PSC mortality estimate for 2015, and **recommends that the analysts verify the PSC mortality estimate for 2015 and correct all tables and figures in the revised draft, as needed.**

### **Social Impact Assessment**

The SSC recognizes the detailed analysis provided in the Social Impact Assessment including the changes made to align with the updated Purpose and Need statement as well as SSC comments from October 2020. **The SSC appreciates the concise table identifying changes made since the most recent review.** The SIA contains the information necessary to understand which communities are engaged with the A80 and directed halibut fisheries, through the harvest, service and processing sectors. The new sections on social justice provide information that allows readers to take into account potential disproportionate impacts on low-income or minority populations.

**The SSC recommends that NOAA staff consider revising the forms and/or process for completing Product Transfer Reports, perhaps requiring a single unit of measure, to reduce the number of errors and make those data available for future analyses.**

### **Final comments**

The SSC notes that, although both the DEIS and the SIA are narrowly focused on the fisheries and communities directly engaged in the BSAI groundfish and halibut fisheries, potential direct and indirect effects of the alternatives also impact fisheries outside the BSAI. Specifically, unlike the groundfish FMPs which clearly delineate harvests in the BSAI and GOA, in the management procedure used for halibut, like that the Council uses for sablefish, all areas explicitly depend on the mortality that occurs in the BSAI.

The SSC recognizes that this action was motivated by limitations in the Council's existing approach to managing halibut PSC. The current understanding of dominant mechanisms underpinning halibut stock dynamics (recruitment and size-at-age) is poor and confounds the ability to predict future states of the halibut stock and the associated implications for halibut PSC management. In fact, these knowledge gaps are motivating a growing body of research (e.g., halibut reproductive biology, realized outcomes of post-discard survival, implication of length-based directed fishery harvest policy on sex ratios, spatial structure of halibut growth performance, etc.) that is likely to substantially change our understanding of these processes going forward. In addition, the SSC's previous reviews and public testimony have shown that PSC encounters in the A80 fishery are spatially and temporally localized, are not strongly correlated with either index of abundance, and that the localized impacts on the directed fishery allocations and associated communities are strong and difficult to predict. These issues were highlighted in public testimony. Additionally, both the A80 and directed fishery fleets must contend with myriad other policy and environmental factors that influence when and where they fish. Fleet perceptions of, and responses to, environmental and policy changes and uncertainty (adaptive capacity), PSC in particular, is also an area of active research (e.g., Murphy et al. 2020 work with the pollock industry, NPRB project # 2013).

Given the substantial uncertainties in fundamental aspects of halibut biology and ecology, broad-scale changes in ecosystem drivers and resultant shifts in A80 target species distributions, and realized and future A80 halibut encounter rates, the SSC concludes that precaution is embodied in the use of a more straightforward PSC specification approach (in this analysis, the lookup tables) coupled with an explicit plan for performance re-evaluation and program adaptation. The latter is not discussed in the DEIS. Therefore, **the SSC recommends that the Council consider how and with what frequency an adopted alternative would be re-evaluated in the future, what metrics would be tracked, and what the process for amending this program would be.** This could be achieved by establishing a re-assessment process similar to the review cycles in place for the IFQ Program and EFH, as well a suite of specific performance standards consistent with the Council's goals and National Standards. In providing these examples, the SSC is not advocating for a 5-yr review cycle, but instead is recommending that the Council consider adopting an explicit and transparent adaptive process to systematically refine the Halibut ABM program moving forward.

Finally, the SSC recognizes that this action has been challenging from the start, as evidenced in the extensive public testimony provided by stakeholders. **The SSC encourages the Council to examine lessons learned during this process, and consider ways to work toward improving the efficacy, transparency and consistency in Council PSC actions going forward.**

**The SSC recommends that both the DEIS and SIA move forward for final evaluation after incorporating the recommendations and addressing the comments provided in this review.**

## **D-5 Salmon Genetics Report**

The SSC received presentations on published and draft reports on the genetic stock composition of GOA

and BSAI Chinook and chum salmon prohibited species catch (PSC) from Chuck Guthrie (NOAA-AFSC) and Chris Kondzela (NOAA-AFSC). Presentations on leveraging new technologies to improve deliverables and an overview of updates to the bycatch genetics workflow were also provided by Wes Larson (NOAA-AFSC) and Patrick Barry (UAF-CFOS). Public testimony was provided by Julie Bonney (Alaska Groundfish Data Bank).

The SSC thanks the presenters and the authors of the salmon bycatch stock composition reports. The SSC also appreciates the effort to catch up on analyzing genetic samples and drafting summary reports, especially given the challenges presented by recent personnel transitions in the genetics program at the Auke Bay Laboratories (ABL) and the COVID pandemic.

Current genetics reports summarize the 2018 and 2019 stock composition estimates for Chinook and chum salmon caught in the Bering Sea pollock fishery, the Bering Sea non-pollock CP trawl fishery, the GOA pollock fishery, and the GOA rockfish CV trawl fishery and add to datasets developed over the past decade. As noted in the 2019 SSC report, the sampling programs have matured over the years and likely provide a representative sample of salmon bycatch occurring in both the Bering Sea and Gulf of Alaska fisheries, even though sampling designs differ among the fisheries. An important component of these reports is the analysis of temporal and spatial patterns in stock composition of the bycatch. With several years of these analyses being completed, patterns emerging in the stock composition estimates, and in stock-specific estimated numbers of fish caught, potentially provide information to develop targeted management actions. However, as exploration for patterns in the data continues (e.g., through spatio-temporal modeling), the SSC encourages the analysts to be mindful of whether the current sampling designs are adequate, or sampling efforts are efficiently distributed, to meet the needs of analyses at finer spatial and temporal resolutions. Similar considerations should be made if the fishing fleet behavior changes in the future. The SSC recognizes that any changes in sampling design will be contingent upon current observer sampling duties and workload, and that coordination between the analysts and FMA will be essential. Furthermore, changes in sampling design should not compromise other management objectives, such as accurate accounting of PSC.

The datasets that have been assembled thus far provide a rich source of information that has the potential to answer a variety of questions about not only stock composition of the bycatch and impacts on salmon stocks at a regional level, but also about what may be driving variation in bycatch rates. They also contain important information for regulatory analyses. However, as noted by the SSC in the past, the linkage between information presented in the reports and PSC management remains unclear. **The SSC reiterates its suggestion that a clear set of management objectives that take full advantage of the data be developed.**

The SSC noted that an important component of understanding the impact of bycatch on specific stocks is an estimate of the run size, and suggests that the authors explore providing estimates of reporting group run size, particularly for Chinook salmon, to provide context for the estimated bycatch proportions and numbers.

The SSC appreciated the presentations by Dr. Larson on leveraging new technologies to improve deliverables and the overview of updates to the bycatch genetics workflow by Dr. Barry. It was encouraging to hear of the efforts being made to increase efficiencies in the lab, such as switching to more cost-effective and efficient chemistries (GTseq) and switching from a microsatellite baseline to a SNP baseline for chum salmon, which will also improve workflow. The improvements in the data analysis pipeline that are currently being implemented – moving from BAYES software to *rubias* and integrating the genetics data into the AKFIN database, which will link observer records to genetic and age information – are also encouraging. These efforts should not only lead to faster turnaround between receiving the samples at ABL and completing analyses, but also make data analysis more efficient and free up the analysts' time to pursue



new advanced analyses. Such analyses, as suggested by the presenters, include more refined spatial/temporal analyses to understand long-term trends, exploration of the influence of environmental variables on bycatch trends, estimates of the distribution of stocks of concern, and leveraging of this information to better facilitate the avoidance of specific stocks.

Another development presented to the SSC was an update on the R Shiny interactive web application. This will be a publicly accessible graphical user interface that will improve ease and flexibility of data exploration and the visualization of temporal and spatial aspects of salmon bycatch genetic data. It was made clear by the presenters that no confidential data would be accessible through this application. Allowing users to interactively explore the data has great benefits, but as suggested by the SSC in the 2019 report, a means of tracking user statistics and soliciting feedback would be useful. Collecting such information will help with identifying user needs and interests, as well as provide information needed to refine the application to maximize its utility and that of the data being collected.

The SSC notes that some of the previously described analytical products are responsive to recommendations from the SSC's April 2019 salmon bycatch workshop and its June 2019 report. The SSC looks forward to receiving updates on the progress and implementation of these efforts and the results of future analyses. **The SSC requests that the next time this agenda item is taken up, a complete list of recommendations from the 2019 workshop and from recent SSC reports, with a description of progress being made on each of them (if still relevant), is provided.**

Dr. Larson indicated that a potential benefit of the advancements being made at ABL is streamlined reports that are available sooner. To that end, the SSC questioned whether the salmon genetics bycatch reports, in their current form, need to be presented annually rather than biennially or triennially as with some stock assessments. It was suggested that perhaps a brief annual "report card" could suffice unless there are significant changes that need to be reported or there are specific issues and actions in front of the Council.

Finally, the SSC extends its gratitude to the Alaska Groundfish Data Bank for their considerable efforts over the past several years to census the Chinook bycatch in the GOA CV rockfish trawl fishery and collect tissue samples for genetic analysis and otolith samples, check for adipose fin clips, and wand every fish for coded wire tags. The data provided have been very useful and informative. The SSC regrets to hear that the 2020 season will be the last year that this extensive sampling will be conducted.

## **D-6 Economic Data Report Workshops and Social Science Planning Team Report**

The Council is in the process of considering revisions to its Economic Data Report (EDR) programs and currently has outstanding motions on EDRs from April 2019 and February 2020. Council requested its Social Science Planning Team (SSPT) assist with the review and revisions to the EDRs, while incorporating opportunities for public input. The SSC received an overview of EDR programs, Council motions on EDRs, and recent meetings regarding potential revisions to EDRs by Sarah Marrinan (NPFMC). Katie Latanich (consultant and workshop facilitator) provided a presentation on 2020 stakeholder workshops and Steve Kasperski (NOAA-AFSC and SSPT chair) provided a presentation on the March 2021 SSPT report concerning a process for recommending changes to EDRs and an overview on the scope and function of the SSPT, Community Engagement Committee (CEC) the Local Knowledge, Traditional Knowledge, Subsistence (LKTKS) taskforce.

The SSC commends the SSPT, NPFMC staff, NMFS staff, stakeholder participants and all who contributed to the EDR workshops, SSPT meetings, and analyses to this point. Evaluating how best to amend and adapt the EDRs to best address the two outstanding Council motions and the various needs for these data is far

from a simple task. The SSC appreciates the work and the thoughtful approach of the SSPT in breaking down the components of the Council motions, framing key questions, and holding virtual EDR workshops during the COVID-19 pandemic to provide the opportunity to receive feedback from industry and to provide a time for dialog between SSPT members and stakeholders. These conversations are essential to aligning and improving processes, and this was an important unmet need prior to the establishment of the SSPT. The intention for the stakeholder workshops and SSPT meetings was to hone questions based on broad concepts of economic data value and burden into specific changes that could be included in an alternative set for Council consideration.

The SSC recognizes the struggle between the desire for more data to evaluate uncertain future circumstances and the potential that data may not be fully utilized. The struggle has been ongoing, and the balance depends on how data collection is designed and what questions are trying to be answered. When the SSPT discussed EDRs at its November 2019 teleconference, the SSPT identified a need to map data collections to current and foreseeable Council needs. The SSC appreciates the approach of the SSPT and agrees that taking a step back to examine what data are needed for what questions and subsequent analyses is necessary. Only by doing this can areas where more data are needed be identified, duplicative data collection be eliminated, and ways to fully utilize data be identified. **The SSC fully supports the collection of socio-economic data to meet National Standards and best available science requirements while avoiding duplicative data analyses, eliminating collections of data that are not used, and working to limit the burden of such data collections on stakeholders.**

What and how data are collected directly impacts the questions that can be addressed, the analyses that can be conducted, and conclusions that can be made. **To collect and utilize data efficiently, the questions for which the data are collected need to be identified first.** When designing sampling or census programs there are four common steps:

- (1) defining the questions that need to be addressed,
- (2) selecting performance metrics and analyses to address the questions,
- (3) identifying types of data and amounts of data will be needed to address the questions accurately and efficiently, and
- (4) planning how data will be collected.

When the EDRs were originally developed, the goal was to answer specific program questions and conduct program reviews. The questions that these data are being used to answer (possibly for individual EDRs and definitely across EDRs) have changed to reflect current circumstances and Council programs as implemented, but the data collections have remained the same. This has undoubtedly contributed to the challenge for analysts when not having the data needed for a certain purpose, and stakeholder frustration that the data they are providing are not used more.

Exclusive access to, and use of, public trust resources should carry with it a burden to affirmatively demonstrate that the resources are being used as intended and in the interest of society, here represented by the National Standards and the stated objectives of the catch share programs. That said, the data collected should be sufficiently aligned with the information businesses typically maintain for their operational purposes, and that each data element requested provides probative, transparency or analytical value worth its incremental cost. As these programs have matured, it is clear that most EDRs have components that would not meet this test.

However, the demonstrated utility is not necessarily only that received by industry. The EDRs are essential

tools and reducing them to the point that they would limit the Council's ability to meet regulatory requirements to monitor catch share programs against their objectives as articulated at inception of the program would be problematic. When viewing the need versus the cost of these data, it is useful to view the value of this information in the context that EDRs place a burden averaging \$47/day across all programs, whereas biological observers cost over \$1000/day.

The SSC believes that there are three primary reasons that the goals for the EDRs need to be revisited by the Council. The first two are *specific to the individual EDRs*. The first is to determine whether there are different considerations for a limited access privilege program (LAPP; e.g., Crab EDR, Amendment 80 EDR) when it is being reviewed for the second or third time since implementation. The second is to consider the current relevance of the EDRs (e.g., is the Amendment 91 EDR duplicative of the Incentive Plan Agreement reports? Is the GOA trawl LAPP no longer a potential/pending initiative?). Therefore, the **SSC supports the SSPT recommendation that the Council revisit the purpose and need statements of EDR programs to see whether the goals of each of these individual data collection programs have changed and to clarify data collection objectives.** The SSC recommends ensuring EDR revisions are responsive to SSC minutes on data gaps identified in past quinquennial reviews, with an awareness that data needs may be evolving to reflect new social justice considerations.

The third reason that the SSC recommends the goals for the EDRs be revisited by the Council is with regard to *what information is needed across EDRs*. The EDR collections are being used for analyses beyond the specific program questions and program reviews for which they were designed. The datasets have been used for Council decision-informing analyses, Economic SAFE reports, SAFEs, ESPs, ESRs, ACEPO, and may also be useful for risk tables. However, the EDR data collections were not designed to be consistent across programs. So, the data used for unanticipated uses are currently piece-meal (e.g., there is a mismatch in the data needed for many Council decision-informing analyses and what exists) and inefficient (i.e., there is data collected through the EDR program that is either duplicative of other data collections or may not be used). **Therefore, the SSC joins the SSPT in recommending the Council explore a more holistic program for collecting baseline socio-economic data as raised in Issue 2 of the Council's April 2019 motion. However, before standardizing elements across EDRs as suggested by the SSPT, the SSC recommends the Council address the larger issue of what questions the Council needs to answer across all fisheries.** Identifying questions that the Council will need a holistic program to address will provide the basis for scientists to develop necessary performance metrics and analyses, to identify what data are needed, and to recommend options to the Council for how the data can most effectively be collected (refer to four steps outlined above). The key to designing an effective data collection program is identifying whether the EDRs are the best place to collect data for the questions the Council wishes to address. It was acknowledged in the SSPT report that the EDR is not the only structure that may work for gathering data on crew, demographic variables and other social information that may be valuable input to the process and that it may not be the right tool to fill all social and economic information gaps. However, it is only after the Council identifies questions to be addressed and the fisheries from which data are needed that scientists can design a program to collect data across fisheries that currently have EDRs, all catch share programs, or all fisheries. If specific decision-informing analyses are not yet known but the Council wishes to have socio-economic data on some or all fisheries to provide support for potential analyses in the future, then scientists can design a sampling/census program to collect commonly used data.

**The SSC recommends the Council identify the needs for broad data collections across fisheries before discontinuing specific EDR data collections.** What data are collected for EDRs now, while perhaps not necessary to answer specific programmatic questions or to support program reviews, may be identified as valuable time-series components of broad data collections within or across fisheries. For instance, while the LAPP that motivated the GOA Trawl EDR is not currently under consideration, this fishery is the focus of numerous actions to address issues threatening participation in the fishery such as observer deployment plans and expansion of EM. The GOA Trawl EDR has proven essential to adequate analysis in support of

these actions, and this justifies, if anything, a broader EDR since management of the fishery is evolving without a particular LAPP purpose and need.

The SSC notes that the process for implementing a data collection program will take time, will be an iterative process, and will require compliance with the Paperwork Reduction Act. As a result, there is a need for the Council to address data collections as soon as reasonably possible. The SSC appreciated the iterative process presented by Dr. Kasperski and suggests that this or a similar process would be useful as the Council works to revise socio-economic data collections.

The SSC recognizes that the need for broad collection of social and economic data is not a challenge for the NPFMC alone, but is a challenge faced by other SSCs and other Councils. The SSC therefore recognizes that SSCs and Councils may want to discuss this at a national level. The SSC heard a description of the national process to create a library of questions to be pre-approved by OMB for application in EDRs for different fisheries. If this library is sufficiently robust that questions can in fact be applied across a range of fisheries and management purpose and need statements, this is an excellent starting point for harmonizing the collection of synthesized data. However, the SSC recognizes that most fisheries and programs are idiosyncratic and that using standard questions will imply some tradeoffs with respect to ease of interpretation and data coverage. If a library of questions is developed, the SSC requests the opportunity to review.

**The SSC encourages the collection of broad information across fisheries for Council decision-informing analyses and recognizes that a framework for doing so is a critical first step. The need for such a framework and data collection for both economic and socioeconomic data are highlighted in the top 10 research priorities recommended by the SSC at this meeting.** In addition to revisiting the purpose and need for individual EDRs and considering holistic changes to the EDR program, **the SSC finds the small changes suggested by the SSPT for each EDR within the existing purpose and needs are valuable and suggests that these be considered by the Council.**

The SSC appreciated the overview comparing SSPT, CEC, and LKTKS taskforce functions and scope. This was helpful for the SSC's understanding the roles of each and how they connect and will be helpful for avoiding duplication of roles and responsibilities between groups.

## **D-7 Research Priorities**

Jim Armstrong (NPFMC) and Dana Hanselman (SSC member, NOAA-AFSC) led the discussion on reviewing and updating the NPFMC research priorities for 2022 – 2024. Public testimony was provided by Megan Williams (Ocean Conservancy) and both public testimony and written testimony were received from Lauren Divine (Ecosystem Conservation Office, Aleut Community of St. Paul Island) and Julie Raymond-Yakoubian (Kawerak Inc.). Public testimony provided support for the importance of Council research priorities and ensuring the process was transparent and formalized. Additionally, there was testimony on the need for documentation of the process with clear on-ramps for stakeholders to submit and/or comment on research priorities.

First and foremost, the SSC would like to express appreciation for the work done by the PTs and NPFMC staff to review the database and to develop their priority lists. The input provided by the PTs is critical to the research priorities process.

In 2011, the SSC and Council established procedures for conducting “multi-year research priorities for fisheries, fisheries interactions, habitats, and other areas of research that are necessary for management purposes” in accordance with the Magnuson-Stevens Act. At that time, the NPFMC determined that research priorities were to be reviewed annually at the Council's June meeting. Prior to Council review, the Council's PTs (GOA and BSAI Groundfish, Crab, and Scallop) would review existing research priorities

and make recommendations for modifications or additions to the list, as needed. From 2011 to 2018, the Council updated research priorities annually at their June meeting. In 2018, a new process for review of the research priorities was executed. This change stemmed from a proposal from a working group of SSC and Council members that was reviewed by the SSC in April 2018. In this proposal, the annual curation of the database would be conducted as normal, with consideration given to the PTs suggested changes. The proposal also indicated that the Council would include a paragraph indicating that continuation of *Critical Ongoing Monitoring* projects should continue as the highest priority. In addition, the subgroup requested that the SSC develop a top ten list of research priorities for 2018 from the priorities identified as Urgent or Important. This top priority list would be developed from a combination of sources. First, the PTs would identify three to five top priorities relevant to their particular team that would be candidates for the top priority list. Second, the SSC would additionally consider any priorities not reviewed by any PT, including those relevant to halibut, marine mammals, seabirds, and social science topics. The intent of this top priority list was to both reduce the review burden on the Council and to improve communication of these highly relevant priorities to external funding sources and the general public. In February 2019, the Council moved review of research priorities from an annual to triennial schedule. This change recognized that the MSA does not require annual review and reflected the Council's desire to streamline the overall review process.

The Council's research priorities consist of a wide range of science-based needs and interests that support or improve the Council's ability to provide stewardship over marine resources offshore Alaska and help provide for the sustained participation of fishing communities. Specific research topics are organized online through a publicly accessible database that can be queried for changes in research status. It can also be downloaded in its entirety for ease of access to detailed information about all of the Council's research needs. Research topics are ranked through four priority categories: *Critical ongoing monitoring*, *Urgent*, *Important (near term)*, and *Strategic (long-term future needs)*. These priority categories have specific definitions that emphasize correspondence of research to the Council's time horizon of management concerns.

Under the revised triennial schedule, the SSC and Council were tasked to review proposed research and develop a "top ten" list of research priorities that highlight relevance to Council needs. The SSC was also tasked with completing a thorough vetting of *Critical Ongoing Monitoring* needs and longer-term *Strategic* research needs.

In February 2020, the SSC held a workshop to discuss research priorities. This workshop specifically focused on *Critical Ongoing Monitoring* and *Strategic* research. While a thorough vetting of *Critical Ongoing Monitoring* research priorities was completed at this meeting, there was not time to review all *Strategic* priorities and review of these priorities was postponed and will be completed at the June 2021 meeting. After the February 2020 workshop, it became clear that the existing collection of research topics contained in the database ranged widely in the level of detail and specificity, and a subcommittee was formed to address potential streamlining of the process.

The SSC subcommittee provided a number of recommendations during this April 2021 meeting in a draft document to improve the research priorities review process. **This draft document will continue to be refined with new input from this meeting and will be reviewed and finalized at the June 2021 meeting.** The initial recommendations of the subgroup and SSC responses follow.

### **Critical Ongoing Monitoring research**

Research priorities designated as *Critical Ongoing Monitoring* are of the highest priority level for the NPFMC. These monitoring activities create and maintain indispensable data that substantially contribute to the understanding and management of fish populations, fisheries, and the communities dependent upon those fisheries. Discontinuation or diminishment of the research that provides these datasets would leave a significant gap in the science needed to support sustainable and successful fisheries management in the North Pacific. The NPFMC and the SSC continue to provide the utmost support for these priorities.

Going forward, the SSC recommends not highlighting and reviewing individual *Critical Ongoing Monitoring* research unless there is a proposal to move a research priority into this category or to remove research from this category. The SSC views these priorities as the most important science products produced by the various agencies and partners for scientific management of fisheries. The SSC expects these research needs to persist indefinitely. The SSC requests an opportunity to comment if any of these activities were to be discontinued. An inclusive narrative of the scope of this category will be included in the June report.

### **Top 10 Research priorities**

A primary purpose of the NPFMC research priorities is identifying to agencies and funding partners which projects are considered to be most needed to inform the NPFMC management process. The SSC believes an effective way to highlight future research priorities is to produce a “top 10” list. Since the PTs and SSC have already reviewed all of the projects in the database, the subcommittee recommended that the SSC should focus on what has been previously identified as *Urgent* (2-3 year time frame). This list should consist of research identified by the PTs and SSC as *Urgent*, but has yet to become *underway*. The SSC agreed that this approach was a good idea, but in practice many of the projects in this category appeared to be out-dated or too narrow in focus for the top ten. **The SSC recommended that, at a minimum, projects in the “partially underway” category also be considered as these may represent projects that got started (e.g., a pilot project) but are in need of further funding to fully execute. The SSC recommends that the starting point of the top 10 should be the previous top 10 list and the SSC should evaluate whether they are still the most relevant or should be replaced by either new projects proposed by the PTs or other existing research priorities.**

### **SSPT research priorities**

Thus far, the SSPT has not been recommending new research priorities separately. The SSC discussed the role of the SSPT and whether they should also be one of the proposing and vetting bodies that contribute to the process. The SSPT originally did not wish to be part of the research priorities process as they wished to focus on identifying data gaps and developing their mission and vision. **However, as the SSPT matures and data gaps are identified, the SSC recommends that the SSPT review and forward research priorities related to socioeconomic and human dimensions research for the next triennial review.**

### **FEP research priorities**

The Bering Sea Fishery Ecosystem Plan (FEP) has its own list of research priorities and the SSC will review and categorize them, add them to the database, and consider them for the Top 10 list. The SSC reviewed the current list of FEP priorities and noted that they were long-term, strategic priorities. **The SSC recommends that the currently identified FEP priorities be added to the database as *Strategic*.**

### **Strategic research**

The SSC subcommittee did not address the process for reviewing *Strategic* research. It was discussed that *Strategic* research, since it is longer term, would rarely appear on the top ten list, and needs less frequent review. **The SSC recommends that a high-level narrative that captures the priorities contained in this category be developed for the June 2021 document similar to that developed for *Critical Ongoing Monitoring*.**

### **New research priorities**

The SSC reviewed five proposed new research priorities, of which two were identified as *Urgent* by the GPTs, two were recommended as *Important*, and one was listed as Pending. The SSC supported the PTs’

recommendations, and also flagged #712 regarding biological collections and the expansion of electronic monitoring (EM) as having potential for the top 10 list. Project #651 (thermally marked chinook otoliths) remained in pending status as the SSC did not feel they had enough information to make a recommendation for changing the status.

### **Development of the 2022-2024 Top 10 list**

The SSC subcommittee process for the development of the list was relatively unstructured in a deliberate attempt to conduct the selection with the participation of the full SSC. The subcommittee had recommended that a top 10 list be developed that included only *Urgent* priorities that had a “No action” status. After considering this list and much discussion, the SSC reverted to using the previous top 10 list as a starting point, and suggested additions, revisions and omissions. Although the SSC has challenges keeping the list at or near 10 priorities, the SSC recognizes that keeping the list constrained is important. **The SSC also suggests that an “year-added” field be added to the top 10 list so that it is known how long a priority has remained on the list if there is rollover from year to year.**

**The SSC recommended a new top 10 for the next 3 year cycle (Table 1).** Four priorities from the last cycle were retained that were still listed in the CPT and GPTs top priorities (148, 163, 189, and 592). The SSC omitted two priorities from the list (179 and 182) because they appear to be already well underway in current Council processes (e.g., periodic reviews of programs and halibut ABM) and are now fairly dated. Priority 491 was also omitted as halibut ABM appears to be nearing final action and other research on halibut actions can be subsumed by Priority 431. Priority 365 was also merged into Project 431. The SSC retained the only priority that related to protected resources (246), which was supported in public comment. Four new projects were added to the top 10 list. One was a new project proposed by the SSC which is to initiate an integrated Norton Sound red king crab project that is to combine communities, management, and assessment dimensions, informed by LKTKS and Climate Change taskforce input. The need for this research has frequently been discussed at SSC meetings, both among SSC members and with the public. A new project proposed by the PTs (712) was also recommended for the top 10 as an *Urgent* priority by the SSC. This priority is to examine further the impacts of the loss of biological data on assessment and management from the expansion of EM. Two human dimensions projects were added to the top 10 that emphasize and expand the collection of socio-economic data (611) and better develop the framework for economic data collection and use (178). Priority 611 is the only priority on the top 10 that is also in the *Critical Ongoing Monitoring* category. The SSC does not feel that this priority is actually underway and recommends highlighting as one of the top 10. For further rationale on the top 10 priorities, see Table 1.

### **Process**

The move to a triennial review has relieved some of the burden of research priority review, but while progress was made by reducing frequency, the SSC has been unable to streamline and improve the process as much as hoped. While the SSC noted the progress at this meeting, members also noted that the complete list of research priorities changes relatively little from year to year. It would be useful to identify some of the oldest priorities to determine if they are still relevant, and it would be helpful to solicit new priorities from stakeholders, SSC minutes, or other sources beyond the PTs. The SSC believes that the process is important (and required) and that with continued development, it can continue to provide tactical and strategic science vision for the North Pacific. **The SSC reviewed a preliminary proposal from the subcommittee on how the process could be improved for the next cycle and recommended this be detailed in the June SSC report.**

### **Additional recommendations**

- **Council staff provide the SSC with a broad 3-year outlook of emerging management issues to help the SSC assess the relevance of research projects.**

- **Improve the priority database by including a “project added date” field and a point of contact for both the Council/SSC and other researchers to find out about progress of a priority.**
- **Council staff consider which non-Plan Team on-ramps could be used or developed to include research ideas for topics from other stakeholders (e.g., marine mammals, seabirds, salmon, communities).**
- **Council staff continue to work on the info-graphic presented at this meeting to show a simplified process and where there are on-ramps for the public.**
- **While the PTs and the SSC could request to add or modify a research project at any time, the SSC recommends the PTs not be requested to review priorities annually but instead synchronize efforts with the SSC triennial schedule.**



**Table 1. Top 10 recommended research priorities for 2022-2024.**

<b>ID</b>	<b>Title</b>	<b>Rationale for Elevation to Top Ten</b>	<b>SSC Priority</b>
148	Spatial distribution and movement of crabs relative to life history events and fishing	Environmental conditions are changing rapidly in the eastern Bering Sea, driving related changes in the distribution of commercial crab stocks. Fishing behavior and life history timing (e.g., reproduction, growth) may subsequently be influenced by changes in crab distribution. The CPT discussed collection of data on distribution and movement relative to oceanographic conditions as critical for the development of the complex models needed to predict future stock abundance, stock boundaries, stock production, and management strategies.	Urgent
163	Conduct routine fish, crab, and oceanographic surveys in the Arctic Ocean	Although fishing is currently prohibited in Alaska’s Arctic waters, the region is changing rapidly and fish or crab populations may expand into or increase locally in the Arctic. Therefore, it is important to conduct routine surveys to monitor changes in Arctic waters.	Important
178	Develop a framework and collect economic information	Addresses the need for a framework for collection of economic information on commercial, recreational, and charter fishing, as well as fish processing, to meet the requirements of the MSFCMA sections 303(a)(5, 9, 13), 303(b)(6), and 303A.	Urgent
189	Develop stock-specific ecosystem indicators and incorporate into stock assessments	To support an ecosystem approach to management in the context of single- (or multi-) species assessments, there is a continued need to develop indicators that link ecosystem variability and changes to variability in growth, survival and recruitment of fish stocks as illustrated by the recent dramatic downturn in Pacific cod. This provides an important avenue for linking ecosystem changes directly to management-relevant reference points such as OFL and ABC.	Urgent

246	Cooperative research efforts to supplement existing at-sea surveys that provide seasonal, species-specific information on upper trophic levels	The pelagic distributions and abundances of top predators (seabirds and marine mammals) provide indicators of the availability of prey, many of which are commercially important species such as pollock or Pacific cod. Thus, knowledge of seabird and marine mammal distributions and abundances can be useful as indicators of ecosystem "health". Also, in some instances, these top predators are inadvertently impacted by fisheries. Thus, knowledge of their distributions can be important for fisheries where impacts may occur.	Important
431	Develop tools for analyzing coastal community vulnerability to fisheries management changes	Predictive accuracy of pre-implementation economic and social impact assessments of proposed fishery management changes (e.g., halibut ABM) would be improved through better understanding of how various dimensions of community vulnerability and resilience can be effectively analyzed and, ultimately, how identified and measured vulnerabilities are likely to interact with the nature, direction, and magnitude of proposed changes to the fishery. An example is the application of genetic tools for tracing the linkages between federal commercial fisheries PSC catch of Chinook salmon and impacts on the use of the salmon resource by communities in western coastal Alaska.	Important
592	Maturity estimates for Bering Sea and Aleutian Island crab stocks	The availability of maturity data from male and female crab is insufficient for use in stock assessment models. Key parameters defining size at maturity, proportion mature at size, and the potential for biennial reproductive cycles are currently uncertain for many stocks. Methods for determining spatial and temporal variability of these quantities are needed to adequately characterize mature biomass.	Urgent
611	Collection of socio-economic information	Collect socio-economic information on commercial, recreational, and charter fishing, as well as fish processing, to meet the requirements of the MSFCMA sections 303(a)(5, 9, 13), 303(b)(6), and 303A.	Critical Ongoing Monitoring

712	Gap Analyses on loss of biological samples due to implementation of EM	Research to determine the effects of loss of biological data collections due to the introduction of Electronic Monitoring (EM). As the use of EM increases in different fisheries, fewer at-sea observer observations and collections are being made which reduces haul-specific data collections. Evaluations of the effects of this on catch accounting estimates and stock assessment are needed.	Urgent
New	Norton Sound Red King Crab case study	Needed to help understand and address urgent stock assessment and management challenges in the NSRKC fishery, including the efficacy of previously instituted community protection management measures through the collaborative involvement of the LKTKS taskforce and the Climate Change taskforce. This research could provide a better understanding of the amount of predation by groundfish on juvenile crab in nearshore areas and other population bottlenecks, and inform management to improve stock condition. What is happening in this fishery involves cross-jurisdictional considerations, points to the need to work with multiple knowledge systems, highlights the intertwined nature of human dimensions and fishery changes (e.g. the effect of climate changes on species distribution and harvest capabilities), and is an urgent matter given the gravity of the changes occurring with the crab population and commercial and subsistence harvests.	Urgent

## D-8 Annual Community Engagement and Participation Overview Report

The SSC received a presentation on the new Annual Community Engagement and Participation Overview (ACEPO) report from Sarah Wise (NOAA-AFSC) and Kate Haapala (NPFMC), with additional information from Steve Kasperski (NOAA-AFSC). There was no public testimony.

The SSC commends the authors on producing a community-level analysis guided by NPFMC management objectives and MSA National Standard 8 for those communities substantially engaged in the federally managed commercial fisheries encompassed by the groundfish and crab FMPs. This analysis, which is designed to be updated annually, is responsive to previous SSC comments on this topic. The information contained in the ACEPO should prove useful for several purposes, including use by Council staff in the preparation of the social and community impact components of FMP amendment and program review analyses, as well as by the public and the broader research community. The community sketches provide nice, consistent, digestible units that help to understand and contextualize how fisheries operate within each community. The SSC recommends that authors pursue increased public accessibility to non-confidential data behind the tables and figures appearing in the analysis to allow for straightforward data downloads as, for example, was possible with the previous online fishing community profiles. The SSC also supports the planned reset and annual updating of the online fishing community snapshots, which are the successors of the community profiles, as those provide additional useful information, such as permit holdings by fishery and by community, that is complementary to the data presented in the ACEPO.

**The SSC recommends that** the authors:

- Incorporate highly engaged communities outside of Alaska in all sections of the document as, for example, the Seattle MSA is the most highly engaged community in multiple federally managed fisheries of the North Pacific. While the community participation indices section and the community participation in groundfish and crab fisheries sections of the document include communities outside of Alaska in their respective tables and figures, the selection of Alaska communities only for inclusion in the community sketches portion of the document creates the impression that the resource is Alaskan and that resource management is focused on Alaska communities, contrary to the federal scope of Council and NMFS resource management.
- Explore disaggregating the At-Sea Processor “community” and attributing the associated revenue to communities of the catcher/processor (or mothership) vessel ownership addresses, consistent with what is done with harvest vessels. Further, explore the use of ongoing AFSC ownership decomposition work to reflect ownership ties to CDQ entities to the extent feasible to improve the analytic utility of ownership attribution to communities or regions.
- Consider disaggregating the fishery tax revenue pie chart slices in the community sketches into the subcategories of local fish tax, state shared fishery business tax, and state shared fishery resource landing tax revenue to potentially allow for additional analytic uses of the data, such as identifying the relative contribution of catcher/processor product transfer related tax revenue.
- Prioritize adding information regarding the sustained participation (or lack thereof) of small communities in federally managed fisheries, where low engagement in absolute terms can be accompanied by locally meaningful levels of dependency. Simple participation indicators such as active vessel and processor counts, for example, when refreshed annually and shown in a time series format could allow red flag indication of changes in patterns of community participation in the federally managed fisheries.

- In the community sketches, add “Minority (%)” to the “Demographics” section and replace “Native Associations & Corporations” with “Federally Recognized Tribal Entities” in the “Social Indicators for Fishing Communities” section. These changes would improve the direct utility for Council analysts and others as minority population data are necessary for Environmental Justice considerations and tribal status is needed for analytic consistency with multiple Executive Orders, a recent Presidential Memorandum (on tribal consultation and strengthening nation-to-nation relationships), and Council intent (as reflected in its recent motion on community engagement). It was suggested that while data on community ANCSA status, regional and village ANCSA corporations, and CDQ group membership are all important, they could perhaps be added to the online community snapshots rather than to the ACEPO community sketches.
- Add a list of recent AFSC publications on community-based topics to the report, which would be useful for analysts and the public.
- Add community dependence indices to the report. The current engagement indices reflect how important the community is to the fishery, but not how much of the economic activity in the community is related to the fishery. This community level dependency information is important to understanding tradeoffs implied by Council actions. The fishery tax revenue information presented in the community profiles provides key information about how fisheries contribute to general fund revenue, which is a solid indicator of dependency. The SSC supports the effort to gather this data, and encourages consideration of decomposing it by FMP, and possibly whether it could form the basis of a sensible dependency index of the same prominence as the engagement indices.

The SSC concurs with the author’s consideration of a next step in the ACEPO development process is an expansion to include other FMPs. The SSC notes that the ACEPO joins a range of social science data products and is relatively evolved. As development continues, if it is necessary to balance workloads across products it is worth considering whether extant products maintain their incremental value in the presence of ACEPO. The SSPT is a valuable resource in considering these tradeoffs.

## **SSC Member Associations**

At the beginning of each meeting, members of the SSC publicly acknowledge any direct associations with SSC agenda items. If an SSC member has a financial conflict of interest (defined in the 2003 Policy of the National Academies and discussed in Section 3) with an SSC agenda item, the member should recuse themselves from participating in SSC discussions on that subject, and such recusal should be documented in the SSC report. In cases where an SSC member is an author or coauthor of a report considered by the SSC, that individual should recuse themselves from discussion about SSC recommendations on this agenda item. However, that SSC member may provide clarifications about the report to the SSC as necessary. If, on the other hand, a report is prepared by individuals under the line of supervision by an SSC member, then that member should recuse themselves from leading the SSC recommendations for that agenda item, though they may otherwise participate fully in the SSC discussion after disclosing their affiliations with the authors. The SSC notes that there are no financial conflicts of interest between any SSC members and items on this meeting’s agenda.

At this April 2021 meeting, a number of SSC members acknowledged associations with specific agenda items under SSC review. Anne Hollowed supervises James Ianelli and is the second-level supervisor of Carey McGilliard (contributing authors of C-2 Halibut ABM). Mike Downs is a contributing author of C-2 Halibut ABM. Curry Cunningham and Dana Hanselman were early contributors to C-2 Halibut ABM, but are not currently involved with this agenda item’s development. Chris Siddon supervises Tyler Jackson (contributing author of C-1 Scallop SAFE and Scallop Plan Team co-chair). Finally, Dana Hanselman supervises Wes Larson, who supervises Chris Kondzela and Chuck Guthrie who prepared and presented D-5 Salmon Genetics.