NORTH PACIFIC FISHERY MANAGEMENT COUNCIL

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SCIENTIFIC AND STATISTICAL COMMITTEE
FINAL REPORT TO THE
NORTH PACIFIC FISHERY MANAGEMENT COUNCIL
February 3rd – 5th, 2025

The SSC met from February 3rd – 5th, 2025 in Anchorage, AK. Members present in Anchorage were:

Franz Mueter, Co-Chair (filling in for Co-Chair Sherri Dressel) *University of Alaska Fairbanks*	Jason Gasper – Co-Chair *NOAA Fisheries—AKRO*	Ian Stewart – Co-Chair *Intl. Pacific Halibut Commission*
Alison Whitman, Vice Chair *Oregon Dept. of Fish and Wildlife*	Chris Anderson *University of Washington*	Fabio Caltabellotta *Washington Dept. of Fish and Wildlife*
Curry Cunningham *University of Alaska Fairbanks*	Martin Dorn *University of Washington*	Mike Downs *Wislow Research*
Robert Foy *NOAA Fisheries—AFSC*	Dana Hanselman *NOAA Fisheries—AFSC*	Brad Harris *Alaska Pacific University*
Kailin Kroetz *Arizona State University*	Andrew Munro *Alaska Dept. of Fish and Game*	Chris Siddon *Alaska Dept. of Fish and Game*
Patrick Sullivan *Cornell University*	Robert Suryan *NOAA Fisheries—AFSC*	Sarah Wise *NOAA Fisheries—AFSC*

SSC members who were absent:

Sherri Dressel, Co-Chair *Alaska Dept. of Fish and Game*	Jennifer Burns *Texas Tech University*

SSC Election of Officers

The SSC re-elected Sherri Dressel (ADF&G) and elected Jason Gasper (NOAA-AKRO) and Ian Stewart (IPHC) as co-chairs for 2025. The SSC also re-elected Alison Whitman (ODFW) to serve as vice chair. Dr. Gasper will chair the April meeting, Dr. Dressel the June and December meetings, and Dr. Stewart the October meeting. Former co-chair Dr. Franz Mueter (University of Alaska Fairbanks) is serving as co-chair at this February 2025 meeting due to unforeseen circumstances. The SSC expresses its sincere thanks for Dr. Mueter's leadership as co-chair since 2022.

SSC Administrative Discussion

The SSC extends a warm welcome to new member Sarah Wise (NOAA-AFSC). Jennifer Burns (Texas Tech University) will be starting on the SSC in April. The SSC is appreciative to the Council for their appointments.

Diana Evans (NPFMC) provided a summary of the NPFMC general code of conduct, an overview of the agenda items at this February 2025 meeting, and reviewed guidelines for oral public testimony, emphasizing that the SSC focuses on scientific evaluation. Ms. Evans also noted the April meeting in Anchorage, and that travel arrangements for the June NPFMC meeting will need to be completed soon. Staff will send out an email to SSC members with directions this week.

General Comments

Process for Reviewing Revised Analyses (e.g. Second Initial Review)

For items that the SSC has previously reviewed and in instances where there is limited time for presentations, the SSC supports focusing on responses to SSC comments, additions and key revisions. The SSC notes that there could be efficiency gains and potential improvement to public and SSC comments if a brief overview of the various analyses and components of the reports were summarized and included in the executive summaries of applicable agenda items.

Methodology for Analysis of Social, Economic and Cultural Impacts

The SSC notes the diversity of potential benefits associated with fisheries, many of which are best characterized using qualitative approaches. The SSC encourages the use of social indicators and human well-being frameworks that are well established in social science literature to better understand the suite and magnitude of social, economic, and cultural benefits related to issues such as subsistence harvest of salmon. These frameworks would enable the categorization of impacts from certain management actions and explore the scope of those impacts for fisheries and fishing communities (e.g., Leong et al. 2024[1]). Applying such frameworks in relation to specific regions and issues and the impacts of management programs, amendments or regulatory actions is valuable to identifying metrics which can be used to monitor and evaluate outcomes. This could include tables, figures, or dashboards that summarize various types of benefits and costs.

Local Knowledge, Traditional Knowledge, and Subsistence (LKTKS)

The SSC notes that how to most effectively apply LKTKS within the Council process is complex and evolving. **The SSC supports the inclusion of LKTKS in Council documents** and notes that the efforts related to inclusion of LKTKS information under agenda item C2 at this February 2025 meeting represent concrete progress toward the larger goal of providing these types of information for consideration and use in Council decision making processes on a regular basis.

C1 2025 Preliminary Salmon SAFE of the Cook Inlet EEZ

The SSC reviewed and received a presentation on the 2025 SAFE Report for the Salmon Fisheries of the Cook Inlet Exclusive Economic Zone (EEZ) from Diana Stram (NPFMC), Richard Brenner (NFMS-AKRO) and Aaron Lambert (NMFS-AKRO).

[1] Leong, K.M., Ingram, R.J., Kleiber, D., Long, S.H., Mastitski, A., Norman, K., Weng, C. and Wise, S., 2024. Aligning fisheries terminology with diverse social benefits. Marine Policy, 170, p.106377.

The SSC received oral public testimony from Pat Shields (self), Janet Carroll (OBI Seafoods), Nick Jacuk (self), Alfred Tellman (Knik Tribe), Samuel Schimmel (Tikahtnu Inter Tribal Fish Commission), Jim Sykes (Matanuska-Susitna Borough Fish & Wildlife Commission), Roland Maw (United Cook Inlet Drift Association; UCIDA), and David Martin (Cook Inlet Fishermen's Fund). The SSC received written public testimony from Mike Simpson (Alaska Salmon Alliance), Andy Couch (Matanuska-Susitna Borough Fish & Wildlife Commission), and David Martin (UCIDA). As the C1 agenda item represents influential scientific information, public testimony is required to be characterized and responded to during SSC deliberations.

Public testimony highlighted several common areas of concern, including:

- The unsuitability of EEZ harvest management based on a preseason total allowable catch (TAC), given the high interannual variability in return abundance, and support for the use of abundance/escapement-based harvest policies with active and adaptive in-season management
- Failure to manage to maximum sustainable yield (MSY) and optimum yield (OY) as well as lost harvest opportunity due to surplus escapement
- Use of recent data to inform status determination and harvest specifications due to recent fishery disaster declarations and State of Alaska management decisions, which may not be representative of long-term productivity trends
- Not all harvest is reported and escapement enumerated (e.g. small Chinook in recreational harvest and Kenai River escapement)
- SAFE is specific to the EEZ only and the drift gillnet fishery in particular, but does not consider the harvest of stocks that pass through the EEZ before and after the drift gillnet fishery
- Economic and industry stability under this management system
- The need to consider broader management implications across both state and federal components of the fishery relative to MSY and OY

Public comment included general support for:

- Use of the lower bound of the escapement goal for calculating status determination criteria and harvest specifications
- Efforts to allow northern Cook Inlet stocks to pass through the EEZ and associated SAFE-recommended ABC buffers specifically for coho and Chinook aggregate stocks.
- Research to fill data gaps on salmon populations and migration timing, including a test fishery, collection of real-time data and use of genetic stock identification of the harvest
- Interest in a test fishery, potentially Tribally led
- Expanded enforcement to ensure all harvested salmon are counted
- Inclusion of Indigenous Knowledge in management of Cook Inlet salmon
- Engaging in government-to-government consultation as relevant

Public comment also included recommendations for timing and frequency of fishing periods in the EEZ as well as gear specifications to allow for passage of fish to northern Cook Inlet salmon streams. The SSC considered these comments in their recommendations.

General Comments

The SSC highlights its appreciation for the extensive efforts of the NMFS Cook Inlet Salmon SAFE Team (SAFE team) in drafting the 2025 Cook Inlet EEZ Salmon SAFE report and responding to the SSC recommendations from February 2024. **The SSC reiterates the challenge of providing a basis for status determination and harvest specifications for this salmon fishery that requires adapting the escapement-based management policy used by the State of Alaska to comply with the Magnuson Stevens Act (MSA) framework.** As noted last year, this is an iterative process and there are opportunities to benefit from lessons learned in MSA salmon management on the West coast by the Pacific Fishery Management Council (PFMC).

Reviewing new SAFE methodology for the first time at the same meeting where harvest specifications are set - without the benefit of independent review - poses a significant challenge. Last year, the SSC highlighted the value of long-format Plan Team meetings for reviewing groundfish and crab stock assessments. These meetings serve as a critical forum for in-depth discussions, allowing for substantive progress in improving processes and models that support management decisions, as well as reviewing proposed methodological changes prior to harvest specifications. **The SSC reiterates its recommendation from last year that a workshop, or series of workshops, focused on further developing Cook Inlet Salmon harvest specification and status determination methods in the context of continued in-season EEZ management be held in the coming year.** This workshop could include members of the SAFE team, ADF&G, SSC, and experts from the PFMC where issues related to federal management of salmon fisheries have been extensively considered. **The SSC also recommends evaluating the establishment of a Plan Team for federally managed salmon stocks in the Cook Inlet EEZ, recognizing that costs, timing of data availability, and determining membership of a plan team need to be considered carefully**.

With regards to the annual assessment and specifications cycle, the SAFE team suggested providing an early draft of the SAFE by December for review by the SSC. The SSC discussed the benefits of previewing newly proposed analyses and methods in response to requests and recommendations from the previous harvest specifications cycle, whether originating from the SSC, workshops or a Plan Team. The timing of presenting an early preview would be dependent on how soon the SAFE team could prepare a report and when the SSC could accommodate it in their schedule. This would allow for the SSC to provide feedback and recommendations prior to the meeting at which specifications are set.

The SSC also discussed the need for continued research and data collection, especially genetics and age-sex-length data of the salmon harvested in the EEZ fishery. Priorities include genetic sampling of sockeye to identify the stock structure and timing of the different sockeye runs in the EEZ fishery, and Chinook sampling to assess the importance of Kenai large late run Chinook in EEZ fishery, and to evaluate the prevalence of non-Cook Inlet Chinook in the fishery. Given the number of Chinook salmon reported to be harvested, it would be reasonable to obtain a census sample from the fishery. The SSC acknowledges the value of in-season information that could be provided by a test fishery, as noted during public testimony. A test fishery could help characterize the timing, magnitude, and distribution of returning salmon, as well as support stock composition estimates if in-season genetic stock composition analysis are feasible.

The SSC reiterates its February 2024 report comment that as the Cook Inlet EEZ management process matures and consistent with National Standard (NS) 2, **the SSC looks forward to the SAFE incorporating a summary of scientific information on the most recent social and economic condition of the relevant fishing interests, fishing communities, and the fish processing industry.** The SSC recognizes the

capacity challenges facing the analysts in the absence of a Plan Team. However, it is important in the context of NS8 to capture the differential distribution of impacts associated with the change to federal management in the early years, especially if there are substantial changes in patterns of engagement or dependency for fishing communities, fishery sectors, and/or fishery support sectors. It is difficult in general to capture information on correlation or causation of changes seen in retrospect, especially with respect to those who exit the fishery. Further, it is important to capture changes in participation across commercial, sport, personal use, and subsistence fisheries, as well as the potential for new or returning entrants, including those represented in evolving Tribal fishery initiatives.

The drainage maps provided at the beginning of each SAFE chapter for the aggregate salmon stock complexes do not align with the Federal definition of these Upper Cook Inlet aggregates provided below each map. The SSC requests that the authors correct these maps for the final SAFE.

The SSC appreciates the SAFE team providing the GitHub repository with data used for the assessment and requests that this practice continue for future salmon SAFEs.

2025 Cook Inlet aggregate salmon harvest specifications and SAFE

Stock status determination criteria for aggregate salmon stock complexes in the Upper Cook Inlet EEZ in 2024 and the 2025 SSC harvest recommendations are summarized in Tables 1 and 2, respectively.

The SSC reviewed status determination criteria for 2024. **Pending final harvest data, final determination cannot be made, but the analysts noted that aggregate salmon stock complexes were not subject to overfishing based on current information. Similarly, pending final harvest and escapement data, aggregate salmon stock complexes, with the exception of aggregate chum and pink stocks, were not overfished. For aggregate chum and pink stocks, an overfished status determination is not possible.**

Table 1. Aggregate stock status in relation to status determination criteria for 2024 salmon fisheries of the Cook Inlet Exclusive Economic Zone Area. Values are in numbers of fish. Status determination recommendations made by the SSC are based on the best scientific information available and final status determination will be made by NMFS Headquarters following SAFE review.

Stock	Tier	MSST	Cumulative Escapement	MFMT	F_{EEZ}	OFL	OFL_{PRE}	ABC	Catch	Overfished
Kenai River Late Run Sockeye salmon	1	3,030,000	8,258,000	0.204	0.072	NA	901,932	431,123	189,380*	no
Kasilof River Sockeye salmon	1	555,000	4,008,000	0.495	0.036	NA	541,084	375,512	77,960*	no
Aggregate Other Sockeye salmon	3	163,000	529,700	NA	NA	1,271,000	887,464	177,493	57,496*	no
Aggregate Chinook salmon	3	44,200	70,800	NA	NA	3,072	2,697	270	31	no
Aggregate Coho salmon	3	38,800	24,400**	NA	NA	439,000	357,688	35,769	4,432	no
Aggregate Chum salmon	3	NA	NA	NA	NA	561,000	441,727	110,432	28,832	NA
Aggregate Pink salmon	3	NA	NA	NA	NA	300,000	270,435	135,218	6,249	NA

*Kenai late-run, Kasilof and Aggregate "Other" sockeye salmon catches are estimated to a stock-specific level using ADF&G inseason genetic stock composition information

** 2025 SAFE notes that this escapement estimate is based on incomplete information

Table 2. SSC recommendations for the salmon fisheries of the Cook Inlet Exclusive Economic Zone Area for 2025. Values are in numbers of fish. Tier designations in this table are based on the SAFE report and accepted by the SSC. SSC recommendations that differ from the SAFE are in bold. This table combines Tier 1 and Tier 3 stocks into a single table; therefore, some columns will have information that is not applicable to a given tier or would require calculations that are not recommended based on the information available (NA).

Stock	Tier	MSST	Escapement goal, lower bound	S_{MSY}*	OFL	OFL_{PRE}	ABC	ABC Buffer (%)
Kenai River Late Run Sockeye salmon	1	**3,030,000**	750,000	1,212,000	NA	**514,761**	**360,332**	**30%**
Kasilof River Sockeye salmon	1	**555,000**	140,000	222,000	NA	**664,294**	**285,646**	**57%**
Aggregate Other Sockeye salmon	3	163,000	65,000	NA	906,757	181,351	154,148	15%
Aggregate Chinook salmon	3	40,500**	13,500**	NA	2,237	373	261	30%
Aggregate Coho salmon	3	38,800**	19,400**	NA	268,053	67,013	**16,753**	**75%**
Aggregate Chum salmon	3	NA	3,500	NA	390,030	97,508	78,006	20%
Aggregate Pink salmon	3	NA	NA	NA	116,348	58,174	52,357	10%

*Hasbrouck et al 2022[2]
** corrected values to be updated in final 2025 SAFE

[2] Hasbrouck, J. J., W. D. Templin, A. R. Munro, K. G. Howard, and T. Hamazaki. 2022. Spawner–recruit analyses and escapement goal recommendation for Kenai River late-run sockeye salmon. Alaska Department of Fish and Game, Fishery Manuscript No. 22-01, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FMS22-01.pdf

Tier 1 General Topics

S_{MSY} vs Lower Bound of the State's Scientifically-based Escapement Goals

The Salmon fishery management plan (FMP) specifies the lower bound of the escapement goal range as the default for calculating status determination criteria (SDC) and harvest specifications, unless the SSC recommends otherwise. In its 2024 review of the first Cook Inlet EEZ SAFE, the SSC recommended that the S_{MSY} should be used for Tier 1 stocks to provide sufficient precaution for setting the preseason OFL and SDCs and to be consistent with the interpretation of this reference point. For the 2025 preliminary Cook Inlet EEZ SAFE, the SAFE team recommended using the lower bound of the State's escapement goal range for Tier 1 stocks with the rationale that this represents the best scientific information available for maximizing yield and preventing overfishing over the long term, in fulfillment of NS1 Guidelines. The SAFE team provided a reasonable rationale for considering using the lower bound of the escapement goal. The SSC appreciates the flexibility in determining the value used to estimate the productive capacity of the stock. For example, in the East Area, the MSST for coho uses the lower bound of the escapement goal range, but Chinook uses the mid-point. Both public testimony and the authors noted the PFMC Salmon FMP includes several examples of reference points that are equal to the lower bound of MSY escapement ranges or other lower bound escapement targets. Part of the challenge with determining the correct approach is the unique nature of the harvest specifications for the Cook Inlet EEZ salmon fishery, including the challenge of using escapement-based management with federal reference point requirements under the MSA. **For the 2025 specifications, the SSC recommends that OFL and MFMT used in SDC calculations for Tier 1 stocks be based on the best available estimate for the spawning biomass that produces maximum sustainable yield over the long-term (S_{MSY}). Likewise, the SSC recommends that an escapement target equal to S_{MSY} also be used in defining the preseason OFL and ABC specifications for the 2025 season. The SSC also recommends further consideration of this issue, such as by the proposed workshop(s) discussed under General Comments.** The SSC recommends this issue be considered on a stock-by-stock basis based on data availability.

MSST scaling

In 2024, the SSC recommended using S_{MSY} as the escapement target for calculating MSST for Tier 1 stocks for consistency with how the MSST is defined in the crab and groundfish FMPs. Under this approach, the MSST is $0.5*S_{MSY}$ (summed over a generation) or half of the spawning abundance expected to produce MSY over the long term. The SAFE team requested input from the SSC on the potential for changing the scalar used to adjust the escapement target in the calculation of MSST to values other than 0.5. The authors noted that this approach is used for select West coast salmon stocks. The SAFE team suggested that the SSC might consider scaling factors from 0.5 to 0.75 and provided examples using 0.6 of the lower bound of the escapement goal as footnotes in Tables 7 and 12 of the preliminary SAFE report. **The SSC acknowledges flexibility in the MSST definition but recommends continuing to use $0.5*S_{MSY}$ (summed over a generation) for the 2025 specifications. The SSC also recommends that the SAFE team provide a more detailed rationale for selecting appropriate scalars for different stocks as necessary.**

SDC and Harvest Specifications Methods/Buffer Calculations

The SAFE team presented three options to calculate components of the preseason OFL for the Tier 1 stocks:

- Using the State-produced preseason forecast of run size
- Autoregressive modeling of historical total run size estimates to project next year's run size as well as the harvest rate in state waters (F_{state}). This was the same method used in 2024 and included calculation of buffers for reducing OFL to ABC based on the probability of over forecasting.

- A new Bayesian approach, which is similar to the autoregressive model framework currently used, except that the preseason run size forecast is fit using an AR1 model and the state harvest model fixed to the best models for the current year. As with the current method, buffers for reducing OFL to ABC are based on the magnitude of positive errors in preseason OFL estimates.

T**he SSC supports the SAFE team's recommendation to use autoregressive models for both Tier 1 stocks (Kenai River late run sockeye and Kasilof River sockeye) to forecast run size and the state waters harvest rates component of the preseason OFL.** Details associated with these models are provided for each stock. The SSC notes that the State-produced preseason forecast sibling models had lower forecast error but are currently unavailable due to the timing of when those estimates are produced relative to when they are needed for harvest specifications. The SAFE team also provided a Bayesian approach that retrospectively evaluated the probability that an ABC exceeded the post-season OFL under different buffers on the preseason OFL. The SSC appreciates the SAFE team's work on this analysis, and supports further efforts to develop this model, including consideration of a longer time series where available. The SSC further recommends the SAFE team consider whether the magnitude of the buffer could be scaled relative to the cumulative probability of a preseason OFL<0 under the posterior distribution for this quantity, rather than the proportion of years in which the ABC was over-forecasted.

Kenai River Sockeye

The SAFE team recommended designating Kenai River late-run sockeye as a Tier 1 stock. An autoregressive model approach was used to predict the 2025 run size (AR1) and state waters harvest (AR model - zero mean white noise) based on historical data, similar to the 2024 methods. Based on these results, the preseason OFL was determined. Buffers for reducing the preseason OFL to the ABC were based on the retrospective median symmetric accuracy of preseason OFL relative to post-season OFL, for those years where the OFL was over-predicted between 2015 and 2024. Harvest specifications based on using S_{MSY} for the stock and the lower bound of the escapement goal were both presented. **The SSC concurs with the SAFE team's recommendation of a Tier 1 designation for Kenai River late run sockeye in 2025.** The SSC accepts the methods used by the SAFE team to forecast the 2025 run size estimate and the estimated harvest rate in state waters given the numerous constraints and data availability at this time. The SSC discussed the appropriate buffer for setting the ABC below the preseason OFL. The buffer recommended in the preliminary SAFE using S_{MSY} as a basis for calculating the preseason OFL based on the retrospective accuracy of preseason OFLs was considered conservative by the SSC. **The SSC recommends setting an ABC buffer of 30% (rounded from the buffer calculated using the lower bound of the escapement goal). This recommendation recognizes that the S_{MSY} estimate for this stock is near the upper end of the MSY escapement goal range based on the stock-recruit relationships presented in the SAFE. Additionally, there are no conservation concerns for this stock**.

Finally, the SSC noted a number of minor editorial comments that will be communicated directly to the SAFE team for the final 2025 SAFE, including correcting the pre-2020 estimates of S_{MSY} and the lower bound of the escapement goal in Table 10. The SSC recommends that the SAFE team provide additional detail (e.g., a table) in the assessment that lists components of the harvest (commercial, sport, personal use, subsistence) and escapement information such that the reader can more easily identify what are final versus preliminary estimates. In addition, the SAFE team should clearly state whether the status determination recommendations (i.e., overfishing and overfished status) include preliminary information.

Kasilof River Sockeye

The SAFE team recommended designating Kasilof River sockeye a Tier 1 stock. An Autoregressive model approach was used to predict the 2025 run size (AR1) and State waters harvest (autoregressive moving average model) based on historical data, similar to the methods used in 2024. Based on these results, the

preseason OFL was determined. Buffers for setting an appropriate ABC below the preseason OFL based on the retrospective accuracy of preseason relative to post-season OFL estimates were proposed similar to Kenai River late-run sockeye salmon. Harvest specifications based on using either S_{MSY} or the lower bound of the escapement goal were both presented. **The SSC concurs with the SAFE team's recommendation of a Tier 1 designation for Kasilof River sockeye in 2025.** The SSC accepts the methods used by the SAFE team to forecast the 2025 run size estimate and the estimated harvest rate in State waters, given the numerous constraints and data availability at this time. The buffer recommended in the preliminary SAFE using S_{MSY} as a basis for calculating the preseason OFL based on the retrospective accuracy of preseason OFL estimates was considered conservative by the SSC. **The SSC recommends setting an ABC buffer of 57%** (the buffer based on the same analysis, but using the lower bound of the escapement goal).

Finally, the SSC noted several minor editorial comments that will be communicated directly to the SAFE team for the final SAFE, including correcting the pre-2020 estimates of S_{MSY} in Table 15. Similar to Kenai River late-run sockeye, the SSC suggests that the authors provide additional detail for the components of the State harvest (commercial, sport, personal use, subsistence) and clearly distinguish final estimates from preliminary estimates.

Tier 3 Stocks

The SAFE team recommended that aggregate "other" sockeye salmon, aggregate Chinook salmon, aggregate coho salmon, aggregate chum salmon, and the aggregate pink salmon stock complexes be specified as Tier 3 stocks, where harvest specifications are based on historical catch statistics. **The SSC supports the designation of these stock complexes as Tier 3.**

In its February 2024 minutes, the SSC made several recommendations regarding the Tier 3 aggregate stocks for the 2025 SAFE. The OFLs should be based on limiting harvest in the current year, rather than the multi-year approach that was used in 2024. The SSC recommended that ABC buffers be expressed as a percent reduction from OFL, consistent with groundfish and crab. Finally, the SSC suggested that a starting point might be the 25% default buffer used for Tier 6 average-catch stocks in the groundfish FMPs, though alternatives should be considered on a stock-by-stock basis.

In response, the SAFE team developed a new Tier 3 approach in which the preseason OFL is based on the maximum average catch over a generation during the period 1999-2024. The maximum average over a generation tends to be 40-60% higher than the overall average but will always be lower than the maximum catch over the equivalent period. Overfishing is determined by comparing the cumulative catch over the previous generation to the maximum cumulative catch. **The SSC supports this more transparent approach and considers it a substantial improvement over last year.** However, it should be acknowledged that this will be less precautionary than the groundfish Tier 6 average-catch approach. Although not articulated in the SAFE, a potential rationale is that for most salmon stocks, a single brood year will return to spawn over several years, so that not all of the stock is exposed to harvest in any single year. This may result in additional resilience to harvest compared to groundfish, where all of the exploitable stock is exposed to harvest.

The SAFE team recommended ABC buffers for each Tier 3 stock, starting with a 15% default ABC buffer. Recommended buffers were 15% for other sockeye, 30% for Chinook, 90% for coho, 20% for chum, and 10% for pinks. In general, proposed departures from the default 15% buffer were well justified. **The SSC raised concerns about the recommended buffer for aggregate coho as noted below, but otherwise concurs with the recommended SAFE team buffers for this year.**

Overall, the SSC is concerned that a 15% default buffer does not adequately recognize the severe limitations of basing harvest specifications on historical catch statistics. These specifications do not respond to changes in the stock abundance due to varying environment conditions, and their relationship to sustainable yield is

highly uncertain. In some cases, there is no adequate basis for determining overfished status. These limitations are the same as for Tier 6 groundfish, implying that the default 25% buffer to obtain the ABC for these stocks would be applicable to Tier 3 salmon stocks to maintain a consistent approach to uncertainty across FMPs. **The SSC therefore requests the SAFE team adopt a default 25% buffer for developing harvest recommendations next year.** Departures from the 25% buffer (both higher and lower) should be justified based on specific issues for each aggregate stock complex such as data availability and quality.

The SSC agrees with the SAFE team's concern with low coho abundance. Harvest in the EEZ and escapement counts from coho index stocks are at all-time lows. Complete weir counts are not available for either coho indicator stock in the last three years. The SAFE team-recommended buffer of 90% is very large and the resulting ABC would have led to an early fishery closure in 24 of the last 26 years. Instead, the SSC recommends a large, but less extreme buffer of 75% for aggregate coho. This magnitude is comparable to the largest buffer used for BSAI crab stocks of 75% for West Aleutian Islands red king crab, which is at very low abundance and has been closed to directed fishing since 2003.

The SAFE team evaluated aggregate "other" sockeye salmon, aggregate Chinook salmon, aggregate coho salmon, aggregate chum salmon and aggregate pink salmon stock complexes with respect to overfishing by comparing cumulative catch over the previous generation to the maximum cumulative catch. Due to limited availability of indicator stock information, only aggregate "other" sockeye, aggregate Chinook, and aggregate coho could be evaluated for overfished status. While none of these stocks were below the MSST, escapement data to compare to the respective MSST are very limited for aggregate coho. In addition, Kenai large late run Chinook may not be a suitable indicator stock since it is likely not well represented in the EEZ salmon fishery.

The SAFE team requested input from the SSC on how to treat overfished determinations with missing or incomplete weir data. The SSC recommends that the calculation of the cumulative escapement goal omit the indicator goal in years when the index is missing or incomplete. For example, when a weir count is missing, the escapement goal for that site in that year is not counted towards the cumulative escapement target over a generation.

The 2025 SAFE document highlighted some sources of uncertainty that were not considered in the assessment, including the unconfirmed historical estimates of salmon harvests in the Cook Inlet EEZ prior to 2024. However, for Tier 3 stocks, these estimates are the basis for the 2024 and 2025 SDC and harvest specifications recommendations. The SSC recommends that, to the extent possible, the SAFE team explore the uncertainty in the historical estimates of salmon harvests in the Cook Inlet EEZ prior to 2024 for all the Tier 3 stock complexes in future assessments.

The SSC appreciates the draft risk table for the aggregate coho salmon complex. While the risk table served to highlight the serious concerns regarding the status of Cook Inlet coho, the scoring was elevated compared to how the risk table has been used for groundfish. Attributes that are typical of Tier 3 stocks should not result in an elevated risk score as they are reflected in the default buffer. The SSC looks forward to further refinement of risk tables for the aggregate salmon stocks in the Cook Inlet EEZ.

The SSC identified the following data needs that would provide an immediate benefit to Tier 3 salmon assessments:

- There should be ongoing genetic sampling of EEZ salmon landings. Priorities include genetic sampling of sockeye to identify the stock structure and timing of the different sockeye runs in the EEZ fishery, and Chinook sampling to assess the importance of Kenai large late run Chinook in EEZ fishery and to evaluate the prevalence of non-Cook Inlet Chinook in the fishery.

- It is a concern that monitoring of salmon escapement in Cook Inlet has decreased over time. Ideally, each Tier 3 aggregate stock complex should have several monitored indicator stocks. Increased support for the existing coho indicator stocks is the highest priority.

There were a number of minor errors in the SAFE document that were communicated to the SAFE team.

C2 Initial Review of Preliminary Draft Environmental Impact Statement for Bering Sea Chum Salmon Bycatch Management

The SSC received a presentation on the C2 preliminary Draft Environmental Impact Statement (DEIS) for chum salmon bycatch management from Kate Hapaala (NPFMC), Sarah Marrinan (NPFMC), and Patrick Barry (NOAA-AFSC). Dr. Barry focused on the simplified adult equivalent (AEQ) analysis, while Dr. Hapaala and Ms. Marrinan focused on the content of the DEIS.

The SSC received written public testimony from Brooke Woods (Permafrost Pathways), Tom Enlow (UniSea), Chair Jonathan Samuelson (Kuskokwim River Inter-Tribal Fish Commission), Roark Brown (HOC Services) and Nathan Elswick (Anvik Village). The SSC received oral public testimony from Frank Kelty (City of Unalaska), Cory Lescher (Alaska Bering Sea Crabbers), Jimmy Hurley (Self), Heather Munro Mann (Midwater Trawlers Cooperative), Andrea Keikkala & Susie Zagorski (United Catcher Boats), Caitlin Yeager and Austin Estabrooks (At-Sea Processors Association), Glenn Merrill (Glacier Fish Company), Trent Hartill (American Seafoods), Craig Chythlook (Self), Brenden Raymond-Yakoubian (Kawerak), Francis Thompson (St. Mary's Village Council), Terese Vicente and Justin Leon (Kuskokwim River Inter-Tribal Fish Commission), Nick Jacuk (Ocean Conservancy) and Steve Martell (Sea State). As the C2 item represents influential scientific information, public testimony is required to be characterized and responded to during SSC deliberations.

Public testimony suggested several specific improvements to the analyses in the DEIS, including:

- Investigating the effects of the pollock fishery on crab and crab habitat, including evaluation of Alternative 5 in relation to crab distribution and seasonal movement patterns.

- Including the effects of alternatives on individual vessels, including smaller vessels that are unable to travel longer distances and larger vessels with differing production needs. It was noted that under the co-op structure, bycatch caps would likely translate into vessel-specific bycatch allotments and could result in a race for fish.

- The impact of alternatives on the performance of the Incentive Plan Agreements (IPAs). Specifically, the potential for reduced rolling hot spot (RHS) information that might lead to reduced ability to identify areas of lower chum bycatch.

- Evaluation of the non-monetary value and costs of the alternatives to Alaska Native communities.

- Replacing the Bethel Test Fishery Index (Alternative 3) with an index based on the Kuskokwim sonar count.

Pollock industry participants highlighted potential costs from PSC limits/caps that could create economic hardship for the pollock fishery participants, Community Development Quota (CDQ) programs, and dependent communities. Public testimony highlighted the economic importance and dependence of harvesters, processors and communities on the pollock fishery with the recent reductions in the crab fisheries. Particular concern was raised of effects on the CV fleet if closures affect areas that are easily

accessible to smaller vessels. Interactions between chum, Chinook and herring bycatch caps and management were identified as likely to change incentives and resulting behavior. Changes in global hatchery fish production were flagged as an uncontrollable factor that would affect performance alternatives. There was support for 'narrower' or more targeted corridors associated with the clusters in Alternative 5 and support for Alternative 4 to provide flexibility in responding to chum encounters through existing IPA and RHS approaches.

Public testimony also identified the need to protect chum salmon in migratory pathways and supported Alternative 5 - Option 1 (a Cluster 1 cap). Some supported Alternative 3 (with a low abundance threshold) to reduce risk and support recovery of the stock. Many comments highlighted the uncertainty in AEQ calculations, impact rates, and the conservation benefits that might accrue. Some highlighted that the AEQ approach was insufficient, not capturing the impacts to discrete spawning populations and impacts due to the waste of sentient species.

Testimony emphasized taking a precautionary approach - that every fish returning to spawn increases the likelihood of bringing back chum salmon stocks. It was reiterated that low impact rates may not translate into low effects on stocks and/or communities relying on the subsistence way of life. Cumulative impacts of fishing on the marine ecosystem and interaction with climate change were also raised as significant concerns. Public testimony identified a need for additional research to address uncertainty particularly in relation to market and non-market costs for Western Alaska (WAK) communities dependent on chum salmon. Testimony also questioned the treatment of potential impacts to WAK Alaska Native communities, suggesting that those impacts were not given equal consideration compared to those of the pollock fishery due to the lack of quantifiable data. Finally, many comments reflected the critical reliance of Alaska Native Peoples on chum salmon for social, spiritual, psychological, educational and cultural needs.

Following extensive discussions and considering the recommended revisions summarized below, the **SSC recommends that the February 2025 DEIS is sufficient to inform the Council's decision-making and the document be advanced for public release, after incorporating the recommendations in the following sections to the extent practicable.**

General Comments/Responses to Previous SSC Comments

The SSC appreciates the responsiveness of the analysts to previous SSC comments. This section focuses on general SSC comments on the current DEIS, previous SSC recommendations from the April 2024 meeting, and the subsequent responses by the authors in their current report. Additionally, the SSC provides general recommendations and suggestions to improve the clarity of the report**.**

The SSC highlights two previous comments from its April 2024 report for the Council to consider as this management action moves forward:

- "The SSC recognizes, however, that establishing new management lines based on historical data can be problematic for many reasons, particularly when climate change is leading to changes in migration and distribution for many marine species."

- **"The SSC recommends clearly defining which outcomes would be considered a success at the time of the action and how those outcomes would be measured. Therefore, the SSC recommends scheduling a performance review of any new management measures to reduce chum bycatch relatively soon after implementation. This will allow managers to quantitatively evaluate the effectiveness of management actions and make the needed corrections."**

The SSC appreciates the authors' diligence in addressing SSC recommendations from April 2024 to the extent practicable. The SSC offers some additional general recommendations to improve the clarity and accessibility of the final DEIS:

- **The SSC recommends that all relevant text and future presentations explicitly state that comparisons to Alternative 1 (status quo) are based on data from 2011 – 2023. This period includes the Council's 2022 request to industry to take immediate voluntary steps to avoid chum salmon in the 2022 B season following a high bycatch year in 2021. As a result, fleet changes during this time may not be fully reflected in the status quo comparison.** Although only two complete years of data have become available since this change, evidence suggests marked reductions in both chum and Chinook salmon bycatch. These reductions should be considered when comparing alternatives to the status quo. **The SSC also advises caution when interpreting results that rely on later years of the retrospective analyses.** Specifically, the quantitative analyses for Alternatives 2, 3, and 5 are based on past fishery data, including recent years when many of the Alternative 4 provisions were in effect. Although the SSC does not recommend additional evaluation on this issue, it urges analysts to acknowledge this limitation in the independent evaluation of Alternatives 2, 3, and 5. Analysts should also highlight where recent years may be outliers due to incentivized chum avoidance.

- **The SSC recommends that the authors further refine, consolidate and present chum fishery removals in one place.** Currently, bycatch, commercial catch, subsistence harvest, and Area M removals are in different sections of the DEIS. While the removals may not be directly comparable as they are not fully standardized and have their own limitations, presenting them together will improve their contextualization. To the extent possible, the SSC requests that analysts provide these data on similar scales. For example, the Area M South Peninsula commercial fishery harvested approximately 1.12 million chum in 2023 (DEIS, pg. 299). While the genetic stock structure of this catch is not known, limited information from earlier years suggests that 13-30% of the catches in those years were Coastal Western Alaska (CWAK) chum salmon, with lower proportions in a more recent study[3,4], potentially equating to substantial removals of CWAK chum salmon in 2023, if proportions were as high as in some earlier studies. Additionally, the DEIS should include a statement that available data suggest CWAK chum removals likely occur in high seas/international trawl fisheries.

- A similar approach should be taken for the Upper/Middle Yukon stock as part of the AEQ analysis (see Simplified AEQ section below for details).

- The SSC suggests that the authors consider separating each of the five regional areas (in Section 3.2.4.1.2) to explicitly highlight where major concerns exist within the CWAK reporting group.

- The SSC recommends that authors re-evaluate the use of averages when a median might be more appropriate. For example, the averages presented in Table 3-12 or Table 4-36 when there was marked step change in 2021 for many population and bycatch metrics. It is important to consider the distribution of the data being presented when choosing one over the other.

[3] Dann, T. H., H. A. Hoyt, E. M. Lee, E. K. C. Fox, and M. B. Foster. 2023. Genetic stock composition of chum salmon harvested in commercial salmon fisheries of the South Alaska Peninsula, 2022. Alaska Department of Fish and Game, Special Publication No. 23-07, Anchorage.

[4] Munro, A. R., C. Habicht, T. H. Dann, D. M. Eggers, W. D. Templin, M. J. Witteveen, T. T. Baker, K. G. Howard, J. R. Jasper, S. D. Rogers Olive, H. L. Liller, E. L. Chenoweth, and E. C. Volk. 2012. Harvest and harvest rates of chum salmon stocks in fisheries of the Western Alaska Salmon Stock Identification Program (WASSIP), 2007–2009. Alaska Department of Fish and Game, Special Publication No. 12-25, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/SP12-25.pdf

- The SSC notes that much of the information is presented in bar and line graphs with text describing relationships between the time series. In some cases, a simple correlation could more effectively illustrate the relationship between two metrics, making it easier for readers to identify patterns and outlying years. As an example, this approach may be useful in Figure 3-17 when comparing the annual total number of chum salmon to WAK chum salmon. Similarly, applying autocorrelation metrics with a one-year lag could help assess the reliability of using prior-year data to assess subsequent-year outcomes (e.g. salmon run size). **The SSC recommends that the analysts consider this type of evaluation in the analysis to the extent practicable.**

Finally, the SSC recommends that authors review content for clarity and condense and refocus pertinent information where possible, especially streamlining the lengthy executive summary.

Integration of LKTKS within the DEIS

The SSC supports the revisions to more fully incorporate LKTKS and acknowledges the breadth and depth of LKTKS information now in the main body of the DEIS and the LKTKS information that has been provided in a new series of appendices. The inclusion of information supplied by Cooperating Agencies, the Kuskokwim River Inter-Tribal Fish Commission (KRITFC) and the Tanana Chiefs Conference (TCC), in the analysis lent clarity and depth when evaluating the Alternatives. LKTKS information is critical to understanding the nature and magnitude of potential risks and benefits of the proposed action alternatives to WAK subsistence chum salmon reliant communities. Public testimony also provided valuable context given the complexity of the subject and possible alternatives.

AEQ and WAK Community Outcomes

The SSC encourages further exploration and expansion to contextualize the AEQ numbers relative to potential benefits of increased chum returns to WAK communities. The analysis notes that it is difficult to determine which communities may receive indirect benefits from potential bycatch reductions; however, it clearly outlines the substantial benefits to inland WAK communities with any increase in chum returns. Specifically, the AEQ numbers could be better contextualized with additional text that directly communicates the likely survival rates of fish caught at sea, and by explicitly addressing the potential for longer-term benefits if WAK bycatch were reduced and those fish escaped to add to stock productivity during periods where escapement goals are not met. When the escapement goals are not met, the AEQ is only a starting point from which the potential for population growth, time to reopening and potential future benefits should be explored.

Individual Vessel Impacts

The SSC appreciates the quantitative evaluation of vessel-specific impacts in Appendix 6, Section 6.4 and the qualitative discussion of potential vessel-specific responses and heterogeneity in responses across vessels within sectors and alternatives. The SSC notes that outcomes will be heavily dependent on how cooperatives choose to respond to the alternatives. **The SSC encourages the analysts to revise the main document to clearly identify relevant material on this subject located in appendices or other sections of the report and direct readers to those sections where appropriate.** The need for considering vessel-specific impacts was also highlighted in public testimony. This is especially needed for material relating to the potential differential distribution of social, economic, and community impacts across communities based on the different catcher vessel (CV) length categories noted in Table 4-26. These may occur within local fleets due to proximity to time and area closures and discussion should include potential safety at sea considerations. While the SSC notes there is a great deal of uncertainty, it would be beneficial to provide insights into the potential magnitude of costs.

Characterization of the Potential for Unintended Consequences

The SSC recommends the analysts summarize the potential for unintended consequences of all alternatives in a separate section for easier comparisons across alternatives. Specifically, this section should consider how fleet efforts to manage pollock harvest and total chum and WAK chum bycatch in response to an action intended to reduce WAK bycatch mortality could inadvertently lead to higher WAK bycatch mortality. This risk arises because the alternatives are structured around total chum bycatch, which can be monitored in real time whereas WAK chum bycatch cannot be determined until after genetic analyses have been completed. Since total chum bycatch is an imperfect proxy for WAK chum bycatch, directing the fleet to reduce total chum bycatch could unintentionally shift fishing effort to times or areas where the proportion or absolute number of WAK chum encountered is higher. Public testimony before the SSC in April 2024 presented data that suggest total chum to WAC chum ratios vary spatially, both between and within Clusters 1 and 2. The present analysis focuses on aggregate year-to-year changes in WAK chum proportion of total chum encountered, without considering the time or area composition of effort.

The SSC appreciates the quantitative and qualitative work summarizing how fleet responses under Alternative 5 could lead to increases in WAK chum bycatch relative to the status quo and requests the analysts consider a similar approach for Alternatives 2 and 3. This would focus on the potential for fleet behavior that is changing across space and time in response to incentives to reduce chum bycatch, and could lead to more fishing in areas that have lower overall chum bycatch but higher WAK chum bycatch. The new section should also include a general discussion of the potential for Alternatives 2, 3, and 5 to increase Chinook and/or herring bycatch relative to the status quo.

Research outlook

The SSC is encouraged by several potential new sources of data or decision support information and requests the analysts provide updates on the status of the Bristol Bay Science and Research Institute initiative to produce in-season chum genetics information, and ongoing work underway at AFSC in collaboration with ADF&G (PI: Dr. Wes Larson) to develop a new genetic marker panel with low coverage whole genome sequencing for WAK chum salmon that will improve the resolution of stock structure. **The SSC notes that in-season genetics for the inshore sector could importantly change the tools available to identify and potentially avoid areas with a high proportion of WAK chum.**

Simplified AEQ and Impacts

The goal of an AEQ analysis is to estimate the number and potential impact (e.g., proportion of a total run size, harvest, etc.) of bycaught salmon that may have otherwise survived the marine environment and returned to natal streams. In April 2024, the SSC requested the analysts prepare a simplified AEQ analysis, acknowledging that information would be limited. The SSC commends the analysts for the substantial work completed since the April SSC review and their responsiveness to SSC requests related to the simplified AEQ.

For the simplified AEQ analysis, the analysts used the CWAK Summer and the Yukon River Fall genetic baseline reporting groups. This aggregation approach, used by the United States Fish & Wildlife Service and ADF&G, differs from reporting groups in previous Council analyses by placing five Upper/Middle Yukon river stocks in the CWAK Summer group. The SSC supports this approach and notes that these groups are nearly identical to the CWAK and Upper/Middle Yukon reporting groups the Council is familiar with. To avoid confusion, the analysts have adopted "CWAK" and "Upper/Middle Yukon" terminology for these groups, respectively.

Chum bycatch in the Bering Sea pollock fisheries is dominated by age 3-5 fish, which are estimated to have survival rates ranging from 80 – 90%. As a result, the simplified AEQ estimates are similar in scale to the total WAK chum bycatch amounts. The SSC notes that AEQ estimates account for natural mortality and

fish maturation schedules but do not account for exposure of returning fish to other sources of fishing mortality (e.g., Area M fisheries).

Estimates of AEQ CWAK chum salmon removed due to pollock fishery B-season bycatch constituted 1.4% of total removals during 2011–2019, and 5.7% from 2020–2022 on average. These proportions are informative but subject to changes in run size as well as processes that influence fishery removals and are difficult to interpret without estimates of uncertainty. AEQ impact rates were not provided given the lack of run size estimates for this reporting group. Run reconstructions are available for the Upper/Middle Yukon group and the AEQ impact rate ranged from 0.22% of the run size in 2013 to 4.93% in 2021, averaging 1.0% over the time period (2011–2022). The notable increase in 2021 is attributed to low reconstructed run size and a doubling of the estimated AEQ from the previous year.

The SSC appreciates the clear and concise characterization of the numerous sources of uncertainty and the associated assumptions required to complete the AEQ analysis, including the conditions of oceanic maturity and survival, in-river age composition, estimates of stock of origin and run size.

The SSC agrees that AEQ estimates and impact rates are helpful in developing realistic expectations of salmon savings associated with status quo and policy alternatives but are not a complete assessment of the potential impact bycatch removals of chum salmon may have on WAK chum salmon populations. Further, Bering Sea pollock fishery bycatch is one of a number of processes that may affect WAK chum salmon abundance including catch from ocean and in-river salmon fisheries, competition from hatchery fish, and environmental factors associated with climate change.

The SSC appreciated the insights provided by KRITFC and TCC in the DEIS Section 4.3.3.2 - Importance of Chum Salmon for Indigenous Peoples in the Yukon and Kuskokwim Regions. The SSC requests that going forward the analysts provide a discussion of AEQ or AEQ impacts in the context of the ecological and cultural information provided by the Indigenous Peoples of the Yukon and Kuskokwim Regions.

The SSC considers the simplified AEQ analyses sufficient to inform the Council's decision-making for this action with the following additional recommendations:

- **Given that run size uncertainty is important for interpretation of AEQ impacts, the SSC requests that the analysts incorporate the available run size uncertainty information (e.g., Addendum Table Ad1 CV estimates) into the Upper/Middle Yukon AEQ impacts analyses and graphics.** The SSC requests the analysts provide 95% confidence intervals in lieu of CVs and that a description of uncertainty estimation methods be included (the SSC cautions against use of the implausibly low Yukon summer chum estimates of uncertainty without further supporting information). The aim is to provide the Council with an understanding of how likely a given reduction in chum bycatch is 1) to be detectable in chum assessments or run reconstructions, 2) to achieve the desired policy outcome, and 3) to support a fuller exploration of tradeoffs in the context of practicability.

- **Provide figures or tables with AEQ, commercial and subsistence catch as a proportion of total removals and - for the Upper/Middle Yukon group - as proportion of run size to provide context for AEQ interpretation,** in addition to the information provided in Figure 3-16. The SSC notes that text related to Figure 3-16 compares commercial harvests to the AEQ numbers and characterizes the AEQ numbers as "low." The SSC recommends not using subjective terms like "low" in the description and to simply report percentages.

- Provide additional information on the assumptions made regarding which year B-season bycatch savings would have returned to river systems, considering the geographic and temporal location of the bycatch in relation to the likely dates of spawning and in-river migration.

- Provide a set of definitions and examine the use of terms used to convey run size (e.g., returns, returns to natal system, escapement, drainage-wide escapement, run reconstruction) for consistency and clarify where terms differ in meaning.

Alternative 5 Methodology

The SSC reviewed the sections added to the DEIS that relate to Alternative 5, which was added for consideration by the Council in April 2024. Alternative 5 would implement in-season corridors triggered by area-specific PSC limits.

The SSC appreciates the efforts of the analysts to describe the potential benefits and associated costs of implementing the three mutually-exclusive options for in-season corridor caps under Alternative 5, both in isolation and in conjunction with other alternatives and options. The DEIS provides clear descriptions of the fundamental considerations for this alternative, including: (1) the large differences in average B season bycatch rates per metric ton of pollock among the proposed corridors, which are nearly four times higher in Cluster 2 when compared with the Cluster 1 or the Unimak corridors, (2) the average genetic composition of chum within each corridor, and (3) differences in realized corridor usage among pollock fishery sectors with higher reliance on the Cluster 1 and Unimak corridors by the shoreside and mothership sectors.

The DEIS also describes the development of a fleet movement model, similar to that utilized with the Bristol Bay Red King Crab EA/RIR, for evaluating the potential impacts of re-distributing effort weekly in response to options under Alternative 5, using haul-level information. In the development of this fleet movement model, the analysts considered reallocating effort in the event of a corridor closure based on either PSC rates or pollock catch per unit effort. Ultimately, the utility of this fleet movement model was limited because the shoreside and sometimes mothership sectors only fished within a single corridor, providing no basis for redistributing displaced effort across space to evaluate impacts on realized PSC. The SSC commends the analysts for their diligence in exploring the feasibility of using an explicit movement model in analyzing this alternative and the clear description of how and where data limitations preclude explicit quantitative analyses.

As an alternative to an explicit fleet movement model, the DEIS provides clear descriptions of differences across space and within the B season of potential pollock landings displaced and PSC rates for chum salmon, Chinook salmon and Pacific herring to contextualize the impact of potential pollock fishery effort displacement under the Alternative 5 options. **The SSC supports the authors' approach in stepping back to holistically consider the impacts of this alternative in the absence of a spatially-explicit fleet movement model.**

The descriptive analysis suggests that under Alternative 5, Option 3 (the Cluster 2 chum salmon PSC limit) presents the least risk of adverse outcomes associated with effort redistribution. Closures in Cluster 1 or the Unimak corridor could displace effort into Cluster 2 which typically had a higher overall chum salmon bycatch rate in the past.

The SSC highlights that behavioral responses to inseason area closures, either preemptively occurring prior to a limit being exceeded or following a corridor closure, will be sector and vessel-specific and that any delays in B season fishing activity until after the August 31 corridor end date will have implications for Chinook salmon PSC. Further, the SSC highlights the challenge in predicting future behavioral responses or impacts in a dynamic marine environment and the inherent challenge in defining static management boundaries in the face of uncertain changes in future species' distribution. The DEIS notes that responses to closure could disproportionately affect the CV sector due to their need to operate near processing facilities.

There was some SSC discussion surrounding the necessity of understanding how heterogeneity within sectors, specifically vessel-specific differences in size and capability, might lead to asymmetric impacts of the Cluster 1 and Unimak corridors under Alternative 5. For additional SSC comments on vessel-specific impacts, including safety considerations, see General Comments above. Potential safety impacts may be a particular concern under Alternative 5, considering increased risks of distant fishing on smaller inshore vessels.

The SSC suggests exploring information on week-area bycatch rates specifically from 2022, 2023 and 2024, where vessels operated under voluntary IPA provisions for chum bycatch management. This information can provide insight into the ability of the fleet, particularly the inshore sector most likely to be impacted by Alternative 5, to avoid triggering a corridor closure and needing to reallocate effort to areas where pollock and PSC catches are less certain. While only three years of information are available, an understanding of short-term effects of the changes to IPA provisions will better inform Council decision-making.

The SSC offers the following additional recommendations:

- In all figures comparing PSC rates and pollock landings across weeks within seasons (e.g. Figures 3-22, 3-30), it is useful to clearly define the week associated with the August 31 end date for Alternative 5 corridor closures, should they occur, to highlight how fishing effort might be re-distributed within the season.

- Further consideration, to the extent practicable, of whether conservation benefits accrued under Alternative 4 (IPAs) might be limited by Alternative 5 (corridors), given potentially more limited information and decreased flexibility for the fleet to actively respond to PSC risk.

- Expanded discussion of the cumulative impacts of multiple potential static closures including the Winter Herring Savings Areas in addition to the corridors defined under Alternative 5.

Economic and Social Impacts

The authors addressed all of the major SSC comments on the April 2024 economic analyses and the Social Impact Assessment (SIA), including the request to synthesize key portions of the SIA into the main body of the DEIS. The SSC finds that the document is largely adequate but requests that the following enhancements be considered to the extent practicable.

Language Related to the Direction of Impact and Uncertainty

The SSC suggests reconsidering language that implies directionality related to impacts. Specifically, language like "Uncertainty in the Potential Benefits for WAK Chum Salmon Savings" is misleading when discussing the impact on WAK bycatch, where there is a question of direction of impact (see "Uncertainty and Direction of Impacts" section below). Changes could be made to be consistent with language like "Effects of the Alternatives on Chum Salmon" that already appears in the text.

Uncertainty and Expected Direction of Impacts

The uncertainty in fleet response and WAK chum bycatch permeates the impact analysis of the alternatives. As outlined in the report, the RHS program can move the fleet to areas of lower total chum, but potentially higher WAK chum. The strategies available to avoid triggering Alternative 5 corridor closures will reflect similar responses to an imperfect proxy.

The SSC recommends an expanded analysis and discussion of how incentives to reduce total chum bycatch and uncertainty interact with the range of Alternative 2 and 3 caps. Specifically, the outcomes for WAK chum will vary in the degree to which the fleet is incentivized to move to avoid total chum bycatch. The

retrospective tables show variability in the prevalence of WAK chum within total chum bycatch and therefore uncertainty when considering future fleet WAK bycatch.

The SSC supports the use of Table 1-5 describing expected impacts of Alternatives 2 and 3, but suggests the analysts expand the discussion of how uncertainty in WAK bycatch varies with a cap to better justify the directions of the arrows. This discussion could build on the current retrospective analysis and consider the relationship between cap size and expected impact. For example, at a total chum cap of zero there would be no uncertainty in Alternative 2 performing better than Alternative 1 in terms of chum bycatch savings. At very low caps, Alternative 2 would have a higher likelihood of reducing WAK chum bycatch compared to Alternative 1, under the assumption that outcomes from past years fully characterize potential outcomes under Alternative 1. On the other hand, very large caps (e.g. the 550,000 cap, which is higher than the chum bycatch in all previous years) are unlikely to induce fleet behavior change relative to Alternative 1, so no impact on WAK chum bycatch would be expected relative to the status quo.

For the intermediate caps analyzed in the document, fleet behavior is likely to change as the fleet seeks to avoid total chum bycatch. For higher caps within the intermediate range, uncertainty in the composition of bycatch introduces uncertainty over the WAK chum bycatch relative to the status quo. However, for lower caps in the range examined, the analysts could build on the retrospective analysis to make some inference about the likely impact of Alternative 2 relative to the status quo. For example, for a 100,000 chum cap and the highest (annual, spatially aggregated) prevalence of WAK salmon in overall chum bycatch (25.1%, Table 3-12), meeting this cap would result in WAK bycatch of 25,100 fish. This is below the level observed in 11 of the last 13 years. Assuming the range of past WAK chum ratios represents ranges under future environmental and behavior conditions, this suggests that such a cap is very likely to lead to WAK chum savings relative to the status quo.

Evaluation of Alternative 4

The SSC recommends the analysts clarify the difference in potential impacts between Alternative 1 and Alternative 4. As indicated in the presentation, an Alternative 1 must represent current conditions; however, recent past and current conditions include any changes that fleets made due to the Council request to industry to take immediate steps to avoid chum salmon in the 2022 B season following the high chum salmon bycatch year in 2021. It also includes the recent series of changes to the fleet IPAs, including those that align the fleet IPAs with Alternative 4. The SSC suggests reframing Alternative 4 and its expected impacts, which in current form attributes future benefits to Alternative 4 implementation but considers associated ongoing costs to be part of the status quo. The SSC recommends interpreting the impact of Alternative 4 as removing the possibility of reverting to pre-2022 status under Alternative 1 by removing some or all of the Alternative 4 provisions. Then, the impact of Alternative 4 is that the fleet:

- Continues to incur any costs associated with the IPA provisions; and
- Continues to implement actions that generate either WAK savings or unintended increases in WAK bycatch.

The text, tables, and figures should all be consistent in the presentation of the expected impacts.

Combined Effects

The SSC recommends changes related to analysis of the alternatives outlined above carry forward into the analysis of combined effects.

Further Context
Public comment and SSC discussion paralleled an SSC comment from April 2024 regarding business and community level interdependencies between pollock and other fisheries:

> **"…** *conditions have evolved with the closure of major crab fisheries, declines in Pacific cod, and downturns in the halibut and sablefish fisheries, all of which create uncertainty for processing operations and the communities in which they operate in general … these sector and community context conditions have the potential to substantially influence the nature and magnitude of potential direct, indirect, and cumulative impacts related to the proposed action."*

The SSC recommends to the extent practicable that the analysts further develop this issue as it is important to the qualitative if not quantitative characterization of vulnerability and resilience capacity at the community level for fishing communities substantially engaged in or dependent on the Bering Sea pollock fishery. This would be especially valuable for communities with substantial support service sector activity and infrastructure that supports multiple pollock fishery sectors, as discussed during the staff presentation and noted in public testimony. The SSC further specifically requests the analysts edit Table 4-2 to put the discussion of potential crew spending impacts in perspective relative to other potential community impacts.

Suggested edits to address minor errors and typos in the document have been provided directly to the authors.

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 that 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 immediate 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 associations 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 February 2025 meeting, a number of SSC members acknowledged associations with specific agenda items under SSC review. On C1 Cook Inlet salmon SAFE, Dana Hanselman is second level supervisor of Lukas DeFillipo, and third level supervisor of Josh Russell. Dr. Hanselman is second level supervisor of Patrick Barry and Lukas DeFillipo on C2 DEIS on chum salmon bycatch management action. Robert Foy is the third or greater level supervisor for Lukas DeFilippo, Patrick Barry, Josh Russell, and Bridget Ferriss. Jason Gasper was involved with the early development of C2 DEIS Alternative 5. Finally, Mike Downs was the primary author of the Social Impact Assessment component of the February 2024 Amendment 16 Environmental Assessment/Regulatory Impact Review (EA/RIR) that is incorporated by reference in the C1 Cook Inlet Salmon SAFE, but was not involved in the 2025 Cook Inlet Salmon Harvest Specifications EA/RIR.