

Scientific and Statistical Committee

Pacific Fishery Management Council
Online Meeting

April 1-2, 2023

Members in Attendance

Dr. Cheryl Barnes, Oregon State University, Newport, OR
Dr. John Budrick, California Department of Fish and Wildlife, Belmont, CA
Mr. Alan Byrne, Idaho Department of Fish and Game, Boise, ID
Dr. John Field, National Marine Fisheries Service Southwest Fisheries Science Center, Santa Cruz, CA
Dr. Chris Free, University of California Santa Barbara, Santa Barbara, CA
Dr. Owen Hamel, National Marine Fisheries Service Northwest Fisheries Science Center, Seattle, WA
Dr. Michael Hinton, San Diego, CA
Dr. Dan Holland (SSC Chair), National Marine Fisheries Service Northwest Fisheries Science Center, Seattle, WA
Dr. Galen Johnson, Northwest Indian Fisheries Commission, Olympia, WA
Dr. Kristin Marshall, National Marine Fisheries Service Northwest Fisheries Science Center, Seattle, WA
Dr. Tommy Moore, Northwest Indian Fisheries Commission, Olympia, WA
Dr. André Punt, University of Washington, Seattle, WA
Dr. Matthew Reimer, University of California Davis, Davis, CA
Dr. William Satterthwaite, National Marine Fisheries Service Southwest Fisheries Science Center, Santa Cruz, CA
Dr. Jason Schaffler (SSC Vice-Chair), Muckleshoot Indian Tribe, Auburn, WA
Dr. Ole Shelton, National Marine Fisheries Service Northwest Fisheries Science Center, Seattle, WA
Dr. Cameron Speir, National Marine Fisheries Service Southwest Fisheries Science Center, Santa Cruz, CA
Dr. Tien-Shui Tsou, Washington Department of Fish and Wildlife, Olympia, WA

Members Absent

None.

SSC Recusals for the April 2023 Meeting		
SSC Member	Issue	Reason
Dr. Owen Hamel	G.6 Considerations for a Sablefish Assessment Update	Dr. Hamel co-authored Agenda Items G.6.a Supplemental NMFS report 1 and NWFSC presentation 1; and supervises contributors.

A. Call to Order

Dr. Dan Holland (SSC Chair) called the meeting to order at 0800. Mr. Merrick Burden briefed the Scientific and Statistical Committee (SSC) on their tasks at this meeting. Dr. Cheryl Barnes volunteered to serve on the Groundfish, Highly Migratory Species, and Ecosystem Subcommittees. Dr. Michael Hinton volunteered to serve on the Coastal Pelagic Species, Highly Migratory Species, and Economics Subcommittees. The April 2023 SSC agenda was approved. Several suggested edits were made to the March 2023 SSC Minutes. Thus, the April 2023 briefing book version of the March 2023 SSC Minutes will be updated to reflect SSC approved changes and the final document will be posted to the [SSC minutes archive website](#).

G. Administrative Matters

5. Membership Appointments and Council Operating Procedures (SSC Closed Session)

H. Coastal Pelagic Species

1. National Marine Fisheries Service Report

The next full assessment of the northern subpopulation (NSP) of Pacific sardine was delayed until 2024 so work could be conducted to better understand stock structure and other uncertainties. A workplan was developed that involved the Southwest Fisheries Science Center (SWFSC) conducting a stock structure workshop in November 2022, the outcomes of which were reviewed by the Coastal Pelagic Species (CPS) Subcommittee of the Scientific and Statistical Committee (SSC). The SSC was briefed on the report of the November 2022 Workshop on Pacific Sardine Stock Structure (Agenda Item H.1a, Attachment 1), which summarized a conceptual model of Pacific sardine, including the characteristics of the NSP, and proposed methods for assigning landings and survey biomass to the NSP or southern subpopulation (SSP) of Pacific sardine, given the working hypothesis of two subpopulations of Pacific sardine off the west coast of North America. The SSC also discussed the [report of the SSC’s Coastal Pelagic Species \(CPS\) Subcommittee \(CPSSC\)](#) related to how to estimate CPS biomass from the 2022 summer acoustic trawl survey.

Pacific sardine stock structure workshop

The SSC agreed with the definitions of the NSP and SSP for management purposes given the working hypothesis of two subpopulations. The workshop report includes a figure showing the typical seasonal distributions of the NSP given the current working hypothesis. The SSC endorsed the CPSSC long-term request that other stock structure archetypes be presented and considered in further work. The SSC is willing to work with the SWFSC to develop the details of these archetypes.

Revised methods for separating northern subpopulation of Pacific sardine

The catches of sardine off Ensenada, Mexico attributed during the last assessment to the NSP are large relative to the estimates of biomass for the NSP and were a part of the justification for the value of sigma used to calculate the Acceptable Biological Catch (ABC) for the NSP in 2022. The CPSSC reviewed an updated habitat model to optimize sampling of NSP sardine and to allocate catches and survey biomass between the NSP and SSP. The modeling approach has not changed but is now based on a wider environmental footprint, especially at the transition sea surface temperature between the two subpopulations. The value of the threshold used when applying the model was selected so that the large 2021 and 2022 catches off Ensenada are assigned to the SSP rather than the NSP. Overall, the SSC agrees that the revised approach is reasonable and an improvement to the earlier model, and endorses use of the updated habitat model to apportion sardine catch and biomass estimates between subpopulations for use in assessments. The 2024 assessment should explore the sensitivity to the threshold value used to separate NSP and SSP catch and biomass.

The SSC notes that the stock structure assumption of the NSP and SSP is a working hypothesis, with supporting evidence. The algorithm for allocating catches and biomass to the NSP and SSP should be revisited as more information is gained or if there are large changes to the abundances of the two subpopulations.

SSC Notes

Some attendees of the November 2022 workshop supported an alternative stock structure hypothesis of a single stock of Pacific sardine. The SSC noted that stock structure for Pacific sardine is being explored using SNPs rather than microsatellite data, which may change the working hypothesis.

Estimate CPS biomasses from the 2022 summer CPS survey

The number of days at sea for the research vessel Lasker was less than anticipated during 2022. Consequently, the Lasker surveyed only part of the typical latitudinal range of the survey, with the remaining portion surveyed by a commercial fishing vessel (the Lisa Marie) and/or two uncrewed surface vessels (Saildrone USVs). The Lisa Marie provided compositional and biological data from the Columbia River to Cape Mendocino via daytime purse seines, rather than trawls at night. Jack mackerel were observed avoiding the purse seine and the compositional data from Lisa Marie were deemed non-representative in this area. Within this area, for sampling events where some sardine were captured, it was assumed that the proportion of sardine in that area could be estimated from a model fitting a GAM to the proportion sardine as a function of latitude during 2018-2021 night-time trawls in the area. The remainder of the fish in these sampling events were assumed to be jack mackerel that avoided capture. This led to the exclusion of other species (e.g., sardine and Pacific mackerel) from some samples where they were observed. These excluded species generally made small contributions to the assemblages in these areas. Overall, the SSC found the adjustments to the survey plan and estimation methodologies made in response to the lack of available days at sea reasonable and appropriate, and endorses the approach as best available science for estimating the biomass of the northern anchovy, herring and the NSP of Pacific sardine during summer 2022. The SSC does not recommend using the Pacific mackerel or jack mackerel biomass estimates from the 2022 survey.

The SSC encourages longer-term work leveraging instances of multiple surveys of the same area that occurred during 2022 to generate variance estimates based on repeated sampling. These estimates can then be compared to the variance estimates obtained from the standard survey methods. The SSC also (1) suggests future consideration of including a temperature covariate in the model of proportion sardine as a function of latitude, (2) requests additional detail in the final report on the synchronization of sampling by saildrones and the Lisa Marie, and (3) suggests that the final report emphasize that only part of the latitudinal range of SSP Pacific sardine was sampled.

H. Coastal Pelagic Species

4. Pacific Sardine Harvest Specifications and Management Measures for 2023-2024

In April 2022, the SSC recommended the 2022 Northern Subpopulation (NSP) Pacific sardine Stock Assessment update be adopted for use by management as a category 2 assessment. The category 2 designation was based on a suite of uncertainties, including questions related to the reported large Mexican catch of NSP sardines relative to the estimated total biomass. At that meeting, the stock assessment team (STAT) expressed concerns about their ability to resolve these uncertainties if also tasked with developing a 2023 stock assessment update. The SSC concurred that delaying a full assessment to 2024 and conducting a review based on new work to better understand stock structure and other uncertainties would be a productive course for improving stock assessments over the longer term.

The SSC discussed the 2022 update stock assessment, their previous statements on an appropriate path forward for 2023-2024 Harvest Specifications, and new information related to the summer 2022 acoustic-trawl (AT) biomass estimate of NSP sardine and the outcome of the SSC CPS subcommittee meeting on March 20-21, 2023 (Agenda Item H.1).

The SSC notes that the summer 2022 AT survey estimated a total NSP Pacific sardine biomass of 69,506 tons, with a CV of 21%. This represents an increase relative to the 2021 estimate of 40,983 tons with a CV of 37%, although given this uncertainty the difference in estimated biomass between the two years is modest. While the SSC recommends adoption of the 2022 survey results for future sardine stock assessments, it does not recommend using the estimate as a direct basis for arriving at an OFL. The SSC notes that the information available during the review discussed under Agenda Item H.1 did not include the proportion of the summer 2022 NSP biomass that is age 1+ (as 1+ biomass is the quantity used to compute an OFL from the stock assessment).

Based on the NMFS report provided under Agenda Item H.1, the SSC recognizes that major improvements to future assessment models are expected. Specifically, the SSC recommended adoption and use of the Southwest Fisheries Science Center's (SWFSC) updated Pacific sardine potential habitat model (Agenda Item H.1.c Supplemental SSC Report 1), for which the threshold value is based on the assumption that the high catch of sardine during 2020-2021 in Mexican waters was from the southern subpopulation (SSP). This is likely to greatly reduce or remove the apparent conflict between the scale of total estimated NSP biomass and NSP catch in previous assessments, ideally resulting in a more robust assessment.

The SWFSC provided the SSC the latest California Cooperative Oceanic Fisheries Investigations (CalCOFI) sea surface temperature (SST) values, which were used to inform sardine harvest control rules (HCRs). The three-year average SST (2020-2022) was estimated to be 15.985°C, slightly lower than the 2019-2021 average temperature of 16.039°C reported in the 2022 update assessment and used to set the 2022-2023 OFL. This would be associated with an E_{MSY} slightly lower than that reported in the 2022 update assessment. The SSC noted last year that since this HCR was revised in 2013, the temperature has suggested an E_{MSY} close to the upper end of the recommended range, despite evidence for low productivity and abundance since that time. The SSC recommends that a workshop be convened to revisit the analysis and assumptions that have been used to inform the NSP Pacific sardine HCR, as there continues to be evidence that the adopted relationship between sardine productivity and ocean temperatures is not currently valid.

The SSC recommends rolling over the 2022-2023 OFL of 5,506 tons for the 2023-2024 management cycle given a lack of compelling evidence that NSP biomass has changed substantially between 2021 and 2022, and the lack of complete information needed to apply the full OFL formula to an updated biomass estimate. Rolling over the 2022-2023 OFL was identified by the SSC in a November 2022 SSC statement on stock assessment prioritization as a potential course of action in the absence of an update stock assessment or other substantial information ([Agenda Item I.5.a, Supp SSC Report 1, Nov 2022](#)).

The SSC recommends that the category 2 sigma continue to be used to inform the ABC (when combined with the Council's decision for a P*) since the revised catch estimates (based on the new habitat model) have not been evaluated within the assessment, and retrospective issues continued to be a concern in the 2022 update assessment. The sigma value should be multiplied by 1.31 to account for the time that has passed since the update assessment was conducted. Table 1, below, provides the recommended OFL and ABC values for P* alternatives that may be selected by the Council.

Finally, the SSC notes that the information reviewed by the SSC CPS subcommittee indicated that the abundance of NSP in Mexican waters appears to have declined over time, suggesting that the DISTRIBUTION term used to apportion the OFL for the NSP should be reconsidered. Similarly, an increasing proportion of the U.S. sardine catch, particularly in Southern California waters, has been assigned to the SSP based on the new habitat model. The SSP is not currently included in the CPS FMP. Consequently, catches of SSP are counted against the allowable catch for the NSP. The SSC recommends that the Council consider an appropriate means of identifying management approaches for the SSP given its inferred increased presence in U.S. waters.

Table 1: SSC recommended OFL and corresponding ABC values based on a year 2 buffer for a category 2 assessment and the Council choice for P* (DISTRIBUTION [0.87 in US waters] was accounted for in the calculation of the OFL)

2023-2024 OFL		5,506 t				
		Category 2 (baseline $\sigma = 1.0$)				
	P*	0.45	0.40	0.35	0.30	0.25
<i>Year 1 buffer</i>		<i>11.8%</i>	<i>22.4%</i>	<i>32.0%</i>	<i>40.8%</i>	<i>49.1%</i>
Year 2 buffer		15.2%	28.2%	39.6%	49.7%	58.7%
2023-2024 ABC (t)		4,669	3,953	3,326	2,770	2,274

Table of Scientific Uncertainty Buffers for Pacific Sardine¹ given a natural mortality rate of $M = 0.59$ (the rounded value from both the 2020 benchmark ($M = 0.585$) and 2022 update ($M = 0.591$)). Based upon the natural-mortality based approach suggested in Wetzel and Hamel (2023; last paragraph of Results section, bottom of page 8), one can calculate r (the annual linear increase in σ) to be:

$$r = 0.52 * M * \sigma_{baseline} = 0.31 * \sigma_{baseline}$$

such that:

$$\sigma_y = \sigma_{baseline} * (1 + 0.31 * (y_{management} - y_{assessment})),$$

where $y_{management}$ is the year being considered for management decisions and $y_{assessment}$ is the year in which the assessment was conducted and adopted for management. Italics indicate values that exceed category 3 values for the same P*. Bold indicates applicable row for 2023.

		Category 1 (baseline $\sigma = 0.5$)							Category 2 (baseline $\sigma = 1.0$)				
Year	P*	0.45	0.40	0.35	0.30	0.25	Year	P*	0.45	0.40	0.35	0.30	0.25
1		6.1%	11.9%	17.5%	23.1%	28.6%	1		11.8%	22.4%	32.0%	40.8%	49.1%
2		7.9%	15.3%	22.3%	29.1%	35.7%	2		15.2%	28.2%	39.6%	49.7%	58.7%
3		9.7%	18.6%	26.8%	34.6%	42.1%	3		18.4%	33.7%	46.4%	57.2%	66.5%
4		11.4%	21.7%	31.1%	39.7%	47.8%	4		21.5%	38.7%	52.5%	63.7%	72.8%
5		13.1%	24.7%	35.1%	44.4%	53.0%	5		24.5%	43.3%	57.8%	69.1%	77.9%
6		14.8%	27.6%	38.8%	48.8%	57.7%	6		27.4%	47.6%	62.6%	73.7%	82.1%
7		16.4%	30.4%	42.4%	52.8%	61.9%	7		30.2%	51.5%	66.8%	77.7%	85.5%
8		18.1%	33.1%	45.7%	56.4%	65.7%	8		32.9%	55.2%	70.5%	81.0%	88.2%
9		19.6%	35.6%	48.9%	59.8%	69.1%	9		35.4%	58.6%	73.8%	83.9%	90.4%
10		21.2%	38.1%	51.8%	63.0%	72.1%	10		37.9%	61.7%	76.8%	86.3%	92.2%
11		22.7%	40.5%	54.6%	65.9%	74.9%	11		40.3%	64.6%	79.4%	88.4%	93.7%
		Category 3 (constant $\sigma = 2.0$)											
P*		0.45	0.40	0.35	0.30	0.25							
		22.2%	39.8%	53.7%	65.0%	74.0%							

¹Developed by Owen Hamel, Northwest Fisheries Science Center

Wetzel, C.R., and Hamel, O.S. 2023. Applying a probability harvest control rule to account for increased uncertainty in setting precautionary harvest limits from past stock assessments. *Fisheries Research* 262, 106659.

April 2022 SSC statement on update assessment and recommendation to defer an assessment in 2023: <https://www.pcouncil.org/documents/2022/04/e-3-a-supplemental-ssc-report-1-4.pdf/>

In the November 2022 SSC statement on CPS stock prioritization, the SSC said: <https://www.pcouncil.org/documents/2022/11/i-5-a-supplemental-ssc-report-1.pdf/>

"If no stock assessment is performed for Pacific sardine in 2023, the SSC will consider any new information provided at the April 2023 meeting, along with the results of the update assessment endorsed in 2022. Rolling over the overfishing limit (OFL) from the 2022 update assessment is one option. Any new information, along with the time since the last full assessment (2020), will be considered in determining the appropriate maximum sustainable yield exploitation rate (E_{MSY}) and OFL, and in setting sigma to reflect the current level of uncertainty." Despite the reference to time since last full assessment, adjustments for assessment age / length of projection period are appropriately reset by update assessments.

The 2021 AT biomass estimate for NSP included in the 2022 assessment update was 40,983 tons (only 455 of which came from acoustic sampling of the nearshore) with a CV on the core biomass estimate of 37%. The 2021 aerial survey estimated a biomass of 14,942 tons and the assessment assumed a Q ratio of 0.733 to account for nearshore biomass missed by the 2021 survey. Applying the Q ratio implies a 2021 AT-derived biomass estimate of about 55,000-56,000 tons depending on the baseline used, although a similar adjustment for Q may not be needed for the 2022 survey given increased nearshore sampling effort. Given the CVs of the estimates, this does not seem very different from the 2022 AT biomass estimate.

There was no support among SSC members for a category 1 designation, but there was some discussion of the merits of a category 2 versus a category 3 designation. Although uncertainty in E_{MSY} would argue for increased uncertainty in the OFL, it was noted that the "nondynamic" harvest rate (estimated to maximize long-term yield in stochastic simulations), of 0.18, is not very different from 0.22 based on current SSTs, and that other CPS stocks have rates that are higher still (Pacific mackerel E_{MSY} is ~ 0.3). With respect to other model uncertainties, it was noted that category 3 assessments typically have no reliable estimate of biomass, but currently there is an (admittedly highly uncertain) assessment as well as a survey biomass estimate. Although the SSC did recommend a category 3 designation in 2021, when the sardine catch only projection could not be adopted, in that scenario there had not been a 2020 survey that helped to inform abundance.

Owen Hamel's uncertainty buffers are based on $\sigma_y = \sigma_{baseline} * (1 + 0.31 * (y_{management} - y_{assessment}))$, which equates to $\sigma_y = \sigma_{baseline} * (1 + 0.31 * 1)$ or $\sigma_y = \sigma_{baseline} * 1.31$ in our case (noting that $y_{assessment}$ is the year the assessment is adopted, not the last year of data informing the assessment). This is based on the approach developed by Wetzel and Hamel (2023) and a natural mortality rate (M) for Pacific sardine of 0.59 (average of values from 2020 benchmark and 2022 update assessments). This would lead to an ABC reduced by 15.2% from the OFL for a P^* of 0.45 or by 28.2% for a P^* of 0.40 (additional values available in the table).

The range of E_{MSY} in the current HCR is between 0.15 and 0.25, and analyses have estimated E_{MSY} as 0.18 when the effects of temperature on productivity are ignored. This value could possibly be an option in the future, pending a reanalysis of the HCR. It was also noted that the productivity

function used to inform this HCR was based on recruits per spawner, not absolute recruitment. However, this is a minor point, the more important point being that the stock has declined substantially in the face of warmer conditions, and this warrants a reanalysis or revision of the temperature-dependent HCR.

CalCOFI SST values to inform sardine harvest control rules, provided by the SWFSC.

Annual SSTs:

2020: 16.410 C

2021: 15.730 C

2022: 15.816 C

Three-year avg SST (2020-2022): 15.985 C

Three-year avg Emsy: 0.22284 [note this reflects a mean temperature calculated at full precision being plugged into the formula]

With respect to the recommendation to consider management approaches for the SSP, at the September 2022 SSC-Ecosystem Subcommittee meeting ([Agenda Item H.1.a SSC-ES Report 1, March 2023](#)) it was discussed that we do expect to see more SSP in U.S. waters with time in the face of climate change. That review included model evaluation of climate projections that indicated northward distributional shifts for the Pacific sardine NSP and a decline in the fraction of landings in California relative to the Pacific Northwest. The SSC-ES notes that the southern subpopulation of Pacific Sardine was not explicitly included in this evaluation and that these results spoke to the value of considering management of the southern subpopulation to also be a high priority in the face of future climate change.

E. Salmon Management

4. Methodology Review Preliminary Topic Selection

The Scientific and Statistical Committee (SSC) met with members of the Salmon Technical Team (STT) and Model Evaluation Workgroup (MEW) to discuss potential topics to be reviewed by the SSC Salmon Subcommittee (SSCSS) in fall 2023. The SSC discussed potential topics for SSCSS review [responsible entities are in brackets]:

1. Re-evaluate use of survival covariates in the Sacramento River winter Chinook forecasting approach given new data now available covering a wider range of environmental conditions [STT].
2. Review methods used to model South of Falcon fisheries in Chinook Fishery Regulation Assessment Model (FRAM) [MEW].
3. Evaluate new methods to forecast the Oregon Production Index for Coho [Oregon Production Index Technical Team].
4. Revisit the Sacramento River fall Chinook (SRFC) abundance forecasting approach [STT].

The MEW discussed their efforts to continue documenting how the FRAM Chinook base period calibration was done. The SSC notes that documenting models used in public resource

management is necessary and should follow best practices and be repeatable by other users. The SSC further notes it is important to quantify the uncertainties in the FRAM outputs.

The SSC reiterates its suggestion to establish a formal process that outlines how and when salmon reference points and conservation objectives are reviewed and updated (see [Agenda Item D.4.a Supplemental SSC Report 1](#) from April 2022 and the SSC Salmon Subcommittee report appended to the June 2021 [Agenda Item C.10.a Supplemental SSC Report 1](#)). Conservation objectives and reference points (e.g., S_{MSY} and F_{MSY}) for SRFC and multiple Washington Coastal Fall Chinook were derived from publications produced in 1984 and do not incorporate any information on run sizes, productivity, or other available biological parameters from the last 40 years. The SSC notes that the values for reference points are routinely updated as a part of the Coastal Pelagic Species and groundfish stock assessment processes, and populations with assessments that do not incorporate recent data are judged to have increased uncertainty.

SSC Notes

- *Previous statement on re-evaluating Sacramento River winter Chinook forecast when more data available (Agenda Item D.2.a Supp SSC Report, Nov 2016): <https://www.pcouncil.org/documents/2016/11/agenda-item-d-2-a-supplemental-ssc-report.pdf/>*
- *Issues related to Sacramento and Klamath River fall Chinook conservation objectives were discussed in greater detail in Agenda Item E.5.a, and could be included in methodology review if work is completed.*
- *Prager and Mohr 2001 (North American Journal of Fisheries Management 21(3):533-547 [https://doi.org/10.1577/1548-8675\(2001\)021<0533:THRMFK>2.0.CO;2](https://doi.org/10.1577/1548-8675(2001)021<0533:THRMFK>2.0.CO;2)) may provide a helpful template or framework for approaching model documentation.*

E. Salmon Management

5. Sacramento and Klamath River Fall Chinook Conservation Objectives

The SSC considered the potential processes, timeline, workload, and content needed to develop new conservation objectives for Sacramento River Fall Chinook (SRFC) and Klamath River Fall Chinook (KRFC) stocks.

Evaluating and updating conservation objectives for SRFC and KRFC should not require a lengthy process nor a long period of time to complete. A report prepared for the Scientific and Statistical Committee's (SSC) Salmon Subcommittee in October 2022 ([Agenda Item D.2, Attachment 1, Nov 2022](#)) indicates that sufficient information to evaluate the SRFC conservation objective likely exists. An update could be accomplished fairly quickly by a small group of analysts with scientific expertise in salmon biology.

For KRFC, there are data to establish conservation objectives for the lower Klamath under current conditions, and there may be information available on the productive capacity of habitat above Iron Gate Dam that could be used to establish a conservation objective, noting that

conservation objectives can include data-gathering strategies ([Pacific Coast Salmon Fishery Management Plan \(FMP\) p.19](#)).

Council Operating Procedure (COP) 15 and the FMP indicate that changes to conservation objectives should occur periodically and take place within the salmon methodology review process ([COP 15 p.1](#), [FMP p.20](#)). Updating conservation objectives for SRFC and KRFC stocks may have unusual challenges that would benefit from a special process, but this need not be the case in general.

The conservation objectives for both stocks are linked to reference points such that updating only the conservation objectives could lead to inconsistency. The lower bound of the conservation objective for SRFC is the S_{MSY} . The KRFC conservation objective is the S_{MSY} . Since S_{MSY} is an input into the control rule for both stocks, the conservation objective is an implicit input as well. In each case, if only the conservation objective is changed, it will no longer be linked to the control rule.

The SSC recommends that the Council differentiate between natural- and hatchery-origin spawners when setting conservation objectives for these stocks.

SSC Notes

The SSC could consider the SRFC and KRFC conservation objectives during this year's salmon methodology review (fall 2023) if materials are ready for review.

In the case of KRFC, it may take many years after dam removal to collect data of sufficient quantity and that covers a representative range of conditions to update the conservation objective. It is better to use the information we have now and proceed.

There are special considerations that may make it worthwhile to have separate processes for these two stocks.

- *SRFC: We don't have all the data needed to calculate S_{MSY} in the same way it has been done recently for other systems such as KRFC, Willapa Bay natural Coho, or Southern Oregon Chinook*
- *KRFC: Large scale dam removal is planned.*

The salmon FMP supports periodic updating of conservation objectives - "periodic review and revision of established objectives is anticipated as additional data become available for a stock or stock complex." -- <https://www.pcouncil.org/documents/2022/12/pacific-coast-salmon-fmp.pdf/#page=28>

"The Council's conservation objectives for natural stocks may (1) be based on estimates for achieving MSY or an MSY proxy, or (2) represent special data gathering or rebuilding strategies to approach MSY and to eventually develop MSY objectives." -- <https://www.pcouncil.org/documents/2022/12/pacific-coast-salmon-fmp.pdf/#page=27>

The goal should be to come up with conservation objectives that are better than what exists, not ones that are perfect.

The control rules are constructed such that conservation objectives are met in most cases if forecasts are correct and the planned exploitation rate is achieved. Conservation objectives will not necessarily be met under these same conditions if conservation objectives are updated without also updating S_{MSY} . Note that in the areas where most harvest of SRFC and KRFC occurs, management is much more often through measures to control effort (time and area restrictions) rather than numeric catch quotas, thus the emphasis on exploitation rate rather than harvest amount.

F. Administrative Matters

1. Regional Implementation of the National Equity and Environmental Justice Strategy

The Scientific and Statistical Committee (SSC) discussed the draft report on Existing Council Activities Responsive to Equity and Environmental Justice (EEJ) Concerns (Agenda Item F.1, Attachment 1) and the topic of EEJ in the PFMC in general and the SSC specifically, and offers the following comments.

The SSC supports the Council's goals and objectives outlined in the draft report and agrees with the assessment that an appropriate response to this initiative by the Council will require more resources and professionally-facilitated training. The SSC also concurs with the NMFS draft policy regarding the need for new research and data to support this initiative including collection of demographic information to identify and understand the needs of underserved communities and once identified, engage those communities to identify, develop, and potentially co-produce research relevant to their needs and interests.

Very little information is currently available to the Council regarding the population of underserved communities who are affected by Council decision-making and how members of those communities participate in fishing and seafood industries. Identifying these communities should be a near-term priority. The SSC draws the Council's attention to a survey the Northwest Fisheries Science Center (NWFSC) hopes to field this summer, which will collect information from commercial vessel owners to aid in identifying underserved populations and communities. However, this survey will not provide information about fishery stakeholders who are not commercial vessel owners. Information on crew members and participants in West Coast fisheries other than vessel owners and processors is essential in identifying and responding to underserved populations and communities. The SSC also notes a need to better understand the demographic composition of the various Council bodies, which can be compared to recent census data and fishery stakeholders as a way of identifying underserved communities in the Council process (e.g., underrepresentation by race and/or gender.)

There is a large body of knowledge about the topic of EEJ. Experts on the topic should be contracted to examine how EEJ is accounted for in current Council activities, and how the Council can better achieve its EEJ objectives. The Council should expand expertise on EEJ issues on its staff and advisory bodies. The SSC proposes that experts in EEJ be involved in

SSC development of research and data needs this cycle, so that we can make progress on these issues as soon as possible. While the SSC can highlight high priority research and data needs topics, the SSC does not have control over who does the research nor how underserved communities are engaged or included in the research itself.

Areas of the draft report where more expertise may help better shape the issue include the section on hiring, which does not examine whether there is bias in the advertising and recruitment for Council employment positions, and the section that mentions, “Council policies often take into consideration community fishing dependence, resilience, and vulnerability”, which is not the same as conducting an environmental justice analysis. While Council and advisory body openings are publicly advertised, many people who apply are already involved in the Council process or know people who are involved in the Council process. This means that recruiting and the applicant pool may be more homogenous than intended. To increase diversity, there likely needs to be proactive efforts to engage people not currently involved (rather than simply stating that under-represented groups are encouraged to apply). Examples of active recruitment efforts include advertising with historically Black colleges and universities (HBCUs), minority-serving professional societies (e.g., SACNAS¹, AISES²), and Tribal entities.

The SSC also encourages considerations of representation in addition to specific areas of expertise when reviewing nominations for vacancies on Council advisory bodies and committees. Moreover, being a single representative from a particular underrepresented group can have its own challenges and best practices in this area suggest aiming for at least two representatives from underserved communities. The SSC recognizes that this is a long-term task for everyone in the Council family and strongly supports the effort.

SSC Notes

Side conversations are highlighted frequently as an important part of the Council process; while these are valuable, they also exclude many parties who might want to be involved in the process. Body language/visual cues are also frequently mentioned as being important components of in-person meetings, but not everyone can pick up on these cues.

Hiring EEJ experts to participate in/facilitate the SSC development of the Research and Data Needs (R&DN) for this cycle would help improve R&DN and could also serve as a test run for addressing EEJ.

Under-representation by race and gender can be explored as discussed in [Arismendi and Penaluna \(2016\)](#). Demographic data from the various Council bodies should also be compared to those pertaining to fishery stakeholders, when available.

¹ [Society for Advancement of Chicanos/Hispanics & Native Americans in Science](#)

² [Advancing Indigenous People in STEM](#)

F. Administrative Matters

2. Council Meeting and Process Efficiencies

The Scientific and Statistical Committee (SSC) discussed the “Staff White Paper on Formats for Council Advisory Body Meetings” (Agenda Item F.2, Attachment 1).

The SSC appreciates the continued opportunity to explore hybrid and remote meeting formats, which increase the accessibility and transparency of SSC meetings. The SSC recognizes the value of meeting in person, particularly for meetings with complex and potentially controversial agenda items. Stock assessment review (STAR) panels are an example of one type of meeting ideally held in person. Ultimately, the decision to adopt one format over another must weigh the benefits and costs of each format, which will vary according to the type and agenda of each meeting.

The SSC has the following recommendations:

- Discretion should be provided to advisory body chairs to determine the best meeting format on a meeting-by-meeting basis, given the expected agenda for the meeting.
- Suitable technology is required for a hybrid format to be successful. Given limited resources, investments in technology should prioritize audio quality over video features.
- Both direct costs (e.g., travel and technology costs) and in-kind costs (e.g., opportunity costs of people’s time) should be considered for each format.
- SSC meetings should be broadcast live publicly for transparency.
- The Council should continue to offer remote options for reading SSC statements, as this allows for subject-matter experts to be available for questions.

SSC Notes

Issues related to the equity of different meeting formats were also discussed. Opportunities for participation, either directly through public comment (oral or written) or indirectly through personal communication, may differ across meeting formats and participants’ situations. The current SSC practice of offering public comment opportunities once per day may need to be revisited to address such concerns.

For improving the general accessibility of remote and hybrid meetings, transcription and closed caption options should be considered, in addition to options for visually presenting slides.

G. Groundfish Management

6. Considerations for a Sablefish Assessment Update

The Scientific and Statistical Committee (SSC) received an overview from Dr. Owen Hamel (Northwest Fisheries Science Center) regarding strong recent sablefish recruitment detected in the 2021 and 2022 West Coast Groundfish Bottom Trawl Surveys and the proposed limited sablefish stock assessment update in 2023. The update would incorporate the trawl survey index and age data from the 2021 and 2022 surveys to provide harvest specifications for 2025-2026 that account for evidence of strong recent recruitment. The SSC discussed the proposed scope of the update, workload implications, and whether to proceed.

The SSC discussed the need to update the 2021 full stock assessment considering review capacity, other ageing priorities, and assessment workload for the 2023 biennium. The limited scope of the update focusing on ageing of only samples from the Trawl Survey should prevent disruption to other ongoing assessment activities previously prioritized for 2023 (Agenda Item G.6.a Supplemental NMFS Report 1). The SSC is supportive of the approach that is being proposed.

The SSC also discussed the potential trade-offs associated with doing the update now, and if that would affect future prioritization of a full or update assessment in 2025. The next few years of surveys will continue to track the recent strong cohorts providing additional information where the selectivity of the gear is greater, better informing recent year class strength in future assessments. Assuming the limited update will not preclude consideration of a full assessment in 2025, the SSC is supportive of the limited update this year.

The SSC Groundfish Subcommittee (GFSC) can review the update assessment at the second of the two Subcommittee meetings planned to review 2023 assessments which is scheduled for August 28-29, 2023. This will provide additional time for ageing the over 3,900 samples collected from the survey during 2021 and 2022. Attendance of the Groundfish Management Team (GMT) and Groundfish Advisory Subpanel (GAP) is highly recommended to provide input.

SSC Notes

- *Primary Topics:*
 - *Consider whether to proceed: No concerns on the ageing workload front in compromising other assessments.*
 - *Workload implications: More time for ageing in late August (28-29th) review. Potentially review at mop-up. Need opportunity for input from the GMT and GAP. May need to increase the meeting time for the second GFSC meeting and start with sablefish to allow time for further analysis and revisitation the next afternoon.*
 - *Scope of the update relative to the TOR: Limited update for trawl survey ageing and evaluation of using marginal vs conditional ageing.*
- *Age zero to three fish in 2021 and 2022 are the highest numbers estimated for those lengths in the history of the survey. This requires an updating of management information for management 2025-2026. If reviewed in late August would provide 2 weeks of additional time. Total of almost 400 otoliths more in 2021 than 2022, but 2022 is more informative since year classes had more time to recruit to the gear. Second review (Aug 28-29) time frame would allow aging of more than half of the 2021 otoliths that otherwise would not be aged if undertaken in the first GFSC review (Aug 14-15). Plan not to undertake ageing of fishery data as these age classes have not yet fully recruited. Exploration of the survey age treatment will focus on the conditional ages vs. marginal ages given concerns with conditional ageing given survey timing and growth rates over time to ensure the best information is available for 2025-2026. In 2022 the peak is composed of age 0 and 1 by length, so ageing is essential to correctly assign them.*
- *Only compositions subject to marginal ageing in the survey presents a concern about the traditional age compositions for the commercial fishery or continue to base their ages on*

conditional ages. Would attempt it both ways, presenting exploration of both conditional and marginal ageing.

- Interest was expressed in seeing where the large tows came from and evaluating the contribution to the Age 0 cohort. What is the value in ageing the 2021 fish if 2022 provides greater information on recent recruitment. Interannual variability and tracking of year class strength between years confirms trends observed. More than one year of data for recruitment events has value to confirm strong year classes and increase precision. If only 2022 was available there would be more uncertainty in the update and might require greater buffering between the OFL and ABC. More information will reduce uncertainty.*
- Any efficiencies in ageing only fish up to age 3 and perhaps doing conditional for all the larger fish. Concern was expressed that the bottom right time varying growth can result in 30 cm fish that are conditionals, but may ascribe them to the wrong age due to variable growth. Ageing small fish using conditional age-at-length doesn't work as well for a species growing this quickly and variably and caught at different times during the survey, which may be problematic. Adjustments for time of capture may not be implemented this time, but can be explored further in the next assessment.*
- A transboundary assessment has repeatedly been identified as a potential improvement to the sablefish assessment and might be accommodated in a full assessment; what are we giving up if we push off the full assessment given the update now. What are the cascading impacts of potentially delaying a full assessment. The next couple years of surveys will further track these cohorts providing additional information where the selectivity of the gear is greater. At least a complete update in two years or a full is still on the table for 2025 to further address ageing considerations and confirm recruitment observed in 2021 and 2022. Still a trade off in terms of potential incentive to "lock in good news" and potentially not having resolved issues or otherwise increasing our understanding of the stock in a full assessment in 2025 if a full assessment is forgone due to the positive results of this update. On the other hand, we might gain the ability to do a full assessment of another stock in need of attention in 2025.*
- Even if 2022 year-class is down weighted in its effect, there is a benefit to accounting for stronger year classes observed in separate years.*
- One focus of the review will be how best to address use of the age data from the 2021 and 2022 NMFS Trawl Surveys as either conditional age-at-length or as direct age reads given variable interannual growth rates for the younger age classes involved and the timing of the survey relative to spawning. Sensitivity analyses should examine the effects of using conditional age-at-length or marginal age compositions direct reads, or a mix of the two across years alternatively treatment of the younger age classes as direct age reads and conditional age-at-length for older individuals with more stable growth rates.*

F. Administrative Matters

7. Future Council Meeting Agenda and Workload Planning

The Scientific and Statistical Committee (SSC) discussed workload planning and has the following updates to its March 2023 statement under this agenda item.

The SSC recommends holding its June, September, and November meetings in-person.

The Pacific Mackerel STAR Panel will be held April 11-13, 2023 at the Southwest Fisheries Science Center in La Jolla, California with Dr. André Punt as chair and with participation from SSC Coastal Pelagic Species (CPS) Subcommittee Members Drs. Theresa Tsou and Chris Free, the CPS Management Team (CPSMT), CPS Advisory Subpanel (CPSAS), and Dr. Joseph Powers from the Center of Independent Experts (CIE). The STAR Panel is planned as an in-person review meeting, with web broadcast to allow for remote public comment.

The Western Groundfish Conference will be held April 24-28, 2023 in Juneau, Alaska. Several SSC members are likely to attend.

The SSC recommends holding a groundfish methodology review as a webinar on May 9, 2023 to review the Sablefish Trip Limit Model. Dr. Cameron Speir will chair the meeting with participation by SSC Economics and Groundfish Subcommittee members, and representatives from the Groundfish Management Team (GMT) and the Groundfish Advisory Subpanel (GAP).

The SSC Economics subcommittee recommends holding a meeting to review the Comparative Cost Study for the West Coast Groundfish Trawl Catch Share Program on May 11, 2023 as a webinar. Dr. Cameron Speir will chair the meeting with participation by SSC Economics Subcommittee members and the Council's consultant Darrell Brannan.

The SSC will participate in the three stock assessment review (STAR) panels for groundfish assessments in June and July of 2023 with participation from the SSC, GMT, GAP and CIE participants yet to be determined. The SSC proposes STAR panels be in-person review meetings, with web broadcast to allow for remote public comment.

- Groundfish STAR Panel 1 for copper rockfish in California, shortspine thornyhead, and rex sole will be held June 5-9, 2023 in Seattle, WA with Dr. Jason Schaffler as chair.
- Groundfish STAR Panel 2 for black rockfish will be held July 10-14, 2023 in Santa Cruz, CA with Dr. John Budrick as chair.
- Groundfish STAR Panel 3 for petrale sole and canary rockfish will be held July 24-28, 2023 in Seattle, WA with Dr. John Field as chair.

The SSC recommends holding SSC Groundfish Subcommittee meetings to prepare Spex Recommendations in August 2023 as webinars. The SSC recommends two meetings with the first held on August 14-15, 2023 to address the first two STAR panels, as well as catch-only projections, and the second on August 28-29, 2023 to address the third STAR panel and any outstanding items including the potential sablefish assessment update, both with participation from Groundfish Subcommittee members and representatives from the GMT and the GAP.

The SSC Ecosystem-based Management Subcommittee recommends scheduling a meeting with the Ecosystem Workgroup (EWG) and the Ecosystem Advisory Subpanel (EAS) to review the new Fishery Ecosystem Plan (FEP) initiative as a webinar in August or September of 2023.

The SSC will participate in the Groundfish Mop-up Panel, if needed, September 25-29, 2023 at a place to be determined with participation from Groundfish Subcommittee members, the GMT, and the GAP.

The SSC recommends holding a Salmon Methodology Review in October 2023 with participation from the SSC Salmon Subcommittee, the Salmon Technical Team (STT), and the Model Evaluation Workgroup (MEW) at a time and place to be determined.

The SSC CPS Subcommittee recommends holding a meeting in Fall of 2023 to review accepted practices guidelines for CPS stock assessments with participation from the CPSMT and the CPSAS.

The Council Coordination Committee's (CCC) Scientific Coordination Subcommittee meeting (SCS8) will be hosted by the New England Fishery Management Council and will be held in the summer of 2024 with a date and location yet to be determined. At least two members of the PFMC SSC are expected to attend.

The SSC recommends participation in the next Sablefish Management Strategy Evaluation (MSE) Workshop in 2024 at a time and place to be determined with participation from the SSC Groundfish Subcommittee, the GMT, and the GAP and possibly the SSC Economics Subcommittee.

The SSC proposes holding a Workshop to Develop Alternative Harvest Control Rules for Pacific Spiny Dogfish in 2024 at a time and place to be determined.

SSC Notes

Consider a workshop for exploration of age determination methods for Pacific spiny dogfish. This may be proposed as a groundfish methodology review topic in September 2023.

A groundfish methodology review to consider the use of ages from the spectroscopy method in stock assessments could be considered as a new groundfish methodology review topic in September 2023 to be undertaken in winter 2023-2024.

Proposed Workshops and SSC Subcommittee Meetings for 2023 and Beyond							
Workshop/Meeting		Potential Dates	Sponsor/ Tentative Location	SSC Reps.	Additional Reviewers	AB Reps.	Council Staff
1	Pacific Mackerel STAR Panel	April 11-13, 2023	SWFSC/ La Jolla, CA/ in-person with web broadcast	Punt - chair Tsou Free	CIE-Powers	CPSMT CPSAS	Doerpinghaus
2	Methodology Review of the Sablefish Trip Limit Model	May 9, 2023	Council/Webinar	Economics and Groundfish Subcommittee Members (Speir - chair)	NA	GMT GAP	Bellman
3	Review of Trawl Catch Share Cost Project Report	May 11, 2023	Council/Webinar	Economics Subcommittee Members (Speir - chair)	NA		Bellman
4	Groundfish STAR Panel 1 for copper rockfish in CA, shortspine thornyheads, and rex sole	June 5-9, 2023	NWFSC/ Seattle, WA/ in-person with web broadcast	Schaffler - chair	CIE (TBD) Hicks	GMT GAP	Bellman
5	Groundfish STAR Panel 2 for black rockfish	July 10-14, 2023	SWFSC/ Santa Cruz, CA/ in-person with web broadcast	Budrick - chair	CIE (TBD) Dorn	GMT GAP	Bellman

Proposed Workshops and SSC Subcommittee Meetings for 2023 and Beyond

Workshop/Meeting		Potential Dates	Sponsor/ Tentative Location	SSC Reps.	Additional Reviewers	AB Reps.	Council Staff
6	Groundfish STAR Panel 3 for petrale sole and canary rockfish	July 24-28, 2023	NWFSC/ Seattle, WA/ in-person with web broadcast	Field - chair Marshall	CIE (TBD)	GMT GAP	Bellman
7	Groundfish Subcommittee Meetings to Prepare Spex Recommendations	August 14-15 and 28-29, 2023	Council/Webinar	Groundfish Subcommittee Members	TBD	GMT GAP	Bellman
8	Ecosystem Subcommittee Meeting to review FEP initiative product	Aug/Sept 2023 TBD	Council/Webinar	Ecosystem Subcommittee Members	NA	EWG EAS	Bellman
9	Groundfish Mop-up Panel, if needed	Sept 25-29, 2023	Council/TBD	Groundfish Subcommittee Members	TBD	GMT GAP	Bellman
10	Salmon Methodology Review	October 2023	Council/TBD	Salmon Subcommittee Members	TBD	STT MEW	Ehlke Bellman
11	CPS Subcommittee Meeting to develop Accepted Practices Guidelines for Stock Assessments	Fall 2023	Council/TBD	CPS Subcommittee Members	NA	CPSMT	Bellman Doerpinghaus
12	CCC Scientific Coordination Subcommittee Meeting (SCS8)	Summer 2024	NEFMC/TBD	SSC members TBD	NA	NA	Bellman

Proposed Workshops and SSC Subcommittee Meetings for 2023 and Beyond

Proposed Workshops and SSC Subcommittee Meetings for 2023 and Beyond							
Workshop/Meeting		Potential Dates	Sponsor/ Tentative Location	SSC Reps.	Additional Reviewers	AB Reps.	Council Staff
13	Sablefish MSE Workshop	2024 TBD	TBD	Groundfish Subcommittee Members	TBD	GMT GAP	Bellman
14	Proposed Workshop to Develop Alternative Harvest Control Rules for Spiny Dogfish	2024 TBD	Council/Webinar	Groundfish Subcommittee Members	TBD	GMT GAP	Bellman

SSC Subcommittee Assignments

Salmon	Groundfish	Coastal Pelagic Species	Highly Migratory Species	Economics	Ecosystem-Based Management
Alan Byrne	John Budrick	André Punt	John Field	Cameron Speir	Kristin Marshall
John Budrick	Cheryl Barnes	John Budrick	Cheryl Barnes	Chris Free	Cheryl Barnes
Owen Hamel	John Field	Alan Byrne	Michael Hinton	Michael Hinton	John Field
Galen Johnson	Chris Free	John Field	Dan Holland	Dan Holland	Chris Free
Tommy Moore	Owen Hamel	Owen Hamel	Kristin Marshall	André Punt	Dan Holland
Will Satterthwaite	Kristin Marshall	Michael Hinton	André Punt	Matthew Reimer	Galen Johnson
Jason Schaffler	Tommy Moore	Will Satterthwaite	Matthew Reimer		Tommy Moore
Ole Shelton	André Punt	Tien-Shui Tsou			André Punt
Cameron Speir	Jason Schaffler				Matthew Reimer
Tien-Shui Tsou	Tien-Shui Tsou				Will Satterthwaite
					Ole Shelton
					Cameron Speir

Bold denotes Subcommittee Chairperson

ADJOURN

PFMC
06/26/23