

Scientific and Statistical Committee

Pacific Fishery Management Council
DoubleTree by Hilton Hotel Fresno Convention Center
Salon D2 and Online
2233 Ventura Street
Fresno, CA 93721
Phone 559-268-1000

March 5-6, 2024

Members in Attendance

Dr. Cheryl Barnes, Oregon State University, Newport, OR
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

Dr. John Budrick, California Department of Fish and Wildlife, San Carlos, CA

SSC Recusals for the March 2024 Meeting		
SSC Member	Issue	Reason
Dr. Owen Hamel	F.2 Consideration of Additional CA Quillback Rockfish Analyses and Adopt Rebuilding Analysis	Dr. Hamel supervises the assessment author.
Dr. Galen Johnson	C.2 Review of 2023 Fisheries and 2024 Stock Forecasts	Dr. Johnson supervises co-authors who contribute forecast materials.
Dr. John Field	C.2 Review of 2023 Fisheries and 2024 Stock Forecasts C.4 Klamath River Fall Chinook Workgroup Report	Dr. Field supervises a co-author (C.2) and the Klamath River Fall Chinook Workgroup chair (C.4).
Dr. Will Satterthwaite	C.2 Review of 2023 Fisheries and 2024 Stock Forecasts C.4 Klamath River Fall Chinook Workgroup Report	Dr. Satterthwaite is supervised by a co-author (C.2) and the Klamath River Fall Chinook Workgroup chair (C.4).
Dr. Kristin Marshall	F.3 Initial Stock Assessment Plan and Terms of Reference	Dr. Marshall is a co-author on a piece of the prioritization process.

SSC Administrative Matters

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 and answered questions from SSC members. A suggestion was made to include a public comment period at the beginning of each day to allow for relevant public comments to be made and considered prior to the SSC taking up an Agenda Item.

The March 2024 SSC agenda was approved. Several suggested edits were made to the November 2023 SSC Minutes and adopted as final. Thus, the March 2024 briefing book version of the November 2023 SSC Minutes will be updated to reflect SSC approved changes and the final document will be posted to the [SSC minutes archive website](#). Subcommittee assignments were discussed in closed session during the election of the SSC Chair and Vice-chair. Open discussion included solicitation of keynote speakers and case studies to be proposed by the PFMC's SSC for the Council Coordination Committee's (CCC) Scientific Coordination Subcommittee meeting (SCS8). The SSC plans to discuss attendees at the April 2024 meeting.

E. Cross FMP

1. Council and SSC Discussion

To internally prepare for this Agenda Item on the Council floor, the SSC discussed items related to general workload, timing, and recent trends and concerns related to groundfish and salmon. A statement was not requested.

J. Administrative Matters

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

a. Election of SSC Chair and Vice Chair

Dr. Jason Schaffler was elected to be the next SSC Chair and Dr. Cameron Speir was elected to be the next Vice Chair. Dr. John Field volunteered to serve as the Groundfish Subcommittee (GFSC) Chair, and Dr. Cheryl Barnes volunteered to serve as Vice-chair. The Groundfish Subcommittee's significant workload was discussed. To assist in addressing workload concerns, the proposal was to create a Vice-chair role, as well as having the GFSC Chair and Vice-chair roles rotate every two years, with the Vice-chair regularly assuming the Chair role, similar to the full SSC election process and on the same schedule (March even years). Dr. Michael Hinton volunteered to serve as the Highly Migratory Species Subcommittee Chair and Dr. Dan Holland volunteered to serve as the Economics Subcommittee Chair.

C. Salmon Management

2. Review of 2023 Fisheries and 2024 Stock Forecasts

The Scientific and Statistical Committee (SSC) discussed the Review of 2023 Ocean Salmon Fisheries (Supplemental Attachment 2) and Preseason Report I for 2024 (Supplemental Attachment 3). Dr. Michael O'Farrell (Southwest Fisheries Science Center, Salmon Technical Team [STT] Chair) provided a brief summary of the reports and members of the STT were available to answer questions. The SSC appreciates the work of the STT in compiling the reports and providing a draft of the Sacramento River fall Chinook (SRFC), Klamath River fall Chinook (KRFC), and Willapa Bay natural coho forecasts. The full Preseason Report I was not available until days before the SSC met, limiting a comprehensive review of the other forecasts.

The Council sets annual catch limits (ACLs) for SRFC, the indicator stock for the Central Valley fall Chinook complex, KRFC, the indicator stock for the Southern Oregon/Northern California Chinook complex, and Willapa Bay natural coho. Preseason Report I provides the ACLs for these stocks (Table V-5). The forecasts for SRFC and Willapa Bay natural coho were derived from forecast models that were reviewed and approved by the SSC and Council in previous years. The SSC found the calculations of the three acceptable biological catches (ABCs) and corresponding ACLs correct based on the forecasts for all three stocks.

As of March 2023, four stocks met the criteria for overfished (KRFC, Queets River natural coho, Queets Spring/Summer Chinook) or not overfished/rebuilding (Juan de Fuca natural coho). The updated status of these four stocks are:

- KRFC. The three-year geometric mean (2021 – 2023) natural area spawning abundance is 30,134, which is below the minimum stock size threshold (MSST) of 30,525. The stock continues to meet the criteria for overfished status.
- Queets River natural coho. The three-year geometric mean (2020 – 2022) escapement was 6,624, which is above the MSST and S_{MSY} (4,350 and 5,800, respectively). The stock meets the criteria for rebuilt status.
- Queets Spring/Summer Chinook. The three-year geometric mean escapement (2020 – 2022) was 346, which is slightly less than the MSST of 350. This stock continues to meet the criteria for overfished status.

- Juan de Fuca natural coho. The three-year geometric mean (2020 – 2022) escapement is 14,461, which is more than the S_{MSY} of 11,000. The stock meets the criteria for rebuilt status.

In addition, both the Sacramento River late fall Chinook and natural-area Sacramento River spring Chinook stocks had the lowest escapements observed since at least 2011 (Review of 2023 Ocean Fisheries Table B-3) and the 2024 forecast for Sacramento River winter Chinook is the lowest forecast on record (1,081 fish; Preseason Report I Table II-2).

No Chinook or coho stocks were determined to be subject to overfishing. However, estimated exploitation rates (ER) for all coho and most Chinook stocks were only available through 2021 (Tables II-6 and III-7; Review of 2023 Ocean Fisheries). Only two Chinook stocks (SRFC and KRFC) had ERs for 2022 (Table II-6).

Although no cases of overfishing were reported, the Maximum Fishing Mortality Threshold (MFMT) reference points for many stocks are based on old data and analyses, and a review and re-analysis of MFMTs using recent data and newer methods is warranted. The analyses presented in Agenda Item C.4 Supplemental Klamath River Fall Chinook Workgroup Report 2 on KRFC productivity show that updating these reference points can be completed relatively quickly.

For Southern Oregon Chinook (specifically its Rogue River Fall Chinook escapement metric), 2022 escapement was below the MSST, 2023 escapement was below S_{MSY} , and the 2024 Rogue Ocean Production Index (ROPI) value is one of the lowest on record. This creates an elevated risk that the geometric mean escapement for 2022-2024 could fall below the MSST.

The SSC strongly recommends that salmon forecasts used in the PFMC process include measures of uncertainty and that methodologies producing salmon forecasts be made available. Documentation of salmon forecast methodologies are also relevant to Fishery Ecosystem Plan Initiative 4, because they inform where and how ecosystem information is currently used in salmon management.

SSC Notes

Review of 2023 Ocean Fisheries

Dr. O'Farrell pointed out a minor error in the Review of 2023 Ocean Fisheries:

- *On page 35 and in Table II-6, the 2022 exploitation rate for SRFC should be 0.76, not 0.52.*

On page 35 of the Review of Ocean Fisheries, 2023 total escapement of Central Valley Spring Chinook was 1,497 not 1,479.

Preseason Report 1

Table V-7 is all NA because of nonsensical results from applying last year's harvest scenario to this year's abundances (e.g. negative abundances).

Table V-4 reports the 2021 Hoko summer/fall Chinook ER as "NA", with a footnote indicating that a reliable ER could not be calculated due to insufficient coded-wire-tag (CWT) information.

The SSC appreciates the addition of Sacramento River winter run stock postseason abundance estimates and explanation of year indexing in Table II-2.

For the Klamath and Sacramento forecast presented in Figure II-7 (page 47) the forecast methodology changes during the time series and it should be noted within the figures.

The SSC suggests that the review of the IEA report and its salmon indicators and stoplight tables be timed to coincide with the Preseason Report I and salmon forecasts. The CCIEA report includes several salmon indicators (pages 18-22, Appendix J-3) as well as specific language developed for risk tables. The explicit risk table language was used only for indicators affecting fish that will be harvested in 2025 or later, so perhaps they are not immediately relevant to Pre-I's forecasts for this year, although it was noted that similar conditions had persisted for multiple years.

*A public comment suggested using buffers and bias correcting forecasts based on forecast performance. A peer reviewed publication outlines one option for doing this:
<https://doi.org/10.1016/j.fishres.2022.106502>.*

The SSC notes that there remains considerable uncertainty about which aspects of the Preseason Report I the SSC is specifically charged with reviewing and endorsing under the Pacific Coast Salmon Fishery Management Plan (FMP) and about the process of initiating potential changes to salmon reference points (e.g., MSST and MFMT; see the Salmon Subcommittee Report attached to [Agenda Item C.10.a, Supplemental SSC Report 1, June 2021](#)).

C. Salmon Management

4. Klamath River Fall Chinook Workgroup Report and 2024 Management Options – Final Action

The Scientific and Statistical Committee (SSC) reviewed the document “Report to the Pacific Fishery Management Council on Klamath River Fall Chinook Interim Management Measures for Ocean Salmon Fisheries in 2024 and Potentially Beyond” from the Klamath River Workgroup (KRWG) (Agenda Item C.4.a Supplemental KRWG Report 2). The four lower dams on the upper Klamath River are being removed this year and Klamath River Fall Chinook (KRFC) will be able to access over 400 miles of habitat that were previously blocked. The report compares the KRFC stock-recruitment curve estimated from data from Brood Years 1979 to 2000 (old time period) with that estimated from data from Brood Years 2001 to 2017 (new time period), while noting updates to the data for some years in the old time period. The report also proposes a number of alternative Harvest Control Rules (HCRs) and lists data and monitoring needs. The SSC commends the KRWG on its work.

The definition of spawners and recruits in Supplemental KRWG Report 2 should be clarified with respect to natural and hatchery fish. KRFC spawner escapement targets are in terms of natural area spawners, which includes some hatchery-origin fish that stray. The presence of hatchery-origin fish complicates interpretation of spawner-recruit relationships, and future reports should

be clear on how they consider hatchery-origin fish when estimating recruitment, and explain why they were treated that way.

The report proposes several alternative harvest control rules. The uncertainty around forecasts affects the ability to meet target spawner abundance levels by choosing a target Exploitation Rate (ER). In cases where forecast error is large, the risk of not meeting spawner abundance targets (or setting an overly conservative exploitation rate) is greater for HCRs that have large, discrete increases in target exploitation rate as potential spawner abundance increases (see for example, Alternatives 3.a., 3.b., and 4).

Alternatives that include a buffer that reduces the ER at high levels of abundance (alternatives 2a., 2b., and 4) have the benefit of (potentially) increasing the utilization of new habitat upstream of the dams.

Estimating spawner-recruit relationships following dam removal in the Klamath River will require 10-15 years of additional data. However, in the interim, the KRWG should explore alternative methods of estimating capacity in the newly available habitat upstream of the dams. Interim methods that do not require more than a decade of new data could then be used to develop escapement targets for the near- or medium-term. Further, maintaining the current level of data collection is required to update spawner-recruit relationships after colonization of the newly accessible habitat.

Similar work that estimates spawner-recruit relationships and evaluates productivity and capacity with contemporary data, as was done by the KRWG, is needed for other salmon stocks on the Pacific coast.

SSC Notes

Preseason predictions of KRFC ocean harvest underestimates harvest with respect to postseason harvest estimates. Looking at alternative methods for forecasting harvest is critical for any control rule.

Table 3.1, page 10. The contents of the column labeled “Percent” is not clear (percent of what?).

Section 4.1.2, p. 11. The usage of “exploitation rate” and “fishing mortality rate” interchangeably is confusing and likely inconsistent.

Section 5, p. 17. The second to last sentence in the first paragraph of this section should read “x-axis” rather than “y-axis”.

Report needs definitions (like S_{max}); explain model form.

Explore developing separate spawner-recruit curves for the Trinity and Klamath rivers.

HCRs with discrete steps (see for example, Alternatives 3.a., 3.b., and 4) are more sensitive to forecast uncertainty than HCRs with smooth transitions. When HCRs are smooth and spawner

abundance is forecast inaccurately, the difference between the selected and intended ER is smaller than when abundance is inaccurately forecast to be on the wrong side of a discrete step. This can result in ERs that are either much too high or too low.

Given the potentially large forecast error present in this case (see Table II-2, 2024 Preseason Report I), alternatives with “smooth” increases in exploitation rate across potential spawner abundance levels present lower risk of not meeting spawner abundance goals.

F. Groundfish Management

2. Consideration of Additional California Quillback Rockfish Analyses and Adopt Rebuilding Analysis

The Scientific and Statistical Committee (SSC) reviewed the [Groundfish Subcommittee \(GFSC\) report](#) on the additional review of quillback rockfish in California. The GFSC convened on January 26, 2024 to discuss potential issues regarding the 2021 stock assessment and subsequent 2023 rebuilding analysis for quillback rockfish. Drs. Ray Hilborn and Mark Maunder presented several items for further consideration, including whether to fix or estimate key parameters (e.g., natural mortality, steepness, growth), the need to account for spatial closures, and whether and how to deal with declining recruitment deviations from 1990 to 2010. These issues were initially raised by Drs. Hilborn and Maunder during public comment at the November 2023 Council meeting.

This re-review adhered to a [Terms of Reference](#) (TOR) that was developed specifically for this meeting. Following more detailed presentations by Drs. Hilborn and Maunder, the GFSC concluded that the issues raised were considered as part of the 2021 stock assessment or not appropriate given the data limitations and TOR for data-moderate assessments at the time. Although Drs. Hilborn and Maunder identified important areas for potential improvement in future assessments, the GFSC did not find justification to reject the 2021 stock assessment or the 2023 rebuilding analysis. The GFSC concluded that a) the choices made by the stock assessment team (STAT) were consistent with the TORs that were in place when the assessment and rebuilding analyses were conducted or b) the data necessary to conduct additional analyses did not exist. The GFSC did not recommend modifications to the base model or additional sensitivity tests. The SSC acknowledges that areas for improvement will very likely be identified each time a stock assessment review is conducted, given additional scrutiny.

The SSC continues to recommend use of the 2021 stock assessment and the adoption of the 2023 rebuilding analysis for California quillback rockfish. The SSC also endorses the areas of future work identified in the GFSC report.

SSC Notes

- *See relevant SSC statements in [June 2021](#), [September 2021](#), [November 2021](#), and [November of 2023](#).*
- *Steepness is unlikely to be estimable for most groundfish stocks, even those that are data-rich. Thus, the steepness prior will continue to be important for this and other groundfish*

stock assessments. There may be utility in revisiting the meta-analysis related to steepness priors, though doing so will constitute a fair amount of work. Alternative methods to estimate steepness are also being developed, which should be reviewed before substantial work is conducted to update the steepness prior.

- *Specific areas of future work include:*
 - *identifying the risk with associated with moving quillback rockfish from a category 2 to a category 3 stock (e.g., using a catch-only model and assuming that the stock is at target levels),*
 - *making use of available data to quantify an index of abundance,*
 - *exploring other methods to estimate steepness,*
 - *running a sensitivity analysis in which the sum-to-zero feature for recruitment deviations is or is not applied, and*
 - *exploring whether an estimated variance for a recruitment deviation in excess of sigma-R indicates model mis-specification.*
- *The SSC continues to encourage greater flexibility (e.g., including age data) when conducting data-moderate stock assessments in the future.*

Relevant excerpts from past SSC statements:

- ***November 2023:*** *The SSC endorses the quillback rockfish rebuilding analysis as best scientific information available (BSIA), and concurs with the GFSC that the analysis was conducted in accordance with the Terms of Reference (TOR) for Groundfish Rebuilding Analysis...The analysis explored an appropriate range of alternative rebuilding strategies as specified in the TOR...In 2021, the SSC reviewed the 2021 assessment and endorsed it as BSIA for use in management and the Council adopted the assessment after considering several discussions presented in SSC statements and GFSC reports that...characterize the SSC's conclusions about the assumptions, strengths, and limitations of the 2021 assessment. The SSC received public comment at this meeting relevant to the assessment and rebuilding analysis and determined that many of the scientific aspects of the public comments had been previously considered in the construction and review of the 2021 assessment. Other comments suggested issues and approaches that will be considered as research and data needs to be addressed before the next quillback rockfish assessment.*
- ***November 2021:*** *The SSC discussed the sensitivity analyses of the California quillback rockfish stock assessment to new age data reported by the GFSC. The additional California data were very sparse, particularly with respect to data from younger, smaller individuals, so a new California-specific growth curve could not be estimated from the available data. Consequently, the SSC continues to endorse the 2021 data moderate assessment for California quillback rockfish as a category 2 stock assessment for use in stock status determination. With respect to future stock assessments, the SSC continues to emphasize that the paucity of data for this species will be a key constraint to improving future assessments, although there are several potential data sources that should be more*

rigorously evaluated to determine whether they could potentially inform either a full or a data moderate assessment model in the future.

- **September 2021:** *The SSC reviewed and discussed outcomes from the GFSC review of additional requests for analyses made by the Council during June 2021 from the length-based data-moderate stock assessment for quillback rockfish in California. The SSC endorsed the assessment as the best scientific information available and suitable for informing management decisions. However, the Council delayed adoption of the assessment pending some additional considerations regarding additional sources of length information, age and growth information and estimation, outliers in the catch history, and selectivity blocking considerations to address depth restrictions implemented in 2001...The additional quillback rockfish otoliths from the CCFRP, the CDFW, the SWFSC and thesis research by Jeff Abrams at HSU, provided after the June Council meeting, are being aged by the NWFSC aging lab. All new age and growth information for quillback rockfish, available from the NWFSC, will be reviewed at the Mop-Up Review Panel...The model is sensitive to parameterizations for growth. Thus, there is a continued need to investigate age and length data and growth estimation for quillback rockfish...Exploration of model sensitivity to allow for selectivity changes due to depth closures impacting the availability of fish to the fishery beginning in 2001 was conducted. The analysis of a 2001 and a more recent 2017 time block for the commercial and recreational fisheries resulted in selectivity that was implausibly shifted to the right after 2017. Additional analysis of a time block in 2001 for the commercial and recreational fisheries provides a means to account for changes in availability due to implementation of depth restrictions. Considerations discussed regarding the representation of closed areas in stock assessments for copper rockfish are also pertinent to quillback rockfish. The SSC endorses the 2021 data moderate assessment for California quillback rockfish as a category 2 stock assessment for use in stock status determination and recommends that the next assessment be a data-moderate assessment....The SSC will review a rebuilding analysis based on the SSC-endorsed California model for quillback rockfish at the Mop-Up Review Panel and requests a rebuilding sensitivity analysis with abbreviated results using the model includes the 2001 time block for the recreational and commercial fleets. This sensitivity analysis will provide results from a model that recognizes changes in availability from the depth restrictions implemented in 2001, within the bounds of the TOR, for comparison to the results of a base model, which does not account for changes in availability because it assumes asymptotic selectivity for the entirety of the time series.*
- **June 2021:** *...There was substantial uncertainty in the California model given sensitivity to assumed growth and mortality parameters. The use of growth from fish sampled in Oregon and Washington, applied in the California assessment presents an unresolved uncertainty, since California is subject to higher water temperatures that can affect growth rates making them potentially unrepresentative. There are additional datasets available to*

potentially inform the future assessments (Table 2) that were not included in the base model because of restrictions imposed by the Data-Moderate Assessment TOR. The SSC concluded that the base models represent the best assessments available...The SSC notes the estimated stock size of California quillback rockfish is below the minimum stock size threshold. The SSC endorses the 2021 data-moderate assessments of quillback rockfish as providing the best scientific information available and suitable for informing management decisions...The SSC recommends that the next quillback rockfish assessment be a full assessment to better understand the current depletion and scale of the stock.

F. Groundfish Management

3. Initial Stock Assessment Plan and Terms of Reference (TOR)

The Scientific and Statistical Committee (SSC) discussed initial planning for groundfish stock assessments, which are anticipated to be completed in 2025 and 2027 to inform the harvest specifications and management measures for fisheries in 2027 and beyond. These discussions included a review of the draft Terms of Reference (TOR) for the stock assessment process to be conducted in 2025-2026 and the need to develop a code of conduct for all SSC meetings, including stock assessment review (STAR) panels.

After the 2023 stock assessment cycle, the SSC recognized a need to develop a code of conduct that identifies the expectations of all participants in the stock assessment process. The SSC will work with Council staff to develop a code of conduct for all SSC meetings, including those related to stock assessment reviews and meetings of SSC subcommittees.

The 2025 stock assessments will inform the harvest specifications and management decisions for groundfish fisheries in 2027 and beyond. Drs. Jim Hastie and Chantel Wetzel (Northwest Fisheries Science Center) were present to answer questions regarding the framework for identifying the highest priority stocks for assessment in the upcoming cycle. This year, an [online groundfish assessment prioritization tool](#) for ranking species replaces the Excel workbook that was used in previous cycles. Notable changes include updates to Tribal and recreational rankings, and how the constituent demand factor is calculated. The SSC agrees that the online assessment tool is ready for use.

The SSC offered guidance to Dr. Wetzel on how the tool could be improved in the future. For the next cycle, the SSC recommends considering using the productivity susceptibility analysis (PSA) as an alternative to or in combination with stock status for previously assessed stocks, as well as re-evaluating how the PSA is used for stocks that have not yet been assessed. The SSC also recommends adding more climate and ecosystem information in the future, including an exploration of how the risk tables developed under the Fisheries Ecosystem Plan Initiative 4 may be used in the stock prioritization process. Additionally, the SSC recommends that for stocks where the most recent assessment was an update, the time since the last benchmark assessment be considered as well.

To facilitate decisions regarding assessment prioritization related to workload, the SSC has taken the prioritization table from Attachment 1 and added two columns denoting which assessments could be candidates for updates relative to benchmark assessments, and the likely number of

models that might need to be developed for each species (recognizing that these are estimates pending stock definition analyses). Note that several assessments listed in Table 2 of Attachment 1 are also candidates for update assessments, but are not ranked in the top 25 species from the prioritization effort. The SSC could provide additional information on the potential use of assessment updates for species and stocks determined to be Council priorities in June.

The SSC reviewed the three draft TORs. The TORs for methodology reviews and for rebuilding analyses (Agenda Item F.3 Supplemental Attachments 6 and 7) are largely unchanged since 2022. The changes to the TORs that will guide the groundfish stock assessment process during 2025 and 2026 reflect outcomes in the [GFSC report](#) from the Groundfish Assessment 2023 Process Review meeting held in January 2024, including recommendations from stock assessment authors. The need to better integrate input from the GMT and the GAP during the last cycle was noted, and revisions have been proposed to address this. The report also noted the need for greater communication between advisory bodies, stakeholders and Council members prior to adopting assessments (e.g., pre-assessment data workshops and the “evening sessions” for stock assessments). The GFSC will continue work on updating the draft TORs for finalization at the June 2024 Council meeting. The TOR should be updated to note that SSC members who served on a STAT or STAR panel are welcome to contribute to discussions but would be required to recuse themselves if details of their assessments come up for a vote.

The SSC requests guidance from the Council on the usefulness of the stock assessment 1-page summaries and whether the Council would like the assessment teams to produce them.

Table 1: Top 25 ranked species for stock assessment priorities with additional information regarding the potential to conduct updates, and likely or plausible number of models/stocks.

Species	Rank	Last Assessed	Recommended assessment type	Likely number of assessments
Quillback rockfish	1	2021	benchmark	1 to 3
Brown rockfish	2	2013	benchmark	unknown
Yellowtail rockfish	3	2017	update and/or benchmark	2
Widow rockfish	4	2019	update or benchmark	1
Chilipepper	5	2015	benchmark (?)	1
Redbanded rockfish	6	-	benchmark	unknown
Vermilion/Sunset rockfish	7	2021	update or benchmark	4
Bocaccio	8	2017	update or benchmark	1 to 2
Lingcod	9	2021	benchmark	2
English sole	10	2013	benchmark	1
Sablefish	11	2023	benchmark	1
Rosethorn rockfish	12	-	benchmark	unknown
Petrale sole	13	2023	update or benchmark	1
Kelp greenling	14	2015	update or benchmark	1 to 3
Greenstriped rockfish	15	2009	benchmark	1
Greenspotted rockfish	16	2011	benchmark	2
Rougheye/Blackspotted rockfish	17	2013	benchmark	1
China rockfish	18	2015	benchmark	3
Canary rockfish	19	2023	update or benchmark	1
Black rockfish	20	2023	update or benchmark	3 to 4
Longspine thornyhead	21	2013	benchmark	1
Starry rockfish	22	-	benchmark	unknown
Treefish	23	-	benchmark	unknown
Yelloweye rockfish	24	2017	update or benchmark	1
Pacific sanddab	25	-	benchmark	1

SSC Notes

There is a growing list of species with assessments that are more than 10 years old. The SSC requested that the Science Centers provide options to address this issue in April 2024.

The data shown in F.3 Supplemental Attachment 4 is not complete, and only reflects the data available to the Science Centers. This is not inclusive of all the data sources in the assessments themselves (e.g., when independent survey programs do not upload data to PacFin or RecFin).

The assessment prioritization rubric in the assessment tool differs from the national guidance with respect to target assessment frequency, given the wide range in the longevity of species found off the U.S. West Coast.

The SSC noted that the new information factor, unlike the other factors, has a maximum score lower than 10, which implicitly down weights the importance of this factor. An alternative

approach would be to scale the new information scores to a maximum of 10 and then reduce the weight.

When considering the utility of PSA scores, the SSC recommends reviewing [Hordyk and Carruthers 2018 PLoS One](#), which argues that PSA scores may not capture the intended vulnerability to overexploitation.

The “choke stock” metric in the constituent demand score, which is based on current average catches compared to future ACLs, may not be a good indication of how constraining a stock actually is. This is because catches of overfished rockfish that appeared to be constraining in the past were often well below their ACLs.

F. Groundfish Management

7. 2025-2026 Fisheries Analysis Update and Adopt California Quillback Rockfish Harvest Specifications and Rebuilding Parameters

Under Agenda Item F.2, the SSC continues to recommend use of the 2021 stock assessment and the adoption of the 2023 rebuilding analysis for California quillback rockfish. Under this Agenda item, the SSC recommends 1.52 mt for the 2025 OFL. The 2026 OFL will depend on the rebuilding strategy adopted by the Council.

The SSC notes that in [Agenda Item E.7.a GMT Report 1 \(November 2023\)](#), the OFL for 2026 under the ABC Rule should be 1.77 mt rather than 1.81 mt.

The SSC suggests that the Council request a catch-only projection for Washington Cabezon to be reviewed at the April Council meeting. This is needed due to the non-equilibrium data-poor assessment used for this stock in 2019 and the need to account for actual removals to better define appropriate management for this stock in 2025 and beyond.

SSC Notes

The 2025 OFL calculated based on SPR50% in Table 5 is different from the OFLs based on the other harvest strategies, in which they should all be the same for 2025. This slight discrepancy is due to rounding when the OFL was generated by different methods.

The sigma for the California quillback stock was set as the time varying category 2 sigma upon adoption of the assessment. 2025 will be year 4 since the assessment leading to a buffer of 14.3% for 2025 and 15.1% for 2026 or multipliers of .857 and 849.

H. Ecosystem Management

1. California Current Annual Ecosystem Status Report

The Scientific and Statistical Committee (SSC) met with representatives of the California Current Integrated Ecosystem Assessment (CCIEA) team, Andrew Leising (Southwest Fisheries Science Center) and Mary Hunsicker (Northwest Fisheries Science Center). The SSC’s discussion with the CCIEA team covered three documents: 1) the 2023-2024 California Current Ecosystem Status

Report ([Agenda Item H.1.a CCIEA Team Report 1](#)), 2) Appendix E. Developing Indicators of climate change and variability ([H.1.a Supplemental CCIEA Team Report 2](#)), and 3) Potential topics for SSC-ES / CCIEA in September 2024 ([Agenda Item H.1.a Supplemental CCIEA Team Report 3](#)).

Review of the 2023-2024 CCIEA Ecosystem Status Report (ESR) and Appendix E

The Ecosystem Status Report (ESR) provides important information on environmental, biological, social, and economic indicators and on an ecosystem perspective on U.S. West Coast fish stocks, fisheries, and coastal communities for the Council process. The SSC commends the CCIEA team's openness and responsiveness to Council and SSC questions and recommendations, and their continuing efforts to improve the ESR each year. Notable additions to the report this year include expanded information on forage species in the California Current Ecosystem (CCE), refinements to salmon stoplight tables and suite of indicators, expanded analyses and figures on the human well-being components, and the addition of new topics to the Climate Change Appendix (see Appendix C of [Agenda Item H.1.a CCIEA Team Report 1](#) for a full list of changes).

The SSC appreciates the progress towards incorporating estimates of uncertainty into the ESR. The SSC recommends that uncertainty and/or sample sizes continue to be added where possible. The SSC also recommends that a discussion of uncertainty using Intergovernmental Panel on Climate Change (IPCC) language be incorporated into Table E.1 on the potential impacts of the 2024 El Niño. The SSC highlights that care is needed in the treatment and discussion of uncertainty when mixing observations of historical conditions with forecasts and projections of future conditions.

The SSC discussed the importance of the timing of the ESR agenda item, with respect to Council decisions, that may benefit from information in the Report. In particular, salmon stoplight tables could better inform Council discussions around preseason forecasts, but the Council does not schedule the ESR agenda item until after the salmon forecast agenda item. More generally, the SSC recommends considering further coordination between the Council and CCIEA team to ensure that the delivery of the ESR is well-timed to support decision-making.

Review of Potential topics for SSC-ES / CCIEA in Summer 2024

The CCIEA team proposed three topics for review by the SSC in Summer 2024: 1) new prey indicators in the ESR; 2) best practices for salmon stoplight tables; and 3) development of risk tables and their applications in support of FEP Initiative 4, which was suggested based on prior SSC-ES feedback. The SSC identified topics 1 and 3 as priorities for the Summer 2024 meeting. The SSC recommends revisiting the potential scope of topic 3 after the March 2024 Council meeting, which could be inclusive of topic 2 if the risk table approach was expanded beyond groundfish. The SSC identified offshore wind energy as an additional topic that could be considered during 2024 or a future review. The SSC-ES proposes to hold this review meeting in the summer of 2024 in time to submit the report from the review to the briefing book for the September Council meeting.

SSC Notes

The SSC appreciates the great progress towards incorporating estimates of uncertainty into time series and recommends that these efforts continue for plots still missing uncertainty estimates (e.g., Figure 3.3).

The SSC notes that more whale entanglements occur than are observed and recommends adding greater discussion of likely rates of underestimation.

The SSC appreciates the addition of smolt year to the stoplight table for California salmon stocks, making them consistent with the Columbia tables, and the application of risk table language to an example smolt year. The SSC suggests that applying the risk table language to smolt year 2022, which will enter the fishery this year, may be more informative to Council decisions than using smolt year 2023, which will not enter the fishery until 2025.

The SSC recommends that new prey indicators continue to be incorporated into the ESR; the rockfish recruitment and ecosystem assessment survey, acoustic surveys, and surveys along the Newport Line as additional sources of krill data.

The offshore wind (OSW) suitability index may be better referred to as an unsuitability index because the high values indicate places of high ecological suitability, which are thus unsuitable for OSW development from a fisheries perspective.

It would be useful to know the sample sizes and sampling location associated with the diet data.

The SSC seeks clarification on what is meant by “Dominated by larvae” in Table E.1, specifying the potential impacts of El Niño on rockfish in 2024.

The SSC highlights that the term overfishing, which for groundfish and CPS is determined based on the ratio of the catch to the overfishing limit (OFL), is used inconsistently with this definition when discussing Figure K.1. We do not define overfishing of groundfish and CPS based on F/F_{MSY} (though we do for salmon).

The SSC suggests that the discussion of OSW development may be better suited under a “hot topics” section of the report. The discussion of the impacts of the upcoming El Niño may also be better suited for such a section.

The SSC is interested in the relationship between Dungeness crab megalope abundance and landings and could review this relationship when published. The SSC is concerned by the selective elimination of data points in the current relationship.

The SSC highlights that Figure L.1 includes an optimistic and pessimistic assessment for bigeye tuna but not for the other HMS species. The SSC seeks clarity on the definition and source of these optimistic and pessimistic assessments.

*The SSC suggests that the geometric index of importance (GII) may be a better indicator of frequency of occurrence for predator diets. See Assis, CA., 1996. [A generalized index for stomach contents analyses in fish](#). *Sci Mar*, 60(2), pp.385-389.*

The SSC discussed the potential to review the new analyses described in Appendix E (the climate change appendix). We will need to revisit this in the future as more products from the NMFS Climate Ecosystem and Fisheries Initiative (CEFI) are developed because it could have substantial workload implications for the SSC Ecosystem Subcommittee.

J. Administrative Matters

3. Future Council Meeting Agenda and Workload Planning

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

The SSC anticipates conducting its April 2024 meeting remotely and anticipates meeting for only one day on Friday, April 5th.

The SSC proposes the SSC Groundfish and Economics Subcommittees hold a meeting to discuss methods for the state/federal catch proportion analysis (recreational and commercial) in late spring or early summer of 2024 prior to application of these methods in the Phase 2 groundfish stock definition analyses with participation from the Groundfish Management Team (GMT) and the Groundfish Advisory Subpanel (GAP), subject to when the analysis and analysts are available. The SSC requests guidance on optimal timing of when this review should occur and the scope of the review to support the Council process.

The SSC Coastal Pelagic Species (CPS) Subcommittee will review and update Terms of Reference for the CPS Stock Assessment Review Process and the Accepted Practices Guidelines for CPS stock assessments on April 17, 2024 during a virtual meeting.

The SSC proposes holding a Groundfish Methodology Review to consider the use of Fourier Transformed Near-Infrared Spectrophotometry (FT-NIRS) method for estimating groundfish ages to be utilized in future stock assessments in late summer 2024 at a time and place to be determined with participation from the GMT.

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 during the week of August 26, 2024 in Boston, MA. At least two members of the PFMC SSC are expected to attend.

The SSC Ecosystem-Based Management Subcommittee proposes a one-day meeting in Summer 2024 to review topics associated with the California Current Integrated Ecosystem Assessment Team's Ecosystem Status Report and Fishery Ecosystem Plan (FEP) Initiative 4 aimed to report to the Council at the September 2024 Council meeting. Anticipated participants include members of the Ecosystem Workgroup (EWG) and the Ecosystem Advisory Subpanel (EAS). The scope and participants for this meeting will be refined after receiving Council and advisory body guidance on FEP Initiative 4 after the March 2024 meeting.

The SSC proposes the full SSC hold a meeting to discuss Phase 2 Stock Definition analyses as an extra day added at the beginning of the September SSC meeting in Spokane with participation invited from representatives of the GMT and the GAP.

The SSC proposes the SSC Salmon Subcommittee hold a Salmon Methodology Review with participation from the Salmon Technical Team (STT), and the Model Evaluation Workgroup (MEW) in the first week of October 2024 at a time and place to be determined.

The SSC proposes the SSC Groundfish Subcommittee hold a meeting to discuss "Approaches to Deal with Large Closed Areas and Other Spatial Issues in Stock Assessments" in 2024 at a time and place to be determined, with participation from the GMT and the GAP, and subject to analysis being completed and ready for review.

The SSC proposes holding a workshop in 2024 on use of remotely operated vehicle (ROV) data in stock assessments to facilitate inclusion in future groundfish assessments, dependent on proponents readiness and the provision of additional information to review by CDFW. This includes review of abundance estimates for quillback rockfish and consideration of methods for integration of results in future stock assessments.

The SSC proposes holding a Workshop to Develop Alternative Harvest Control Rules for Pacific Spiny Dogfish in 2024, particularly if spiny dogfish or another elasmobranch species is included in the stock assessment prioritization for 2025 assessments. However, the SSC notes that this would require that an analysis be developed and available to review. The review would take place at a time and place to be determined.

Proposed Workshops and SSC Subcommittee Meetings for 2024 and Beyond

Workshop/Meeting		Potential Dates	Sponsor/ Tentative Location	SSC Reps.	Additional Reviewers	AB Reps.	Council Staff
1	Meeting to Discuss Methods for the State/Federal Catch Proportion Analysis (Recreational and Commercial)	Late Spring/Summer 2024	Council/TBD	Groundfish/ Economics Subcommittee Members	NA	GMT GAP Advisors	Bellman
2	CPS Stock assessment TOR and Accepted Practices	April 17, 2024	Council/TBD	CPS Subcommittee Members	NA	CPSMST CPSAS Advisors	Doerpinghaus
3	Groundfish Methodology Review of FT-NIRS Method for Estimating Fish Ages Utilized in Stock Assessments	Summer 2024 TBD	NWFSC	Groundfish Subcommittee Members	CARE	GMT	Bellman
4	CCC Scientific Coordination Subcommittee Meeting (SCS8)	August 26-29, 2024	NEFMC/ Boston, MA	SSC members TBD	NA	NA	Bellman
5	Ecosystem-Based Management (EBM) Subcommittee Review of CCIEA topics	Summer 2024	Council/TBD	EBM Subcommittee	NA	EWG EAS	Bellman
6	Review Phase 2 Stock Definition Analysis	Extra SSC added to September SSC Mtg	Council/Spokane	Full SSC	NA	GMT GAP Advisors	Bellman
7	Salmon Methodology Review	First week of October 2024 TBD	Council/TBD	Salmon Subcommittee	NA	STT MEW	Bellman/Ehlke
8	Approaches to Deal with Large Closed Areas and Other Spatial Issues in Stock Assessments	By End of 2024 TBD	Council/TBD	Groundfish Subcommittee Members	NA	GMT GAP Advisors	Bellman

Proposed Workshops and SSC Subcommittee Meetings for 2024 and Beyond

Workshop/Meeting		Potential Dates	Sponsor/ Tentative Location	SSC Reps.	Additional Reviewers	AB Reps.	Council Staff
9	Use of ROV Data in Stock Assessments Workshop	By End of 2024 TBD	TBD	Groundfish Subcommittee Members	TBD	GMT	Bellman
10	Proposed Workshop to Develop Alternative Harvest Control Rules for Spiny Dogfish	TBD	TBD	Groundfish Subcommittee Members	TBD	GMT GAP Advisors	Bellman

SSC Subcommittee Assignments

Salmon	Groundfish	Coastal Pelagic Species	Highly Migratory Species	Economics	Ecosystem-Based Management
Alan Byrne	John Field (Chair)	André Punt	Michael Hinton	Dan Holland	Kristin Marshall
John Budrick	Cheryl Barnes (Vice-Chair)	John Budrick	Cheryl Barnes	Chris Free	Cheryl Barnes
Owen Hamel	John Budrick	Alan Byrne	John Field	Michael Hinton	John Field
Galen Johnson	Chris Free	John Field	Dan Holland	André Punt	Chris Free
Tommy Moore	Owen Hamel	Owen Hamel	Kristin Marshall	Matthew Reimer	Dan Holland
Will Satterthwaite	Kristin Marshall	Michael Hinton	André Punt	Cameron Speir	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
03/20/24