Scientific and Statistical Committee's Groundfish Subcommittee 2025 Groundfish Stock Assessments Report

Pacific Fishery Management Council
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Introduction

The Groundfish Subcommittee (GFSC) of the Scientific and Statistical Committee (SSC) met at the University of Washington School of Aquatic and Fishery Sciences in Seattle on August 12-13, 2025 to review the new groundfish stock assessments that will be considered by the full SSC and the Pacific Fishery Management Council (PFMC, referred as the Council) at the September 2025 Council meeting. These included the benchmark assessments reviewed by Stock Assessment Review (STAR) Panels during 2025, two stock assessment updates reviewed only at this meeting (noting that updates "reset" time-varying sigma), and numerous catch-only projections reviewed only at this meeting (noting that catch-only projections do not reset time-varying sigma, but often lead to changes in overfishing limit (OFL) and acceptable biological catch (ABC) projections by virtue of accounting for differences between assumed and realized catches from past assessments). Per the Terms of Reference for the Groundfish Stock Assessment Review Process for 2025-2026, this meeting is intended to provide time for a more thorough review of the new assessments than would otherwise be available to the SSC at the September Council meeting, when the assessments are scheduled to be formally adopted for use in the groundfish harvest specification process. A list of participants and their affiliations is provided in Appendix A.

This report provides the SSC GFSC recommendations for the three benchmark assessments reviewed during STAR Panels 1 and 2. The remaining recommendations will be included in a supplemental report made available for the September 2025 Council meeting.

Yellowtail Rockfish Benchmark Assessment (North of 40º 10' N. Latitude)

The SSC GFSC reviewed the 2025 full benchmark assessment for yellowtail rockfish North of 40º 10' N. lat., which was last assessed in 2017 as a benchmark assessment.

The 2025 assessment is based on a single-area model with sex-specific growth and mortality estimated internally. The assessment includes catch, length, and age data from three fishery fleets (commercial shoreside, at-sea, recreational) and various data types from four survey fleets (West Coast Groundfish Bottom Trawl Survey [WCGBTS], Triennial survey, OR-WA hook-and-line survey, Standard Monitoring Units for the Recruitment of Fishes [SMURF] recruitment index). The WCGBTS survey provides conditional age-at-length, length, and index data. The Triennial survey provides age, length, and index data. The assessment also includes two new fishery-independent indices: the combined hook and line survey from Oregon and Washington, which includes associated length data, and the SMURF recruitment survey from Oregon. The model starts

in 1889, which is the earliest year of the commercial catch reconstruction. The population was assumed to be unfished and to have an equilibrium age structure at this point. Early recruitment deviations are estimated from 1932 to 1961 to better match the age structure at the start of the availability of composition data in 1972.

The major changes from the 2017 assessment can be divided into three categories: data updates, data additions, and structural changes. The 2025 assessment reanalyzed and extended all relevant data sources through 2024, corrected the weighting of the commercial fishery composition data, and updated the ageing error matrix. The 2025 assessment also added a combined OR-WA hook-and-line catch-per-unit-effort (CPUE) index, added the SMURF recruitment index, and added the foreign trawl catches from 1966-1976 that were omitted from the 2017 assessment. Finally, the 2025 assessment used estimated discards from the Groundfish Expanded Mortality Multi-year (GEMM) data product rather than modeling retention curves, used a single recreational fleet rather than separate OR and WA recreational fleets, modelled sex-specific recreational fishery selectivities, added additional selectivity time blocks, and updated the maximum age in the data bins to better match observations. The bridging analyses revealed that the largest changes in biomass scale and status resulted from correcting the weighting of the commercial fishery composition data, incorporating eight years of new data, and updating the selectivity blocking. The GFSC requests that the STAT provide the figures associated with the bridging analysis in units of biomass rather than egg production in the final assessment document, to fully understand the impacts of these changes on population scale.

The STAR Panel and GFSC found this assessment to be an improvement over the 2017 assessment. The 2025 assessment is relatively data-rich with large amounts of fishery-independent and -dependent data, including large amounts of age and length observations. The assessment has well-informed estimates of sex-specific natural mortality, growth, and unfished recruitment. The fits to the composition data were good, with simple selectivity assumptions and fleet structure. The model was very stable, with most sensitivity runs falling within the confidence intervals of the base model. The assessment is in good agreement with a recent Canadian assessment for yellowtail rockfish in British Columbia.

The STAT, STAR Panel, and GFSC noted that the fishery-independent indices of biomass were fairly uninformative, indicating that bottom trawl surveys may not be the most reliable indices for this (and other) midwater schooling species. Preliminary exploration showed that a series of relatively high biomass estimates (2014-2019) were also seen for other midwater rockfish species, suggestive of a possible environmental driver resulting in variable catchability. As a result, the GFSC recommends additional research into survey catchability, and that future assessments consider whether an environmental index could better model time-varying survey catchability.

The 2025 estimated stock status is estimated to be 62.6% of unfished spawning output, which is above the management target of 40% of unfished spawning output. The 2025 estimated exploitation rate is 0.043, which is below the 0.051 management target (the exploitation rate that leads to a spawning potential ratio of 0.5).

Endorsement as the Best Scientific Information Available

The GFSC endorses the assessment of yellowtail rockfish North of 40º 10’ N. lat. as providing the best scientific information available and suitable for informing management decisions.

Major Uncertainties and Considerations for Management Decision-Making

Unfished recruitment (R_0) was identified as the major axis of uncertainty for the decision table as the sensitivity analyses yielded a broad range of R_0 estimates. Although natural mortality (M) has previously been considered a major uncertainty, it was less uncertain than R_0 in this assessment. There is also considerable uncertainty in stock structure. Although there is genetic evidence to support a stock split at 40°10' N. lat., there is no such evidence for a split at the U.S.-Canada border. This perspective is also supported by the draft 2024 Canadian yellowtail rockfish assessment. While this is noted in the assessment report, and review panel requests included a comparison of recruitment and depletion trends, additional efforts to address this uncertainty would be helpful in future assessments of this (and other) stocks.

Stock Category and the Sigma Recommendations

The GFSC recommends that the yellowtail rockfish North of 40º 10' N. lat. stock be assigned a Category 1b designation with the default sigma value of 0.5 for calculating the scientific uncertainty buffer. The GFSC recommendations are consistent with the STAR Panel recommendations. The pilot application of the risk table to yellowtail rockfish North of 40º 10' N. lat. yielded a Level 2 (Neutral) designation, which means that the default sigma would be retained if the risk tables were applied.

Benchmark or Update Recommendation for the Next Assessment

The GFSC recommends that the next assessment be an update, unless the next assessment can be conducted as a transboundary assessment in collaboration with Canada, in which case a full assessment would be preferred.

Recommended OFLs for 2027 and 2028

The OFLs for the next management cycle are 5,051 mt for 2027 and 4,882 mt for 2028, based on the assumption that the Council chooses a P* of 0.45 (default harvest control rule) for the 2027 ABC (full attainment of annual catch limit (ACL) assumed in Table vii projections for 2027 and beyond).

Quillback Rockfish Benchmark Assessment (California)

The SSC GFSC reviewed the 2025 full benchmark assessment for quillback rockfish off California, which was last assessed with a data-moderate assessment in 2021. The structure was a single-sex and single-area model with pre-specified natural mortality and growth estimated internally. The assessment included two catch fleets (commercial and recreational) and three survey fleets (growth, California Collaborative Fisheries Research Program [CCFRP], and remotely operated vehicle [ROV]) that integrated lengths, ages (as conditional age-at-length), and indices (including a recreational fishery index). Major changes from the data-moderate assessment can be categorized as data changes and structural changes. Data changes involved adding 2021-2024 data to the model, reanalyzing inputs from the entire time series of data, updating biological relationships, and including new sources of length and age data. Structural changes involved the addition of ages as part of a "growth fleet", inclusion of survey fleets, and use of asymptotic and dome-shaped selectivity and blocks.

Bridging analyses from the 2021 data-moderate assessment to the 2025 benchmark assessment indicated that growth and natural mortality (*M*) were key drivers of the change in perception of stock productivity and status. In particular, the addition of age composition data helped to improve the model estimate of population structure, as well as resulted in recruitment deviations indicating fewer and stronger pulses of recruitment from the stock during the 1990s, which ultimately drove stock biomass higher as it matured. The fraction of unfished spawning output from the 2025 assessment is estimated to be 43.5% and age-3+ biomass is estimated at 291 mt. The lowest point of spawning output is estimated to have occurred in 1998, at 31.8% of unfished spawning output. Overall, this benchmark assessment presents a stock biomass trajectory that never fell below the minimum stock size threshold (MSST) and has recently exceeded the management target.

A single point of disagreement between the STAT and the STAR Panel was around the use of a "growth fleet" in the pre-STAR base model. This disagreement focused on the apparent influence of age data from the growth fleet on recruitment dynamics. The Panel's major concern was that few of the sampling strategies for datasets included in the "growth fleet" provide age data that are representative of stock dynamics. The disparate spatiotemporal extents of the 10 sources of age data also posed a concern by the Panel, given the apparent influence of the "growth fleet" on recruitment dynamics estimated by the assessment. Ultimately, the Panel and STAT settled on a base model that included only Abrams (2014) data in the "growth fleet" and treated the age data from the CCFRP as conditional age-at-length for the CCFRP fleet.

The 2025 benchmark assessment is a major improvement over the 2021 data-moderate assessment. Inclusion of age information clearly supports efforts to continue collecting data that are representative of the stock. Although new indices included in this assessment had little overall effect on the estimated stock dynamics, continuing to refine the ROV and CCFRP survey indices should be prioritized given that quillback rockfish are not well represented in trawl surveys. Ideally, abundance indices should be more influential on biomass scale than age or length information, which was not the case for this assessment.

Endorsement as the Best Scientific Information Available

The GFSC endorses the 2025 full benchmark quillback rockfish in California assessment as providing the best scientific information available and suitable for informing management decisions.

Major Uncertainties and Considerations for Management Decision-Making

Assumptions around productivity were the major uncertainties within the 2025 quillback rockfish in California assessment. Estimating natural mortality (*M*) decreases recent depletion more so than the steepness of the stock-recruit relationship. The oldest individual observed in California was aged as 57. However, the assumed *M* suggests maximum age should be ~80, which is well below the maximum ages seen in Alaska and British Columbia.

Stock Category and the Sigma Recommendations

The GFSC recommends that quillback rockfish in California stock be assigned a Category 1b designation with a sigma value of 0.75 for calculating the scientific uncertainty buffer. The GFSC recommendations deviate slightly from the STAR Panel recommendation of a Category 1 designation with a default sigma value of 0.5. Although the internal model estimate of sigma was

0.188, the GFSC was concerned with the limited number of representative age estimates and the uncertainty around *M*. Given that *M* and *h* were fixed in the assessment, the internal model estimate of uncertainty is certainly a substantial underestimate. These uncertainties led to extended discussions about where this assessment fit on the Category 1 versus Category 2 continuum of assessment types.

The pilot application of the risk table to quillback rockfish in California yielded a Level 3 (Unfavorable) designation, which means that the default sigma would have been increased to 0.75 had the GFSC not already recommended this value and had the risk tables been applied.

Benchmark or Update Recommendation for the Next Assessment

The next assessment should be an update assessment. The next benchmark assessment should occur after sufficient age structures are collected that are representative of the stock.

Recommended OFLs for 2027 and 2028

The OFLs for the next management cycle have not been calculated for 2027 and for 2028 due to the recommendation of a Category 1 assessment with a sigma of 0.75, which is greater than the default sigma value of 0.5. These values are anticipated to be available for the September 3, 2025 SSC meeting based on the assumption that the Council chooses a P* of 0.45 (default harvest control rule) for the 2027 ABC.

Chilipepper Rockfish Benchmark Assessment

The SSC GFSC reviewed the 2025 full benchmark assessment for chilipepper rockfish, which was last assessed in 2007 as a benchmark assessment.

An update to the 2007 benchmark assessment was conducted during 2015, followed by a catch-only update to correct errors in historical landings in 2017. A catch-only projection based on the 2017 update was completed in 2023 (Wetzel 2023). The STAT re-analyzed all data sources used in the previous assessment and updated the model structure to reflect current best practices. The major changes in data sources included removing fisheries-dependent relative abundance indices and adding the CalCOFI ichthyoplankton index, a trawl discard fleet, and bycatch from the at-sea hake fishery.

The model on which the 2025 assessment is based is structured as a single-area, two-sex population, spanning U.S. waters from Mexico to Canada. The model covers the period 1875 to 2024, assuming an unfished equilibrium population prior to 1875, and includes eight fishing fleets and four fishery-independent survey indices. Although not explicitly spatial, the "fleets as areas" approach allows the size and age structure of catches to reflect area-specific fleets where appropriate. Growth is estimated within the model and is assumed time-invariant, or averaged over time, though time-varying growth was documented from the data and explored as a sensitivity. This assessment assumes the Beverton-Holt stock recruitment relationship and sets steepness (*h*) at 0.72, whereas steepness of 0.57 was used in the 2007, 2015, and 2017 assessments. Sex-specific natural mortalities are estimated. A lognormal prior for female natural mortality (*M*) with a median of 0.154 yr^{-1} and a log-standard deviation of 0.31 yr^{-1} was based on the Hamel and Cope (2022) prior and maximum age of 35 yr. Male *M* was modeled as an exponential offset from female *M*.

The point estimates for female and male *M*'s were 0.165 yr^{-1} and 0.216 yr^{-1}, respectively. These values are similar to the values assumed in the 2007 assessment. Selectivities for both commercial and recreational fleets are length-based, with time-blocking in the hook-and-line, trawl, and southern California recreational fleets.

Estimated stock status is above target, with a point estimate of 83.2% of unfished spawning output in 2025. Long-term equilibrium yield based on Spawning Potential Ratio (SPR) proxy harvest rates is 2,114 mt coastwide (95% asymptotic confidence intervals 1588-2639 mt), compared to 2,230 mt based on the SB40% proxy.

The STAT and STAR Panel report highlighted unresolved issues and challenges in estimating steepness, outliers in age data, modeling time-varying growth and selectivity, a strong retrospective pattern, and poor fit to early years of WCGBTS index (2004-2007). The data weighting and selectivity procedures also warrant further consideration. The STAT, the STAR Panel, and the GFSC expressed concerns that inferred catchability (q) values are greater than 1 for both the WCGBTS and Triennial survey. This may imply misspecifications in the dynamics model, index standardization model, or lack of understanding of the sampling process, e.g., herding. Different modeling techniques and approaches were explored to improve the spatiotemporal model used to construct these biomass indices during the STAR Panel. Adding a depth effect to the model used to develop the survey indices resulted in some improvements to both the fit and biomass scaling, but issues remained. The GFSC recommends further evaluation of the impacts of the bad-fitting years on estimates of q by removing them from the index.

The GFSC noted that the natural mortality values changed as the surveys were sequentially removed from the assessment. For example, when the WCGBTS index was dropped from the model, the female *M* value changed from 0.165 yr^{-1} in the base model to 0.140 yr^{-1}; and male *M* offset value from 0.266 yr^{-1} to 0.329 yr^{-1}. It was somewhat unexpected that the survey index would have that level of influence on estimated *M* values.

Both the Decision Table and the OFL/ABC projections are currently being revised as the rate of change in time-varying sigma is different when *M* is above 0.15. The revised rate of change will be based on the geometric mean of the two *M* values in the model, the appropriate buffers will be provided to the STAT by Owen Hamel, and a supplemental document will be provided to the SSC prior to September 3rd.

Endorsement as the Best Scientific Information Available

The GFSC endorses the assessment of chilipepper rockfish (*Sebastes goodei*) in U.S. Waters off California, Oregon, and Washington in 2025 as providing the best scientific information available and suitable for informing management decisions.

Major Uncertainties and Considerations for Management Decision-Making

Steepness (h) for the Beverton-Holt stock-recruitment relationship was identified as the major source of uncertainty in the states of nature. This is because h is not estimated but set to the prior mean of 0.72 while other parameters, *e.g.* natural mortality, typically used as the axis of uncertainty were estimated. A low state of nature (low-productivity) alternative (h = 0.38) and high state of nature (high-productivity) alternative (h = 0.97) are presented in addition to the risk-neutral base

model (h = 0.72). Though the h values used for determining alternative states of nature do not represent the commonly used logic (12.5% and 87.5% quantiles of the likelihood profile of an estimated parameter), the TOR allows "expert judgment to be used as long as it is fully explained, justified, and documented." The STAR Panel report provided detailed justification for the choices.

Stock Category and the Sigma Recommendations

The GFSC recommends that the chilipepper rockfish stock be assigned a Category 1b designation with the default sigma value of 0.5 for calculating the scientific uncertainty buffer. The GFSC recommendations are consistent with the STAR Panel recommendations.

The pilot application of the risk table to chilipepper rockfish yielded a Level 1 (Favorable) designmation, which means that the default sigma would be reduced to 0.25, if the risk tables were applied.

Benchmark or Update Recommendation for the Next Assessment

The next chilipepper rockfish assessment is recommended to be an update assessment.

Recommended OFLs for 2027 and 2028

The OFLs for the next management cycle will be provided subsequent to revised runs to account for time-varying sigma values for stocks with natural mortality rates greater than 0.15. As noted above, a supplemental document will be provided to the SSC prior to September 3rd.

Appendix A.

SSC Groundfish Subcommittee Members in Attendance

Dr. Cheryl Barnes, Oregon State University and Oregon Department of Fish and Wildlife, Newport, OR (SSC GFSC Vice Chair)
Dr. John Budrick, California Department of Fish and Wildlife, San Carlos, CA
Dr. John Field, National Marine Fisheries Service Southwest Fisheries Science Center, Santa Cruz, CA (SSC GFSC Chair)
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. Tommy Moore, Cambridge, United Kingdom
Dr. André Punt, University of Washington, Seattle, WA
Dr. Jason Schaffler (SSC Chair), Muckleshoot Indian Tribe, Auburn, WA
Dr. Tien-Shui Tsou, Washington Department of Fish and Wildlife, Olympia, WA

Stock Assessment Team (STAT) Members in Attendance

E.J. Dick, NMFS Southwest Fisheries Science Center, Santa Cruz, CA
Fabio Caltabellotta, Washington Department of Fish and Wildlife, Montesano, WA
Julia Coates, California Department of Fish and Wildlife, Santa Barabara, CA
Jason Cope, NMFS Northwest Fisheries Science Center, Seattle, WA
Megan Feddern, NMFS Northwest Fisheries Science Center, Seattle, WA
Vlada Gertseva, NMFS Northwest Fisheries Science Center, Seattle, WA

Maurice Goodman, University of Washington, Seattle, WA
Melissa Haltuch, NMFS Alaska Fisheries Science Center, Seattle, WA
Morgan Johnston, Oregon State University, Corvallis, OR
Michael Kinneen, University of Washington, Seattle, WA
Brian Langseth, NMFS Northwest Fisheries Science Center, Seattle, WA
Melissa Monk, NMFS Southwest Fisheries Science Center, Santa Cruz, CA
Kiva Oken, NMFS Northwest Fisheries Science Center, Seattle, WA
Alberto Rovellini, University of Washington, Seattle, WA
Ian Taylor, NMFS Northwest Fisheries Science Center, Seattle, WA
Chantel Wetzel, NMFS Northwest Fisheries Science Center, Seattle, WA
Alison Whitman, Oregon Department of Fish and Wildlife, Newport, OR
Joshua Zahner, University of Alaska Fairbanks, Department of Fisheries at Lena Point

Advisors in Attendance

Merit McCrea, Groundfish Advisory Subpanel
Christian Heath, Groundfish Management Team
Marlene A. Bellman, Pacific Fishery Management Council

PFMC
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