

# Terms of Reference

## for the

### Additional Review of Quillback Rockfish in California

January 2024

#### Goals and Objectives

The Scientific and Statistical Committee's (SSC) Groundfish Subcommittee (GFSC) is requested to review issues raised by two public comments provided during the November 2023 Pacific Fishery Management Council (PFMC) meeting by Dr. Mark Maunder (via a letter submitted by J. Timothy Hobbs) and Dr. Ray Hilborn (public oral testimony).

The purpose of reviewing this information is to provide the Council with further guidance on using the existing quillback rockfish assessment and corresponding rebuilding analysis. In particular, the GFSC is being asked whether the information provided by Drs. Maunder and Hilborn should result in a different conclusion regarding the 2021 assessment. Specific questions to be considered by the GFSC:

- To what extent were the issues raised by Drs. Maunder and Hilborn previously considered in the 2021 assessment? For any issues that were not explicitly considered, would consideration of such issues been likely to have changed the conclusion that the 2021 assessment meets the scientific quality standard necessary for use in management?
- If greater consideration of these issues could have led to a different outcome, are there changes that could be made to the current (2021) assessment or most recent (2023) rebuilding analysis that would allow it to achieve this standard?
- If the current assessment and associated rebuilding analysis should still be considered appropriate for use by the Council, are there any new considerations the Council should be aware of when it is used?

#### Process related to this review

The GFSC is only tasked with reviewing matters brought forth by Dr. Hilborn and Dr. Maunder in November 2023 (see section below). Questions and issues that were not raised by Drs. Hilborn and Maunder in November of 2023 will not be considered.

A full re-review of the 2021 stock assessment itself will not be part of the GFSC meeting.

This review will be hosted by the Pacific Fishery Management Council at the Watertown Hotel (4242 Roosevelt Way NE), in Seattle WA. The review will occur in late January 2024 as an in-

person meeting with an option for remote participation. The meeting will be open to public attendance, with an opportunity for public comment.

Outcomes and a post-meeting summary will be presented to the full SSC in March 2024:

- Any GFSC recommendations will be considered by the full SSC at that time, after which the full SSC will advise the Council.
- Assessment authors may provide any written response to GFSC recommendations or comments, including additional model runs or sensitivity analyses, if desired.
- If the GFSC review requests modifications, the assessment authors will need to:
  - Provide revised assessment outputs to the full SSC in March 2024,
  - Provide revised rebuilding analysis to the full SSC in March 2024.

### Roles and Responsibilities of Process Participants

Drs. Maunder and Hilborn will be asked to provide written reports to the SSC GFSC two weeks or more prior to the GFSC meeting. The documents should include the basis for conclusions regarding the assessment and rebuilding analysis within the public comments provided during the November 2023 PFMC meeting by Dr. Mark Maunder (via a letter submitted by J. Timothy Hobbs; Exhibit A) that deviate from those of the existing base model. In addition, all Stock Synthesis files associated with any alternative model runs for results provided in the Hobbs letter should be provided to the SSC GFSC.

Similarly, Dr. Hilborn will be asked to provide a written copy of the issues presented in his oral public comments two weeks or more prior to the GFSC meeting.

Preferably, both Dr. Maunder and Dr. Hilborn, and the stock assessment author(s) would be available to participate in the review meeting. However, priority will be given to a date and time that works for members of the GFSC.

When conducting the meeting, GFSC members follow regular SSC operational guidelines, advisory body ground rules, and Council Operating Procedures.

GFSC members with conflicts of interest would be permitted to participate in GFSC discussions and would recuse themselves from voting, should a voting protocol occur. Any others with conflicts of interest, including stock assessment authors, should be required to recuse from voting as well.

A designated SSC GFSC member will serve as Chair of the meeting, with additional designated discussion leads and rapporteurs.

PFMC staff will provide assistance in coordinating logistics, providing support for a hybrid meeting format, provide an invitation authorizing funding for SSC GFSC member travel, facilitate distribution of review materials and post-meeting reporting.

## Specific issues raised by Dr. Hilborn and Dr. Maunder

### Dr. Maunder specific issues raised:

- The assessment relies on length-composition data to inform estimates of absolute abundance and depletion levels. Using length-composition data to inform these estimates has several issues and its informational content is conditional on other key parameters.
- All the likelihood profiles suggest a less depleted stock than under the base assumptions, much related to the commercial length-composition data. It does not appear that sensitivity runs were conducted to evaluate selectivity before and after 2003, with before being dome shaped.
- The sensitivity runs were mainly conducted one at a time and therefore some issues or sensitivities in the assessment may have been hidden.
- Different years of data for each gear type could be evaluated independently.
- The maximum age values used for the basis of natural mortality can make large differences in the estimated natural mortality. It is not clear if the maximum age used represents the California component of the population.
- It may also be appropriate to make natural mortality a function of length.
- An alternative model run with different selectivity and time blocking estimated a value for natural mortality with a better fit to the data and a much less depleted stock.
- The growth model does not appear to fit the age-length data well.
- A dynamic spawning biomass reference point may be more appropriate to estimate the unfished abundance so that it is based on recent recruitment, adjusted by the stock-recruitment relationship.
- The decline in abundance appears to be driven by the estimated decline in recruitment deviates from 1990-2010, some of which may be compensating for unmodelled changes in selectivity.

### Dr. Hilborn specific issues raised:

- The assessment does not take into account the fact that large portions of the habitat have been closed to fishing and more areas are remote enough they are not fished. The length frequency data come exclusively from the areas that are fished.
- Sensitivities to parameters such as natural mortality, spawner recruitment steepness,  $L_{\infty}$ , growth  $k$ , all show minimum negative log likelihood (best fit to the data) values for these parameters that indicate the stock in better condition, yet in every case the assessment chose, as its base case, a parameter that leads to the stock being assessed as overfished.
- The current assessment suggests that the current exploitation rate is very high, and this seems inconsistent for a stock with a significant area of its habitat closed to fishing or unfished.
- The yield curve that results from the assessment shows the long-term yield at current stock size roughly equivalent to the long-term yield at the rebuilding target, so there does not appear to be benefit to yield from rebuilding the stock.
- Fits to the recent commercial length composition data are quite poor (Figures 18 and 63 of the assessment).