

Notes from the Ageing and Data Preparation Coordination Meeting to Support 2021 Groundfish Stock Assessments

The Pacific Fishery Management Council (Council) convened a meeting on August 11th 2022 to coordinate ageing efforts and discuss data sources to be used in the 2023 and 2025 stock assessments. The participants included the Scientific and Statistical Committee (SSC) Groundfish Subcommittee (SSCGS), Stock Assessment Team (STAT) members, representatives from agencies involved in surveys, ageing and catch estimation. The meeting was chaired by Dr. John Budrick, Chair of the SSCGS. At the June 2022 meeting, the Council identified groundfish stocks slated for assessment in 2023 to begin the stock assessment process. The Council also identified priority stocks for the 2025 assessments to provide time to fill data gaps for these stocks in advance of the assessments.

The primary goals of this meeting were to facilitate utilization of available age structures, prioritization of their processing, and coordination of ageing cross validation for stocks subject to assessment in 2023. Having identified candidate stocks for assessment in 2025, this meeting also provided the opportunity to discuss where sampling or data collection priorities might be augmented to fill data gaps. Participants discussed the availability of ageing structures collected by the states, Pacific States Marine Fisheries Commission (PSMFC) and National Marine Fisheries Service (NMFS) in fishery sampling and surveys that may inform stock assessments prioritized for 2023 and 2025. These recommendations will be provided to the SSC and the Council for their consideration at their November meeting. Notes for each agenda item provided below were collected by assigned rapporteurs to inform interested parties of the proceedings, findings and considerations identified as they pertain to assessment planning.

Ageing Prioritization

Stocks Prioritized for 2023 Assessments

Meeting participants discussed ageing responsibilities for 2023 assessments. Washington Department of Fish and Wildlife (WDFW) will age all of the structures collected from their fisheries from recent years, including catching up on black rockfish, canary rockfish, and petrale sole samples. Oregon Department of Fish and Wildlife (ODFW) will age black rockfish samples from their fisheries. The NMFS Northwest Fisheries Science Center (NWFSC) ageing lab will conduct all other ageing needed to support the 2023 assessments, which includes:

- Petrale sole and canary rockfish structures from Oregon
- Black rockfish, petrale sole, and canary rockfish structures from California
- All samples from the NWFSC Groundfish Bottom Trawl Survey and Hook and Line Survey
- Any new copper rockfish samples, with some potential cross-reading provided by Southwest Fisheries Science Center (SWFSC)
- Potential re-ageing of some petrale sole samples from WDFW
- Potential ageing of rex sole to facilitate development of a growth curve for the data moderate length-based assessment

The NWFSC plans to explore using the near infrared spectroscopy approach to develop ages for shortspine thornyhead due to the difficulty of ageing structures from that species using traditional methods. However, a set of structures with age estimates are needed to calibrate the spectroscopy method, and these are not currently available. A research project could explore using similar slope rockfish species to develop the relationship needed to apply spectroscopy ages for shortspine thornyhead, but that would not be completed for the 2023 assessment cycle.

Stocks Prioritized for 2025 Assessments

Meeting participants discussed data collection efforts and ageing priorities for the next assessment cycle. The following species have been preliminarily prioritized for assessments in 2025: aurora rockfish, China rockfish, Pacific spiny dogfish, quillback rockfish, rougheye/blackspotted rockfish, sablefish, yelloweye rockfish, and yellowtail rockfish.

Pacific spiny dogfish is a challenging species because spine wear results in incomplete ages. Statistical models have been proposed to adjust for that bias, but issues have been found with those models. This issue has not been fully resolved for Pacific spiny dogfish, and more work will be needed to better understand how much effort will be required for ageing this species prior to a planned 2025 assessment. No new ages were included in the last Pacific spiny dogfish assessment. As such, age validation for Pacific spiny dogfish could be a useful topic for a methodology review in fall 2023. Pacific spiny dogfish age validation challenges could also be brought to the Committee of Age Reading Experts (CARE).

Rougheye/blackspotted rockfish complex had been identified as a good candidate for a 2023 assessment, but WDFW identified a large unaged inventory (approximately ~15,000 otoliths), which would be too time intensive to read. Rougheye/blackspotted rockfishes might be a good candidate for the spectroscopy method. The NWFSC's spectrometer is being moved from AFSC to Newport next month. PSMFC is onboarding a technician to operate that machine. Testing will include focusing on unaged structures for sablefish. A methodology review in winter 2023-2024 could consider the use of ages from that approach in stock assessments. If it were endorsed, that could help alleviate the burden of ageing for rougheye/blackspotted in time for an assessment in 2025. However, test reading will need to be completed early to ensure the spectroscopy method will be appropriate for this species.

More coordination of ageing will be needed for yelloweye rockfish and yellowtail rockfish for assessments in 2025. In the past, the WDFW ageing lab helped ODFW with their ageing for these species, but ageing staff turnover is currently limiting their ageing capacity. Further evaluation of how many structures need to be aged is needed, and any structures to be aged will need to be received early enough to have sufficient time for processing. CDFW anticipates age sampling for yellowtail rockfish will increase due to the new mandatory sampling for age structures in the commercial fishery.

All parties noted the need for early and ongoing coordination of ageing needs for 2025 due to limited capacity of the ageing staff at all the facilities involved.

California Sampling Efforts

A new mandatory sampling requirement for the commercial fishery in California allowing greater access to sample fishers and dealers in 2022 and thereafter, may provide more age structures and length data to inform 2025 and future stock assessments. PSMFC samplers with the California Cooperative Groundfish Survey sampling the commercial fishery, could benefit from the requirement. CDFW has conducted supplemental sampling programs intended to provide additional data for growth estimation, which will also have greater access to samples, however these will be collected opportunistically, rather than as random sampling representative of the fishery as a whole. It was noted that random sampling representative of the fishery as a whole, rather than opportunistic sampling, would be beneficial to increasing the utility of this sampling effort.

The California Recreational Fishery Survey (CRFS) was designed to collect data for catch estimates essential to in-season fishery management for multiple fisheries including groundfish, highly migratory species, salmon and numerous state managed fisheries. The number of sampling locations and demands of the existing survey for catch estimation have prevented collection of age structures, which is time consuming and disruptive to other sampling duties, though the survey provides thousands of lengths each year. This prohibits collection of data for the construction of growth curves and age compositions for assessment models in the course of sampling for catch estimation. The existing priorities for data collection are influenced by NMFS recommendations for changes to those priorities would need to be coordinated internally at NMFS and then provided to CDFW.

Alternatively, incidental collection of relinquished prohibited yelloweye rockfish and over limits of copper or quillback rockfish sub-bag limits will provide age structures for growth estimation in 2025 assessments. In addition, an opportunistic recreational sampling effort by the CDFW Groundfish Project utilizing the same staff that conduct the corresponding commercial sampling effort is providing additional otolith and length samples to inform growth for 2025 assessments. Carcass sampling efforts started in 2017 may resume with the advent of adjustments from filleted to unfileted lengths under development by SWFSC and Cal Poly San Luis Obispo, potentially providing additional samples in a more systematic effort after publication in 2022 and derivation of adjustments for species of interest.

Documentation of Available Age Structures

Andre Klein (CDFW) presented an overview of otolith collections that are available for black rockfish, canary rockfish, and copper rockfish in the 2023 stock assessment cycle and for candidate species for the 2025 stock assessment cycle in California. Otoliths from recreational fisheries came from three sampling programs that included the recently initiated Recreational Biological Sampling program, the Recreational Carcass Sampling program, and the ongoing CRFS Voluntary Rockfish Collection program. The recent and ongoing programs are expected to continue collecting otoliths for target species that could be included in future stock assessments. Otoliths from commercial fisheries came from a 2019 Commercial Pilot Sampling program and from a relatively small Essential Fishery Information Sampling program during 2021. To date, only a few copper rockfish otoliths from these collections have been aged, but CDFW is coordinating with NMFS, ODFW and WDFW aging labs to provide ages for all available samples prior to the 2023 stock assessment cycle.

Ali Whitman (ODFW) presented an overview of otolith collections that are available for black rockfish, canary rockfish, copper rockfish, and petrale sole in Oregon. All data from commercial fishery collections are available in the PacFIN database and all data from recreational fishery collections are available in the RecFIN database. Double-read samples are available for commercial samples in PacFIN but ODFW is still working to include them in RecFIN. Otoliths from black rockfish after 2015 have not been aged but are anticipated to be completed by January 2023. Canary Rockfish otoliths from Oregon's recreational fishery, which re-opened in 2015, have not been aged since the overfished designation was put in place 20 years ago. Similarly, commercial fishery otoliths from petrale sole have not been aged since the 2019 assessment, and there is an ongoing project to change the ageing methodology to address surface reads made earlier in the time series. Otoliths from copper rockfish were aged through 2019 in anticipation of the 2021 stock assessment. There are additional samples available through 2021, but few available after fishery restrictions mid-2021 were implemented to reduce catch. There are substantial ODFW collections available for the 2025 assessment species and emphasized early coordination among ageing labs to process and age these samples, potentially earlier than the anticipated ageing workshop for the next cycle.

Dr. Theresa Tsou (WDFW) presented an overview of otolith collections available from Washington. PacFIN and RecFIN pull data from the WDFW database daily for biological data collected in the most recent five years and replace the entire database monthly. Results from multiple ageing events for the same fish, e.g., double read results, are available in PacFIN but not in RecFIN. A good number of lengths from recreational caught species are from carcasses and some commercially caught landings have dressed lengths (e.g., dressed sablefish). However, the commercial samples can be sorted by PacFIN condition code, which indicates the type of sample (dressed or whole fish). Dressed lengths and weights are converted to whole/round fish lengths and weights. This category is not recorded for recreational samples but can be added moving forward. WDFW staff noted differences of up to 2 cm between the whole and fileted/carcass length observed for black rockfish, though most were less. Efforts to produce carcass versus whole fish length adjustments are ongoing in collaborations between SWFSC and Cal Poly, as noted above and may provide means to address biases identified.

Dr. Jim Hastie (NMFS) presented an overview of otoliths available from black rockfish, canary rockfish, and petrale sole from NMFS fishery independent and dependent sampling programs. The Cooperative Ageing Program (CAP) lab, in Newport, is hoping to complete over 8,000 canary rockfish reads by February-March 2023 from strata outside Washington that have not been aged since 2013. This amount is in addition to perhaps another ~6,000 ages developed by WDFW from their fishery collections. CAP will be responsible for all ageing of recently-collected structures (aside from WDFW) for petrale sole. Of highest priority will be ageing a subsample of roughly 4,300 recent survey and fishery otoliths from Oregon and California. After completing these, ageing will focus on developing break-and-burn ages in strata of highest priority among 13 years of WDFW samples and six years of ODFW samples, from before 2009 where only surface ages currently exist. All three ageing labs will be jointly targeting completion of over 17,000 black rockfish ages, from recently-collected samples from all three states' fisheries in support of the 2023 assessment. WDFW and ODFW are currently planning on ageing over 15,000 combined otoliths collected from their respective fisheries, while California fishery samples (approximately 2,200 otoliths) will be read by the CAP lab.

There is no central repository for all otolith collections or age availability, complicating accounting for all available sources of otoliths. Marci Yaremko raised a concern that the PacFIN and RecFIN databases were not ideal as a communication tool to determine otolith or age availability. Dr Jim Hastie agreed that existing PSMFC biological databases are not well-suited for housing data from all types of collections (particularly information collected as part of surveys) but does believe that randomly-collected biological sample information from fisheries, which is appropriate for direct inclusion in assessment models, should be included in PSMFC biological data systems that were designed for that purpose. WDFW and ODFW both transmit information on the collection of otoliths from commercial fisheries to PacFIN which has been a useful source of information to inform both assessment prioritization and initial ageing discussions between the States and the Science Centers. NMFS stock assessment analysts will continue working closely with state personnel to assess availability of data until the appropriate tools are built. A master list compiled by Dr. Hastie in excel will be used in the interim repository for the 2023 assessment process and documentation of available samples reviewed at the meeting and the master list will be available at the [shared drive](#) for the meeting. In the future, a database for otolith inventory that will include samples collected from all sources, i.e., commercial, recreational, and research/special projects, would be very useful.

Ageing Cross-Validation

Ageing-criteria standardization among West coast ageing labs is accomplished through the Committee of Age Reading Experts (CARE, <https://care.psmfc.org/>). Structure exchange protocols and historical exchanges through CARE are documented (<https://care.psmfc.org/structure-exchanges/>) and results from inter-lab exchanges are also available. SWFSC is initiating a CARE exchange for black rockfish. All west coast groundfish ageing labs will participate. In addition, SWFSC, NWFSC, and ODFW are arranging a lab exchange for copper rockfish.

The last lab exchanges between WDFW and NWFSC for petrale sole and canary rockfish were conducted in 2017 and 2018, respectively. There will be discussions between the two ageing labs and assessment teams to decide if another exchange is needed.

For within lab standardization and consistency as well as providing estimates of uncertainty in age reads in assessments, a 20% double-read protocol is a standard used at NWFSC, WDFW, and ODFW ageing labs. Note that, currently there is only one experienced age reader at each of the WDFW and ODFW ageing labs. Therefore, this within-lab double-read will be conducted by the same age reader at each lab. ODFW noted that within-lab double reads are available for assessment authors directly from ODFW, as they are not yet available on PacFIN or RecFIN, and that 20% of structures are regularly double-read for use in lieu of inter-lab comparisons. The commitment to maintaining this standard comes at a substantial cost in the number of ages that can be completed for inclusion in models, particularly when the inventory of unaged structures is far greater than the capacity of our ageing labs.

Scientific and Statistical Committee's Groundfish Subcommittee Ageing Prioritization for 2023 and 2025 Stock Assessments

Pacific Fishery Management Council
Online Meeting

August 11, 2022

Instructions for how to connect to the Scientific and Statistical Committee's (SSC) Groundfish Subcommittee webinar will be posted on the Pacific Fishery Management Council's (Council's) website prior to the first day of the meeting.

SSC meetings are open to the public and a public comment period has been scheduled. Additional public comments may be taken at the discretion of the Chair. Times on this agenda are subject to change once the meeting begins. Committee member work assignments are noted in parentheses at the end of each agenda item. The first name listed is the discussion leader and the second, the rapporteur.

Thursday, August 11, 2022 – 9 AM

A. Introduction

1. Roll Call, Introductions, Announcements, etc. John Budrick
2. Goals of the Meeting
3. Review and Approve Agenda

B. Ageing Prioritization

1. Stocks Prioritized for 2023 Assessment
 - a. Full or Update: copper rockfish, black rockfish, canary rockfish and petrale sole
 - b. Data-moderate: shortspine thornyhead and rex sole
 - c. Which ageing laboratories will take responsibility production ageing of which stocks for samples from each state?
2. Stocks Prioritized for 2025 Assessment: aurora rockfish, China rockfish, Pacific spiny dogfish, quillback rockfish, roughey/blackspotted rockfish, sablefish, yelloweye rockfish,

and yellowtail rockfish
(9:00 a.m.; Budrick, Marshall)

C. Documentation of Available Age Structures

1. Identify and document the available collections from ongoing and historical sampling programs and special projects not otherwise available from PacFIN and RecFIN
2. NMFS Data Collections Jim Hastie and John Field
3. California Data Collections John Budrick
4. Oregon Data Collections Ali Whitman
5. Washington Data Collections Theresa Tsou
6. Documentation and Databases for Available Data Collections
(10:00 a.m.; Budrick, Schaffler)

BREAK (10:45 –11:00 a.m.)

D. Ageing Cross-Validation

1. Which laboratories have capacity and time to cross validate between labs or within labs?
2. Existing ageing or validation protocols for species of interest
3. Maintaining an online catalog of available ageing structures (both processed and unprocessed) on the Council and/or CARE website
(11:00 a.m.; Budrick, Tsou)

PUBLIC COMMENT PERIOD
11:30 a.m. (or immediately following Agenda Item D)
Public comments are accepted at this time.

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