

Committee of Age Reading Experts
2017 Committee Report
and
Executive Summary of the
Nineteenth Biennial Meeting April 4-6, 2017

Prepared for the Fifty-Ninth Annual Meeting of the
Technical Subcommittee of the Canada-USA Groundfish Committee

April 24 – 25, 2018



Prepared by
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A. CARE Overview

1. History

The Committee of Age-Reading Experts, CARE, is a subcommittee of the Canada-USA Groundfish Committee's Technical Subcommittee (TSC) charged with the task to develop and apply standardized age determination criteria and techniques and operate within the Terms of Reference, approved by the TSC in 1986, and the CARE Charter, developed in 2000 and approved by the CARE in 2004.

2. Report Period

This report covers the work period of January 1 – December 31, 2017. This reporting period includes information from the 2014 Committee Report and Executive Summary prepared by outgoing CARE Chair Chris Gburski. CARE Officers through June 30, 2017 (elected at the April 2015 meeting) are:

- Chair – Chris Gburski (AFSC)
- Vice-Chair - Lance Sullivan (NWFSC)
- Secretary – Kevin McNeel (ADF&G)

The 2017 CARE Conference Minutes have been prepared and are waiting CARE member approval. The Chair prepared an executive summary and the Secretary prepared the first draft of the minutes, which were edited and reviewed by the Chair prior to final distribution to the members for review and approval. After the minutes are approved by CARE members, they will be uploaded to the CARE website.

3. CARE Conference

CARE meets biennially for a conference that usually lasts three days. Conferences typically consist of one and a half “business” days and one and a half days for a hands-on calibration workshop at microscopes to review and standardize age reading criteria with any extra time scheduled for a specific focus group or workshop.

- a. **Overview:** The most recent biennial CARE Conference was held in Seattle, WA, April 4-6, 2017 at the NOAA Western Regional Center at the Alaska Fisheries Science Center (AFSC), Sand Point facility, and hosted by the Age and Growth AFSC staff (Appendix I). The conference was attended by 41 CARE members (Table 1, Figure 1) from seven participating agencies ADF&G (5), AFSC (17), CDFO (3), IPHC (5), NWFSC/PSMFC (5), ODFW (1), and WDFW (5). The next CARE Conference in 2019 will be held prior to the TSC meeting in April at a location to be determined by the end of the calendar year 2018. The following officers were elected at the April 2017 meeting and will take office July 1, 2017:

- Chair – Kevin McNeel (ADF&G-Juneau)
- Vice-Chair – Barbara Campbell (CDFO)
- Secretary – Nikki Atkins (NWFSC-PSMFC)

b. **Business Session Highlights:**

i. **Scientific presentations:**

An official Call for Presentations and Posters for the 2017 CARE Conference was sent to members on February 23, 2017 (Appendix II and III). Submissions were requested

to address topic sessions on current research (e.g., comparative age structure studies, otolith microchemistry, climate driven studies).

Abstracts were due to the CARE Chair by March 17, 2017. There were two oral presentations and one poster abstract submitted for the scientific presentations session. (Appendix IV).

Five oral presentations in PowerPoint format were given during the CARE meeting:

1. April Rebert, *How old is that crab? Progress on an age old question* (20 min)
2. Kevin McNeel, *Update on shortraker rockfish (Sebastes borealis) otolith analyses* (20 min)
3. Craig Kestelle, *Elevating the management tier of commercially important rockfish: II-Age determination and accuracy* (20 min)
4. Dr. Thomas Helser, *Fish Tales: isotopes, trace elements and increments, and what they tell us* (20 min)
5. Andrew Claiborne, *Lingcod ageing & structure comparison* (20 min), during lingcod workshop

Three posters were available for viewing during the CARE Conference:

1. Dana Rudy, *Reconstructing the growth history of Pacific halibut (Hippoglossus stenolepis) natural population by otolith increment analysis*
2. Thomas E. Helser, Craig R. Kestelle, Todd T. TenBrink, *Elevating the management tier of commercially important rockfish: II – Age determination and accuracy*
3. Thomas E. Helser et. al., *A 200 year archaeological record of Pacific cod life history as revealed through ion microprobe oxygen isotope ratios in otoliths*

ii. Agency Reports:

CDFO (Steve Wischniowski), IPHC (Joan Forsberg), AFSC (Thomas Helser), ADF&G-all sites (Elisa Russ, Kevin McNeel, Sonya El Mejjati), NWFSC-PSMFC (Patrick McDonald), WDFW (Andrew Claiborne), and ODFW (Lisa Kautzi) provided reports summarizing and updating agency activities, staffing, organization, new species and projects. There was no representative at CARE from SWFSC or CDFG. Details from agency reports will be available in the finalized CARE minutes, published to the CARE website.

iii. Workshops:

a) Longnose skate age standardization:

The goal of this workshop was for standardizing age determination protocols across multiple ageing labs through investigating a reference collection of vertebra thin sections and images from a validated ageing method. Chris Gburski and Beth Matta from the AFSC described images of thin sections and pointed out defining features as well as growth zones. They showed annotated images and specimens (under stereo scopes) to demonstrate hematoxylin-staining effects. Chris explained how water helps reduce glare of thin sections under reflected light but oil, while it reduces glare, tends to blur the pattern with time. Beth described how “birth marks” or “birth bands” (emergence from the egg case) are indicated by a slight change in the angle of the thin section. The current maximum age for longnose skate (18 years) was given. For validation efforts, Chris and Beth showed bomb radiocarbon data with a cluster of data suggesting potential issues with the analysis. Regarding precision efforts, they mentioned that structures were exchanged for ageing between AFSC, Pacific Shark Research Center/Moss Landing Marine Laboratories, and DFO. Both Chris and Beth mentioned they were trained on criteria at Moss Landing. The group looked at specimens and attempted band counts, and then Chris and Beth lead the group on a tour of the processing lab (showing saws, resins, and molds). Individuals took turns at the microscopes and imaging stations (including looking at 1-year-old specimens). Beth described life history events and biological differences between regional populations. Finally, Beth mentioned it might be worth trying the Mutvei’s staining solution (that Bethany Stevick-WDFW mentioned earlier in the CARE meeting) to improve pattern clarity. Individual discussion included graduate work with Morgan Arrington (AFSC, University of Washington-Seattle) and lighting conditions (Morgan, Chris, Beth, and Tyler Johnson-NWFSC). There were 6 participants from AFSC, ADF&G, NWFSC, and ODFW.

b) Rougheye rockfish early growth years:

The goal of this workshop was to look at early growth years and investigate any inter lab/agency ageing criteria for rougheye rockfish. Additionally, mixed species with rougheye rockfish (i.e., blackspotted rockfish) were discussed. Attendees viewed annotated rougheye rockfish break and burn otoliths on dissecting microscopes at imaging workstations. Samples were provided by the AFSC and ADF&G. Measured early year (first year) growth patterns and size from different regions were compared. Jeremy Harris (AFSC) provided support while using imaging software to calibrate measurements and scale bars for first year growth bands. Kevin McNeel brought young rougheye otoliths from North Gulf of Alaska with fish length and otolith length, height, and weight. From Harris’s measures, the group identified identifiable first annulus with 1-1.5 mm dorsal-ventral width. They also discussed plus growth, clarified potential differences, and discussed differences in processing (i.e. braking or cutting otoliths and using water dishes to clear whole otoliths). Betty Goetz (AFSC) and McNeel suggested the port samplers should collect young rougheye released during adult female sampling to get a better idea on the size of otolith between 0 and 1-year-old. There were 13 participants from AFSC, ADF&G, CDFO, and NWFSC.

Betty Goetz suggested that agencies talk about the research they were involved with rougheye, blackspotted, and shortraker rockfish. Harris and

Charles Hutchinson (AFSC) are involved in research working on blackspotted, rougheye, and shortraker genetically identifies specimens. Lance Sullivan commented that the NWFSC is also going to work on a collection of potential blackspotted and rougheye rockfish. The workshop went back to the Traynor Room to go over shape analysis using shapeR. McNeel walked through an analysis of rougheye, blackspotted, and shortraker rockfish that he ran on previously tested specimens. Harris and Hutchinson commented that rougheye/blackspotted rockfish could impact results and that they had 19 out of 700 rougheye/blackspotted hybrids in their sample. McNeel commented that there was no indication of hybridization within the samples he tested. During the analysis, Joanne Groot (CDFO) commented that readers at CDFO noted two distinct rougheye rockfish otolith patterns and felt that these might be related to rougheye and blackspotted. Harris commented that individuals at AFSC likely couldn't distinguished between the two species based on the shape of the whole otolith without analysis. After McNeel's demonstration, he told the group that the R script would be uploaded to the CARE forum.

c) Lingcod ageing structure comparison:

Comparative age structures (i.e., sectioned fin rays, whole vertebrae and otoliths) and ageing was discussed at this workshop. Andrew Claiborne (WDFW) began the workshop with a PowerPoint presentation 'Lingcod ageing & structure comparison.' Nikki Atkins (NWFSC) demonstrated lingcod fin ray preparation (pinning and drying) prior to sectioning and slide mounting for ageing. There were 14 participants from WDFW, AFSC, ADF&G, CDFO, and NWFSC.

iv. Hands-on Session Highlights and Demonstrations:

A total of seven readers reviewed four species during the hands-on workshop at microscopes, mainly for calibration between age readers and agencies. Members aged black rockfish, yelloweye rockfish, eulachon, and Pacific Ocean perch. A demonstration for preparing (pinning and drying) lingcod fin rays was demonstrated by Nikki Atkins (PSFMC). See species aged, participating members, and agencies in Table 2.

v. Exchanges:

Lance Sullivan (NWFSC) gave updates on CARE exchanges. He reported that all 2014 and 2015 exchanges were finalized, but two of the four 2016 exchanges were not complete. The two incomplete exchanges were arrowtooth flounder, blue and deacon rockfish complex; and these were waiting on age reader calibration and sample size, capture area, and participating agency information. There was one 2017 exchange with yelloweye rockfish, but no agency information, sample sizes have been received. Sullivan requested additional information.

B. CARE Subcommittee (Working Group) Reports – Executive Summary

There were five active working groups that reported at the 2015 CARE Conference:

1. TSC Meeting 2016:

Chris Gburski (AFSC) gave an overview of the 2016 meeting that Lance Sullivan presented for the CARE Chair in Newport, Oregon. Chris Gburski read CARE updates posted on the TSC website including:

- No consensus has been reached on the preferred method of otolith storage and agencies will continue with different techniques
- Thin section updates will be added to the manual
- The CARE website committee will update agency production numbers for 2015 and 2016, post exchanges, and meeting minutes (All of these were done)
- All age structure exchanges were finalized
- The Charter committee wants to update timelines on the TSC report submissions.
- The Sablefish working group added new members and tasks were reassigned and an update to the manual was scheduled to be completed by Summer of 2016
- The Shortraker working group will continue to focus on pattern criteria and exchange specimens. A workshop will be held at CARE 2017
- Ergonomic recommendations were drafted CARE to CARE and CARE to TSC

2. CARE Website:

- a. **Website:** Jon Short (AFSC) CARE Webmaster gave updates on the CARE website. Short presented the current website and pointed out updated content including production numbers and previous meeting minutes. Short also addressed updating or changing the website CMS, because the current version of Joomla has not been supported since 2009. Short commented that the current PSMFC server is no longer using Joomla; that contributors may not need prior experience; and that moving to a new version or CMS would require time to program and update links likely but would not cost anything if CARE moved to a free CMS. Suggested servers were updated versions of Joomla, Drupal (used by PSMFC), and WordPress. Short also commented that updating tables, populated by databases, would take time as well. In the previous meeting, other agencies had suggested using ASP.NET as a server, but that is not compatible with the PSMFC website. CARE members suggested that two servers could be suggested by the website committee. Short also commented that the database parts of the website could be supported by other agencies (ADF&G) and the updated CMS could support ASP.NET windows.
- b. **Forum:** Nikki Atkins (NWFSC) gave an update on the CARE website forum. Atkins remarked that the forum has users from CARE as well as users from different countries, but there is not much information on the forum. Further, with potential updates to the website, Atkins suggested members copy information off of the forum before it is potentially erased. Also, to get a username and password, contact Atkins, and updates to the website might help forum security.

Tom Helser (AFSC) commented that the current Age and Growth Lab's webpage may change. Jon Short elaborated that current information may be combined with other centers to group similar information.

- c. **Website Publication Portal:** Kevin McNeel (ADF&G) CARE Secretary gave updates on the website publication database portal and walked through the use of the portal. The portal has search and upload features currently available for member publications. The link to the database is a sublink within "Related Links" and the link to the publication database is not visible until the Related

Links is clicked. There currently are no publications on the website and some of that is due to questions about distributing copyrighted material. Jon Short (AFSC) mentioned that when these questions get answered, this can be moved into the main links. Tom Helser and Craig Kastle (AFSC) commented that it will be an issue getting copyrighted material and suggested that maybe abstracts could be uploaded and agencies could upload their own reports. Sonya El Mejjati (ADF&G) reminded the group about the publication list already published online and suggested that we use this to help populate the database. Helser suggested that the journal source should be a drop down to make standardized journal names to make searching possible. Short suggested that a complete list be presented first, but to include the search at the top of the page. Short also suggested looking into copyright laws regarding posting abstracts.

2. **CARE Manual/Glossary:** Elisa Russ (ADF&G) provided updates on the CARE manual. The additional changes have not been incorporated into the manual, but the baking otolith section, ergonomic section, and lingcod otolith section are complete, reviewed by the working group and approved by CARE. The new sablefish section is complete, but still needs to be reviewed by the manual working group. The manual is getting clunky, but all sections should be reviewed by all members.
 - a. Chris Gburski (AFSC) reported on progress made on the skate and spiny dogfish section of the manual. Beth Matta (AFSC) recommended that this be included in the manual as a reference to the published literature. There is a draft of the skate manuscript that is not yet complete, but the dogfish section was published by Dr. Cindy Tribuzio (AFSC, not present). Either a citation or summary should be included within the manual, but Tribuzio should be contacted.
 - b. Russ commented that the pollock section has not yet started, and baking otolith references and removing redundancies within the manual will get covered in the CARE recommendations.
3. **Charter:** Elisa Russ (ADF&G) gave updates on the charter working group. The time between the CARE meeting and the TSC meeting is short. Developing an executive summary to report at the meeting is two days to a few weeks. Russ proposed moving meeting times to help chairs write executive reports. TSC and CARE did not want to change meeting times in previous years. Sandy Rosenfeld (WDFW) suggested moving the meeting back to even years and Nikki Atkins (NWFSC) commented that the CARE meetings were moved to odd years to facilitate people going to the Western Groundfish Conference and Russ commented that TSC meets every year. Russ commented that a later meeting, after the TSC meeting, would conflict with survey activities. Russ finished updates with reiterating that it was recommended to put agency production numbers in the charter and coordination with host agencies.
4. **Sablefish Ad Hoc Working Group:** Delsa Anderl (AFSC) gave updates on the working group. The participating agencies: Sclerochronology Lab (CDFO), AFSC, Age Determination Unit (ADF&G), and NWFSC, age sablefish across the western coast, Gulf of Alaska, and Bering Sea. The group tries to have at least one exchange per CARE. In the 2008 CARE, the ad hoc committee was created to 1) revisit criteria, 2) recalibrate, and 3) look at potential latitude differences. To look at latitudinal difference, the agencies sent 0 and 1-year old sablefish otoliths to the ADU to be measured. To recalibrate, the agencies performed a round robin exchange of approximately 100 otoliths prior to the 2009 CARE meeting. At the 2009 meeting, representatives reviewed discrepancies and identified common patterns to look at. AFSC received known age sablefish from sablefish tagged and released as 0 and 1-year-olds at St. John the Baptist Bay. Anderl chose otoliths that represented the pattern and exchanged 15 samples with the other agencies. During a WebEx meeting and at the 2011 CARE meeting, the group discussed the results of the exchanges. At the 2013 CARE, the working group agreed to submit an update to the sablefish manual, summarize the 0 and 1-year-

old otolith measurements, and document each lab's protocols. These were completed and sent to the manual committee and suggested that the working group be disbanded.

C. CARE & TSC Recommendations

1. CARE to CARE 2017

- A. Recommends the CARE Manual working group finalize and add the following sections to the CARE Manual on Generalized Age Determination and distribute the updated version of the manual to the CARE membership by June 1, 2017 with the finalized version to be submitted to the website working group by June 30, 2017 for posting on the CARE website:
 1. Lingcod Otolith Ageing Procedures section;
 2. Sablefish Ageing Procedures section;
 3. Thin Sectioning Method section – add a section under the General Ageing Procedures;
 4. Add section on baking otoliths under General Otolith Ageing Procedures;
 5. Ergonomics section including equipment checklist as appendix;
- B. Recommends the Manual working group continue the revision and expansion of the CARE Manual on Generalized Age Determination with the following sections drafted or revised by May 1, 2018 for review and addition of edits to the manual by the 2019 CARE meeting:
 1. Walleye Pollock Ageing Procedures section (use AFSC manual as starting point);
 2. Spiny Dogfish Ageing Procedures section – summary of spiny dogfish age determination paper by Dr. Cindy Tribuzio;
 3. Rockfish Ageing Procedures section;
 - a. Edit to avoid redundancy with Thin Sectioning section;
 - b. Revise/move some information to General Otolith Ageing Procedures section where appropriate;
 4. Remove documentation sections regarding changes to CARE Manual
 - a. See Recommendation C to post archived editions.
 - b. Remove 2015 recommendation to add Acknowledgements section.
- C. Recommends the CARE Manual working group submit archived editions of the CARE Manual to the website working group for posting on the CARE website to preserve historical records.
- D. Recommends that the CARE Forum be continued.
- E. Recommends the website working group continue to refine the searchable publication database to be housed at ADF&G-Juneau, so that relevant information is more accessible to the age

reading community and stock assessors. Recommend CARE members enter publications into the database using the online form to populate the database. Recommend publications page includes full list of all publications with searchable feature at the top of page with a link to the publication entry form by CARE 2019. Verify online publication permissions prior to adding publication or abstract; may add abstract if not allowed to post full publication.

- F. Additional recommendations for the website to be completed prior to the 2019 meeting are as follows:
1. Add information at the top of the Species Information page to “Check with specific agency about changes in historical techniques”; report that “Methods listed are for most recent reporting year,” or adjust in conjunction with changes incorporated in Recommendation G;
 2. Add table for agency contacts with e-mail address of agency leads and information on age readers and species (to be completed by the end of 2018);
 3. Update agency production numbers annually (update website with current production numbers by the end of 2018), and
 - a. Include methods for current year and use appropriate codes (B&BN = Break- and-burn, B&BK = Break-and-bake);
 - b. Update Species Information page to include new codes;
 - c. Edits such as consistent capitalization on the Species Information page;
- G. Recommends the Website subcommittee continue to research the possibility of converting the CARE website and CARE Forum to a different technology (Joomla is out-of-date and requires a major undertaking to update to new version). The website working group will research software options and make a recommendation (e.g. WordPress, Drupal, or new version of Joomla).
- H. Recommends that an Otolith Storage Ad Hoc Working Group be created to address the issues of short and long-term storage of otoliths with a complete report reviewed by membership for CARE 2019. This is in response to prior TSC to CARE recommendations and due to the issue of otolith storage becoming a 2017-2021 research priority for the North Pacific Fishery Management Council. It is imperative that the historical archive of age structures is preserved.
- I. Recommends the Charter Working Group revise the charter and submit it to CARE membership for approval by 2019 meeting; changes to include:
1. Information on timelines including preparation of TSC report following same year CARE meeting;
 2. Submission of production numbers (species aged table); and
 3. Chair coordination with host agency regarding meeting logistics.
- J. Recommends that the Sablefish Ad Hoc Working Group produce a final report summarizing their work to be published on the CARE website by the 2019 meeting with possible publication as a formal report.
- K. Recommends that a Skate Ad Hoc Working Group be created for standardization of age determination methods; this project already has funding through NOAA Fisheries.
- L. Recommends that a Rougheye/Blackspotted/Shortraker Rockfish Ad Hoc Working Group be created for addressing mixed sample issues involving these three, long-lived species and possibly other slope rockfish species.
- M. Recommend posting list of maximum ages on CARE website (or link to lists on AFSC and ADF&G/ADU - Juneau, websites). Recommend developing a process to update maximum ages including a CARE age structure exchange between appropriate agencies (age structure exchange may be done at CARE meeting to minimize transport and maximize efficiency).

2. CARE to TSC 2017

- A. CARE recognizes that otolith storage was approved as a 2017-2021 research priority for the North Pacific Management Council. CARE appreciates that the TSC recognizes that CARE members are experts in the field of otolith reading and storage, and are thus best suited to develop and use best practices. As requested by the TSC, CARE has initiated this process to document structures and storage methods currently in use (by species and agency) with information on their benefits and deficits. This request has been addressed by creating an ad hoc working group to report on current procedures for short and long-term storage of otoliths by CARE agencies and produce a document to support this research priority.

3. TSC to CARE 2015/2016/2017

- A. The TSC thanks CARE for taking time during their biennial meeting to work towards developing a set of best practices for short and long-term storage of otoliths. However, the TSC is discouraged that CARE was unable to come to agreement on this and considers this important to all member agencies. The TSC believes that CARE members are experts in the field of otolith reading and storage, and are thus best suited to develop and use best practices. The TSC asks CARE to reconsider TSC's request at their next meeting and initiate this process by documenting structures and storage methods currently in use (by species and agency) with notes on their benefits and deficits. The TSC will also move this request forward to the U.S. Groundfish Management Teams for their consideration through the Councils' Science and Statistical Committees to develop a study proposal to investigate best practices. The TSC acknowledges the valuable work of CARE and encourages work on this problem and recognizes that this is a long-term goal for agencies.
- B. The TSC understands the importance of ergonomic issues for CARE members and shares their concern regarding potential ergonomic injuries to age readers. In response, the TSC voiced their concern about this issue in the 2014 Letter to Supervisors that was sent to each TSC member agency, specifically to supervisors and managers for groundfish research activities in each agency. The TSC places this issue within agencies' health and safety policies and urges agencies to pursue this matter directly through lab supervisors and their agency's health and safety committees. The TSC recommends that, where there are concerns in this regard, CARE send a letter to the specific agency or supervisor, with specific suggestions to alleviate the ergonomic conditions, highlighting the health and safety issue.
- C. The TSC is supportive of CARE taking on non-groundfish work because it advances fisheries research. However, the TSC reminds CARE that its mandate has always been groundfish and they should be given priority within CARE. CARE does not need to include shellfish investigations in their report to the TSC.
- D. The TSC understands that CARE is concerned about the short amount of time, usually less than one month, between the biennial CARE meeting and the TSC meeting which makes it difficult for the CARE Chair to prepare the CARE minutes in time for the TSC meeting. If there is not enough time to submit a full report for the TSC annual meeting, the TSC will accept a brief summary and conclusions from the CARE meeting along with any recommendations to the TSC. The full report can then be submitted at a later date when the final agency reports are due, usually the end of June. Note: In recent years the TSC has met the last week of April, and that should not change. The TSC cannot schedule their meeting any later because many TSC members start their field season the first week of May.
- E. In 2017 TSC asked CARE to again review yelloweye rockfish aging.

4. TSC to the Parent Committee 2016

- A. After the 2016 TSC meeting, TSC member Jim Armstrong reported his progress towards the TSC to CARE recommendation in 2015 on the otolith storage issue: “Prior to every June Council meeting, the Joint Groundfish Plan Team, the Crab Plan Team, and the Scallop Plan Team review all existing research priorities. Their review considers modifications to priority category and research progress, and the possibility of eliminating or adding new priorities. As a participant in the Groundfish Plan Team review in 2016, I communicated the otolith storage issue to the Team, and it was included among their recommendations to the (North Pacific Fishery Management) Council. At the June 2016 Council meeting, the Council's SSC (Scientific and Statistical Committee), which reviews the collective plan team's recommendations, agreed with the addition of that priority item. Finally, the Council approved the addition of the otolith storage issue in its final determination of its five-year (2017-2021) research priorities, which it communicated to the Secretary of Commerce, fulfilling a mandate of the Magnuson-Stevens Act.” The TSC is delighted to report that the otolith storage issue is approved as a 2017-2021 research priority for the North Pacific Management Council and will remove the TSC to CARE recommendation pertaining to this issue. The TSC thanks the Parent Committee for their support in moving this issue forward.
- B. The TSC would like to thank CARE for its ongoing reporting and research into the otolith storage issue and is delighted to report that this issue will be a 2017-2021 research priority for the North Pacific Management Council. The TSC encourages CARE and all its member agencies to support this research priority.

Table 1. Attendees of the CARE Conference, April 4-7, 2017, Seattle, Washington, U.S.A.

Last name	First name	Agency	Location	Country	Email
Pollak	Andrew	ADF&G	Homer	USA	andrew.pollak@alaska.gov
Russ	Elisa	ADF&G	Homer	USA	elisa.russ@alaska.gov
McNeel	Kevin	ADF&G	Juneau	USA	kevin.mcneel@alaska.gov
Rebert	April	ADF&G	Juneau	USA	april.rebert@alaska.gov
El Mejjati	Sonya	ADF&G	Kodiak	USA	sonya.elmejjati@alaska.gov
Anderl	Delsa	AFSC	Seattle	USA	delsa.anderl@noaa.gov
Arrington	Morgan	AFSC	Seattle	USA	morgan.arrington@noaa.gov
Benson	Irina	AFSC	Seattle	USA	irina.benson@noaa.gov
Brogan	John	AFSC	Seattle	USA	john.brogan@noaa.gov
Gburski	Chris	AFSC	Seattle	USA	christopher.gburski@noaa.gov
Goetz	Betty	AFSC	Seattle	USA	betty.goetz@noaa.gov
Harris	Jeremy	AFSC	Seattle	USA	jeremy.harris@noaa.gov
Helser	Thomas	AFSC	Seattle	USA	thomas.helser@noaa.gov
Hutchinson	Charles	AFSC	Seattle	USA	charles.hutchinson@noaa.gov
Kastelle	Craig	AFSC	Seattle	USA	craig.kastelle@noaa.gov
Matta	Beth	AFSC	Seattle	USA	beth.matta@noaa.gov
Neidetcher	Sandi	AFSC	Seattle	USA	sandi.neidetcher@noaa.gov
Pearce	Julie	AFSC	Seattle	USA	julie.pearce@noaa.gov

Piston	Charlie	AFSC	Seattle	USA	charlie.piston@noaa.gov
Short	Jon	AFSC	Seattle	USA	jon.short@noaa.gov
TenBrink	Todd	AFSC	Seattle	USA	todd.tenbrink@noaa.gov
Williams	Kali	AFSC	Seattle	USA	kali.williams@noaa.gov
Campbell	Barbara	CDFO	Nanaimo	Canada	barbara.campbell@dfo-mpo.gc.ca
Groot	Joanne	CDFO	Nanaimo	Canada	joanne.groot@dfo-mpo.gc.ca
Wischniowski	Stephen	CDFO	Nanaimo	Canada	stephen.wischniowski@dfo-mpo.gc.ca
Forsberg	Joan	IPHC	Seattle	USA	joan@iphc.int
Johnston	Chris	IPHC	Seattle	USA	chris@iphc.int
Planas	Josep	IPHC	Seattle	USA	josep@iphc.int
Rudy	Dana	IPHC	Seattle	USA	dana@iphc.int
Tobin	Robert	IPHC	Seattle	USA	robert@iphc.int
Atkins	Nikki	NWFSC	Newport	USA	nikki.atkins@noaa.gov
Hale	James	NWFSC	Newport	USA	james.hale@noaa.gov
Johnson	Tyler	NWFSC	Newport	USA	tyler.johnson@noaa.gov
McDonald	Patrick	NWFSC	Newport	USA	pmcdonald@psmfc.org
Sullivan	Lance	NWFSC	Newport	USA	lance.sullivan@noaa.gov
Kautzi	Lisa	ODFW	Newport	USA	lisa.a.kautzi@state.or.us
Claiborne	Andrew	WDFW	Olympia	USA	andrew.claiborne@dfw.wa.gov
Hildebrandt	Anna	WDFW	Olympia	USA	anna.hildebrandt@dfw.wa.gov
Rosenfield	Sandra	WDFW	Olympia	USA	sandra.rosenfield@dfw.wa.gov
Stevick	Bethany	WDFW	Olympia	USA	bethany.stevick@dfw.wa.gov
Topping	Jennifer	WDFW	Olympia	USA	jennifer.topping@dfw.wa.gov

Table 2. 2015 CARE Hands-On “Scope Time” Session – Species Aged, Participants, and Agency.

Species	Participants	Agency	Comments
Black Rockfish	Sonja El Mejjati	ADF&G	Calibration
	Lisa Kautzi	WDFW	
Yelloweye Rockfish	Elisa Russ	ADF&G	Calibration
	Andrew Pollak	ADF&G	
	Patrick McDonald	NWFSC	
Eulachon		WDFW	Calibration

		DFO	
		NWFSC	
Pacific Ocean Perch	Betty Goetz	AFSC	Calibration
	James Hale	NWFSC	

Table 3. CARE age structure exchanges initiated in 2016 and 2017.

Exchange ID No.	Species	Originating Agency	Coordinator	Coordinating Agency
16-001	Pacific Herring	CDFO	Joanne Groot	WDFW
16-002	Pacific Herring	WDFW	Andrew Claiborne	CDFO
16-003	Arrowtooth Flounder	NWFSC-PSMFC	Lance Sullivan	AFSC
16-004	Blue/Deacon Rockfish	ODFW	Lisa Kautzi	SWFSC (Don Pearson)
17-001	Yelloweye Rockfish	CDFO	Barbara Campbell	NWFSC
17-002	Rougheye Rockfish	ADF&G - Juneau	Kevin McNeel	
17-003	Rougheye Rockfish	ADF&G - Juneau	Kevin McNeel	
17-004	Blue/Deacon Rockfish	ODFW	Lisa Kautzi	SWFSC (Don Pearson)
17-005	Yelloweye Rockfish	ADF&G - Juneau	Kevin McNeel	WDFW, NWFSC, and ADF&G- Juneau
17-006	Lingcod	WDFW	Jennifer Topping	ADF&G - Juneau
17-007	Yelloweye Rockfish	NWFSC	Patrick McDonald	WDFW, NWFSC, and ADF&G
17-008	Yelloweye Rockfish	NWFSC	Patrick McDonald	WDFW
17-009	Yelloweye Rockfish	WDFW	Andrew Claiborne	ADF&G
17-010	Pacific Cod	WDFW	Sandy Rosenfield	AFSC
17-011	Petrale Sole	NWFSC	Patrick McDonald	WDFW
17-012	Lingcod	MLML (moss landing)	Laurel Lam	PSMFC
17-013	Pacific Cod		Sandy Rosenfield	AFSC

Figure 1: Attendees of the 2017 CARE Conference, April 4-7, 2017 Group Photo.



APPENDIX-I



**Nineteenth Biennial Meeting of the
Committee of Age Reading Experts**

Working Group of the Canada – US Groundfish Committee Technical Subcommittee

AFSC Sand Point Facility, NOAA Western Regional Center

**7600 Sand Point Way NE, Seattle, WA, USA 98115
Bldg. #4, Room 2076 April 4 – 6, 2017**

Tuesday, April 4

I. Call to Order [8:30 am] – CARE Chair (Chris Gburski)

II. Host Statement

1. Welcome statements & host info: safety/security orientation, refreshments, social. etc.

(Tom Helser-Age and Growth Program Director, Chris Gburski)

III. Introductions

1. Round-table intro (name, agency, location)
2. Attendance-name, agency, location, email (distributed)

IV. Approval of 2017 Agenda

V. Working Group Reports [9:00 – 9:45] Activity since CARE 2015 (~ 5 min each)

- C.** TSC Meeting 2016 (Chris Gburski)
- D.** Age Structure exchanges (Lance Sullivan)
- E.** CARE Website and publication database (Jon Short, Kevin McNeel)
- F.** CARE Forum (Nikki Atkins)
- G.** CARE Manual (Elisa Russ)
- H.** Charter Committee (Elisa Russ)
- I.** Sablefish (Delsa Anderl)

VI. CARE & TSC Recommendations [9:45 – 10:15]

5. CARE to CARE 2015 (see pages 25-27 in 2015 CARE Meeting Minutes)
6. CARE to TSC 2015 (see pages 27-28 in 2015 CARE Meeting Minutes)
7. TSC to CARE 2015/2016

Break 10:15 – 10:30

VII. Agency Reports [10:30 – 11:15] Activity since CARE 2015 (~ 5 min each)

1. CDFO – (Steve Wischniowski)
2. IPHC – (Joan Forsberg)
3. ADF&G – (Elisa Russ, Kevin McNeel, Sonya El Mejjati)
4. AFSC – (Tom Helser)

Lunch 12:30 – 1:45

VIII. Agency Reports [1:45 – 2:15] Activity since CARE 2015 (~ 5 min each)

5. NWFSC – (Patrick McDonald)
6. WDFW – (Andrew Claiborne)
7. ODFW – (Lisa Kautzi)

IX. Scientific PowerPoint Presentations [2:15 – 3:15]

6. April Rebert, *How old is that crab? Progress on an age old question* (20 min)
7. Kevin McNeel, *Update on shortraker rockfish (Sebastes borealis) otolith analyses* (20 min)
8. Craig Kastelle, *Elevating the management tier of commercially important rockfish: II-Age determination and accuracy* (20 min)

Break 3:15 – 3:30

X. Workshops, working groups, hands-on microscope work [3:30 – 5:30]

1. Longnose Skate Workshop (Imaging Room 1110) add time if needed.
2. Working Groups (Traynor Room and Room 2079)
3. Hands-on microscope work and calibration (Traynor Room)

Wednesday, April 5

XI. Workshops, working groups, hands-on microscope work [8:30 – 5:00]

*schedule lunch as appropriate for respective groups

1. Rougheye rockfish workshop [9:00 – 10:30] Imaging Room 1110
2. Lingcod workshop [10:30 – 12:00] (Imaging Room 1110, Groundfish Lab 1125 for structure preparation)
3. Working Groups (Traynor Room and Room 2079 available all day)
4. Hands-on microscope work and calibration (Traynor Room)

XII. Scientific PowerPoint Presentation [1:00 – 1:45]

Tom Helser, *Fish tales: isotopes, trace elements and increments, and what they tell us*

XIII. Workshops, working groups, hands-on microscope work (continued)

5. Longnose skate workshop [2:00 – 5:00] (Imaging Room 1110)

--- Posters available for viewing during breaks from other tasks all day---

CARE Social at the Wedgwood Ale House and Café-see sign-up sheet and directions (5:30-9:00)

Thursday, April 6

XIV. Recommendations [8:30 – 9:00]

1. CARE to CARE 2017
2. CARE to TSC 2017
3. TSC to CARE 2015/2016

XV. Topics for Discussion/New Business [9:00 – 9:30]

1. Symposia/Conferences since CARE 2015 meeting & upcoming
2. Non-agenda items

XVI. Concluding CARE Business [9:30 –10:00]

1. Administration nominations
2. Schedule and location of 2019 meeting

XVII. Working groups & Hands-on Workshop [10:00 – 12:00]

1. Working Groups – additional time available to meet and schedule tasks for 2019
2. Hands-on Workshop – dual microscopes available for calibration work until noon
3. Workshops – additional time if needed
4. Group photo

XVIII. CARE Business Meeting Adjourns [12:00 noon]

APPENDIX-II



CARE 2017

CALL FOR PRESENTATION ABSTRACTS



Please submit abstracts by March 17, 2017 to: christopher.gburski@noaa.gov

See attached for complete details on abstract submission.

The 2017 CARE Meeting will be held April 4-6, 2017 at NOAA, AFSC, Seattle, WA.

APPENDIX-III



CARE Meeting2017

April 4-6, 2017

NOAA, Western Regional Center,
Alaska Fisheries Science Center, Sand
Point, Seattle, WA

CALL FOR PRESENTATIONS & POSTERS

The Committee of Age Reading Experts is pleased to announce the Call for Presentations and Posters for the 2017 CARE Meeting.

While no specific theme has been designated, topic sessions can focus on exciting 'current research', e.g., comparative age structure studies, otolith microchemistry, climate-driven studies.

Please submit abstracts by Friday, March 17, 2017 to Chris Gburski, CARE Chair:

christopher.gburski@noaa.gov

Submit abstract as a Word document (preferably) and include the following information:

- Type of presentation (oral or poster)
- Title
- First and Last Name of Author(s)
 - Include any preferred appellation (e.g. Dr. or Ph.D.)
 - Name of Presenter (if more than one author)
 - Include any affiliations (spell out agency), city, country, and e-mail

- Text of abstract in 250 words or less
- Amount of time needed for presentation (maximum of 20 minutes-including questions)

The CARE meeting includes presentations, age reader calibration, workshops and workgroup meetings, held April 4-6, 2017.

- Oral presentations-Tuesday (afternoon), April 4
- Poster session-Wednesday, April 5

CARE Website: <http://care.psmfc.org>

APPENDIX-IV



Nineteenth Biennial Meeting of the Committee of Age Reading Experts

Working Group of the Canada – US Groundfish Committee TSC

AFSC Sand Point Facility, NOAA Western Regional Center

April 4 – 6, 2017

Abstracts

Type of Presentation: Oral

Title: How old is that crab? Progress on an age old question

Authors and affiliation:

April Rebert^{1,2}, Joel Webb¹, Kevin McNeel¹, and Gordon Kruse²

¹Alaska Department of Fish and Game, Division of Commercial Fisheries, Mark, Tag and Age Laboratory, Juneau, AK 99811

²University of Alaska Fairbanks, College of Fisheries and Ocean Sciences, Juneau, Alaska 99801

Abstract:

Age information provides direct insight into rates of growth, reproduction, and survival essential to stock assessment and fishery management. Crab and shrimp have long supported vital fisheries in Alaska, but direct determination of their ages has not been possible. Structures useful for age determination (e.g. fish otoliths) are generally retained throughout the lifespan; banding patterns on these growth structures associated with seasonal growth variability are interpreted as indices of chronological age. Due to the loss of the calcified cuticle during molting, it has been presumed that age determination in crab and shrimp is impossible. However, banding patterns potentially useful for age determination were recently identified in the gastric mill (grinding apparatus in stomachs) of snow and red king crabs and eyestalks of spot shrimp from Alaska. This study investigates whether banding patterns on these structures yield reliable indices of chronological age for crabs and shrimp by: (1) developing standardized workflows to facilitate evaluation of differences in band counts between groups of small and large individuals for each species; (2) examining whether the endocuticle layer of each structure is retained through the lifetime to describe potential band retention or formation; and (3) evaluating chemical marking methods that can be used to validate that bands form annually. Project milestones to date include: (1) production of over 2,000 thin-sections for band counts; (2) sampling of red king crab and spot shrimp before and after molting to evaluate cuticle retention; and (3) identification of calcein as an effective fluorescent marker for age validation.

Type of Presentation: Oral

Title: Update on shortraker rockfish (*Sebastes borealis*) otolith analyses

Authors and affiliation:

Kevin McNeel

Alaska Department of Fish and Game, Division of Commercial Fisheries, Mark, Tag and Age Laboratory,
Juneau, AK 99811

Abstract:

Shortraker rockfish (*Sebastes borealis*) are a long-lived, high trophic-level fish found in the North Pacific that are caught as bycatch in longline, and trawl fisheries. Management of these fisheries is potentially constrained by limited life history and catch information for this species. Furthermore, species misidentification and limited age validation force management to use potentially conservative estimates of allowable catch. A greater understanding of species specific characteristics, current age criteria accuracy, and factors influencing productivity would provide insights helping to reduce uncertainty in stock assessments. Studies of sagittal otolith shape, chemistry, and annual increments have been used to investigate these issues. The Alaska Department of Fish and Game has a historic archive of shortraker and other rockfish otoliths and otolith measurements including otolith length, height, weight, and core ^{14}C activity. To improve life history information, I propose to (1) use available and shape measurement data to discriminate between potentially misidentified species, (2) provide a limited age criteria validation with available ^{14}C data, and (3) develop a chronology of shortraker rockfish growth using otolith annual increment measurements to compare with climate and ecosystem trends from fish caught in Prince William Sound.

Type of Presentation: poster

Title: Reconstructing the growth history of Pacific halibut (*Hippoglossus stenolepis*) natural population by otolith increment analysis

Poster Presenter: Dana M. Rudy

Authors and affiliation:

Dana Rudy, Chris Johnston, Robert Tobin, Tim Loher, Ian Stewart, Josep V. Planas, Joan Forsberg.
International Pacific Halibut Commission, 2320 W. Commodore Way, Seattle, WA 98119. All email correspondence to dana@iphc.int

Abstract:

The Pacific halibut (*Hippoglossus stenolepis*) is one of the largest and longest-lived flatfish in the world, reaching up to 200 kg in body weight and 2.4 m in length and with the oldest individual caught aged at 55 yrs. Although female Pacific halibut attain much larger sizes than males, the average size at age for both males and females has significantly decreased during the last 25 years, especially in the Gulf of Alaska. This has led to a decrease in the exploitable biomass of halibut stocks. Several factors, including environmental, fisheries-related and even anthropogenic, could be responsible for the observed decrease in the growth potential of this species. Here, we looked at Pacific halibut otoliths from the 1977, 1987, 1992, and 2002 cohorts from the Gulf of Alaska. Over the past few decades, which include these cohorts, the International Pacific Halibut Commission (IPHC) has observed a significant decline in halibut size at age throughout their range. However,

we did not find a similar decline in otolith growth during this time period for halibut in the Gulf of Alaska. For example, in 15-year-old females sampled from the 1977 and 1992 cohorts, there was a 2.45% increase in mean otolith radius during that time period, despite a 14.97% decrease in mean body length for those fish. Additionally, we found that otolith accretion in male and female halibut does not reflect their large dimorphic size differences. Although factors regulating otolith growth in Pacific halibut are not well understood, otolith growth appears to be independent of somatic growth.