Monday, April 3, 2023

I. Call to Order [8:30 am] – Acting CARE Chair (Andrew Claiborne)

II. Host Statement

1. Welcome statements & host info: safety/security orientation, refreshments, social. Etc. (Tom Helser)

Notes about safety: Guests should be escorted into building every day by local; FT-NIRS workshop concurrent in building 9 auditorium; social times and locations (see Chris for donation $$); COVID safety – masks & sanitizer available, go virtual and notify immediately if sick

III. Introductions

1. Round-table intro (name, agency, location) (See sign-in sheet)
2. Attendance-address, phone, email (written list distributed)

IV. Approval of 2023 Agenda

Agenda approved

V. Working Group Reports [9:00 – 9:45] Activity since CARE 2019 (~ 5 min each)

1. TSC Meeting 2019 (Andrew Claiborne)

Updated on exchanges – 10; website was being updated; 1st FIT-NIRS conference; we had 36 peeps from 7 agencies; updated on Yelloweye exchanges; discussion about oto storage & glycerine thymol issues

2. Age Structure exchanges (Andrew Claiborne)

14 exchanges in 2022, 2 in 2021, 10 in 2020; 5 black rockfish exchanges, 2 REYE, 2 canary, 2 PTRL, 1 YEYE, 1 SABL, 1 LING (those all in 2022)

3. Website (Jon Short)

Jamie & Andrew work on as well; Wordpress backbone; Forum, species info, structure exchanges; we'd like to turn off old website but want to make sure that everything is ported over. All care minutes or reports (TSC etc) are on the CARE website or PSMFC website.

4. CARE Forum (Nikki Paige)

Reminder that the forum exists and is a good way to keep in contact if other methods are unavailable. Basic overview of how to sign up and get in contact with Nikki to make sure you're signed in properly

5. CARE Manual (Elisa Russ)

New sablefish section; new Lingcod section? Update the manual on the website. Adding Andrew to the manual committee. Longnose skate new info to include. Will circle back on Friday

6. Charter Committee (Elisa Russ)

Time between meetings (CARE & TSC) is short and is sometimes a crunch; talked about meeting times, even vs odd years

7. Lingcod Working Group (Leif Rasmussen)

Lots of structures gathered but group still in new days; most info has been collating info on number of structures and what the labs have done with them; report on agencies and what they have, and agencies working out which structure we want to use; Leif will work up all stats. Talk to Kevin about Ling otos because his lab has the most experience about criteria; ODFW samples look nothing like Alaska? AFS report available; scope time this week

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

1. CARE to CARE 2019 (see pages 25-27 in 2019 CARE Meeting Minutes)

CARE manual working group finalize sections on Ling procedures; SABL ageing procedures section; update to thin sectioning procedures; general oto ageing procedures adding baking (needs some more info from other agencies); ergonomic equipment section; spiny dogfish section; rockfish ageing section & thin sectioning; remove changes to the manual section & acknowledge section; send archived sections to the website for safekeeping. Add forum to website (done); discontinue publication list; add info to species info page; report that methods listed are for most recent year; update agency production numbers annually (done for last meeting, now need to update for this meeting 2019 to current, send to Andrew); edit species info for formatting done; agencies should provide links to structure inventories (not done yet, limits to how we're allowed to give out info? If it's allowed we can do it, but some labs not allowed. Put "contact [agency lead]" otherwise, as a data request. Maybe consolidate those who can link into the "links" page). Table of max age info for species and validation for such (structure exchange, etc); Care oto storage working group – is this one done? We believe so, complete. Some groups are still using glycerine thymol, the long term storage issue is a lab-by-lab basis and the issues are known and there are steps to correct it;

2. CARE to TSC 2019 (see pages 27, 28 in 2019 CARE Meeting Minutes)

3. TSC to CARE 2019

Considering ageing ling otos as primary; create record of ageing methods as a learning tool (videos!) (our issue is with some labs being able to publish them publicly)

Break 10:15 – 10:30

VII. Agency Reports [10:30 – 11:15] Activity since CARE 2022 (~ 5 min each)

1. CDFO – (Steve Wischniowski/Audrey Ty)

Since CARE 2021 Aged:

Common Name	Scientific Name	Group	2021-22	2022-23	Total
Dover sole	Microstomus pacificus	flatfish	67	0	67
		subtotal	67	0	67
Rougheye rockfish	Sebastes aleutianus	rockfish	164	0	164

Pacific ocean perch	Sebastes alutus	rockfish	2910	6129	9039
Yellowtail rockfish	Sebastes flavidus	rockfish	829	0	829
Quillback rockfish	Sebastes maliger	rockfish	917	241	1158
Canary rockfish	Sebastes pinniger	rockfish	1398	413	1811
		subtotal	6218	6783	13001
Sablefish	Anoplopoma fimbria	roundfish	2681	1239	3920
Lingcod	Ophiodon elongatus	roundfish	1557	169	1726
Hake	Merluccius productus	roundfish	581	1170	1751
		subtotal	4819	2578	7397
Total Groundfish			11104	9361	20465
Herring	Clupea harengus pallasi	pelagics	15927	13804	29731
Total Pelagics					29731
Chum	Oncorhynchus keta	salmonids	4212	5118	9330
Coho	Oncorhynchus kisutch	salmonids	4265	7995	12260

Sockeye/Kokanee	Oncorhynchus nerka	salmonids	18487	20046	38533
Chinook	Oncorhynchus tshawytscha	salmonids	31734	29842	61576
Total Salmonids			58698	63001	121699
Geoduck	Panopea abrupta	shellfish	454	969	1423
Total Shellfish					1423
Total Ages Produced			86183	87135	173318
Number of Agers	(Full-time Equivalent)		6.6	6	

We returned to ageing in our lab in July 2020. All Covid restrictions were removed by Autumn of 2022.

SCL Direct Data Entry (SCLDDE) App trial began with Hake in December 2021. There were some adjustments to work flow and to the rigidity of the database format but now the majority of the increase in time in processing a sample is to due to the additional time it takes to weigh and image the otolith before ageing it.

We have procured a FT-Nir machine and have begun scanning Pacific Ocean Perch otoliths as our proof of concept test. Since August 2022, Steve Wischniowski has been in a research role and Audrey Ty has been acting manager.

One experienced ager retired end of March 2022. One novice ager resigned August 2022 to go back to school. We hired a new ager in August 2022. Two intermediate agers came back from Maternity leaves; one in June 2022 and one in November 2022. We hired a new ager in January 2023 who will be filling in for the maternity leave of one of our intermediate agers starting April 2023.

At present the Sclerochronology lab has a low ratio of experienced agers to novice agers. We've introduced a new training plan that outlines a path to learn our core species progressing through the easiest group of species to the most difficult group of species. We've created a new position to create training manuals and train trainers

as well as agers. This will help us catch up on the training that should have been prioritized earlier and help us transition faster to an ageing group with broad experience among most of its members.

2. IPHC – (Joan Forsberg)

4 to 3 age readers in 2021; aged on av 25-30k halibut a year. 2021 26,282; 2022 25,923. Glycerol storage for most, some dry and are cleared before aging. Most break and bake, very young by surface; yay for new tray biens but the lids are a pain; spray painting the bottoms to make otos more noticeable (specifically for plastic); onsite work in 2021, but most of age readers remote until 2022, now all back in office; 2 more training in summer in anticipation of retirements.

3. AFSC – (Tom Helser)

Staffing

Now a 2 supervisor program with ageing and research components

Delsa retired and I am the acting supervisor for the ageing team until the position is filled and Tom Helser, the supervisor for the research team

Andrew Chin was hired as an age reader

Age team

Since CARE 2019 meeting, we have produced traditional otolith 101,511 ages.

Completed new reference collections for Alaska plaice, dover sole, Greenland turbot, northern rockfish, Pacific cod, Pacific ocean perch, rex sole, and walleye Pollock

Produced training videos for dover sole, Greenland turbot, northern rockfish, Pacific cod, sablefish, and yellowfin sole

FT-NIRS

Pandemic was disruptive for the application development, nationwide

Scanned a total of 89,567 otoliths

Assessing the integration of FT-NIRS produced ages of Pollock and P. cod into stock assessments

Expanding FT-NIRS into examination of soft tissues to look at energy density and fish condition and for maturity studies

Moving towards deep machine learning for predictive models and using google cloud for the computing environment

Jon Short is looking at using the database user interface and architecture to ingest FT-NIRS products

FT-NIRS workshop happing now

Other research

Using O18 isotopes to expand Pacific cod age validation, and as a proxy indicator for preference in habitat use by arctic cod

4. ADFG – (Elisa Russ, Kevin McNeel, Sonya Elmejjati)

The ADF&G-Homer sportfish aging lab is part of the Southcentral Alaska Halibut and Groundfish Harvest Assessment program. The port sampling program collects biological samples including age structures (otoliths and fin rays) from groundfish species harvested by the sport fishery in Cook Inlet and Prince William Sound management areas. Samples are collected by field technicians in the ports of Homer, Anchor Point, Ninilchik, Seward, Kodiak, Whittier, and Valdez. The lab also receives black rockfish otoliths to age from the Southeast Alaska port sampling program.

The majority of production age reading is done by program biologist Marian Ford, with additional sample preparation and aging done by one seasonal technician, Tim Blackmon. Our program is supervised by Clay McKean out of the Anchorage office.

In 2022, the Homer lab prioritized the aging of black and yelloweye rockfish in response to an ADF&G Statewide Rockfish Initiative, but also aged dark, dusky, quillback, and other rockfish species as time allowed. A total of 2,640 otoliths were aged this season. Lingcod fin rays are cross-sectioned and mounted on slides for aging. A total of 467 fin ray slides were aged for the 2022 season. All halibut otoliths collected by our project are sent to the IPHC for aging.

Each season agers do calibration testing for each species before moving on to production age reading. Precision testing is done on 20% of all samples. In the last couple years, the Homer lab participated in a lingcod otolith/fin ray exchange with the ADU lab and participated in an interagency black rockfish otolith exchange.

CARE 2023 ADF&G- JUNEAU UPDATE- The ADF&G Age Determination Unit (ADU) is the statewide groundfish and invertebrate age reading program based out of Juneau, AK. The ADU currently has two permanent staff, two seasonal staff, and interim personnel borrowed from adjacent ADF&G projects. The ADU has had turnover and had one biologist (Cathy Mattson) and two technical staff (Mollie Dwyer, Juliet Harrison) go through the program. Currently, Chris Hinds, who is also leaving the program, Josh Dore, Mark Plumb, and Kevin McNeel are the primary groundfish age readers for the lab.

During 2022, the ADU received 9,057 otolith sets from Central and Southeast Alaska commercial and survey sampling. These collections represented approximately 12 species and during the 2019 and 2023 period, the ADU focused on processed sablefish, lingcod, Pacific cod, yelloweye, black, shortraker, rougheye rockfish, and weathervane scallops and distributed at least 10,000 ages per year. Historically, the ADU questioned conventional age methods for Pacific cod, but internal and AFSC based research supported conventional methods and ADU staff trained with AFSC staff.

During processing, personnel measure and weigh 100% of otoliths for quality control and age estimates are compared to growth model intervals in addition to random subsets of second reads. Growth models consist of estimated fish length and otolith weight at age ranges for lingcod, black rockfish, yelloweye rockfish, rougheye rockfish, shortraker rockfish, shortspine thornyhead, sablefish, and scallops. Estimated size-at-age values were developed from Ludwig von Bertalanffy and exponential growth models, and reasonable error ranges per size were entered into a database table. Further, personnel develop Shiny apps to look at fishery data to flag and address outliers. To work on criteria, the ADU concluded a rougheye rockfish exchange with the Alaska Fisheries Science Center in Seattle, WA (AFSC) and a lingcod exchange with AFSC and ADF&G Homer-Sport, respectively. Also, the ADU continued work on a black rockfish exchange that is presented later.

For age related research, ADU personnel participated in the following projects:

- In collaboration with Baylor University, personnel finalized the North Pacific Research Board funded project 1803: Reconstructing reproductive histories of yelloweye rockfish through opercular hormone profiles. Project results were published in Charapata et al. (2022) in Canadian Journal. Work to extract and understand hormone fluctuations in bone are ongoing and include a collaboration with Alaska Fishery Science Center and Little Port Walter staff to support a long-term Pacific cod and walleye pollock rearing study, and rockfish and salmon samples with corresponding plasma, gonad, and isotope samples.

- In collaboration with ADF&G Kodiak Otolith Lab, ADU staff established models and workflow to evaluate black rockfish species misidentification using fish length and otolith weight at age along with otolith morphology criteria to detect errors in contemporary and historical data. Results were presented at the Alaska American Fisheries Society meeting

- In collaboration with the ADF&G Gulf of Alaska Bottomfish Program (GOAB), ADU staff performed and presented comparisons between fin spine and otolith age estimation methods using paired structures collected in Southcentral and Southeast Alaska and results were also presented at the Alaska American Fisheries Society meeting.

- In collaboration with the AFSC, Auke Bay Laboratories, ADU staff aided an investigation of age-0 lapillar and sagittal otoliths to infer daily growth in juvenile sablefish in the Gulf of Alaska. This study used laboratory reared fish in temperature and feed treatments and the manuscript is in internal review.

Charapata, P., D. Oxman, K. McNeel, A. Keith, F. Mansouri, and S. Trumble. 2022. Lifetime hormone profiles for a long-lived teleost: Opercula reveal novel estimates of age-specific reproductive parameters and stress trends in yelloweye rockfish (*Sebastes ruberrimus*). Canadian Journal of Fisheries and Aquatic Sciences in Press.

ADF&G-Homer

In 2022 the Homer Alaska Department of Fish and Game (ADF&G) commercial groundfish age lab had four age readers: Elisa Russ (project leader), Andrew Pollak (primary production reader), Aaron Slater (black rockfish; hired in September 2021 and resigned August 2022), and Alissa Cole (walleye pollock; hired in November 2022). The port sampling program collects biological samples including age structures (primarily otoliths) from state managed groundfish and shellfish species harvested in Cook Inlet and Prince William Sound management areas (Central Region). All age readers also act as port samplers and sometimes as ADF&G observers. Sampling goals are 550 otolith pairs collected from each management area and from each primary groundfish species – Pacific cod, sablefish, lingcod, walleye pollock, and rockfish species. Groundfish sampling occurs in the ports of Homer, Seward, Whittier, Cordova, Kenai, and Kodiak.

Groundfish species aged in Homer include demersal shelf rockfish (primarily yelloweye and quillback), pelagic shelf rockfish (primarily black rockfish), and walleye pollock. The remainder of groundfish otoliths – lingcod, sablefish, and slope rockfish are sent to the ADF&G Age Determination Unit (Kevin McNeel – project leader).

In 2021, the Homer age lab continued to prioritize black and yelloweye rockfish age work in response to an ADF&G Statewide Rockfish Initiative (SRI) focusing on black and yelloweye rockfish assessment with those two rockfish as the keystone species. A total of 2,060 ages were produced in 2022. Age data is current through 2021 collections for black rockfish and yelloweye rockfish. In fall of 2022, staff began to tackle the backlog of walleye pollock specimens. Aaron Slater had become proficient in age reading black rockfish in his 1 year with the program and Alissa Cole trained on walleye pollock in late 2022; Andrew Pollak worked on yelloweye rockfish early in the year and then focused on pollock in the fall and training Alissa Cole.

The Homer ADF&G Division of Commercial Fisheries (DCF) age lab worked on a CARE exchange with other labs within ADF&G on yelloweye rockfish. The Homer DCF lab collaborated on a black rockfish maturity study involving age and growth with ADF&G SRI staff from other regions utilizing histology work on ovarian

tissue. Homer DCF staff also collected genetics samples from black and yelloweye rockfish for another SRI study and also collected genetics samples from Pacific cod for NOAA staff.

Precision testing is done on 20% of all samples and on 100% of samples that are aged by new readers. All differences beyond 1 year are resolved, unless there is bias, and then all differences are resolved. Otoliths are stored dry, cut using an Isomet saw and baked; burning is used to refresh otoliths during precision testing. Morphometric measurements have been collected for all species (otolith length, width, and weight, excluding crystalized or broken otoliths) since 2018. This information is analyzed to help identify outliers and errors in the age, species identification, or data entry.

Kevin, groundfish – in email (2 perm 2 seasonal staff)

ADFG – commercial fisheries dockside program. Down to 2 agers; black dark RF and pcod 25,000 pcod 1000 black 100 (?) dark. Pcod baked

South central halibut port sample – 2022 black & yelloweye, dark dusky & quillback 2,460 this season.

5. NWFSC – (Patrick McDonald)

Staff/New Hires

We have 8 people in our lab including myself; Our two most recent hires

Meredith - New hire in August ahead of when we received our instrument from AFSC – she will update you on our FT-NIRS work/Proposed work for the Strategic Initiative.

Liz Ortiz – 11/17/22; She was hired to help out with age reading CA Structures.

We have staff doing a mix of working 100% on-site and others doing a mix of telework with on-site.

Groundfish Assessments Supported

BLCK, CNRY, COPP, PTRL, PWHT and REX (24, 240 otoliths aged, 5,400 DR; over 29,500 otoliths aged in past year

CARE Exchanges Participated

BLCK rockfish 4 agency round robin

REYE; AFSC vs Newport

CNRY/PTRL; WDFW vs Newport

SABL; hope to participate in

Projects Participated

LINGCOD Paired Structure – Nikki will be heading up our lab's work for this project.

SABL – midcycle assessment; based on NWFSC combo the number of 'small' sablefish caught in 2022 is 2-3 times larger than anything that has been observed since 2003; Potential historic recruitment class.

6. WDFW – (Andrew Claiborne)

Personnel Update:WDFW has one new age reader and one retirement since CARE last met, virtually. The lead groundfish age reader at WDFW, Sandra Rosenfield, retired after over 50 years of age reading. Sandra provided ages for species ranging from yelloweye rockfish to petrale sole. Sandra's tireless work ethic and attention to detail were instrumental in stock assessments, conserving groundfish populations, and collaborating on research projects. We were sad to lose such a vital part of our team but wish Sandra the best in retirement. Jenny Topping was promoted from our second groundfish age reader to the lead reader in 2022, after over 30 years with WDFW. In turn, Merrie Schultz was hired in August of 2022 and since then is quickly becoming proficient as a groundfish age reader.

- Jenny Topping- Lead Groundfish Age Reader
- Merrie Schultz- Groundfish Age Reader
- Austin Anderson-Salmon Age Reader
- Christina Jump-Freshwater Age Reader and Database
- Andrew Claiborne-Team Lead and Salmon Age Reader

Research Update: The WDFW Fish Ageing Lab has participated in several exchanges in 2022 including the round robin black rockfish, petrale sole, and canary rockfish exchanges. WDFW is collaborating on a study with Oregon State University looking at the potential of using petrale sole otolith chemistry as an indicator of ocean hypoxia and acidification pH. WDFW is working with the lingcod working group to compare age estimates from fin rays versus otoliths. The WDFW lab has also authored and co-authored nine manuscripts since the 2019 meeting, primarily related to ocean ecology and life history of anadromous species. Two relevant publications authored by the lab relating to age validation for anadromous species are provided below.

Anderson, A. J., Claiborne, A. M., & Smith, W. (2023). Validation of age estimates for Chum and Sockeye salmon derived from otolith and scale analysis. Fisheries Research, 259, 106556.

Claiborne, A. M., Losee, J. P., & Miller, J. A. (2020). Estimating migratory behavior and age for anadromous Coastal Cutthroat Trout in south Puget Sound: evaluation of approaches based on fish scales versus otoliths. North American Journal of Fisheries Management, 40(5), 1313-1323.

Production Age Reading Update: Numbers aged since 2019 CARE:

Common Name	Scientific Name	Year	N
Black Rockfish	*Sebastes melanops*	2020	4426
Black Rockfish	*Sebastes melanops*	2022	3216
Black Rockfish	*Sebastes melanops*	2023	1318
Canary Rockfish	*Sebastes pinniger*	2022	2
Canary Rockfish	*Sebastes pinniger*	2023	3624
Chinook Salmon	*Oncorhynchus tshawytscha*	2019	37403
Chinook Salmon	*Oncorhynchus tshawytscha*	2020	39342
Chinook Salmon	*Oncorhynchus tshawytscha*	2021	43742
Chinook Salmon	*Oncorhynchus tshawytscha*	2022	41804
Chum Salmon	*Oncorhynchus keta*	2019	722
Chum Salmon	*Oncorhynchus keta*	2020	15955
Chum Salmon	*Oncorhynchus keta*	2021	22174
Chum Salmon	*Oncorhynchus keta*	2022	31807
Coho Salmon	*Oncorhynchus kisutch*	2020	162
Coho Salmon	*Oncorhynchus kisutch*	2021	1217
Coho Salmon	*Oncorhynchus kisutch*	2022	229
Copper Rockfish	*Sebastes caurinus*	2020	1077
Eulachon	*Thaleichthys pacificus*	2019	500
Eulachon	*Thaleichthys pacificus*	2020	500
Eulachon	*Thaleichthys pacificus*	2021	500
Eulachon	*Thaleichthys pacificus*	2022	500
Lingcod	*Ophiodon elongatus*	2020	3396
Lingcod	*Ophiodon elongatus*	2021	4151
Northern Anchovy	*Engraulis mordax*	2019	1373
Northern Anchovy	*Engraulis mordax*	2020	1821
Northern Anchovy	*Engraulis mordax*	2021	202
Northern Anchovy	*Engraulis mordax*	2022	1088
Pacific Sardine	*Sardinops sagax*	2019	79
Pacific Sardine	*Sardinops sagax*	2020	59
Pacific Sardine	*Sardinops sagax*	2021	50
Petrale Sole	*Eopsetta jordani*	2019	2879
Petrale Sole	*Eopsetta jordani*	2022	1457
Quillback Rockfish	*Sebastes maliger*	2020	2411
Sockeye Salmon	*Oncorhynchus nerka*	2021	924
Sockeye Salmon	*Oncorhynchus nerka*	2022	1642
Stealhead	*Oncorhynchus mykiss*	2019	1013
Stealhead	*Oncorhynchus mykiss*	2020	1887
Stealhead	*Oncorhynchus mykiss*	2021	1666
Stealhead	*Oncorhynchus mykiss*	2022	2336
Vermilion Rockfish	*Sebastes miniatus*	2020	808
Yelloweye Rockfish	*Sebastes ruberrimus*	2019	819
Yelloweye Rockfish	*Sebastes ruberrimus*	2020	214
Yellowtail Rockfish	*Sebastes flavidus*	2019	7407
Yellowtail Rockfish	*Sebastes flavidus*	2021	3416

7. ODFW – (Leif Rasmussen/Mark Terwilliger)

Personnel: Leif Rasmuson, Program Manager

Mark Terwilliger, Age Reading Specialist

Production ageing: Production activity in 2022-2023 was heavily focused on ageing the considerable backlog of Black Rockfish otoliths for the upcoming 2023 assessment:

Year Captured	Commercial ages	Commercial 2nd reads	Avg. % agreement (% APE)	Sport ages	Sport 2nd reads	Avg. % agreement (% APE)
2019	894	180	66.67 (2.22)			
2020	961	193	56.99 (2.72)	1115	223	54.71 (3.02)
2021	908	181	60.77 (2.67)	1100	220	56.82 (3.20)
2022	901	180	63.33 (2.51)	1151	230	65.65 (2.18)

In total, I aged 7030 Black Rockfish otoliths (1407 double-reads).

My plan was to age approximately 1000 samples per fleet per year. In some cases, (the recreational catches and 2020 commercial), the total number of structures approached 1000 and so no subsampling occurred; commercial 2019, 2021, and 2022 required subsampling. Subsampling was random and based on sex and length.

In years where subsampling occurs, I have also been heavily sampling the tails of the length distribution. These nonrandom samples are flagged as such in the data and are meant to better inform the length-at-age curves. These ages are **not** used to generate catchability curves for the stock assessment.

Exchanges: ODFW participated in the 2022 Black Rockfish exchange along with NWFSC, AFSC, and WDFW. With the ODFW ageing sample, precision among readers ranged from relatively high (Pat McDonald (NWFSC): APE=2.39% , 60% agreement, + bias) to very low (WDFW: APE=8.88%, 10% agreement, + bias).

ODFW intra-lab ageing: To develop ageing error vectors for interpreting conditional ages-at-length, the authors of the 2015 Black Rockfish Stock Assessment used a multiple-read study conducted in 2008 that included 150 original ages from three past age readers and double-reads of those ages by the current reader at the time. The resulting error increased exponentially with age, and further investigation into the inter-reader error and how to decrease it was listed as a research need. Therefore, I re-read all 150 otoliths used in the 2008 study and generated precision estimates between myself and each original reader as well as between myself and the original double-reader. Precision estimates in all cases improved over original values. I also performed 150 double-reads on Black Rockfish otoliths originally aged by a different ODFW reader post-2015. To conclude, ODFW has provided to assessors Black Rockfish double-read data between the current age reader and the past 5 readers dating back to the late 1990s.

Oregon Statewide Black Rockfish Survey: In anticipation for the 2023 assessment, ODFW conducted a survey of Oregon's nearshore environment with the purpose of providing an abundance estimate for black rockfish. The survey incorporated acoustics, CTD casts, video camera drops, and hook-and-line drift sampling.

All fish caught by hook-and-line were measured, sexed, and subsequently aged. Since the 2022 CARE meeting, age estimates were generated for 434 Deacon Rockfish (112 double-read), 53 Canary Rockfish (11 double-read), 50 Yellowtail Rockfish (10 double-read), and 48 assorted rockfishes (10 double-read). We also double-read 24 Black Rockfish otoliths that had been initially aged in 2021.

Black Rockfish ages for maturity study: Melissa Head, NOAA Research Fisheries Biologist with the FRAM division at NWFSC, has been conducting a maturity study on Black Rockfish that will be used to inform the 2023 assessment. I aged 117 Black Rockfish as part of this maturity study, representing fish captured between 2014 and 2021.

Lingcod aging structure comparison: We have concluded collection of paired structures for Lingcod. All fins have been dried, and I have just been sample processing and ageing. We have 368 pairs of structures between commercial and recreational fleets. Approximately 20% of our fins have been glued and 10% have been sectioned and aged. Thirty-five otoliths have been aged using a combination of break-and-burn and surface reads. Most of my focus will be finishing prep and ageing the remainder over the next few months.

Age Validation: Our paper on validating ages of Black Rockfish, Copper Rockfish, and Cabezon using SIMS was published in Winter 2023. The full citation is: Terwilliger MR, Rasmuson LK, Stern RA (2023) Age validation of Black Rockfish, Copper Rockfish, and Cabezon using secondary ion mass spectrometry (SIMS) to elucidate seasonal patterns in otolith stable oxygen isotopes. Environmental Biology of Fishes 106: 553-573.

Although visually derived otolith ages have been used in stock assessment models for decades, accuracy of the ageing method has not been determined for most groundfish species in the northeast Pacific. In this study, we validated otolith ages for Black Rockfish (*Sebastes melanops*), Copper Rockfish (*Sebastes caurinus*) and Cabezon (*Scorpaenichthys marmoratus)*, three species with recreational and commercial importance to Oregon. Ages obtained by traditional break-and-burn methods were validated using secondary ion mass spectrometry (SIMS) to examine otolith stable oxygen isotope ratios ($\delta^{18}O$) over a fish's lifetime. This technique relies on the inverse relationship that exists between otolith $\delta^{18}O$ and ambient water temperature, and independent counts of $\delta^{18}O$ maxima should be comparable to ages obtained by visual counts of otolith growth marks laid down during cold water periods. Locations of $\delta^{18}O$ maxima in otolith chronologies matched well with locations of visual growth marks in otoliths of all three species, maxima counts were strongly positively correlated with age, and variation in otolith $\delta^{18}O$ decreased with age. However, significant variability in the $\delta^{18}O$ chronologies caused by variability in intra-seasonal upwelling and resulting water temperature variations made maxima counts difficult in several samples. Correct interpretation of chronologies required knowledge of location of the first annulus, the compression of growth zones with age, and an assumption of the seasonal amplitude of the ambient water $\delta^{18}O$.

VIII. Topics for Discussion/New Business [11:15 – 12:00]

1. FT-NIR with input from agencies applying this technology

Steve is testing on POP; John 90k scanned plus soft tissues; ODFW doesn't have a machine, they send theirs to PSMFC; IPHC no machine – going to hire postdoc for genetic ageing but funding fell through; southwest center shortbelly and possibly anchovy. Scan samples first so that they're whole before broken and burned.

2. Western Groundfish Conference including the Age Reading Workshop

Back on same year as CARE; workshop meant to help pull folks outside of CARE into the ageing fold, so it can be more universally understood. Do we try to get CARE back on alternate years?

3. Symposia/Conferences previous & upcoming

Nothing to report

4. Revising the CASE Invoice

Consolidated to 50 on one page; removed stats section because it wasn't filled out; added exchange purpose; larger comment field; added exchange instructions so they're saved locally; exchange tracker so you know who to send it to next

5. CARE Website (what else would you like to see on the website?)

6. Agency updates & verification of sp. info on CARE website

Leaving it in the minutes is adequate

7. Non-agenda items

Lingcod – SE AK having trouble getting head-on fish at ports for commercial, and 'can you move to spines' oof. Want to know if structures are *comparable*, not saying one type is better than the other, so that as others move to otos they can still use fins.

Lunch 12:00 – 1:15

IX. Scientific PowerPoint Presentations [1:15 – 2:45]

1. Navigating through the new CARE Website (Jamie Hale)

We got a nice overview of the new site!

2. How we produced age determination tutorial videos at AFSC (Julie Pearce)

Grab PPT file

3. Role of AFSC age readers with the new FT-NIRS technology (John Brogan)

Grab ppt. Ties directly into the database, sample numbers etc all preloaded. Weights and scans taken at the same time.

4. Proposing a new way of reporting age data to data users at the AFSC (Beth Matta)

Grab ppt QAQC query to R and then into a markdown language that can be output as a PDF. Now have some graphical output in the reports

5. Results from a recent Black Rockfish exchange (Andrew Claiborne)

Grab ppt

Break 2:45 – 3:00

X. Workshops, working groups, hands-on microscope work [3:00 – 5:30]

(Working group notes will be amended to the end of this document)

1. Longnose Skate scope work (Traynor room)

2. Working Groups (Traynor Room or Room 2079 available in morning)

3. Hands-on microscope work and calibration (Traynor Room)

4. Sablefish exchange group (Traynor Room or Room 2079 available in morning)

5. Black rockfish exchange group (Traynor Room or Room 2079 available in morning)

Informal social at the Burke Gilman Brewing Co on Monday evening starting at 5:00PM

Tuesday-Thursday, April 4 - 6, 2023

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

*schedule lunch as appropriate for respective groups

1. Longnose skate microscope work (mornings in Rm 2079 available)
2. Lingcod Working group (mornings in Rm 2079 available)
3. Working Groups (Traynor Room and Room 2079 available in the mornings)
4. Hands-on microscope work and calibration (Traynor Room)
5. Nikon reps to demo an innovative new inverted microscope imaging system on Thursday afternoon at 1:30 PM.

CARE/FT-NIR Social Wednesday evening at Elliot Bay Brewing Co.

Friday, April 7, 2023

XII. Recommendations [8:30 – 9:00]

1. TSC to CARE

   Recommendations from Monday
2. 2023 CARE to CARE (CHANGE all refs of 2025 to 2024)
   - Care manual working group add the following sections-

     Lingcod Otoliths, sablefish, thin sectioning, break and bake, ergonomics, rockfish sectioning, big skate, longnose skate - nearly complete or in progress. Draft CARE manual July 1, submitting by July 31

     Walleye pollack, spiny dogfish, other revisions, adding a black rockfish section later (2025 rec)
   - Posting of old manuals to the website (scanning and posting)
   - Update production numbers biannually around meetings
   - Updating age validation list in the manual
   - Lingcod working group - adopt objectives one and two from the working group report before the next meeting in 2025
   - Max age info - labs comment on ages provided by ADF&G if they have samples that go beyond the max supplied by them. Initiate exchanges for those samples
   - 2025 recommendation to discuss morphometrics
   - RECOMMENDATION: Moving care meetings to even years. (vote 15 to 2, many abstaining), Moving meeting to 2024 (2024 7 votes, 2026 4 votes.)
3. 2023 CARE to TSC
   - Recommend support across agencies for equipment for collection of morphological data (scales, calipers, FIT-NIRS, software, etc).
   - Recommend support across agencies for age validation testing and equipment.

XIII. Concluding CARE Business [9:00 –10:00]

1. Administration nominations
    Voted to move CARE to even years, starting with 2024
    Nikki Paige voted in as Secretary (overwhelming)
    Mark Twilliger voted in as Vice Chair (overwhelming)
    Patrick McDonald voted in as Chair (overwhelming)
2. Schedule and location of 2024 meeting
    Potential for meeting in Newport in 2024 (overwhelming vote for yes)

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

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

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

WORKING GROUP NOTES:

Lingcod

Lingcod Working Group Minutes 4/5/23

Proposed Objectives of the Lingcod Working Group

- The first objective of the Lingcod Working Group is to have each region/lab (ADFG, CDFO, WDFW, ODFW, NWFSC) age the otoliths and fin rays and from their respective region using common age reading criteria.
- The second objective of the Lingcod Working Group is to have a single expert otolith reader and a separate expert fin ray age reader produce age estimates for a subsample of structures from all regions to address inter-lab bias.
- The final objective of the working group validate age estimates derived from otoliths.

To accomplish objective one the working group will need to collaborate with the manual working group to complete the lingcod otolith ageing section. ADFG's manual will be used as a jump off point perhaps adding reference images from the other regions that help address any regional differences in growth patterns observed that may influence ageing criteria.

To accomplish objective two and three the LWG will need to identify two experts willing to age the structures from all regions and procure funding to support that effort. Objective three will require an academic partner and likely graduate student to complete. Jessica Miller from Oregon State University has expressed interest and funding opportunities may be available via North Pacific Research Board.

Sample Update

- WDFW has completed ageing of fins and not otoliths. Range of fish fin ray age is approximately 2-20 years.
- ADFG has completed 2021 fins and otoliths but 2022 samples are not complete. Does not have young age fish due to a commercial sample.
- NWFSC have paired samples, fin rays are prepped. Otoliths not aged yet. They have a wide range of age down to age-1 fish.
- CDFO- has completed fin rays and their sample ranges from age 1 to 15. Otoliths are not complete.
- ODFW has recently started processing and ageing fin rays and otoliths. They have a good size range and worked with the Observer Program to get undersized samples.

Working Group Discussion and Sample Examination

Alaska is walking through their SOP with a live otolith image. Discussing core measurement criteria-2 mm for 1st year lingcod otolith, ageing axis folks are comparing the age they are coming up with the reference age. ADFG has mentioned they age on the ventral side only and burn the whole otolith so the distal surface can be examined.

WDFW is using a yellow/green light filter for the fin rays. NWFSC is doing this as well because they were trained by WDFW. DFO, ADFG, and ODFW are not using filters. Jen from WDFW is going to track down the model number and see if the filter is a polarized filter.

Nikki's notes:

1st year measurement = 2mm (Alaska, diameter through sulcus)

2.5-3mm too big for 1st year.

Surfaces in southern stuff may be too washy after 1-2

Preferred left anterior

Surface used as minimum age estimate

Crenulations on winter growth of annuli – "warts". Kind of like dark mounds of material. Pretty indicative of an annuli being there.

Core/false 1st?

Can be tail-y and checky in the first few years. Expect noise in the first few years.

MAX max age around 30. Average oldest tend to run around teens to 20

Us weirdos who use a green filter to age finrays started a whole convo about why. We're not sure if the filters are polarized or not. I (Nikki) was trained years ago by Sandy and that was how she did it, so I brought the method back to the Newport Lab.

Also discussed how the finrays can occasionally be cut at an unideal angle, and how the slides can be tilted to clarify the annuli (looking "straight" through the ray)

Sablefish:

Attendees:

Josh Dore, ADFG	Charlie Piston, AFSC	Liz Ortiz, NWFSC
Audrey Ty, CDFO	Julie Pearce, AFSC	Nikki Paige, NWFSC
Chelsea Rothkop, CDFO	Denise Parker, NWFSC	Kevin McNeel, ADFG - Juneau
Chelsea Cooke, CDFO	Tyler Johnson, NWFSC	John Brogan

Point of exchange – how are we calling edge types and the influence that has on ageing

Young fish picked from various months of the year

Example 1: surface seemed to show 3, but on break and burn it looks much more like a 2 to most groups. Time of year was 6/21. Is the 2nd year bandy and still putting down material, not much edge? Or a really thin annuli, lots of growth and another annuli? General consensus came out to age 2, 5+ edge

Example 2: Time of year mid July. 1-3 *fairly* clear, question comes on edge again. On surface there could be the ghost of a 4th year, but it *could* be part of 3? On break, the possible annuli seems like it's faint or nonexistent. Maybe 4 edge?

Example 3: Aug 7 catch date. Ages from 4-5. Surface a bit messy but looks like a good 4. Sulcus count looks like 4, wingtip messier. 1 – edge

Example 4: November. Ages from 2-4. On the surface it's really messy, and there are multiple checks on the break. It's just messy. But looks like a wider edge.

Example 5: October. Ages 3-5. Issue isn't edge, but where to break things out. Everything else was massively checky.

Example 6: June 21. Between 2 and 4. Grooves don't help so much

Break to show Delsa's paper showing probability of edge types by month. Lowest probability of an annuli on edge is in August. But it's still not 0% for the months around then.

Kevin: Huge 2014 & 2016 year class Alaska tracked. But the age data was seeing a 2015 bump. Needed to nail down what was going on.

Went through slides from Delsa's Sablefish Ageing video

Black Rockfish Working Group

Tuesday April 4, 2023 10:30am- 1:30pm

Attendees:

Kevin McNeel ADFG-Juneau	Marian Ford ADFG-Homer Sport	Andrew Claiborne-NWFSC-Newport
James Hale NWFSC-Newport	Josh Dore ADFG-Juneau	Mark Terwilliger- ODFW
Merrie Schultz – WDFW	Sonya Elmejjati ADFG-Juneau	Mark Plumb ADFG-ADFG-Juneau
Liz Ortiz – NWFSC, Newport	Patrick McDonald-NWFSC-Newport	Melissa Munk SWFSC

Summary

Following the presentation by Andrew Claiborne (WDFW), the black rockfish working group met to review criteria and to look at otoliths from the exchange and from NWFSC California Assessment. The working group reviewed potential cryptic species, with black rockfish being misidentified as dark and dusky rockfish in Alaska. The group noted that those species may not be present in southern collections and are not problematic. Also, criteria for the size of the first was reviewed: ADFG-Juneau uses an approximate 2mm diameter for the first, ADFG-Kodiak uses 2-2.5mm, ADFG-Homer-SF uses 1.8-2.5mm. Most agencies used an approximate range for the diameter of the first that were comparable. The working group discussed counting axes. All agencies agreed that both the dorsal and ventral half were used to estimate ages. Some age labs preferred to use the dorsal and specifically the light-dark boundary on the dorsal half to get a final estimate. Also, the group reviewed edge type and plus growth assignment. Some agencies recorded plus growth as percent growth and others recorded it based on capture date.

The working group noted current and historical age validation work. Currently, NWFSC is presenting a bomb radiocarbon analysis of California black rockfish, ODFW validated ages using oxygen isotope, and ADFG is working to publish bomb radiocarbon validation. Historically, Vanessa Von biela did an Alaska wide chronology of black rockfish growth.

After age discrepancies were highlighted from the exchange, the working group reviewed young black rockfish. Working group identified annuli 2-5 as potential sources of error. Also, some specimens were difficult and had potential differences between group. After reviewing specimens, the group suggests that current agency

methods be reformatted and published as a CARE Manual chapter. Further, an additional exchange was suggested to evaluate improvements after the workshop.

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