Committee of Age Reading Experts

2023 Committee Report

Prepared for the Sixty-third Annual Meeting of the

Technical Subcommittee of the Canada-USA Groundfish Committee

April 3– 7, 2023

Prepared by
Andrew Claiborne
2019-2023 CARE Vice Chair (Acting Chair)

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1111 Washington St SE
Olympia, WA 98501

Picture of CARE Members that attended the 2023 CARE Conference in Seattle, WA. Photo by Chris Gburski (AFSC).

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 April 8, 2022 – April 7, 2023. To promote timely reporting of work and recommendations occurring during the recent CARE conference, an Executive Summary of the 22nd CARE conference held April 3-7, 2023 is included here as part of the TSC report. Current officers through June 30, 2023 (elected at April CARE 2019 Meeting) are:

- Chair – Delsa Anderl (AFSC-Seattle)
- Vice-Chair – Andrew Claiborne (WDFW-Olympia)
- Secretary – Nikki Paige (NWFSC-Newport)

The current Chair of CARE, Delsa Anderl, retired on March 31, 2023, from the AFSC after a storied career leading production age readers and helping validate age estimates for some of Alaska's most valuable fish species. Delsa was integral part of CARE, and we wish her the best in retirement. The current Vice Chair, Andrew Claiborne, served as the acting Chair for the 2023 CARE conference and will remain Chair until June 30, 2023.

The Secretary will prepare a draft of the minutes from the recent CARE meeting to be distributed to CARE members for review and subsequent approval prior to June 30, 2023 and posted on the CARE website. Due to the proximity of the TSC meeting following the CARE meeting, it is necessary for the Chair to prepare the report to TSC to include proceedings of the recent meeting as an executive summary.

3. CARE Conference - Executive Summary

CARE meets biennially for a conference that usually lasts three days. CARE 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. Occasionally extra time is scheduled for a specific focus group or workshop. However, due to COVID-19 pandemic restrictions, the CARE biennial meeting that was supposed to take place in April 2021, was rescheduled for November of 2022 and ultimately postponed until April of 2023 so that all members were allowed to travel and meet inside government buildings.

a. Overview

The most recent biennial CARE Conference was held in Seattle, WA, April 3-7, 2023, 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, with a virtual option (Appendix I). The conference was attended by 41 CARE members and nonmembers from seven agencies (Table 1). Concurrently, AFSC hosted a five-day FT-NIRS workshop (Appendix II).

CARE voted to move the biennial conference to occur on even years starting with the next CARE Conference in 2024 (See section 6 subheading f). CARE voted to hold CARE 2024 in Newport, OR and will finalize meeting dates after July 1st, 2023. The following officers were elected at the April 2023 meeting and will take office July 1, 2023:

- Chair – Patrick McDonald (NWFSC-Newport)
- Vice-Chair – Mark Terwilliger (ODFW-Newport)
- Secretary – Nikki Paige (NWFSC-Newport)

b. Agency Reports

AFSC (John Brogan), CDFO (Audrey Ty), IPHC (Joan Forsberg), ADFG-ADU (Kevin McNeel), ADFG-Homer-Commercial Fisheries (Elisa Russ), ADFG-Homer-Sport (Marian Ford), ADFG-Kodiak (Sonya Elmejjati), NWFSC-PSMFC (Patrick McDonald), WDFW (Andrew Claiborne), and ODFW (Mark Terwilliger) provided reports summarizing and updating agency activities, staffing, organization, new species, and projects. There was no update given at CARE from SWFSC or CDFG. Details from agency reports will be available in the finalized CARE minutes and published to the CARE website by year's end.

c. Scientific Presentations

Five oral presentations were presented in PowerPoint format during the CARE meeting.

- Jamie Hale (NWFSC) – Navigating through the new CARE website.
- Julie Pearce (AFSC) – How we produced age determination tutorial videos at AFSC.
- John Brogan (AFSC) – Role of AFSC age readers with the new FT-NIRS technology.
- Beth Matta (AFSC) – Proposing a new way of reporting age data to data users at the AFSC.
- Andrew Claiborne (WDFW) – Results from a recent black rockfish exchange.

4. CARE Subcommittee (Working Group) Reports - Executive Summary

There were 7 active working groups that gave reports at the 2023 CARE conference that summarized activities since the last in person meeting in 2019.

a. TSC Meeting 2019

Andrew Claiborne presented to TSC in Olympia, WA on behalf of CARE. Kevin McNeel (ADFG) was chair for 2017-19. Highlights presented to TSC include: 36 people from 7 agencies attended the CARE meeting. 10 sample exchanges in 2018. Andrew updated TSC on the CARE website which had been updated substantially in Word Press. Andrew updated TSC

on the manual working group which has updated the manual substantially; new sections are coming soon. Many CARE members met for an international ageing meeting April 9-12, 2019, at the AFSC which focused on near-infrared spectroscopy aging techniques. Yelloweye exchanges were reviewed. Details were presented to TSC in an oral presentation.

b. Structure Exchanges

There were 14 exchanges initiated in 2022 (Table 2). This is an increase from only 2 exchanges initiated in 2021, and 10 initiated in 2020. The 2022 exchanges included 5 black rockfish exchanges, 2 rougheye rockfish, 2 canary rockfish, 2 petrale sole, 1 yelloweye rockfish, 1 sablefish, and 1 lingcod exchange. A new exchange form was demoed, and CARE members voted to use the new form going forward.

c. CARE Website and Forum

John Short (AFSC), Jamie Hale (NWFSC), Nikki Paige (NWFSC) and Andrew Chin (AFSC) have done a great amount of work on the CARE website transitioning to Wordpress. Improvements have been made to the forum, species info, structure exchanges, and references. All CARE minutes and reports are on the CARE website now. Exchanges were updated through 2022 during the meeting and a basic overview of how to sign up for the forum was demonstrated.

d. CARE Manual

The Care Manual working group, Elisa Russ lead (ADFG-Homer), Barb Campbell (CDFO), and now Kevin McNeel who joined this meeting (ADFG-ADU) are finalizing the lingcod otolith section which is based on work by ADFG who have the most experience ageing lingcod with otoliths. The manual group is also finalizing a new species section for big and longnose skate, which was submitted during this meeting by the AFSC. The manual working group is also updating the sablefish, rockfish, thin sectioning, break and bake, and ergonomics sections.

e. Lingcod Working Group

Over 2,700 paired otoliths and fin rays have been collected from California to Alaska. Approximately 2,117 fin rays have been processed and many aged. Most agencies have not aged the otoliths and a goal of this meeting was for the working group to establish objectives and establish lingcod otolith ageing criteria. More detail can be seen in the working group summary below.

5. TSC and CARE Recommendations

a. 2022 TSC to CARE Recommendations

- Consider aging lingcod otoliths using FT-NIRS to eliminate need to collect fin rays.
- Create a record of aging methods as a learning tool. Possibly a library of video instructions to be housed on the CARE website.

b. Progress on 2022 TSC to CARE Recommendations

- The lingcod working group has collaborated with the NWFSC and AFSC to address this recommendation and this topic was presented on by Laurel Lam (NWFSC) at the FT-NIRS workshop (Appendix 2). This included 77 samples from the working group that were sent to ADFG-ADU for otolith ageing. The samples were previously imaged and analyzed using FT-NIRS by AFSC and will be recorded in CARE exchange ID 22-010.
- The AFSC has completed several video tutorials including one for sablefish and Pacific cod, dover sole, Greenland turbot, northern rockfish, walleye pollock and yellow fin sole. Pacific cod and sablefish tutorials were both reviewed during CARE and Julie Pearce gave a presentation on how the AFSC created the videos. The other CARE

agencies plan on making progress on this TSC recommendation as time allows. Currently, adding videos to the CARE website has not occurred due to agency requirements that may need review and approval to make public.

6. CARE to CARE Recommendations 2023

a. Care Manual Working Group

- CARE manual group to complete and provide to CARE by July 1, 2023 a final draft manual with:
  - new sections on sablefish and skate (longnose and big);
  - update the lingcod (fin ray) section with a new section on otoliths;
  - update rockfish section;
  - update age validation list;
  - add figure on right and left otolith;
  - update general information to include baking otoliths, ergonomics, long-term storage table, and review outdated information; and
  - replace cover.
- CARE members will have until July 31, 2023 to provide review to the manual group and approve the manual; a non-response will imply approval.
  - Posting the updated manual to the CARE site is expected by September, 2023.
- Work with Website Working Group to post previous versions of CARE manuals to CARE website.

b. Website Working Group

- Post previous versions of CARE manuals to CARE website.
- Update production numbers on CARE website after each biennial meeting.

c. Lingcod Working Group

- Adopt and make progress toward objectives one and two from the working group report below before the next meeting in 2024.

f. CARE Charter Group

- Move CARE conference to even years. Votes were as follows:
  - Moving care meetings to even years. (Vote 15 to 2, many abstaining.)
  - Moving meeting to 2024. (2024 7 votes, 2026 4 votes.)

g. General recommendations

- Recommendation to discuss morphometrics at the CARE conference in 2024.
- Max age information – Each lab should comment on ages provided by ADFG. If CARE members have samples that go beyond the max aged listed by ADFG please report to CARE Chair and ADFG-ADU and initiate exchanges for those samples. The link to the ADFG table is here: https://mtalab.adfg.alaska.gov/ADU/analysis.aspx#/maxage.

7. CARE to TSC Recommendation 2023

a. Recommend support across agencies for equipment for collection of morphological data (scales, calipers, FIT-NIRS, software, etc.).

b. Recommend support across agencies for age validation testing and equipment.

8. 2023 CARE Conference Hands on and Working Group Minutes - Executive Summary

There were 3 working groups who met during the CARE conference (lingcod, black rockfish,

sablefish), 1 informal discussion group (oxygen isotopes), and 2 hands on groups (yelloweye rockfish and Nikon Microscope Demo)**.** Below is a summary of the 3-working groups. The oxygen isotope discussion took place on Wednesday at 3:30PM and representatives from AFSC, CDFO, ODFW and ADFG. Recent studies and manuscripts by the participants relating to age validation were discussed. The yelloweye rockfish group met on Thursday at 10:45AM and reviewed the ADFG validated samples using a camera microscope. The Nikon microscope demo occurred Thursday from 1:00PM-5:00PM and included examination and imaging of rockfish thin sections, otolith daily increments, lingcod fin rays, and examination of Alizarin marked otoliths provided by the AFSC.

a. Black Rockfish Working Group

- **When:** Tuesday April 4, 2023 10:30am- 1:30pm
- **Attendees:** Kevin McNeel ADFG, James Hale NWFSC, Merrie Schultz WDFW, Liz Ortiz NWFSC, Marian Ford ADFG, Josh Dore ADFG, Sonya Elmejjati ADFG, Patrick McDonald- NWFSC, Andrew Claiborne- WDFW, Mark Terwilliger ODFW, Mark Plumb ADFG, Melissa Monk SWFSC, Jenny Topping WDFW (virtual).
- **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 year was reviewed: ADFG-Juneau uses an approximate 2mm diameter for the first year, 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 year 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 on publishing 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. Participants identified annuli 2-5 as potential sources of error. Also, some specimens were difficult and had potential differences between age readers. After reviewing specimens, the group suggested that current agency methods be reformatted and published as a CARE Manual chapter. Furthermore, an additional exchange was suggested to evaluate improvements after the workshop.

b. Lingcod Working Group

- **When:** Wednesday April 5, 2023 9:00am- 12:30pm
- **Attendees:** Kevin McNeel ADFG, James Hale NWFSC, Merrie Schultz WDFW, Nikki Paige, NWFSC, Marian Ford ADFG, Josh Dore ADFG, Sonya Elmejjati ADFG, Patrick McDonald- NWFSC, Andrew Claiborne- WDFW, Mark Terwilliger

ODFW, Mark Plumb ADFG, Audrey Ty CDFO, Chelsea Rothkop CDFO, Chelsea Cooke CDFO, Jenny Topping WDFW (virtual).

- **Summary**

The lingcod working group proposed the following objectives: The first objective is to have each region/lab (ADFG, CDFO, WDFW, ODFW, NWFSC) age the otoliths and fin rays from their respective region using common age reading criteria. The second objective 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 is to 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 starting point perhaps adding reference images from the other regions to help address any regional differences in growth patterns observed that may influence ageing criteria. To accomplish objective two and three the working group 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 a 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 fish fin rays, but not otoliths. The range of fin ray ages is approximately 2-20 years. ADFG has completed ageing 2021 fin rays and otoliths, but 2022 samples are not complete. ADFG does not have young age fish because it is a commercial sample. NWFSC has paired samples, and fin rays are prepped, but otoliths are not aged yet. They have a wide range of ages down to age-1 fish. CDFO has completed ageing 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 work 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. 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

c. Sablefish Working Group

- **When:** Wednesday April 5, 2023 1:30pm- 5:00pm
- **Attendees:** Kevin McNeel ADFG, Tyler Johnson NWFSC, Nikki Paige, NWFSC, Josh Dore ADFG, Audrey Ty CDFO, Chelsea Rothkop CDFO, Chelsea Cooke CDFO, Jenny John Brogan AFSC, Denise Parker NWFSC, Julie Pearce AFSC, Liz Ortiz NWFSC, Charlie Piston AFSC.
- **Summary**

Point of exchange and working group is to determine how labs are calling edge types and the influence that has on ageing. Young fish were picked from various months of the year. Several images were examined as a group. A narration of each otolith used as an example is below.

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 generally 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: August catch date. Ages from 4-5. Surface a bit messy but looks like a good example of an age 4. Sulcus count looks like 4, wingtip messier. 1 – edge

Example 4: November catch date. Ages from 2-4. On the surface it is really messy, and there are multiple checks on the break. 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.

Went through slides showing various sablefish growth patterns and known age sablefish.

9. Table 1 Attendance for CARE Conference 2023

Last name	First name	Agency	Location	Country	Email
Russ	Elisa	ADFG	Homer-DCF	USA	elisa.russ@alaska.gov
Ford	Marian	ADFG	Homer-DSF	USA	marian.ford@alaska.gov
Dore	Josh	ADFG	Juneau	USA	josh.dore@alaska.gov
McNeel	Kevin	ADFG	Juneau	USA	Kevin.McNeel@alaska.gov
Plumb	Mark	ADFG	Juneau	USA	mark.plumb@alaska.gov
Elmejjati	Sonya	ADFG	Kodiak	USA	sonya.elmejjati@alaska.gov
Arrington	Morgan	AFSC	Seattle	USA	morgan.arrington@noaa.gov
Brogan	John	AFSC	Seattle	USA	john.brogan@noaa.gov
Chin	Andrew	AFSC	Seattle	USA	Andrew.Chin@noaa.gov
Gburski	Chris	AFSC	Seattle	USA	Christopher.Gburski@noaa.gov
Groom	Brenna	AFSC	Seattle	USA	brenna.groom@noaa.gov
Helser	Tom	AFSC	Seattle	USA	Thomas.Helser@noaa.gov

Kastelle	Craig	AFSC	Seattle	USA	Craig.Kastelle@noaa.gov
Matta	Beth	AFSC	Seattle	USA	Beth.Matta@noaa.gov
Pearce	Julie	AFSC	Seattle	USA	julie.pearce@noaa.gov
Piston	Charlie	AFSC	Seattle	USA	Charlie.Piston@noaa.gov
Stone	Kali	AFSC	Seattle	USA	kali.stone@noaa.gov
Campbell	Barbara	CDFO	Nanaimo	Canada	Barbara.Campbell@dfo-mpo.gc.ca
Cooke	Chelsea	CDFO	Nanaimo	Canada	Chelsea.Cooke@dfo-mpo.gc.ca
Rothkop	Chelsea	CDFO	Nanaimo	Canada	Chelsea.Rothkop@dfo-mpo.gc.ca
Ty	Audrey	CDFO	Nanaimo	Canada	Audrey.Ty@dfo-mpo.gc.ca
Forsberg	Joan	IPHC	Seattle	USA	Joan.forsberg@iphc.int
Johnston	Chris	IPHC	Seattle	USA	chris.johnston@iphc.int
Tobin	Robert	IPHSC	Seattle	USA	robert.tobin@iphc.int
Hale	James	NWFSC	Newport	USA	jhale@psmfc.org
Johnson	Tyler	NWFSC	Newport	USA	tjohnson@psmfc.org
Kamikawa	Betty	NWFSC	Newport	USA	betty.kamikawa@noaa.gov
McDonald	Patrick	NWFSC	Newport	USA	pmcdonald@psmfc.org
Paige	Nikki	NWFSC	Newport	USA	npaige@psmfc.org
Parker	Denise	NWFSC	Newport	USA	dparker@psmfc.org
Boeck	Meredith Emery	NWFSC	Newport	USA	memeryboeck@psmfc.org
Ortiz	Liz	NWFSC	Newport	USA	lortiz@psmfc.org
Terwilliger	Mark	ODFW	Newport	USA	mark.r.terwilliger@odfw.oregon.gov
Monk	Melissa	SWFSC	Santa Cruz	USA	melissa.monk@noaa.gov
Choi	Jessica	SWFSC	Santa Cruz, CA	USA	jessica.choi@noaa.gov
Anderson	Austin	WDFW	Olympia	USA	Austin.Anderson@dfw.wa.gov
Claiborne	Andrew	WDFW	Olympia	USA	Andrew.Claiborne@dfw.wa.gov
Topping	Jennifer	WDFW	Olympia	USA	Jennifer.Topping@dfw.wa.gov
Schultz	Merrie	WDFW	Olympia, WA	USA	Merrie.Schultz@dfw.wa.gov
Winters	Terra				

10. Table 2 CARE Exchanges

Exchange ID #	Exchange Year	Species	Sample Size (n)	Stock	Originating Agency	Participating Agency (Cooperators)
22-001	2022	Black rockfish	90	Alaska	ADFG	ADFG
22-002	2022	Yelloweye rockfish	360	Alaska	ADFG	Jessica Randall University of Melbourne
22-003	2022	Rougheye rockfish		Alaska	AFSC	NWFSC-PSMFC
22-004	2022	Rougheye rockfish	36	West Coast	NWFSC-PSMFC	AFSC
22-005	2022	Black rockfish	50	Alaska	ADFG	WDFW, NWFSC, ODFW
22-006	2022	Black rockfish	50	Washington	WDFW	ADFG, ODFW, NWFSC
22-007	2022	Black rockfish	50	Oregon	ODFW	ADFG, WDFW, NWFSC

22-008	2022	Black rockfish	50	California	NWFSC	ADFG, WDFW, ODFW
22-009	2022	Sablefish	100	Alaska	AFSC	ADFG, CDFO, NWFSC
22-010	2022	Lingcod	77	West Coast	AFSC	ADFG -Homer
22-011	2022	Petrale sole	50	Washington	WDFW	NWFSC
22-012	2022	Petrale sole	50	West Coast	NWFSC	WDFW
22-013	2022	Canary rockfish	50	West Coast	NWFSC	WDFW
22-014	2022	Canary rockfish	50	Washington	WDFW	NWFSC

11. Appendix 1 CARE Agenda

C.A.R.E. 2022Agenda

Twenty-second 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
7600 Sand Point Way, NE, Seattle, WA,
USA Bldg. #4, Jim Traynor Conference Room 2076 April 3 – 7, 2023

I. Monday, April 3, 2023

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

III. Host Statement

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

III. Introductions

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

IV. Approval of 2023 Agenda

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

1. TSC Meeting 2019 (Andrew Claiborne)
2. Age Structure exchanges (Andrew Claiborne)
3. Website (Jon Short)

4. CARE Forum (Nikki Atkins)
5. CARE Manual (Elisa Russ)
6. Charter Committee (Elisa Russ)
7. Lingcod Working Group (Leif Rasmussen)

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

1. CARE to CARE 2019 (see pages 25-27 in 2019 CARE Meeting Minutes)
2. CARE to TSC 2019 (see pages 27, 28 in 2019 CARE Meeting Minutes)
3. TSC to CARE 2019

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)
2. IPHC – (Joan Forsberg)
3. AFSC – (John Brogan)
4. ADFG – (Elisa Russ, Kevin McNeel, Sonya Elmejjati)
5. NWFSC – (Patrick McDonald)
6. WDFW – (Andrew Claiborne)
7. ODFW – (Leif Rasmussen/Mark Terwilliger)

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

1. FT-NIR with input from agencies applying this technology
2. Western Groundfish Conference including the Age Reading Workshop
3. Symposia/Conferences previous & upcoming
4. Revising the CASE Invoice
5. CARE Website (what else would you like to see on the website?)
6. Agency updates & verification of sp. info on CARE website
7. Non-agenda items

Lunch 12:00 – 1:15

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

1. Navigating through the new CARE Website (Jamie Hale)
2. How we produced age determination tutorial videos at AFSC (Julie Pearce)
3. Role of AFSC age readers with the new FT-NIRS technology (John Brogan)
4. Proposing a new way of reporting age data to data users at the AFSC (Beth Matta)
5. Results from a recent Black Rockfish exchange (Andrew Claiborne)

Break 2:45 – 3:00

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

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

IV. 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.

V. Friday, April 7, 2023

I. Recommendations [8:30 – 9:00]

1. TSC to CARE
2. 2023 CARE to CARE
3. 2023 CARE to TSC

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

1. Administration nominations
2. Schedule and location of 2025 meeting

III. 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

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

12. Appendix 2 FT-NIRS Workshop Agenda

FT-NIRS Workshop

Virtual attendance via Webex will also be available
(see page 4)

Monday, 3 April

1:00 PM – 1:30 PM	**WELCOME AND INTRODUCTIONS**
1:30 PM – 2:30 PM	NOAA Fisheries FT-NIRS Fish Ageing Strategic Initiative: Past, present & future (Thomas Helser, AFSC — Seattle Lab)
2:30 PM – 4:30 PM	Session 1: AFSC Spectroscopy Lab Tour & demonstration (Bruker Applications Scientist - Jason Erikson). AFSC, Building 4 Room 1111
5:00 PM	Informal social: **Burke Gilman Brewing Company**, 3626 NE 45th Street, Suite 102

Tuesday, 4 April

Presentations	**FT-NIRS APPLICATION DEVELOPMENT**

9:00 AM – 9:30 AM	FT-NIRS age prediction of eastern Bering Sea yellowfin sole: a case study of a moderately long-lived flatfish (Todd TenBrink, AFSC – Seattle Lab)
9:30 AM – 10:00 AM	A preliminary analysis and review of FT-NIR spectroscopy and DNA CpG site methylation for fish age prediction (Laurel Lam, NWFSC – Seattle Lab)
10:00 AM – 10:30 AM	Applying FT-NIRS predictive ageing to different genetic stocks of white grunt within the U.S. south Atlantic (Jamie Clark, SEFSC – Beaufort Lab)
Break	
11:00 AM – 11:30 AM	A novel approach for determining the spawning phenology of walleye pollock using Raman spectroscopy (Sandi Neidetcher, AFSC – Seattle Lab)
11:30 AM – 12:00 PM	FT-NIRS ageing of finfish and shark species in the northwest Atlantic (Alex Rubin, NEFSC – Narragansett Lab)
12:00 PM – 12:30 PM	Exploration of FT-NIRS for shortbelly rockfish (*Sebastes jordani*): an ecologically important forage fish off the coast of California (Jessica Choi, SWFSC – Santa Cruz Lab)
Lunch	
2:00 PM – 2:30 PM	Investigating the use of FT-NIR spectroscopy to age gag (*Mycteroperca microlepis*), a protogynous hermaphroditic species (Beverly Barnett, SEFSC – Panama City Lab)
2:30 PM – 3:00 PM	Exploring the use of FT-NIRS for ageing sablefish (*Anoplomona fimbria*) and Pacific hake (*Merluccius Productus*) of the U.S. west coast (John Wallace, NWFSC – Seattle)
3:00 PM – 3:30 PM	Developing spectroscopy approaches to measure life history characteristics of fish throughout ontogeny (Esther Goldstein, AFSC – Seattle, Lab)
Break	
4:00 PM – 4:30 PM	Rapid daily age estimation of juvenile walleye Pollock in the Gulf of Alaska using FT-NIR spectroscopy (Beth Matta, AFSC – Seattle Lab)
4:30 PM – 5:00 PM	Fish otolith proteomics and its relationship and impact on the use of FT-NIR spectroscopy for fish age prediction (Oliver Thomas, University of Melbourne)
Close	

Wednesday, 5 April

Presentations cont.	

9:00 AM – 9:30 AM	Developing NIR sampling methodology for modeling species discrimination in live catfish for aquaculture (Carrie Vance – Mississippi State University)
9:30 AM – 10:00 AM	Fourier transform near infrared spectroscopy discriminates archived otoliths of newly detected cryptic species, *Etelis carbunculus* and *Etelis boweni* (Kristen Dahl, PIFSC)
	FT-NIRS IMPLEMENTATION
10:00 AM – 10:30 AM	Trials and tribulations of using FT-NIRS on Pacific Sardine: Method development for scanning Pacific Sardine otoliths (Emma Saas, SWFSC – La Jolla Lab)
10:30 AM – 11:00 AM	Benefits and challenges of using FT-NIRS for production age estimation at the Northeast Fisheries Science Center (Eric Robillard, NEFSC – Woods Hole Lab)
Break	
11:30 AM – 12:00 PM	FT-NIR spectroscopy of otoliths coupled with deep machine learning to improve age prediction (Irina Benson, AFSC – Seattle Lab)
12:00 PM – 12:30 PM	Automatic fish age prediction using deep machine learning: combining otolith image, NIR spectra and metadata features (Aotian Zheng – University of Washington)
12:30 PM – 1:00 PM	Calibration and variation of FT-NIRS otolith spectra among NIR spectrometers and species (Andy Ostrowski, SEFSC – Beaufort Lab)
Lunch	
2:00 PM – 2:30 PM	A simulation study exploring best practices for model development and updating (Morgan Arrington, CICOES-AFSC)
2:30 PM – 3:00 PM	Database architecture and management envisioned for the FT-NIRS paradigm at Alaska Fisheries Science Center (Jon Short, AFSC – Seattle Lab)
3:00 PM – 3:30 PM	Group discussion: Likelihood of operational success, timeline for operational readiness and communication to stake holders (follow up on Friday, April 7 at 9:00 AM).
3:30 PM – 5:30 PM	Session 2: AFSC Spectroscopy Lab Tour & demonstration (Bruker Applications Scientist – Jason Erikson). AFSC, Building 4 Room 1111
6:00 PM – 10:00 PM	Organized social mixer and casual dinner – **Elliot Bay Public House & Brewery** 12537 Lake City Way NE., Seattle WA 98125

Thursday, 6 April	
Presentations cont.	**FT-NIRS STOCK ASSESSMENT INTEGRATION**
9:00 AM – 10:00 AM	Envisioning the future of production fish ageing: end-to-end integration of the FT-NIRS age estimation enterprise (Thomas Helser, AFSC – Seattle Lab)
10:00 AM – 10:30 AM	A simulation framework to examine the effect of ageing error on model-based age predictions (Morgan Arrington, CICOES-AFSC)
Break	
11:00 AM – 11:30 PM	Integration of FT-NIRS age data products into the eastern Bering Sea walleye pollock and Pacific cod stock assessments (Thomas Helser, AFSC – Seattle Lab)
Lunch	
1:00 PM –1:30 PM	Efficacy of FT-NIRS predicted ages for use in the Gulf of Mexico gray snapper stock assessment (Steve Garner, SEFSC – Panama City Lab)
1:30 PM – 5:00 PM	Open discussion with national stock assessment forum

Friday, 7 April	
	FT-NIRS STRATEGIC INITIATIVE BUSINESS
9:00 AM – 10:30 AM	Wrap up - open discussion
Break	
10:30 AM – 12:00 PM	FT-NIR strategic initiative business and budget meeting
Meeting Adjourn	

WORKSHOP: Rapid Estimation of Fish Age Using Fourier-transform Near Infrared Spectroscopy (FT-NIRS)

Connect virtually

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