Committee of Age-Reading Experts

2004 Committee Report

Prepared for the Forty-fifth Annual Meeting of the Technical

Subcommittee of the Canada-USA Groundfish Committee

May 4 – 5, 2004

Prepared by
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CARE 2004 Report to the Technical Subcommittee of the Canada-USA Groundfish Committee

A. CARE Overview, 2003-2004

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

1. The last biennial CARE Workshop/Conference was held April 20-22, 2004. The minutes are currently being drafted and should be available for the 2005 TSC. Workshop participants (Appendix I) and workshop agenda (Appendix II) are included in this report.

2. No dates have been set for the next biennial CARE Workshop but the workshop is expected to be held prior to the 2006 TSC meeting.

B. CARE Working Group Reports

1. Manual/Glossary Subcommittee- Shayne MacLellan (chair, report contributor), Betty Goetz, Kristen Munk, Bob Mikus
    a. The ageing manual is posted on the new CARE web site. At the 2002 workshop it was agreed to add chapters on lingcod and Pacific whiting.
    b. John Sneva from the Washington Dept of Fish and Wildlife is lead draft writer for the lingcod chapter with participation from the Canada Dept of Fisheries and Oceans. This chapter is nearly complete.
    c. Patrick McDonald from the Oregon Dept of Fish and Wildlife is lead draft writer for the Pacific whiting chapter with participation from the Canada Dept of Fisheries and Oceans. This chapter is nearly complete.
    d. Steve Wischniowski from the International Pacific Halibut Commission is lead for drafting a new design for the cover page of the manual. The new design was approved at the 2004 CARE meeting and will soon be available for viewing on the new CARE web site.
    e. At the 2004 workshop, it was agreed to add a chapter on statistical analysis/tools appropriate for age reading comparisons. Michael Shirippa is lead draft writer for this chapter.
    f. No new updates to the glossary.

2. Web Page Subcommittee- Jon Short (chair), Delsa Anderl, Brenda Erwin
    a. A new CARE web site will soon be updated to include 2002–2004 age-structure exchange results, 2004 minutes, age structure images onto the Ageing Methodology page and additions to the CARE manual. Suggestions from the 2004 meeting will be reviewed and posted by the web page subcommittee.
    b. The CARE web site is available at http://www.psmfc.org/care/CARE_Pub/index.htm.

3. Charter Subcommittee – Shayne MacLellan, Kristen Munk, Betty Goetz, Bob Mikus
    a. A completed draft of the charter was proposed to the CARE membership and approved at the 2004 workshop (see Appendix III).
    b. The charter includes an overview of CARE, outlines the selection and duties of officers and membership, defines the role of subcommittees, and defines the format of the CARE biennial meeting, age structure exchange protocol and report protocols.

C. Agency Structure Exchanges

Additions have been made to the structure exchange table in the 2004 CARE to TSC report. However, the Dover sole age structure exchanges are currently in progress since the 2004 Dover sole workshop will not be held until later in May. All other exchanges prior to the 2004 CARE meeting are included in the CARE structure exchange table (see Appendix IV).

D. CARE Workshop Business

1. Status of 2003 Recommendations from TSC to CARE

The CARE membership was advised of the 2003 recommendations from the TSC to CARE, in a summary report following the 2003 TSC meeting.

2. Status of 2004 Recommendations from CARE to TSC

a.. CARE recommends that TSC and its participating agencies support additional hands-on only workshops to address species specific age reading issues.

b. CARE recommends to TSC that Appendix III (CARE Charter) be included in the 2004 CARE to TSC report.

APPENDIX I

CARE 2004 Attendees				
Agency	**Last**	**First**	**Email**	**Phone Number**
ADFG-Homer	Cowan	Philip	Philip_cowan@fishgame.state.ak.us	907 235-8191
ADFG-Juneau	Botz	Jeremy	jeremy_botz@fishgame.state.ak.us	907-465-3490
ADFG-Juneau	Constantine	Britt	Britt_constantine@fishgame.state.ak.us	907-465-3490
ADFG-Juneau	Munk	Kristen	kristen_munk@fishgame.state.ak.us	907-465-3054
ADFG-Kodiak	Brodie	Joan	joan_brodie@fishgame.state.ak.us	907-481-1902
CDFO	Campbell	Barbara	campbellba@pac.dfo-mpo.gc.ca	250- 756-7179
CDFO	MacLellan	Shayne	MacLellanSh@pac.dfo-mpo.gc.ca	250-756-7179 x7189
IPHC	Blood	Cal	Cal@iphc.washington.edu	206-634-1838 x228
IPHC	Forsberg	Joan	joan@iphc.washington.edu	206-634-1838 x224
IPHC	Tobin	Robert	robert@iphc.washington.edu	206-634-1838 x233
IPHC	Wischniowski	Stephen	SteveW@iphc.washington.edu	206-634-1838 x231
NMFS-AFSC	Anderl	Delsa	Delsa.Anderl@noaa.gov	206-526-4218
NMFS-AFSC	Benson	Irina	Irina.Benson@noaa.gov	206-526-4669
NMFS-AFSC	Brogan	John	john.brogan@noaa.gov	206-526-4219
NMFS-AFSC	Foy	Dan	Dan.Foy@noaa.gov	206-526-4267
NMFS-AFSC	Gburski	Christopher	Christopher.Gburski@noaa.gov	206-526-4268
NMFS-AFSC	Goetz	Betty	Betty.goetz@noaa.gov	206-526-4217
NMFS-AFSC	Hutchinson	Charles	Charles.Hutchinson@noaa.gov	206-526-6302
NMFS-AFSC	Johnston	Chris	chris.johnston@noaa.gov	206-526-4683
NMFS-AFSC	Kastelle	Craig	craig.kastelle@noaa.gov	206-526-4266
NMFS-AFSC	Kautzi	Lisa	Lisa.Kautzi@noaa.gov	206-526-4701
NMFS-AFSC	Kimura	Dan	Dan.Kimura@noaa.gov	206-526-4200
NMFS-AFSC	Piston	Charlie	Charlie.Piston@noaa.gov	206-526-6524
NMFS-AFSC	Shockley	Wesley	wesley.shockley@noaa.gov	206-526-4684
NMFS-AFSC	Short	Jon	Jon.Short@noaa.gov	206-526-4685
NMFS-NWFSC	Coccetti	Susan	susan.coccetti@noaa.gov	541-867-0515
NMFS-NWFSC	Lysak	Lisa	lisa.lysak@noaa.gov	541-867-0516
NMFS-NWFSC	McDonald	Patrick	Patrick.J.McDonald@noaa.gov	541-867-0513
NMFS-NWFSC	Menkel	Jennifer	Jennifer.Menkel@noaa.gov	541-867-0517
NMFS-NWFSC	Rodriguez	Omar	Omar.rodriguez@noaa.gov	541-867-0512
NMFS-NWFSC	Schirripa	Michael	Michael.Schirripa@noaa.gov	541-867-0536
ODFW	Mikus	Bob	bob.mikus@hmsc.orst.edu	503-378-6925 x22
WDFW	Rosenfeld	Sandra	rosenslr@dfw.wa.gov	360-902-2851
WDFW	Sneva	John	snevajgs@dfw.wa.gov	360-902-2762
WDFW	Topping	Jennifer	toppijat@dfw.wa.gov	360-902-2795

APPENDIX II

COMMITTEE OF AGE-READING EXPERTS
A Subcommittee of the Technical Subcommittee of the Canada-USA Groundfish Committee
2004 Biennial Meeting Agenda
April 20 – 22, 2004
NOAA-NMFS Alaska Fisheries Science Center
Seattle, Washington

DAY 1 Tuesday, 4/20/04

8:30 – 10:00 AM

I. Non-agenda Announcements, Introductions, Attendance
II. Approval of Agenda
III. Approval of 2002 Minutes
IV. Updates
    A. CARE email addresses and phone numbers
    B. Summary of age-reading methodology
    C. Standards
V. Working group reports
    A. Manual/Glossary (MacLellan, Goetz, Munk, Mikus)
    B. Charter (Munk, Goetz, MacLellan)
    C. Web site (Short, Anderl)
VI. Structure Exchanges (Patrick McDonald)

10:00 – 10:20 AM BREAK

10:20 AM – 12:00 Noon

VII. Age and Growth Lab overview and update by agency
    A. ADFG – Kristin Munk
    B. CDFO – Shayne MacClellan
    C. CDFG – Brenda Erwin
    D. IPHC – Joan Forsberg
    E. NMFS-AFSC – Betty Goetz
    F. NMFS-NWFSC (PSMFC) – Patrick McDonald
    G. ODFW – Bob Mikus
    H. WDFW – John Sneva
    I. Other agencies and labs
VIII. Similarities and differences between agencies/labs
    A. Databases
    B. Reading sheets – what's on them and what's not
    C. Statistical analysis
    D. Standardization – what's possible and what's not
    E. Same species ageing differences – address a protocol toward resolution.
IX. Ergonomics (Betty Goetz)

12:00 – 1:15 PM LUNCH

1:15 – 2:30 PM

X. Recommendations
    A. 2002 CARE to TSC recommendations
    B. 2003 TSC to CARE recommendations
    C. 2002 CARE to CARE recommendations

D. 2004 CARE to TSC recommendations
E. 2004 CARE to CARE recommendations

XI. Election of 2004-2006 Officers
A. Chair (Patrick McDonald)
B. Vice Chair/Age Structure Exchange Coordinator
C. Secretary/Rapporteur

2:30 – 3:30 PM

XII. Presentations
A. Proposed new CARE web site – by Jon Short (AFSC)
B. Otometrics – by Kristin Munk (ADFG)
C. Research Projects at DFO – Shayne MacClellan (CDFO)
D. Ageing skate species using vertebrae thin sections – by Chris Gburski (AFSC)

3:30 – 3:45 PM **BREAK**

3:45 – 4:45 PM

E. The challenges of determining ageing criteria for the Greenland turbot – by Jake Gregg (AFSC)
F. Age validation of canary rockfish using bomb radiocarbon dating – Jennifer Menkel (ODFW)
G. Walleye pollock radiometric age validation – by Craig Kastelle (AFSC)
H. Sufficient sample size to measure bias between two age determinations – Michael Shirripa (NWFSC)

DAY 2 Wednesday 4/21/04

On-going scope work from 8:00 AM – 5:00 PM at scheduled stations

8:00 – 8:30 AM	**Working group review of sablefish ageing** in preparation for the upcoming TSC initiated international sablefish workshop
8:30 – 9:00 AM	**Working group review of Pacific cod ageing** specifically on the determination of the first three annuli.
9:00 – 9:30 AM	**Working group review of Walleye pollock ageing** specifically to document differences in ageing criteria.
10:00 – 10:20 AM	**BREAK**
10:30 – 11:00 AM	**Working group review of Pacific hake ageing**
11:00 – 11:30 AM	**Working group review of shortspine thornyhead ageing** specifically to collaborate on developing ageing criteria
12:00 – 1:15 PM	**LUNCH**
1:30 – 2:30 PM	Thin section prep/demo using P. cod and sablefish otoliths
3:00 – 3:20 PM	**BREAK**
3:20 – 5:00 PM	Microscope collaborative work and discussions
6:00 PM	Evening social event and potluck dinner hosted by Cal Blood and family.

DAY 3 Thursday, 4/22/04

8:00 – 9:30 AM	Wrap-up group session
9:30 – 10:00	Microscope collaborative work and discussions
10:00 – 10:20 AM	BREAK
10:20 – 12:00	Microscope collaborative work and discussions
12:00 – 1:15 PM	LUNCH
1:30 – 3:30 PM	Microscope collaborative work and discussions
3:30 PM	Conclusion of conference

APPENDIX III

CHARTER OF THE COMMITTEE OF AGE READING EXPERTS
A WORKING GROUP OF THE TECHNICAL SUBCOMMITTE TO THE CANADA-US GROUNDFISH COMMITTEE

OVERVIEW

The Committee of Age Reading Experts (CARE) was initiated after a series of meetings in 1982 by the Technical Subcommitte (TSC) of the Canada-US Groundfish Committee. The first two workshops were convened in 1983 (April 27-29 and August 3-5) to document and standardize current methods used to age groundfish. These workshops discussed use of appropriate age structures, preparation of samples, equipment required, and reading procedures. Additional issues discussed were development of procedures for interagency calibration and methodology for age validation work. The primary objectives of these meetings were to reduce variation in age reading between agencies and to produce a manual of standard techniques. Target species for these initial meetings were rockfish of "regional management concern". From 1986 through 2002, CARE meetings were held every two years and included participation by agencies (state and federal) and institutions involved in age determination work. Participants were from agencies in the USA (California, Oregon, Washington, Alaska) and Canada (British Columbia). Focal topics are provided by the TSC and member agencies. Throughout the history of CARE, the primary issue of concern continues to be interagency calibration and the validation and standardization of age reading criteria.

The membership of CARE has seen little turnover in its history. These longterm members provide a stabilizing force for continuing CARE responsibilities within their original intent. In the event of member turnover or simply in the interest of promoting long term consistency, this charter, initiated in 2000, provides a framework within which the original intent of CARE may continue. This charter also expedites familiarization of new CARE Members to the responsibilities and function of CARE.

ADMINISTRATION OF CARE

Selection of Officers

Three positions will administer to CARE responsibilities. Officers will be volunteer CARE Members, or CARE Participants as approved by CARE Members. Positions will begin July 1 of the rotation year, and will last for two years. No person shall hold responsibilities of one position for more than 1 term. These terms shall rotate among agencies. Rotation will be from Vice-chair to chair for subsequent workshops, with no one agency supporting both Vice-chair and Chair positions. The position of secretary rotates among agencies every two years. One agency may support both the Secretary and either the Vice-chair or Chair. If an individual vacates their role prior to completion of their term, it is recommended that a replacement be identified according to the following: the departing person should submit the name of an individual within their agency to the CARE chair (or vice chair if the chair is vacating); and/or the CARE chair should submit a request to the Age Lab supervisor of the agency of the departing individual, to submit a name of someone within their agency. Upon submission of a name the CARE chair will apprise the Membership and request confirmation or objection. If these events do not result in a candidate the CARE chair will request a volunteer from the Membership, and will then request of the Membership confirmation of or objection to the candidate.

Responsibilities of Officers

Chair:

- acts as formal liaison with the Chair of the TSC
- ensures that recommendations of CARE and TSC are documented, considered, and acted upon

- interacts with Vice-chair, Secretary and sub-committees of CARE providing information, advice and direction to ensure that responsibilities are met
- organizes biennial CARE meeting, sets agenda, and chairs meeting
- guides meeting according to set agenda facilitating documentation and discussion
- prepares the annual report to the TSC
- distributes final minutes, recommendations status, etc, to the TSC and CARE Members

Vice-chair:
- liases with Chair to assist organization of CARE meetings
- directs and initiates Primary Exchanges
- receives and collates results of Primary and Secondary Exchanges.
- monitors and collates all exchange information twice per year
- provides Chair with table of exchange results in time for annual TSC meeting/report and or CARE meeting
- attends to other formal responsibilities as assigned by Chair

Secretary:
- acts as rapporteur for the biennial CARE meeting
- distributes a draft of CARE meeting minutes in appropriate format to all CARE Members within one month of the meeting
- incorporates appropriate edits to minutes and submits final meeting minutes to the CARE Chair

Subcommittees (Working Groups)

Working groups serve a valuable purpose by focusing on specific issues of concern to CARE and the TSC. Committee members are CARE Members or CARE participants as approved by CARE Members, and should be volunteers of appropriate experience and interest. Committee members should serve for the life of the working committee or a maximum of 2 terms or longer, as approved by the CARE membership. The identified working committee selects a chair to lead the group and direct the process. The subcommittee chair should:
- coordinate the work of the group to ensure progress and completion of the task
- update the Chair on status of work as appropriate
- upon notification by the CARE Chair, provide a written summary of work on an annual basis in time for inclusion into the CARE Annual Report

CARE MEMBERSHIP

CARE Member

- a Member of CARE is one who has an agency representative on the TSC or approval of an agency which has a representative on the TSC
- a Member of CARE actively participates in mandated CARE activities, CARE functions, or serves as an officer of CARE

CARE Participant

- a Participant of CARE meetings or functions is one who does not have an agency representative in the TSC
- a Participant does not serve as an officer of CARE, unless approved by the CARE Membership
- a Participant may advise CARE Members regarding mandated CARE activities

Member Responsibilities

- CARE Members must work with CARE Officers to address issues of concern to TSC and CARE
- Members are encouraged to promote and apply standardized methodologies and criteria
- Members should participate in CARE activities in a manner which advises and educates the membership.
- Members are required to expedite processing of structure exchange samples

- A member agency that drafts written materials which characterize the methodologies and/or protocols of other agencies with intent for distribution and/or publication, are encouraged to allow the agencies involved to review and comment on the final draft prior to distribution.

CARE MEETINGS & WORKSHOPS

Duration of Meeting
The purpose of the meeting will define the duration, though a minimum of 3 days is strongly encouraged for accomplishing CARE business and workshop exercises.

Structure of Meeting
Meetings will follow the agenda set by the officers and membership. The format should remain relatively informal to promote discussion, exchange of information and calibration of age-reading criteria.

Chronicle of Meeting
Meeting minutes will be recorded in writing. A draft will be available for review by all Members one month after the meeting. Following review by all Members, this draft will have tentative standing for distribution to the TSC by the CARE Chair. This draft will be "accepted" or "rejected" at the next meeting of CARE.

AGE STRUCTURE EXCHANGE PROTOCOL

Primary Structure Exchanges/Species
Primary exchanges are initiated by the TSC, for those species of heightened interest. These are inter-agency exchanges. These exchanges are required, and must be conducted well in advance of the next CARE workshop. Exchange results must be submitted to include in the "Structure Exchange Table".

Secondary Structure Exchanges/Species
Secondary exchanges are initiated by CARE Members for those species of interest, and while of interest to the TSC, are not mandated for exchange. These are interagency exchanges. Exchange results may be submitted for inclusion in the "Structure Exchange Table".

Primary Exchange Protocols:
- The Vice-chair, as advised by the CARE Chair, will inform the membership to initiate Primary Exchanges (species and numbers of fish) as identified by the TSC.
- Exchanges should be initiated in a reasonable amount of time prior to the CARE workshop or whenever recommended by the TSC, and should be completed in a timely manner.
- Exchanged samples should be processed by each agency within two weeks, or longer if agreed on by all when sample size is large. Members unable to quickly process samples should rotate their turn to the end of the exchange and send the sample to the next cooperating lab.
- Appropriate agencies (those who are in production reading status for that species) should allow at least 1 production reader to participate in Primary Exchanges.
- Precision test results from the Exchange should be submitted to the Vice-Chair in time for the CARE Chair to include in the CARE annual report to the TSC and/or at the CARE meeting. .

Secondary Exchange Protocols:
- CARE members initiating Secondary Exchanges between agencies should notify the Vice-chair and expedite results to the Vice-chair upon completion.
- These exchanges should be initiated throughout the two year interim between CARE meetings.
- Species and numbers of structures exchanged are to be set by CARE members.

- Samples may be processed at a pace agreed upon by the participants, however, members are encouraged to carry out all exchanges expeditiously.

General Exchange Protocols:

- The Vice-chair receives and reposits results for all exchanges in a standardized EXCEL table format (see "Product Format"), and next submits them to the CARE Chair who will then submit them to the Web Site Committee for publication to the CARE Web site.
- To facilitate a timely exchange, limit the number of agencies to four. Limiting the number of agencies involved also avoids excessive degradation of broken and burnt otolith specimens.
- Each agency should submit an "agency age estimate" that is resolved for all readers participating within that agency (intra-lab readings should be maintained in-house).
- When exchanging otolith samples, each agency should "conserve" structures, and burn only one-half of potentially four surfaces for each specimen. This assures adequate and ideally "equal" growth information available to all participants.
- Exchanges that require involvement of more than four agencies should be conducted in a way to assure integrity of structures so as to allow more than 4 comparable opportunities.

PRODUCT FORMAT

Meeting Minutes

CARE Meeting minutes should be prepared and submitted according to the following (see example in Appendix A):

- Use the meeting agenda outline for headings and subheadings (discussion should be prefaced by the speaker's full name (first occurrence) and subsequently last name, and may be quoted or paraphrased.
- Dynamic discussion should be summarized as to the theme, recognizing all participants, and with key points discretely credited.
- Other non-agenda items should be prefaced as "Non-Agenda Item:", and noted in the minutes in their sequence of occurrence.

Annual Report to the TSC

The CARE annual report (see example in Appendix B) to the TSC is submitted at the annual meeting of the TSC. The Chair should solicit status reports (paragraph) from subcommittee chairs, or other points of interest raised by CARE, and at the discretion of the Chair.

Age Structure Exchange

The Age Structure Exchange precision results will be submitted to the Vice-chair in a manner consistent for inclusion into the "Summary of Structure Exchange Table" (see example in Appendix C). The type and formulation of reported statistics should be calculated according to current convention.

Precision Test Statistics and Formulation

Precision testing is routinely conducted to measure the "readability" of a sample. Several statistics are routinely calculated to describe this precision. Some of the most commonly used statistics (noted below), and their mathematical formulation are presented in Appendix D.

- average percent errror (APE)
- coefficient of variation (CV)

Computer Software Standards

To expedite exchange of documents or spreadsheets, the following software standards were approved to be standard, circa 2000. Updates to these standards will be frequently made to reflect evolution of software.

- Word Processing ~ Microsoft WORD (documents saved as "WORD 97-2002&6.0/95-rtf(*.doc)")
- Spreadsheet ~ EXCEL (documents saved as "Microsoft EXCEL97-2002&5.0/95")

APPENDIX IV

EXCHANGE ID NO.	EXCHANGE YEAR	ORIGINATING AGENCY	COORDINATOR	COOPERATOR(S)	DATE INITIATED	SPECIES	STOCK	STRUCTURE	TECHNIQUE	PURPOSE	SAMPLE n=	NO. READERS	% AGREE	AVG % ERR	MEAN VAR	SAMPLE ST.DV	SA CV
98-001	1998	WDF	J. SNEVA	ODFW	1998-1999	English Sole		interopercles	SURFACE	training		3					
98-002	1998	WDF	J. SNEVA	ODFW	1998-1999	Black Rockfish		otolith	BB	training		3					
99-001	1999	ODFW	B. MIKUS	CDFG,IPHC,NMFS	spring 1999	Dover Sole		otolith	BB	annual calibration	50	12					
99-002	1999	ADFG-Kodiak	C. WORTON	ADFG-Juneau	spring 1999	Black Rockfish		otolith	BB	calibration	23	2	70%	0.75%	0.3409	0.2892	
99-003	1999	ADFG-Kodiak	C. WORTON	ADFG-Juneau	spring 1999	Pacific Cod		otolith	BB	calibration	21	2	43%	6.65%	0.9286	0.639763	
99-004	1999	ADFG-Homer	S. MEYER	IPHC	1999	Halibut		otolith	SURFACE	annual calibration	102		77%	--	--		
99-005	1999	WDFW	J. SNEVA	CDFO,NMFS-Tiburon	spring 1999	Lingcod		fin rays	THIN SECTION	criteria calibration	50-100	3	"high"				
99-006	1999	ADFG-Juneau	K. MUNK	CDFO,ODFW	10/25/1999	Rougheye Rockfish	SEA/SCA	otolith	BB	calibration	20	3	10%	9.10%	11.76		
99-007	1999	ADFG-Juneau	K. MUNK	CDFO,ODFW,WDFW	10/25/1999	Yelloweye Rockfish	SEA/SCA	otolith	BB	calibration	20	7	0%	6.17%	12.57		
99-008	1999	ADFG-Juneau	K. MUNK	CDFO,ODFW	10/25/1999	Thornyhead rockfish	SEA/SCA	otolith	BB	calibration	20	2	--	--	--		
99-009	1999	ADFG-Juneau	K. MUNK	CDFO,ODFW,WDFW	10/25/1999	Quillback Rockfish	SEA/SCA	otolith	BB	calibration	20	7	0%	7.28%	22.55		
99-010	1999	ADFG-Juneau	K. MUNK	CDFO,ODFW,WDFW	10/25/1999	Dusky Rockfish	SEA/SCA	otolith	BB	calibration	20	10	0%	6.66%	1.55		
99-011	1999	ADFG-Homer	C. STOCK	CDFO?	10/1/1999	Lingcod		fin rays	THIN SECTION	calibration	40	?					
99-012	1999	CDFO	S. MacLELLAN	NMFS-AFSC	1/31/1999	Pacific Whiting		otolith	BB		118	?					
00-001	2000	ADFG-Juneau	K. MUNK	ODFW,NMFS-AFSC	1/15/2000	Sablefish	SEA	otolith	BB	calibration	20	3	20%	9.83%	2.91		
00-002	2000	ODFW	B. MIKUS	CDFG,IPHC,NMFS,CDFO	1/27/2000	Dover Sole(1)	WC	otolith	BB	calibration	?	15			2.951	1.596	
00-003	2000	ODFW	B. MIKUS	CDFG,IPHC,NMFS	1/27/2000	Dover Sole(2)	WC	otolith	BB	calibration	?	12			5.012	2.0138	
00-004	2000	ODFW	B. MIKUS	CDFG,IPHC,NMFS	1/27/2000	Dover Sole(3)	GOA	otolith	BB	calibration	7	12			57.865	6.91211	
00-005	2000	ADFG-Juneau	K. MUNK	NMFS-AFSC	3/1/2000	Pollock	GOA	otolith	SURFACE+BB	calibration	200	2	5.73%	13.92%			
00-006	2000	ADFG-Juneau	K. MUNK	CDFO	3/1/2000	Thornyhead rockfish	SCA	otolith	BB	calibration	12	2	0%	6.30%	23		
01-001	2001	ADFG-Juneau	K. MUNK	CDFO	1/12/2000	Yelloweye Rockfish	SEA	otolith	BB	calibration	50	2	14%	3.51%	3.46	1.86	
01-002	2000	WDFW	J. SNEVA	WDFW,DFO,ODFW	2001	Lingcod	WC	fin rays	THIN SECTION	calibration	262	3					
01-003	2001	NMFS-Seattle	D.ANDERL	NMFS-AFSC,ODFW	1-Aug	Pacific Whiting	WC	otolith	BB	calibration	59	2	54.2	5.50%			
01-004	2001	ODFW	P. MCDONALD	ODFW,NMFS-AFSC	1-Nov	Pacific Whiting	WC	otolith	BB	calibration	253	3	61.2% & 48.3%				
02-001?	2002	NMFS-Seattle	D.ANDERL	ADFG-Juneau	12/?/01	Sablefish(known-age)	NGOA?	otolith	BB	calibration	31	1	35.48%	8.36%	0.6129	0.7828	
02-002	2002	ODFW	B. MILLER	ODFW, NMFS-AFSC, CDFG, IPHS	Feb-02	Dover sole	WC	otolith	BB	calibration	20	12				8.69	
02-004	2002	ODFW	P. MCDONALD	ODFS,NMFS-AFSC,DFO,ADFG-Juneau	1-Dec	sablefish	WC	otolith	BB	calibration	30	5					
03-001	2003	ODFW	B. MIKUS			Dover sole		otolith	BB	annual calibration							
03-002	2003	PSMFC	O. RODRIGUEZ	PSMFC-CAP, CDFO	Oct-03	Pacific Whiting	WC	otolith	BB	calibration	99	2	51.52				
03-003	2003	CDFO	S. MacLELLAN	CDFO, PSMFC-CAP	Nov-03	Pacific Whiting	WC	otolith	BB	calibration	98	2	47.96				
04-001	2004	NMFS-AFSC	C. KASTELLE	NMFS-AFSC, ADFG -Juneau	Spring 2002	Pollock	Shelikof st.	otolith	BB	Age Validation study	618	2	14.6				
04-002	2004	PSMFC-CAP	P. MCDONALD	PSMFC-CAP, NMFS-AFSC	Feb-04	sablefish	WC	otolith	BB	calibration	25	2	52.00%				1
04-003	2004	PSMFC-CAP	J. MENKEL	PSMFC-CAP, NMFS-AFSC	Mar-04	Darkblotched rockfish	WC	otolith	BB		50	3					
04-004	2004	ODFW	B. MIKUS	ODFW, PSMFC-CAP, CDFG	Mar-04	Dover sole	WC	otolith	BB	annual calibration							