

# 1994 Biennial Meeting

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## MINUTES TO THE CONFERENCE OF THE COMMITTEE OF AGE READING EXPERTS (C.A.R.E.)

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June 14-16, 1994

National Marine Fisheries Service, Sandpoint

Seattle, Washington

Dr. John Butler, Chair of CARE, opened the meeting on the 14th of June at 9:00 am.

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### INTRODUCTIONS:

Participants introduced themselves and stated the agency they represented.

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### APPROVAL OF PROPOSED AGENDA:

The agenda was approved with the addition of the Sablefish exchange to the scheduled presentations.

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### MINUTES OF LAST MEETING:

The highlights of the last meeting were read by Craig Kastle (past Chair). The minutes of the 1992 CARE meeting were accepted by the 1994 participants.

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### UPDATE OF CARE AGE DETERMINATION MANUAL:

Shayne MacLellan submitted the final draft (hard copy and disk) of text and figures to members. There were 13 figures (8 photographic). The draft was passed around to members. A discussion ensued on the expense of reproducing the figures with the necessary quality. Ms. MacLellan recommended that it was important to request the best quality possible in order for the photo-figures to be effective as a training tool. Scott Meyer suggested that flatbed scanners could be used for figure reproduction.

There was also discussion on the number of manual copies to be produced and the format. Ms. MacLellan said that originally the manual was to be a living document (binder style) which could be added to and recommended that this remain the format. This would accommodate additions and amendments over time. Mr. Kastle stated that he had thought it would be published as a formal document. However, most members were in agreement with the original intent. Ms. MacLellan brought up that it would be useful to place a header for each manual amendment that would date its inclusion in the manual. She stated that it was important to keep a record of changes in recommendations and current ageing information. Members felt that this was a useful idea and should be incorporated into the manual.

Although it was generally agreed that 2 copies were enough for each agency, there was debate as to who the manual should be available to besides CARE members. At first, Dr. Butler suggested that 50 copies should be available to members. Don Pearson mentioned that other agencies not presently associated with CARE would be interested. Some felt that it should be available to any fish ager in the interests of providing standardized methodology, instruction and advice. Betty Goetz felt that one of the original ideas was that the document would be used as a reference for new ageing staff and could be used to provide justification for buying good quality equipment. Cal Blood suggested that copies be made available at cost recovery to outsiders.

The issue of maximum number of copies and scope of distribution was not resolved as it was felt that TSC would have input and it would likely be affected by costs of figure reproduction. However, it was determined CARE would recommend to TSC, that 25 hard copies of the manual would be the minimum number required by members. Dr. Butler suggested that an electronic copy could be made available for any that could access it. All CARE members felt that this was an excellent idea, even if the figure reproduction was not top quality. It was decided that this would also be a recommendation to TSC.

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#### UPDATE SPECIES LIST:

Copies of the 1992 list were circulated. Dr. Butler called out species in order and Ms. MacLellan noted any changes and additions.

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#### NEW BUSINESS:

#### DISCUSSION OF VALIDATION PROBLEMS:

Mr. Blood asked Brenda Erwin about the status of Dover sole ageing and validation studies. There had been no advancement in validation work for this species. Bob Mikus mentioned that there was no funding in Oregon and there had been many staff cuts, which had affected work on Dover sole. OTC studies were also stalled partially because of the difficulty of dealing with stringent FDA requirements within the United States.

Discussion turned to alternate options to OTC. Various members indicated that, although other chemicals had been identified as capable of marking bony tissue, investigators attempting to use them would experience the same problems with the FDA as with OTC. Pete Hagen stated that he thought that a working group formed at the Hilton Head "Fish Otolith Research and Application" Symposium (Jan 1993) had worked on something to present to the FDA that would provide a "blanket" application for fisheries agencies wishing to carry out validation work using injectables. It was hoped that this would ease the problems of dealing with the FDA on an individual basis each time validation studies were needed.

Mr. Hagen said that he would check into the situation and send it as an addition to the minutes (Appendix 4).

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#### BREAK

Ms. Goetz requested updated list of presentations for June 15 to allow outsiders to attend appropriate talks. The order of talks was decided.

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#### RECOMMENDATIONS FROM THE TSC:

Dr. Butler was asked to read the recommendations from TSC (Appendix 5), which included a set from both 1993 and 1994. There was some confusion as members had not received copies of the original 1993 recommendations. Copies of the letter from Mark Saunders (TSC Chair) to Dr. Butler were passed out to members. It was also made known that TSC amended their 1993 recommendations to CARE in their May 1994 meeting and that it was to these that CARE should reply. The 3rd 1994 recommendation from TSC to CARE was to "formalize and expand" meeting minutes to facilitate communication between the two groups. It was suggested that this be done by organising a section on recommendations. It is a little awkward for these minutes, as TSC met before CARE and is making 1994 recommendations before CARE has had a chance to meet. Despite this, the attempt is made here, to capture all discourse on TSC and CARE recommendations at the 1994 CARE meeting within the outline requested:

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#### PROGRESS ON RECOMMENDATIONS:

A.CARE to itself (from 1992 meeting, Appendix 6):

- The topic of alternatives to OTC was scheduled for discussion in the 1994 agenda. See section in 1994 minutes on DISCUSSION OF AGE VALIDATION PROBLEMS.
- Since the 1992 meeting, agencies have purchased and investigated the use of DOS and Apple imaging systems.

There was no spring 1993 meeting on imaging systems due to various difficulties. Mostly this was because of budget problems causing a delay in acquiring equipment and/or a lack of time/support to learn the systems. Results and opinions on advantages and disadvantages as well as demonstrations were scheduled to be presented and discussed in an imaging workshop during the 1994 meeting. See a later section in the 1994 minutes on COMPARISON OF IMAGE ANALYSIS SYSTEMS AND OTOLITH READING SOFTWARE PC AND MAC SYSTEMS.

- CARE members were involved in a number of exchanges within the working group as well as with outside agencies. Exchanges included such species as Dover sole, pollock, sablefish and shortspine thornyhead. See Appendix 7 for a list of exchanges that occurred since the 1992 meeting.

- Following the 1992 meeting, the CARE manual working group provided review comments to the editor. The editor was scheduled to present the final draft (text and figures) to members for approval during the June 1994 meeting. See the 1994 minutes sections on UPDATE OF AGE DETERMINATION MANUAL and SUMMARIZATION OF MEETING/SUGGESTIONS.

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B.From TSC to CARE (1993, amended 1994, Appendix 5)

Discussion and Reply during 1994 CARE meeting:

- This recommendation was deferred back to TSC. Ms. MacLellan stated that during their 1994 meeting, TSC recognized that this was better directed to TSC itself. It would be their role to encourage member agencies to carry out validation studies in order to provide fish agers with much needed support in developing accurate age criteria, especially for difficult species.

- Although TSC did not support the CARE recommendation of setting up a separate radiochemical lab for marine fish validation, its importance was recognized. The AFSC agency has made progress in forming a separate lab. Mr. Kastle reported that although he was still doing a lot of work at the Univ. of Washington lab, very soon he would be establishing a functioning and licensed radiochemical lab at AFSC.

- A discussion ensued on the topic of the new lab. Mr. Kastle outlined that a separate lab was necessary in order to reduce contamination problems. Ms. MacLellan asked if the facility would be available for other agencies that needed validation work on their species?. Mr. Kastle replied that it would not in the near future, as AFSC had a number of species slated for work first. But, he added that eventually it would be available for work outside his agency. (Craig to submit outline to TSC? minutes?)

- See progress on imaging systems investigations in CARE recommendations to itself in previous section.

- See progress on continued age exchanges in CARE recommendations to itself in previous section.

- See discussions in 1994 minutes in section on UPDATE OF AGE DETERMINATION MANUAL and progress on CARE 1992 recommendation to itself in previous section.

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The following includes discussions/actions on the TSC's 1994 recommendations to CARE that occurred over the days of the meetings:

- A committee was formed to consider figure reproduction: Ms. MacLellan, Joan Forsberg, Ms. Goetz, Mr. Hagen and Dr. Butler. Ms. Forsberg volunteered to scan a figure at the IPHC site and bring the results for inspection the next day.

- CARE agreed with the need for better communication with TSC and also discussed how to keep itself better informed. Dr. Butler suggested that it would be useful to invite a member of TSC to attend CARE meetings. This would allow issues brought up by TSC to be addressed directly. Mr. Pearson called for better communications for members between CARE meetings. It was suggested that it should be the CARE chairperson's responsibility to circulate an annual "newsletter" to members that would include updates on reports to and from TSC, age exchanges, species aged by agencies and current work on validation studies. It was also suggested that the chairperson would pass on this information to the TSC Chair in the form of an annual report. There was general agreement. CARE proceeded to incorporate the section on recommendations in the format requested by the TSC into CARE minutes and reports.

- Ms. Goetz questioned TSC's concern over CARE providing a list of species aged by agency, as CARE has always provided an updated list with their meeting minutes. Some members wondered if the TSC required more information than was on the current list? It was suggested that possibly the list should note when readers change in an agency, if criteria changed, include a readability index, reasons for not ageing species anymore, precision for assessing error or what factors are affecting precision? In the end, no decision was made to change the current format of the species list, but it was recognized that the TSC should be sent an annual update.

- The guidelines for CARE as reported in the 1983 TSC minutes were referred to. There was no discussion and appeared to be no disagreement with the guidelines.

- Dr. Butler felt that TSC was indicating a need for more formalized communications, documentation of ageing work and justification for ageing techniques and requesting more exchanges between agencies. He stated that CARE recognizes the need for exchanges, and that since inception, this had been a prime goal for members. Other comments were that CARE has expanded and has been meeting the goals of standardization through annual exchanges, by producing the manual and by reporting on/participating in validation studies. CARE has also been actively investigating new technologies that could benefit fish ageing processes (see the imaging workshop and hands-on sections of minutes). Ms. Goetz agreed to prepare the requested document on CARE's history and achievements to the TSC in 1995. She will be

assisted by Sandra Rosenfield and Ms. MacLellan.

#### OTHER DISCUSSION ON RECOMMENDATIONS TO BE MADE TO SELF AND TSC:

Dr. Butler mentioned rockfish species (nearshore and offshore species) were being exploited for local markets. He stated these fish were not presently being aged or studied and identified this as a possible recommendation to TSC.

Mr. Pearson suggested that CARE make recommendations to TSC as to which species should have ageing priorities according to exploitation, this being a problem in California. Ms. MacLellan felt that it was within CARE's mandate to request support for development of effective ageing methods and validation work, but it was difficult to solicit said support if it was not seen as a priority by individual agencies. Mr. Pearson queried who sets priorities for fish ageing to prevent redundancy and overlapping of efforts? Mr. Hagen felt that perhaps this was a California agency problem and pointed out that it did not fall under the guidelines set out in item #4 of the TSC 1994 recommendations to CARE. Mr. Pearson felt that the TSC should develop better guidelines on what requirements are needed to prioritize validation on certain species and suggested that TSC should supply more guidance. After a lengthy discussion in which other CARE members attempted to understand Mr. Pearson's point of view, it was determined that it was not within CARE's mandate to put forth his recommendations to TSC.

Other members stated that they acted as service groups that aged species according to user input and that requests mainly were for stock assessments. The choice of which species are to be validated is user driven according to need. It was agreed that CARE could reinforce the general recommendation to TSC of supporting validation of methods used for species they are required to provide age data for. Dover sole was suggested as a good example of a species which CARE should recommend for support from TSC for validation work and further exchanges. It was generally felt that it was up to members to identify problem species, submit it up through CARE to TSC to obtain funding for validation studies. Mr. Kastle also suggested that CARE recommend to itself to maintain validation studies as a priority. Ms. Goetz suggested that TSC should address sample size, subsampling etc., since CARE is not set up to do it.

Later, Mr. Pearson supplied a written outline which more clearly outlined his concerns (paraphrased): "...CARE should recommend that the TSC identify priorities for species to be aged, validated and numbers of fish that should be aged. Agers are asked to age more new species, most of which have not been validated. There is no validation for some important species. The increase in work load has come at a time when the number of agers has decreased. There is a redundancy among agencies; some species which probably should be aged are not..."

Through discussions on imaging technology, the availability of Internet was identified by Dr. Butler as a tool to facilitate exchange of fish age methodologies and associated processes. Electronic images alone or in connection with real ageing material could work to train, assess or advise fish agers needing help in solving problems. It would be much cheaper than travel and would be quicker than mail. There was a suggestion put forth that CARE recommend to TSC to encourage agencies to have access to Internet and invest in imaging systems as a means to facilitate exchanges. Delsa Anderl felt that this would not work for older, difficult to age species, such as sablefish. Others stated that imaging analysis was too expensive and it was not a feasible recommendation. Cost aside, it was generally agreed that electronic communications was potentially a good tool that should be explored by CARE members who were able to do so.

Rachael Miller indicated that she was having problems with chilipeppers, *S. goodei*. She wondered what she should do about precision testing, as she had nobody with whom to exchange. It was suggested that the decision to do self precision or between reader testing would depend on the purpose of precision testing, ie. for training, quality control etc. Ms. Goetz pointed out that precision testing methods were fine tuned by most agencies. Ms. MacLellan suggested that CARE recommend to itself to include the various precision testing systems member agencies had created as the next amendment to the manual. She stated that discussion on precision testing could be found in CARE's 1992 minutes. MS. Goetz also suggested that perhaps the TSC could address the issue of assessing precision testing methods and their results.

Mr. Blood stated that he would like to have access to an inventory of age readings done by other labs. He was interested in knowing the annual output as an aid to understanding what had been aged historically (species, numbers fish aged etc.) and to know work various agencies were capable of doing. Other members felt that such an inventory would require a great deal of effort. Ms. Erwin brought up that such an inventory was already in the works as a "tri-state" document being put together by a statistical working group involving California, Oregon and Washington. It would include sampling methods, data collection, analysis information, number of agers and number of fish aged.

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#### RECOMMENDATIONS:

A.From CARE to itself (1994 meeting)

- In the interests of improving communications and raising CARE's profile, it will be the chairperson's responsibility to write an annual "newsletter" to CARE members. The newsletter will keep them informed as to interactions with TSC and

updated as to age exchanges, workshops, species aged by agency, progress on validation studies and publications. This information will also be submitted to TSC. It will be the responsibility of member agencies to keep their chairperson informed.

- CARE will set up a regular schedule of age exchanges each year.
- Ms. Goetz will provide a document on the history and achievements of CARE to TSC in 1995.
- Validation work should be maintained as a high priority for CARE members. CARE should identify problem species and provide baseline information to TSC on species that need to be validated.
- The manual "image committee" will assess the methods of reproducing the manual figures for the hard copy format, keeping in mind quality and cost and will make a recommendation to TSC.
- CARE will continue to explore the potential of Internet and image analysis systems with reference to its mandate.

#### B.From CARE to TSC (1994 meeting)

- CARE recommends that each agency should have 2 hard copies of the CARE Ageing Manual. Depending on cost (to be determined according to choice of figure reproduction) a minimum of 25 hard copies need to be produced. It is also recommended that an electronic version of the manual be made available through Internet and the NMFS Bulletin Board.
- CARE recommends that a member of TSC be invited to CARE meetings in order to improve communications between the two groups and to provide clarification of issues put forth to CARE from TSC.
- CARE asks for continued support in fish ageing and validation studies, especially in the case of "new" priority or difficult to age species. Dover sole is of current concern to a number of CARE members.
- CARE asks that TSC provide encouragement to its member agencies to support CARE members in exploring Internet and imaging technology to facilitate exchange.
- Time spent at different fish ageing tasks is a premium. CARE members request help from the TSC in addressing and assessing such issues as sample size, subsampling and precision testing systems.

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#### SELECTION OF CHAIRPERSON 1996 CARE MEETING:

Ms. Goetz volunteered to be the Chair for the next CARE meeting and Mr. Blood volunteered to serve as Vice-chair.

It was announced that new microscope equipment from Leica was on display after today's meeting, for those interested. Maps were handed out to Mr. Blood's residence as he was hosting a potluck dinner for members.

The meeting was adjourned at 4:00 pm.

Dr. Butler called the meeting to order on June 15th at 8:05 am.

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#### PRESENTATIONS ON VALIDATION:

There were 7 presentations given by various CARE members. The list is as follows:Â

Shayne MacLellan

Hake natural tag

OTC validation of English sole

Delsa Anderl

Atka mackerel 1st year determination

Sablefish exchange

Kristen Munk

Lingcod multi-structure comparisons

Craig Kastle

Radiometric age validation of rockfish

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Abstracts or outlines of the presentations can be found in Appendix 8.

BREAK FOR LUNCH 12:00 - 1:30 pm

#### COMPARISON OF IMAGE ANALYSIS SYSTEMS AND OTOLITH READING SOFTWARE PC AND MAC SYSTEMS:

During the afternoon workshop, CARE members spent time looking at two image analysis systems. These were the NIH (National Institute of Health) and Bony Parts programs for the Power Macintosh, demonstrated by Mr. Pearson and Dr. Butler, and the Optimas system for IBM PC compatibles, demonstrated by Pete Hagen. Pros and cons of each system were looked at, and side by side images were compared. Different enhancement techniques were demonstrated and discussed, with different applications being explored.

Leica had the following equipment on display as well: Wild MZ8 stereomicroscope; CV-730 camera, Sony Triniton screen Wild M3Z stereomicroscope fibre optics Is-150 Leica GZ6 compound scope with camera and computer Leitz DMRB

A variety of structures were used for demonstration purposes on the 2 image systems: daily growth rings on juvenile anchovy otoliths, halibut otoliths, salmon otoliths, thin sections of shortspined thorny head otoliths, sablefish otoliths, salmon scales, and thermal marks on salmon otoliths.

Mr. Mikus and Ms. Rosenfield look at English sole interopercules using the Leica display equipment. Ms. Munk brought various lingcod ageing structures for people to look at, and make recommendations.

The meeting broke for the day at 5:00 pm.

Dr. Butler called the meeting to order on 16th June at 8:15 am.

#### SUMMARIZATION OF MEETINGS/SUGGESTION:

Instead of going to the hands-on session, it was decided to deal with the summarization and unfinished business first. Age exchanges:

Ms. MacLellan asked the group about conducting regular exchanges and if CARE should set up a regular time frame for exchanges of problem species. She suggested that this could be a recommendation from CARE to itself. There was general agreement. A number of exchanges were set up, with a sign up sheet sent around the table. Appendix 9 shows a matrix of species and agencies that will participate over the next year.

#### Â Image systems:

Dr. Butler asked for members impressions on the image systems. Mr. Kastle thought that there were only subtle differences between the systems, but that they basically did the same job. He felt that cost was not a factor, both were very impressive and that it was good to see their capabilities and potential. Most members were restricted as to which system they would obtain because of computer standards set within agencies. However, it was demonstrated that the technology existed that allows transfer of files between IBM and Apple systems. It was pointed out that NIH and Bony Parts were free and that there was a color version of NIH. Mr. Hagen said that he was willing to share the macros he had written.

Dr. Butler brought up that the image systems were not capable for reading all otoliths, but would work on easier ones. Most members felt that the systems were not capable of ageing, but were tools of great potential for any measuring work associated with interpretation of growth patterns. Mr. Hagen stated that there was a lot more information that could be collected from otoliths than just the age, such as; growth changes, maturation, climatic changes, natural tags, OTC studies etc. He pointed out that many of these issues are within CARE's mandate. In any case, it was agreed that the ability to capture images and transmit them worldwide would definitely be a plus. Dr. Butler suggested that images could be stored and then look at much later date to assess the problem of fading in the burnt otolith method. Mr. Hagen and Mr. Pearson, each agreed to supply a synopsis comparing the two systems (Appendix 10). A CARE ageing manual:

Ms. MacLellan passed around the scanned image of the sablefish figure for the manual (1.7 Mb image, high resolution, 350 dpi). Seven members felt the image was good enough for the hard copy of the manual and 6 voted against it. The 7 thought that the image would be OK if the resolution could be improved and if the drafting was clear enough for demonstration. One person suggested it might be used for certain figures, but not for those requiring high resolution. Some felt that if the purpose of an image was to illustrate concepts only, and ageing from them was not required, then the scanned image at a higher resolution would be suitable, and less expensive. Those against scanning stated that photographs were better and necessary for effectiveness.

Charlie Leap from publications (AFSC) was invited to the meeting and talked about scanned images for the manual, going over the technical and cost aspects of this kind of image reproduction. It was decided that Ms. Forsberg would be

left with the original manual figures to be scanned. It was decided later that the committee would need a few months to investigate options in reproducing figures. Sep. 30th was the date set to provide the TSC with a recommendation. Mr. Leap's advice would be sought.

Electronic and hard copies of the manual were handed out to everyone for review. Ms. MacLellan said that it was her preference to include figures at the end of each section in which they are referred to. There was no opposition to this suggestion.

Mr. Kastle asked that Dr. Butler pass around the TSC recommendations and responses to CARE members with the minutes prior to sending them off to TSC.

Thanks were given to Ms. Forsberg and Ms. Anderl for the T-shirts, and to Sue Janz for rapporteur duties.

Dr. Butler adjourned the formal part of the meeting at 9:35 am. He directed members to the hands-on workshop for the rest of the morning.

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#### HANDS-ON WORK WITH MICROSCOPES AND PHOTOGRAPHS:

The following species and age structures were examined by CARE members:

*S. entomelas* otoliths (b&b) - Mr. Mikus, Ms. Janz & Ms. Munk

*S. melanops* otoliths (b&b) - Ms. Rosenfield & Ms. Janz

English sole (interopercules) - Ms. Rosenfield & Mr. Mikus

Shortspine thornyheads (thin XS & b&b) - Dr. Butler, Ms. Goetz & Ms. MacLellan

Lingcod (fin XS, otoliths) - Ms. Munk, Ms. MacLellan, Ms. Rosenfield

Thermal marked salmon otoliths - Mr. Hagen & Ms. MacLellan

English sole - Kent Scott & Ms. MacLellan

The First International Idiot Exchange was arranged. It would consist of approximately 30 fish from the full age range. Members were harangued into participating at the end of June, each having turnaround of 1 week.