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Analysis, Interpretation, and Applications of Fish Otoliths and Other Hard Parts: The State-of-the-Art

June 1-2, 2001
SUNY ESF
Syracuse, New York

Sponsored by—

New York State Chapter of the American Fisheries Society
SUNY College of Environmental Science & Forestry
Great Lakes Fisheries Commission
New York Sea Grant
NE Division, American Fisheries Society
Cornell Biological Field Station

Vital statistics such as age, growth rate, and many life history events are now routinely gathered with information stored in the otoliths, scales, and bones of fishes. Although methods of age and growth determination have become a standard part of the fisheries professional's toolbox, data analysis and validation remain problematic. Environmental information, which can be extracted from microchemical studies of many of these structures, offers a new means of validation and also opens up exciting avenues of inquiry. New, high-resolution techniques, in combination with traditional methods, have revolutionized fisheries research. Elements and isotopes in otoliths can now be measured at fine enough spatial scales on otoliths so as to correspond to the time scales of interest (daily, seasonal, and annual) that can be determined with otoliths and other hard parts of fishes. Hypotheses about behavior, energetics, and food web relationships can now be tested. By running a transect through an otolith and measuring isotopes or elements, we can learn about migration (by the ratio of strontium to calcium), thermal histories (from oxygen stable isotopes), and we can discriminate between stocks or sub-populations of fish species (via multiple elemental analysis). Dietary information can be inferred from carbon isotopic ratios in otoliths, and other ecologically useful stable isotopes (e.g. nitrogen), while not within the realm of analysis at the present time, are on the horizon.

This workshop is designed as a "stand-alone" training course for professionals and students. The format will consist of two full days of lectures and demonstrations. There will also be a poster session at the end of the first day. Integrated into the workshop on the second day will be a trip to the Cornell Biological Field Station (ca. 25 minute drive), where there will be a tour of the facilities, more demonstrations, and dinner.

A special feature of this course will be the workshop's lecture roster, consisting of speakers who are leaders in the field. A permanent record of the lectures will be made, either as a set of lecture notes or (potentially) a methods book. The agenda will include reviews of the literature, the current state of the art, and practical hands-on information.

Continuing Education Credit:

AFS Certified Credits: This workshop has been approved for 1.60 Continuing Education credits. The additional fee for AFS credits is \$7 for members/\$10 for nonmembers.

Workshop Location: SUNY ESF, Syracuse, New York
Directions will be sent with acknowledgment of registration.

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Call for Posters

Poster displays of research projects are invited for a poster session to be held on Friday afternoon. Poster boards are 8 feet long by 4 feet high.

You may submit an abstract electronically to Karin Limburg (klimburg@esf.edu), or include a hard copy with your registration.

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Preliminary Program

Friday, June 1, 2001

7:30 am Registration and Sign-up for Demonstrations

8:40 **Welcome and Introduction**

Karin Limburg, SUNY-ESF

9:00 **Otolith Structure, Micro to Macro**

Ed Brothers, EBB Consultants, Steve Campana, Bedford Institute & John Casselman, Lake Ontario Fisheries Station

10:00 Break

10:15 **Other Useful Hard Elements in Fish**

John Casselman, Lake Ontario Fisheries Station

11:00 **Otolith Marking Methods**

John Farrell, SUNY-ESF, & Ed Brothers, EBB Consultants

Noon Lunch

1:00 pm **Demonstrations**

2:15 **Otolith Weight and Shape Analyses**

Mark Wuenschell, SUNY-ESF and Håkan Wickström, Institute of Freshwater Research, Drottningholm, Sweden

3:00 **Elemental Analysis of Otoliths I: Strontium**

David Secor, University of Maryland

3:30 Break

3:45 **Elemental Analysis of Otoliths II: Other Elements**

Steve Campana, Bedford Institute

5:00 Poster Session and Social

Saturday, June 2, 2001

9:00 am **Stable Isotope Analyses**

William Patterson, Syracuse University

10:00 Break

10:15 **Radioisotopes and Combining Otolith Analyses with Other Analyses**

Steve Campana, Bedford Institute

11:15 **More Demonstrations/Discussions**

12:15 pm Lunch

1:15 **Statistics and Modeling of Otolith Data**

Cynthia Jones, Old Dominion University

2:15 Break (short)

2:25 **Ecological Applications**

Karin Limburg, SUNY-ESF, David Secor, University of Maryland & Don Stewart, SUNY-ESF

- 3:25 **Future in Otolith Research and Application**
Graduate Students at SUNY-ESF
- 4:00 Wrap-up
- 5:30 Party at Shackelton!!

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Registration Information

To Register: *Please preregister!* Simply fill out and mail the registration form with your registration fee. You may register by phone by calling ESF Continuing Education at (315) 470-6891; or fax to (315) 470-6890.

Early Registration Discount: Registrations *and payment* must be *postmarked* by May 22, 2001 if you wish to qualify for the early discount. Government or corporate purchase orders received by the deadline also qualify for the early discount.

Workshop Fees: The workshop fee includes lunch and refreshments, and materials.

	Paid by May 22	After May 22
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Registration fee:	\$95	\$125
Student fee:	\$65	\$85
Student fee (without lunch):	\$40	\$60

Continuing Education Credit:

AFS Certified Credits: This workshop has been approved for 1.60 Continuing Education credits. The additional fee for AFS credits is \$7 for members/\$10 for nonmembers.

Fees are payable to SUNY-ESF. VISA or MasterCard also accepted.

Refunds: SUNY-ESF reserves the right to cancel any program in the event of insufficient registrations. A full refund will be given if a program is canceled. Participants who wish to withdraw must give written notice one week in advance to receive a full refund. After that date a \$25 cancellation fee will be charged. Substitutions are permissible at any time.

Lodging: We have reserved a block of rooms at the Hotel Syracuse for Thursday night, May 31, Friday night, June 1, and a few rooms on Saturday night, June 2 for workshop participants. Please specify that you will be attending the Fish Otolith Workshop to receive the workshop rate of \$70. Reservations may be made by phone at (315) 422-5121 or 1-888-813-2133 (toll-free).

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Registration Form

PLEASE PRINT CLEARLY

Name _____ Phone (____) _____

Organization _____ Fax (____) _____

Address _____

City _____ State _____ Zip _____ email _____

Register me for the Fisheries Workshop on June 1-2, 2001

Enclosed is my workshop fee,

Registration Fee: **If paid** by May 22: \$95 **After** May 22:\$125

Student Fee: **If paid** by May 22: \$65 **After** May 22: \$85

Student Fee (without lunch): **If paid** by May 22: \$40 **After** May 22: \$60

AFS Certified Continuing
Education Credits (1.60): Member: \$7 Nonmember: \$10

Total Fees: _____

Credit Card Payment: VISA Mastercard

Account Number: _____ Expiration Date: _____

Signature: _____

Special needs: _____

Mail form to: ESF Continuing Education, SUNY College of Environmental Science & Forestry, Syracuse, NY 13210-2784