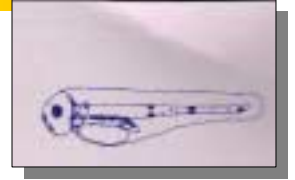


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ELHS Newsletter
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stages



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This message will largely be an introduction to items that can be found in other places in this issue of *Stages*. Maybe the Early Life History Section can be likened to a mushroom: a lot is happening all the time, but it is only easily visible for a brief period each year (at the Annual Larval Fish Conference). Indeed a lot is going on: the Larval Fish Conference in Bergen is fast approaching, we are seeking nominations for President and Secretary elect, and a proposal is now "on the floor" for support of publications.

At the time of this writing, according to the website (www.fishlarvae.com/lfc/) for the 26th Annual Larval Fish Conference to be held in Bergen on 21-27 July 2002, 175 people have registered, and 150 abstracts have been submitted. This may prove to be our most eclectic meeting, with scientists from at least 24 countries attending. Howard Browman is planning to host a truly memorable meeting including papers presented under five relevant and exciting themes. As an additional benefit to the Section of Howard's work in planning for this meeting, he has offered the website design for future LFC hosts. I am sure I join our other members in thanking Howard for his work so far, and look forward to thanking him in person in Norway in July. See you there!

Speaking of things international, the International Section of the AFS is establishing the "International Endowment Fund" which will be used "to support international memberships in the Society, purchase books and journals, support speakers here and abroad, provide seed money for international conferences, symposia, and workshops, publishing articles and books". The Executive Committee of the ELHS voted to contribute \$500 to this fund. We are quite an "international" section, and felt that this fund might provide us an opportunity to help support events and publications particularly for our members from developing countries

You will see elsewhere in this issue of *Stages* a request for nominations for President-elect and Secretary-elect. At our meeting in Bergen, the gavel for President will pass to Jeff Isely and for Secretary to Rich McBride. Our Executive Committee consists of the President, Secretary, Treasurer, President-elect, and Secretary-elect, and this committee conducts much of the Section business between LFCs. Therefore, in order to conduct business properly we need to have these elect positions filled by our meeting in Bergen. I encourage each of you

Upcoming Events

26th annual LFC, Bergen, Norway July 22-26,2002.

World Congress on aquatic protected areas. Cairns, Australia August 2002. :www.ozacom.com.au/apa2002 for information

Ecology/Ethology Conf. to include Symposium on marine fish larvae:homing Quebec City, August 15-20, 2002 (see p. 12)

The Masthead

President: Art Kendall

**NOAA/NMFS Alaska Science Center,
7600 Sand Point Way NE Seattle,
WA98115. (206) 526-4108**

Art.Kendall@noaa.gov

President Elect: Jeff Isely.

jisely@clemson.edu

**Secretary Susan Sogard. NOAA/NMFS,
Hatfield Marine Science Center**

Newport, OR 97365-5296. (541) 867-0222

Sogards@ccmail.orst.edu

Secretary-elect Richard McBride

richard.mcbride@fwc.state.fl.us

Treasurer: Kathy Lang

NOAA/NMFS, 166 Water Street,

Woods Hole, MA 02543. (508) 495-2237

kathy.lang@noaa.gov

Editor of Stages: Perce Powles

**Trent University, Peterborough, ON K9J
7B8**

**(705) 743-6479 is also my fax.
pmpowles@netcom.ca**

Other Officers

ELHS Webmaster: Jim Rice

jim_rice@ncsu.edu

Historian: Robert Hoyt

robert.hoyt@wku.edu

Regional Representatives

Northcentral Region: Bruce Comyns

bruce.comyns@usm.edu

Northeast Region: Tom "Motz" Grothues

grothues@ahab.rutgers.edu

Southeastern: Richard McBride

Richard.McBride@fwc.state.fl.us

Western: Dan Margulies

dmargulies@iattc.ucsd.edu

Pacific Rim: Iain Suthers

I.Suthers@unsw.edu.au

**Chairs and members of standing committees,
and ad-hoc committees are listed on our web
page: <http://www2.ncsu.edu/elhs/index.html>**

President's Message continued

to think about yourself and fellow ELHers in light of serving the Section in one of these capacities. Please submit appropriate names to Jeff Govoni as soon as possible.

Also in this issue of *Stages* you will see guidelines developed by Lee Fuiman for support of publications by the ELHS (p. 5). Lee drafted these guidelines at the request of the Section and presented them at the last LFC in New Jersey. At that time we decided to print the guidelines in *Stages* to get feedback from our membership, and based on that submit them to a vote of the Executive Committee. We are overdue on this, and have a publication proposal waiting for the outcome of the vote. Therefore the Executive Committee will vote on this issue by 1 June, so please get your comments to me before then.

We received and have approved a proposal submitted by Churchill Grimes to hold the 2003 LFC in August in Santa Cruz, California. The hosts for this conference will include the Santa Cruz Laboratory of the National Marine Fisheries Service. Again, you can read more about this elsewhere in this issue of *Stages*.

Let me close this by thanking all of the people who keep our Section running and growing, quietly behind the scenes between the Larval Fish Conferences. Unlike mushrooms (which I understand grow in the dark on horse manure) the ELHS runs on the dedication and hard work of volunteers who care about our discipline and the people in it.

25th Annual LFC 2001 Meeting

The NMFS Howard Marine Sciences Laboratory on Sandy Hook hosted the 25th Annual LFC at Monmouth University, NJ, August 8-13th, 2001. The steering committee, chaired by Chris Chambers, was composed of Peter Berrien, Danielle Dowds, Michael Fahay, Ursula Howson, Anette Kalbach, and David Witting. Eleven countries were represented, with the U.S. and Canada in the majority, but Norway very prominent (this is not an allusion to the presence of the Moksness monster!). Other countries represented were Australia, Japan, Egypt, Germany, Poland, Portugal, Spain, and the UK. The environs were beautiful, the south shore of New Jersey, and the campus facilities provided were excellent, and easily accessed by a short walk through the campus from the residences.

The focus of the meeting was on change, and a number of the review papers presented (see last issue of Stages for complete listing of papers) provided interesting technical advances over the years, and also provided insights into the historical development of our ELHS from years gone by.

The student papers were excellent, and the competition was keen. The overall winner of the Sally Richardson award for best paper was **Mark Sullivan**, Division of Marine Biology, Rosentheil School of Atmospheric Science, Florida. The photograph below shows Mark with our President Art Kendall at the awards presentations following



Mark Sullivan and President Art Kendall (photo courtesy of Darrel Snyder)

the banquet. Mark's study was entitled "The effects of scallop dredging on recently settled flatfish (yellowtail flounder): disturbance or status quo?" Co-authors: R.K. Cowan, K.W. Able and M.P. Fahay.

Honorable Mention for best paper went to **Tom Hurst**, Marine Sciences Research Center, SUNY Stony Brook for his study "Interannual variation in body size and energy storage among overwintering YOY striped bass," with K.A. McKown and D.O. Conover, co-authors.

In spite of the emphasis on change, and technological advances which marked the meeting (e.g., fish tanks in which anoxia was controlled by computer - Kevin Stierhoff and T. Targett, University of Delaware), there were some interesting taxonomic and ecological discoveries made by tried and true traditional methods. For example, in estuarine and open sea plankton surveys Grace Klein-McPhee and her colleagues discovered the eggs and larvae of smallmouth flounder (the eggs of which were undescribed until 1980) suddenly (since 2000) made up 16.5% and 11% of the plankton tows. The possible reasons for local increase in this species created some lively discussions. Scientifically, the meeting produced a variety of scientific advances in our field of early life history, which made it a most successful conference.

A great ending to the meeting was the banquet/cruise into Manhattan Harbour. In spite of some fog, rain, and thunder to make thing interesting, we enjoyed splendid views of Manhattan, the Statue of Liberty, and harbour front. The vessel was small enough to bring everyone close together for the event, and the evening passed pleasantly, with conversation, making of new acquaintances, exchange of scientific information, and eventually, dancing on a somewhat rocking deck!

Several post-conference activities had been organized, including a kayaking expedition into the salt marsh of the Jacques Cousteau National Estuarine Research Reserve at Mullica River, Great Bay. This fit-looking group of larval fish scientists are shown on the next page, again, courtesy of Darrel Snyder's photograph collection.

Thanks again for all your work, Chris and committee, patient spouses/partners and friends.



Kayaking group led by Mike Fahay, following the 25th annual LFC in New Jersey, August, 2001. (photo courtesy of Darrel Snyder)

Experiments on the effects of sub-marine detonations on larval and juvenile fishes. by Jeff Govoni

The Beaufort Laboratory of NOAA's National Marine Fisheries Service and National Ocean Service has conducted experiments on the effects of sub-marine detonations on larval and juvenile fishes. This work was supported by the United States Army Corps of Engineers (COE), while the COE was blasting bedrock (limestone) from the Cape Fear River, North Carolina. The Cape Fear River is a presumed migratory pathway for late-larval and juveniles of estuaries dependent fishes. Experimental detonations, exploded in the channel that separates Pivers Island from the Beaufort-Morehead City Causeway, simulated the shock waves that were generated by blasting operations in the Cape Fear River.

For the experiments, bags with fishes were submerged to 2 m depth from an open boat, stationed at three distances from the detonation; 3.6, 7.5, and 17.0 m. Fish were not allowed to acclimate to the pressure encountered at 2 m because of the excessive equilibrium rates of

ALFC 2003 Announcement

Director Churchill Grimes, of the Santa Cruz NMFS Laboratory in Santa Cruz, has announced their hosting of the 2003 LFC for August, dates to be decided. We are grateful and excited about this offer. Many thanks! (see p. 14 for details)

swimbladder volume following a change in pressure. Triplicate charges were detonated at each distance with one bag of each fish species submerged with each bag. Control bags, one for each species, were submerged for 7 min.

Juvenile pinfish, *Lagodon rhomboides*, and spot, *Leiostomus xanthurus*, exposed to pressure waves exhibited both sub-lethal and probable antemortem trauma. Rupture of the pancreas, hemorrhage within the coelom and within the swimbladder and liver, hematuria, and coagulative liver necrosis were the most recurrent and significant traumas evident from histopathological examination. These traumas were likely caused by rapid displacement that result from the rapid contraction and occasional rapid expansion of the swimbladder as the pressure impulse passed. Of the traumas observed, hemorrhaging and hematuria, are likely sub-lethal. Rupture of the pancreas and coagulative liver necrosis are typically irreversible and hence antemortem. Spot are more susceptible to injury than are pinfish

(Contacts: Jeff.Govoni@noaa.gov ((252) 728-8727)

or Larry.Settle@noaa.gov).

Readers: please send your comments (by email) on this proposal to our president, Art Kendall, or bring your comments to the business meeting at Bergen. We are grateful to Lee and Dave for their work in preparing this document.

Memorandum

Date: 1 May 2001

To: Early Life History Section EXCOM

From: Lee A. Fuiman, ELHS Publications Editor

Subject: Guidelines for offering funds to support publications

As requested of me by outgoing ELHS President Jeff Govoni at the ELHS business meeting held during the 24th annual Larval Fish Conference, I have drafted a set of guidelines for offering Section funds for partial support of the publication of ELH-related materials by ELHS members (full and affiliate) of proceedings, books, monographs, and other substantial products." Dave Secor kindly offered to help me with this and made several constructive comments on the original draft.

The philosophy behind these guidelines was that the Section should support useful and innovative projects that further the Section's objectives. It was intentional that the range of projects that could be supported is broadly defined, yet did not include normal costs of doing scientific work (such as page charges) or projects that benefitted a limited audience (for example, internships). The guidelines presented here do not specify how the Executive Committee will come to a decision on a request. The Excom may choose to decide among its own members, seek the advice of others, or use some other method.

If you have any questions about the guidelines, please contact me at your convenience.

Guidelines for Requests for Subventions

from the Early Life History Section of the American Fisheries Society

prepared by

Lee A. Fuiman and David Secor

May 1, 2001

BACKGROUND

Supporting publication of materials related to the early life history of fishes is an important activity of the Early Life History Section. Section C of the bylaws, as displayed on the Section's internet site (<http://www2.ncsu.edu/elhs/>) as of 1 March 2001, states that the Section's objectives shall be achieved by:

"gathering, exchanging, and disseminating pertinent information, ideas, techniques, and materials through...special symposia, paper sessions, workshops, short courses, or other communication vehicles either independently or in association with events of the Society, other Society subunits, or outside organizations;...promoting coverage of the early life history of fishes and its importance in pertinent educational courses and curricula;...identifying critical gaps in our knowledge of the early life history of fishes and facilitating efforts to fill those gaps."

In support of these objectives, the Section will consider requests for financial support of publications (as defined below) that contribute to the Section's scientific objectives.

DETAILS

The Section will consider requests by its members (voting and affiliate) for partial support of costs associated with the preparation of significant publications. The term "publications" is interpreted broadly to include documents, such as books, proceedings, manuals, and monographs, in paper form as well as electronic or other media. To be considered, the proposed publication must be scholarly, of high scientific caliber, be of broad interest to Section membership and other ELH

scientists, and intended to be distributed widely. Subventions will not be granted to cover page charges or other routine expenses involved with individual research papers. The amount of funding for subventions depends upon the availability of funds in the Section's budget. It is anticipated that the Section will be able to support subventions to a maximum of \$2,000 to \$3,000.

The Section will only consider requests originating from its members (voting or affiliate). That person (or persons), to be referred to as "the Applicant," will be expected to serve as the supervisor(s) of the publication project and will be identified on the final product as the author (s) or editor(s).

Requests for a subvention will be considered at any time. A request must include a cover letter and a proposal (as described below) and be submitted to the President of the Section for distribution to the Executive Committee. The Executive Committee will evaluate the request and decide to approve or disapprove funding. The Executive Committee may seek external reviews of the proposed publication project to aid in its decision. The decision will be based on the following criteria:

- 1) availability of funds in the Section's budget;
- 2) need for supplemental funds;
- 3) match between goals of the publication project and Section's objectives;
- 4) perceived quality and impact of the proposed publication;
- 5) Applicant's ability to carry out the work.

Approved requests should be considered as a donation by the Section in support of the publication project. The Section prefers to make payment to a recognized organization (university, publisher, etc.), but can pay the Applicant directly if necessary.

The Section requires a summary accounting of expenditures upon completion of the project, but an official accounting prepared by fiscal officers is not necessary.

Reimbursement or other return of funds (residual funds, royalties) to the Section will be accepted but is not required. The Section's

support must be amply acknowledged in the resulting publication. A complimentary copy of the resulting publication must be submitted to the Executive Committee for the Section's archive.

PROPOSAL

Each request for a subvention must include a proposal of no more than ten pages that describes the project, how it contributes to a field of research, how it addresses the Section's objectives, the plan for its completion, and the need for funds. The following components must be included.

- **Executive summary** - overview of publication project proposal
- **Objectives of publication**
 - **Background** - rationale, expected contribution to field of research, etc.
 - **Content** - proposed Table of Contents and/or List of Contributors
 - **Market Assessment** - need for publication, relevance to Section objectives, description of audience and market, existing similar publications (similarities and differences), anticipated print run/sales.
 - **Publication Plans** - type of publication, name of publisher, qualifications of publisher, letter of commitment from publisher if available
 - **Qualifications of Applicant(s)** - current curriculum vita, publication experience (organizing, writing, editing, production), relevant research experience, relevant teaching experience, editing experience
 - **Work Plan** - milestones, time line for publication
 - **Finances** - purpose and amount of request, other funds received or sought.

Regional News of ELHS Research

Southern Region: Dr. Rich McBride

We are very grateful to Rich for his many years of dedication as southern region representative for the ELHS section. As you move on to your new position of Secretary, we wish you well!

Early Life History Research at the Florida Marine Research Institute.

As the outgoing newsletter representative for the Southern Region, Rich McBride reports on early life history projects at his home institution, the Florida Marine Research Institute. The Institute is the State of Florida's center for research, education, and management of marine environmental issues. There are a number of projects at the Institute supporting early life history research of vertebrate and invertebrate fishes.

Rich McBride (richard.mcbride@fwc.state.fl.us) has recently finished outlining the spawning grounds of two halfbeaks species in south Florida. The species of interest, ballyhoo (*Hemiramphus brasiliensis*) and balao (*H. balao*), are targeted by a net fishery for bait. The state's management commissioners had asked a simple question: where do these fish spawn? In the course of answering this question, a novel approach of plotting spawning grounds was developed. The project began with an assessment of the available data and appropriate options. Published egg and larvae surveys offered no answer, presumably because

halfbeak eggs are attached to floating vegetation and larvae hatch out at a large enough size (5-7 mm) to avoid plankton collecting gear. New collections would not necessarily delineate spawning grounds either. Laboratory culture experiments by Steve Berkeley and Ed Houde (in the 1970's at the University of Miami) showed that eggs could take 9 days to hatch, so eggs could be dispersed great distances from spawning areas before hatching. These problems were addressed by stepping back in the life cycle and plotting the distributions of ripe females (i.e. females with oocytes in final maturation). Fish were collected from coastal waters in south Florida: north of Miami, throughout the Florida Keys, and including Florida Bay. Histological stages of oocyte development from several hundred females were related to gonad-somatic indices, and this showed that females with GSI's > 6 would spawn in a matter of hours. The GSI had been measured for several thousand females and we used these data to plot the distribution of females with GSI's > 6 as a proxy for spawning grounds. This method may be considered a synthesis of GIS and GSI's. Such plots showed that ballyhoo spawn throughout the fishing grounds, all along the coral reef tract and in Florida Bay. Spawning by balao occurred near the coral reef tract, but balao were not distributed inshore of the reef tract or in Florida bay. Several interesting life history trade-offs were also noted and are the subject of another paper, which was also recently drafted.

After reading David G. Smith's ladyfish (*Elops*) chapter in the 'leptocephali' volume of the Sears Foundation book series (i.e. FWNA), McBride has been following up hypotheses regarding the life history and population structure of this common, but neglected species. Research on the use of estuaries as nursery habitats by ladyfish, presented earlier at the 20th Annual Larval Fish Conference, was recently published (Fish. Bull. 99: 443-458; co-authored with Tim MacDonald, Ed Matheson, Dave Rydene, and Peter Hood). Continued work has explored the ecology of two ladyfish morphs in the western Atlantic region, which is the basis of Andrij Horodysky's honors

thesis at Eckerd College and was recently presented at the 25th Annual Larval Fish Conference. Many thanks to Jon Hare (NOAA-NMFS) and others who have sent specimens for this work. Preliminary genetic analyses at Brian Bowen's lab (Univ. of Florida) suggest that these two morphs are different species; such an outcome should eventually confirm David Smith's earlier postulations that there are two *Elops* species in the western North Atlantic.

Bill Arnold's (bill.arnold@fwc.state.fl.us) bivalve team is comparing the effectiveness of various strategies to enhance hard clam populations in the Indian River lagoon, including spawner transplants, seeding, and direct larval injection. The latter consists of fertilizing large numbers of eggs (> 250 million) in an upland hatchery and immediately transporting those larvae to a predetermined site for release. In an attempt to monitor the fate of the released larvae, water masses and the associated larvae are tracked using sulfur hexafluoride (SF₆) and shallow-water drifters. Diffusion and advection of water masses will be related to the pattern of larval dispersal by quantifying larval abundance with a genetic probe. This will allow estimates of *in situ* rates of growth and mortality, to determine if larvae are faithful to a water mass, and to estimate the pattern of settlement in this shallow, microtidal lagoon. Ultimately, the resultant post-metamorphic population will be sampled to determine if direct larval injection is an effective approach for hard clam population restoration or enhancement.

Bob McMichael (bob.mcmichael@fwc.state.fl.us) and a cast of thousands conduct a fisheries-independent survey to monitor the relative abundance of fishery resources in major riverine and estuarine systems throughout the state. Data from this program provides information on the relative abundance, recruitment, habitat use, and distribution of estuarine species, and is used as "tuning indices" for stock assessments of recreationally and commercially important species. Seines and trawls are used within a stratified-random sampling design to collect young-of-the-year stages, juveniles and small adult fishes. This long-term (since 1989) database provides a unique source of information on economically valuable species, as well as for other

fishes that may influence fisheries or are important indicators of ecosystem health. Annually, the total number of fishes collected by this program exceeds one million individuals, representing over 140 taxa. Some the dominant species collected each year are engraulids (*Anchoa* spp.), atherinids (*Menidia* spp.), poeciliids (*Lucania parva*), clupeids (*Harengula jaguana*), sparids (*Lagodon rhomboides*), gerreids (*Eucinostomus* spp.), haemulids (*Orthopristis chrysoptera*), and sciaenids (*Bairdiella chrysoura*, *Leiostomus xanthurus*). Recreationally and commercially important fishes account for approximately 11% of the overall annual catch and include the common snook (*Centropomus undecimalis*), sheepshead (*A. probatocephalus*), spotted seatrout (*Cynoscion nebulosus*), and striped mullet (*Mugil cephalus*).

There are many other research projects here at the Institute regarding nursery habitat use by Florida fishes. Ed Matheson (eddie.matheson@fwc.state.fl.us) continues collaborating with USGS-BRD and NOAA-NMFS in Florida Bay (see January, 1999 STAGES). He is also writing up a manuscript on seagrass and drift algae as nursery habitat in general and another manuscript on anchovy (*Anchoa*) nursery habitat in Tampa Bay. Luiz Barbieri (luiz.barbieri@fwc.state.fl.us) and Jim Colvocoresses (jim.colvocoresses@fwc.state.fl.us) are investigating the life history of several snapper (Lutjanidae) species in southeast Florida. Kevin Peters, recently retired from FMRI, published two papers in as many years on the early life history of snook (*C. undecimalis*).

The Florida Marine Research Institute started 45 years ago to study red tide. Legislative action moved the Institute in 1995 from Florida's *Department of Natural Resources* to Florida's *Department of Environmental Protection*. In 1999, a referendum moved the Institute again, this time into the newly created *Florida Fish and Wildlife Conservation Commission (FWC)*. The FWC is charged with the protection, conservation, and management of Florida's fisheries and related marine issues as diverse as turtles, marine mammals, and subtropical-tropical coastal zone management in a

rapidly growing state. There are over 300 staff members in the main office in St. Petersburg and at 11 field labs around the state. If you would like to learn more about the Florida Marine Research Institute or Florida's marine resources log on Institute website: www.floridamarine.org, or the main FWC website: <http://floridaconservation.org>.

Western Region Dr. Dan Margulies

Juvenile salmon physiological ecology at the NMFS Santa Cruz Laboratory. **R. Bruce MacFarlane**

Studies on the physiological ecology of juvenile salmon at the Santa Cruz Laboratory of the National Marine Fisheries Service began in 1995 when the laboratory was the Tiburon Laboratory and located on San Francisco Bay in Tiburon, California. The preceding eight years of drought in California caused the Physiological Ecology Investigation to conjecture that reduced freshwater inflow, and other co-occurring physical and chemical alterations, to the San Francisco Estuary may have impacts on juvenile chinook salmon (*Oncorhynchus tshawytscha*) emigrating through the estuary from their natal streams and hatcheries in California's Central Valley. A field study was established to test the hypothesis that juvenile development while transiting the estuary varied interannually and was influenced by environmental variables that changed in response to freshwater flows.

After seven years of data gathering, patterns of estuarine usage are emerging. Fortunately for the ecology of the state and the welfare of its human community, the years from 1995 to the present have all been wet years with above average precipitation. Unfortunately, the lack of drought years and large inter-annual variability in freshwater outflow has not allowed elucidation of the influences of flow. Thus, the results to date characterize development in the estuary under beneficial, high outflow conditions for the southernmost chinook populations in North America.

Our data indicated that sub-yearling chinook

salmon (ocean-type life history) spent about a month in the 68-km length of the northern San Francisco Estuary before entering the ocean at the Golden Gate. Juvenile fall-run chinook salmon, the primary race in California, started entering the estuary in large numbers in May. Ocean entry for the emigrating population was essentially completed by the end of June. While in the estuary, they grew little in length or weight, fed moderately, neither accumulated nor depleted lipid energy reserves, and had declining condition. Additionally, we found that they did not accumulate metals or organic contaminants to levels indicative of physiological impairment.

We also collected salmon, plankton, and oceanographic data in the Gulf of the Farallones just seaward of the Golden Gate. Here the pattern of development changed greatly. Growth rates and condition rose dramatically in conjunction with increased feeding and utilization of lipid reserves. It appears that juvenile chinook salmon from the Central Valley have adopted an evolutionary strategy of expedited migration through the estuary to gain ecological benefit from the biologically-productive coastal waters of central California.

Since 2000, and in response to the data on juvenile salmon ocean dynamics from earlier years, we have expanded our research into the physiological ecology of salmon during the first year of their ocean phase. The new study is designed to assess abundance, distribution, and movement patterns in addition to growth, energy dynamics, and feeding ecology. We conduct cruises immediately after the year class has entered the ocean (June-July), two to three months later, and again in the winter (February-March) during the period of lowest ocean productivity. These studies are designed to determine the importance of oceanographic features (temperature; current dynamics, eddies, freshwater plume, jets, upwelling centers, etc.) and biological productivity to salmon growth, development, and survival.

In addition to physiological ecology, other studies are just beginning that intend to determine the genetic diversity, origin, and growth history of salmonids inhabiting the coastal waters of central and northern California. Using microsatellite DNA

to assign fish to specific populations and otolith microstructure and micro-chemical analyses to determine stream of origin (natal stream or hatchery) we anticipate the ability to determine the races (fall, late fall, winter, spring) and natal sources, and the relative importance of different source populations. Otolith increment analyses may provide evidence of differential growth and survival among year classes, races, populations, and natal sources associated with various oceanographic features, etc., as well as size-selective mortality.

Other research projects in development or early operation include a comparative study of juvenile salmonid ecology in small estuaries on the central California coast, many of which are often closed to the ocean by sandbar formation; the reproductive behavioral ecology of mixed hatchery and wild stocks of steelhead; and the development of a coho salmon captive broodstock to supplement the southernmost population of coho salmon in the United States.

These projects will greatly improve our understanding of salmon biology and the ability to effectively manage salmon populations at the southern margins of their distributions, in environmental conditions that differ considerably from those in the Pacific Northwest, the source of most salmon data.

From “Here and There”—International early life history items **Dan Faber** (one of our past presidents,) has agreed to be international representative for Europe and Canada. His contributions will appear in the next issue of *Stages*

Department of Biology, University of New Brunswick - reported by Allen Curry

“YOY Slimy Sculpins help track impacts in agricultural watersheds.”

Michelle Gray (PhD Candidate) is studying the impacts of intensive agricultural activities on resident fish populations in North-western New Brunswick. The young-of-the-year slimy sculpin (*Cottus cognatus*) is being used as an indicator of

possible impacts on reproductive performance or early life-stage survival. Using population survey data, we constructed length-frequency distributions to assess whether there were differences between the proportions of YOY sculpin at reference points and impacted sites. In the summer of 1999, the proportion of YOY sculpin in the agricultural region was less than half of that for the reference region. Multi-season population length distributions have also allowed us to assess relative growth of the first year class. Growth during the summer was significantly higher for YOY in the agricultural region, but was similar to the reference fish by the late fall. The agricultural sites were found to be warmer than the reference sites, with increased temperatures being correlated with increased size and also decreased density of YOY sculpin. The relative importance of sediment deposition on YOY sculpin survival and growth is still being investigated.

Using YOY Brook Trout to determine the contributions of resident and anadromous adults to reproduction.”

Allen Curry is presently studying the carbon, nitrogen, and sulphur isotope signatures of YOY brook trout to determine the relative contribution of anadromous and resident adults to reproduction in streams of the east coast. Newly emerged alevins appear to maintain signatures similar to their maternal origins. If the female was recently in the marine environment, then her young will have a marine isotope signature. The results will be used to examine the evolutionary significance of anadromous life history strategies in brook trout, and assist managers of the important recreational fisheries supported by brook trout.

Japan Shinji Uehara and Iain Suthers

According to the Japanese national plan, our nine fisheries research institutes have been reorganized and started as the member of a new independent corporation, "Fisheries Research Agency (FRA)" on April, 2001.

Shinji Uehara and colleagues continues to examine the survival mechanism of young Japanese horse mackerel (*Trachurus japonicus*) in relation to oceanographic condition. We have established a

method to collect samples using mid-water trawl (100m long, 20m mouth diameter), which can collect juveniles ranging 15-65 mm TL. Continued field effort is scheduled for spring of 2002 and 2003. Shinji, Takumi Mitani, Chris Taggart (Dalhousie University) and Iain Suthers (University South Wales, Australia) are writing up the abundance of juvenile yellowtail (*Seriola quinqueradiata*) as a function of drifting seaweed and regional hydrography off the Pacific coast of southwestern Japan.

Update on the 26th Annual Larval Fish Conference (LFC2002) Bergen, Norway, 22-26 July 2002

From: Howard Browman, Organizer

To date, 175 people have registered to participate in LFC2002, including 40 students! The program, which is extremely strong, will consist of approximately 150 presentations: 40 poster and 110 oral. All of the titles and abstracts submitted for presentation at the conference will be made available on the conference web site by April 2002. Participation is extremely cosmopolitan, with the following 23 nations represented: Australia, Austria, Canada, Denmark, Egypt, Finland, Germany, Greece, Italy, Japan, Korea, Mexico, New Zealand, Norway (!!), Pakistan, Portugal, Romania, Russia, Spain, South Africa, Sweden, The United Kingdom, and The United States of America.

Theme Session Line-up

1.) Developmental neurobiology and sensory biology of fishes. Organizers: Howard Browman and Thomas Becker

R. Glenn Northcutt: DEVELOPMENT OF LATERAL LINE PROJECTIONS

Stephan Neuhauss: DEVELOPMENT OF THE VISUOTOPIC MAP IN THE ZEBRAFISH

Herwig Baier: DEVELOPMENT OF MOTION

PERCEPTION IN ZEBRAFISH

Pierre Drapeau: HOW LARVAL ZEBRAFISH SWIM

Kjell Døving: DEVELOPMENT OF GUSTATION AND OLFACTION IN FISHES

Howard Browman et al. LIFE-HISTORY TRANSITIONS AND ONTOGENY OF THE ULTRAVIOLET PHOTORECEPTOR

Thomas Becker: SELECTIVE MUTATIONS OF THE VISUAL SYSTEM IN ZEBRAFISH

2.) Essential fatty acids and fish development. Organizer: Reiji Masuda

G. Mourente: ACCUMULATION OF DHA (DOCOSAHEXAENOIC ACID; 22:6n-3) IN LARVAL AND JUVENILE FISH BRAIN

D. Tocher: BIOCHEMICAL AND MOLECULAR STUDIES OF THE FATTY ACID DESATURATION PATHWAY IN FISH

T. Lewis: POLYUNSATURATED FATTY ACIDS FROM BACTERIA AND THRAUSTOCHYTRIDS: PRODUCTION AND USE TO ENRICH ROTIFERS AND FISH LARVAE

K. Yazawa: PRODUCTION OF EICOSAPENTAENOIC AND DOCOSAHEXAENOIC ACID BY MARINE BACTERIA ISOLATED FROM FISH INTESTINE

J. Pickova: HATCHING SUCCESS AND FATTY ACID COMPOSITION IN COD

W. Koven: ARACHIDONIC ACID AND ITS ROLE INCREASING STRESS RESISTANCE IN DEVELOPING MARINE FISH LARVAE

M. Bell: IN VIVO ASSAYS OF DOCOSAHEXAENOIC ACID BIOSYNTHESIS IN FISH

B. Estevez: FATTY ACIDS AND PIGMENTATION PROBLEMS OF CULTURED FLATFISH

T. Takeuchi: FATTY ACID REQUIREMENT OF LARVAL FISHES

R. Shields: PROVISION OF ESSENTIAL FATTY ACIDS TO MARINE FISH LARVAE VIA INTENSIVELY CULTURED COPEPODS

Symposium: "Sensory environments and homing behaviour of marine fish larvae" part of the Ecological and Evolutionary Ethology of fishes August 2002 meeting

This conference will include a symposium on the topic of "Sensory environments and homing behavior of marine fish larvae".

In this symposium, we will explore the sensory systems, behavior and cues that fish larvae may use to return to natal habitats. Sound may be an important navigational cue for larvae and a plenary address by Art Popper of the University of Maryland will describe the evolution and development of hearing in larval fishes. John Montgomery of the University of Auckland, New Zealand will review his recent work on acoustic, olfactory and wave cues as means for larvae to locate reefs.

This symposium will be of interest to researchers examining sensory perception, larval behavior, orientation and the settlement process in fishes. **Registration closes 1st May 2002. Details about the schedule for the meeting, venue and registration can be found at:**

<http://www.bio.ulaval.ca/CIRSA/EEEF2002/>

For further information contact **Mark Meekan**, Australian Institute of Marine Science, Northern Territory University, Darwin, NT, Australia.

M.Meekan@aims.gov.au

Other symposia include:
"The evolution of alternative reproductive strategies"
Contact: Julian Dodson, Université Laval,
Julian.Dodson@bio.ulaval.ca

"The role of trophic polymorphism in the evolution of fish populations"
Contact: Pierre Magnan, Université du Québec pierre_magnan@uqtr.quebec.ca

"Genetic basis, architecture and determinants of fitness-related traits in fishes" Contact: Dany Garant, Université Laval, Québec, Canada
dany.garant.1@agora.ulaval.ca

Bergen meeting update (con'd from p. 11)

R. Masuda: DOCOSAHEXAENOIC ACID AS A CRITICALLY IMPORTANT FACTOR FOR THE BEHAVIOURAL DEVELOPMENT IN FISHES

T. Hamazaki: EFFECT OF DHA ON THE HUMAN HOSTILE BEHAVIOR

3.) Larval growth and survival in varying environments: implications for stock conservation and aquaculture. Organizers: Tara Marshall and Birgitta Norberg

Mark Dickey-Collas: EGG MORTALITY, RELATIVITY AND INCORPORATING ICHTHYOPLANKTON SURVEYS INTO STOCK ASSESSMENT- AN EXAMPLE FROM THE IRISH SEA

Carl van der Lingen ISH IN THE BENGUELA UPWELLING SYSTEM: ICHTHYOPLANKTON STUDIES OF PELAGIC Fish.

Fritz Koster: PROCESS-ORIENTED STUDIES OF BALTIC COD RECRUITMENT

Alexander Bonk: HERRING REPRODUCTION AND EARLY LARVAL PERIOD IN THE BAYS OF WEST BERING SEAL.

Cernisencu, M. Staras, I. Navodaru: ICHTHYOPLANKTON SURVEYS OF THE DANUBE DELTA - IMPLICATIONS FOR STOCK CONSERVATION

Duffy-Anderson, J.T., Honkaletho, T., Bailey, K., CIANNELLI, L: CONSEQUENCES OF A SUPERABUNDANCE OF LARVAL WALLEYE POLLOCK, THERAGRA CHALCOGRAMMA, IN THE GULF OF ALASKA

Catriona Clemmeson: MATERNAL EFFECTS OF ATLANTIC COD: FAMILY VARIATION IN LARVAL AND POST-METAMORPHOSIS SURVIVAL AND GROWTH IN LARGE MESOCOSMS

Arild Folkvord: SIZE AND TEMPERATURE DEPENDENT GROWTH IN COD LARVAE (GADUS MORHUA)

Adrian Jordaan: ELUCIDATING THE EFFECTS OF ENVIRONMENTAL TEMPERATURE ON VITAL RATES DURING THE EARLY LIFE OF COD (GADUS MORHUA).

Nina V. Mukhina et al.: TRACKING THE SIGNAL IN YEAR-CLASS STRENGTH OF NORTHEAST ARCTIC COD THROUGH MULTIPLE SURVEY ESTIMATES OF EGG, LARVAL AND JUVENILE ABUNDANCE

E. Trippel et al.: RELATIVE ROLES OF EACH SEX IN GOVERNING EARLY LIFE HISTORY TRAITS OF BALTIC COD (GADUS MORHUA)

4 TEMPERATURE CHANGE

Robert S. Batty: LOCOMOTION OF FISH LARVAE: SWIMMING THROUGH THICK AND THIN

Lee A. Fuiman: CHANGING STRUCTURE AND FUNCTION OF THE MECHANOSENSORY AND AUDITORY SYSTEMS OF FISHES DURING DEVELOPMENT FISHES DURING DEVELOPMENT

Barbara Evans and Howard Browman: VARIATION IN THE DEVELOPMENT OF THE FISH RETINA. TO WHAT EXTENT DOES GOOD VISION MATTER?

Jennifer L. Specker: ENDOCRINE SYSTEM / OSMOREGULATION, METAMORPHOSIS & SYSTEM CONTROL

4) **Morphological development and physiological function in fishes: studies in larval fish adaptation. Organizer: John Jeffrey Govoni**

Jeff Govoni: INTRODUCTION AND OVERVIEW

Masaru Tanaka: ALIMENTARY CANAL / DIGESTION/ & ASSIMILATION

Katja Hoehne-Reitan and E. Kjørsvik: COMPARATIVE APPROACH TO FUNCTIONAL DEVELOPMENT OF LIVER, EXOCRINE PANCREAS AND DIGESTIVE ENZYMES IN DEVELOPING TELEOSTEAN FISH

Bernd Pelster: SWIMBLADDER / BUOYANCY

Peter J. Rombough: STRUCTURAL AND FUNCTIONAL DEVELOPMENT OF THE LARVAL GILL

.G.M van den Boogaart and J.W.M. Osse: GROSS EXTERNAL ANATOMY / SWIMMING, ALLOMETRY & ISOMETRY, FEEDING, & VENTILLATION

I.A. Johnston: MECHANISMS OF MUSCLE DEVELOPMENT AND RESPONSES TO XYGEN CONSUMPTION OF FISH EMBRYOS

Trine F. Galloway and T. Bardal: THE ONSET OF MYOSATELLITE CELL PRODUCTION IN ATLANTIC HALIBUT

T. Gunbaum and R. Cloutier: CONGRUENCY BETWEEN CHONDRIFICATION AND OSSIFICATION PATTERNS DURING CAUDAL DEVELOPMENT: A MOXOSTOMATINI CASE STUDY

Ione Hunt von Herbing: BIOPHYSICAL INTERACTIONS OF TEMPERATURE ON SWIMMING ENERGETICS IN MARINE FISH LARVAE

M. Castro Cuhna et al.: DEVELOPMENT OF THE IMMUNE SYSTEM AND USE OF IMMUNOSTIMULANTS IN SENEGALESE SOLE (SOLEA SENEGALENSIS)

D.J. Martell et al.: THE EFFECTS OF TEMPERATURE ON HADDOCK (MELANOGRAMMUS AEGLEFINUS) MUSCLE DEVELOPMENT THROUGH ONTOGENY

N. Okada et al.: BONE DEVELOPMENT DURING THE METAMORPHOSIS OF JAPANESE FLOUNDER (Paralichthys olivaceus): DIFFERENTIAL RESPONSIVENESS TO THYROID HORMONE

M.R. Pena: DEVELOPMENT OF THE DIGESTIVE TRACT AND THE EYE OF SPOTTED SAND BASS LARVAE PARALABRAX MACULATOFASCIATUS FED LIVE PREY

Karin Pittman et al.: WHAT MAKES A FLATFISH FLAT? CONTROL OF METAMORPHOSIS IN FARMED FLATFISH

Andrew Trotter et al.: INTERVAL AND MORPHOLOGY OF INITIAL SWIM BLADDER INFLATION IN STRIPED TRUMPETER (LATRIS LINEATA) LARVAE

5.) **Ocean and Estuarine Ecology of Juvenile Salmon. Organizer: Churchill B. Grimes**

Rick Brodeur: DISTRIBUTION, GROWTH, ORIGIN, TROPHIC AND SPECIES ASSOCIATIONS OF JUVENILE SALMONIDS IN THE NORTHERN CALIFORNIA CURRENT ECOSYSTEM

Jack Helle: DISTRIBUTION AND GROWTH OF JUVENILE SALMONIDS IN THE GULF OF ALASKA AND BERING SEA

Kevin Friedland: THE RELATIONSHIP BETWEEN SMOLT SIZE AND FINISHING GROWTH AND POST-SMOLT GROWTH IN ATLANTIC SALMON IN THE

Wanted!

Nominations/Volunteers for the following executive positions in your organization:

President Elect (2004-2006)

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The **Rewards** are great!

Please talk to our President ASAP

2003 ALFC Confirmed for Santa Cruz Plan now

Director Churchill Grimes has confirmed that the NMFS Santa Cruz Laboratory will host the 27th Annual Larval Fish Conference of the Early Life History Section at the University of California, Santa Cruz. The conference will be held in mid-August of 2003, with exact dates to be determined soon. The ALFC will be held in conjunction with a Symposium entitled "Early Life History of Fishes in the San Francisco Estuary and Watershed" sponsored by the Interagency Ecological Program for the San Francisco Estuary, a cooperative California state and U.S. Federal research and monitoring program.. More information on conference facilities at UCSC can be found at <http://oasas.ucsc.edu/conference/>. Santa Cruz is located on the Monterey Bay about an hour from the airport at San Jose and about one and a half hours from the airport at San Francisco. The weather in August is usually excellent with daytime highs in the 70s and night-time lows in the 60s. The Monterey Bay coast, among the most active marine research regions in the world, will provide an exciting and naturally beautiful venue for the meeting with many opportunities for field trips. For more information, phone or e-mail **Churchill Grimes at 831-420-3931** or **Churchill.grimes@noaa.gov**. See you in Santa Cruz! Churchill B. Grimes,

Continued thanks to Tom Miller, who is still looking after the publication of Stages. I do the collecting of copy, and assemble it into MS Publisher, Tom looks after the publication details and the mailing. Thanks for doing this Tom! It is very much appreciated. (Perce)

(CONT'D FROM P. 13)

Bruce MacFarlane: INFLUENCE OF THE 1997-99 ELNINO-LA NINA ON JUVENILE CHINOOK SALMON OFF CENTRAL CALIFORNIA USING OTOLITH MICROSTRUCTURE AND MICROCHEMISTRY FOR STOCK COMPOSITION ANALYSES AND IDENTIFYING PATTERNS IN JUVENILE SURVIVAL

M. Holm et al.: DISTRIBUTION AND FEEDING OF SEAWARD MIGRATING ATLANTIC SALMON POST-SMOLTS IN SIX NORWEGIAN FJORDS.

Contributed papers and poster titles will appear in the next issue

New Book edited by
ELHS members Lee A.
Fuiman and Robert G.
Werner

Title: "Concepts in Fisheries Science: the Unique Contribution of Early Life History Stages"

By Iowa State University Press- a Blackwell Science Company 2121 South State Ave., Ames, IA. 515-292-0140. Fax: 515-292-3348 Orders: 800-862-6657

Publication date: January 2003

Table of contents:

Special considerations of fish eggs and larvae - *Lee Fuiman*

Age and growth - *Cynthia Jone*

Mortality - *Edward D. Houde*

Recruitment - *James A. Cowan and Richard F. Shaw*

Population Analysis - *Pierre Pepin*

Cohort Identification - *Karin E. Limberg*

Habitat Requirements - *Robert G. Werner*

Assemblages, Communities, and Interactions - *Thomas J. Miller*

Fishery Management - *Edward R. Rutherford*

Human Impacts - *G. Joan Holt*

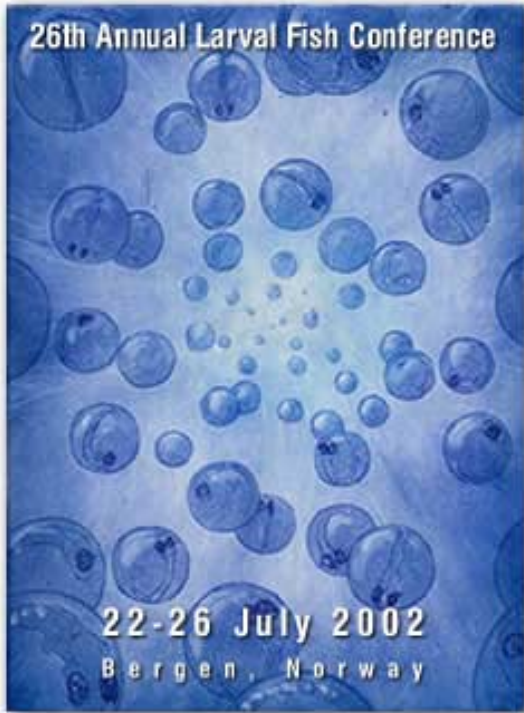
This book is user friendly and well illustrated. Editors and authors have between them, a vast wealth of knowledge and experience in this field. Each chapter covers a topic traditionally taught in fisheries science courses, from the point of view of early life history stages.

Primary market: Upper level undergraduates and graduate students of fisheries science, fish biology, ichthyology, marine science, aquatic biology, and aquaculture.

Edited by: Lee A. Fuiman, Professor of Marine Science and Integrative Biology, University of Texas, Austin and Robert G. Werner, Emeritus Professor of Environmental and Forest Biology, S.U.N.Y., Syracuse, NY

Details. 352 pp., 6¾ x9½", illus., paperback, ISBN 0-632-05661-4, \$48.95 (Price subject to change without notice). For orders and more information, visit: www.isupress.com

Marketing Contact person: Joanne Kilvington: Joanne.Kilvington@blacksci.co.uk



See you in Bergen!

Important Reminder!!

Please consider volunteering yourself, or submitting nominations for two officer positions: secretary elect, and president elect. We have two excellent officers in these positions taking over at Bergen, and they will be serving two years. But we need to think to the future. We appeal to you to consider either of these two interesting and rewarding positions. Send names or nominations to our President, Art Kendall ASAP. Spread the word.

AFS-ELHS
Chesapeake Biological Laboratory
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