



Newsletter of the  
**Early Life History Section**  
of the American Fisheries Society

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Lee A. Fuiman, Editor

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### Inside this issue

President's Message .....	1
News from the Regions .....	2
Section Officers .....	2
People .....	6
Publications .....	8
Upcoming Events .....	9
Announcements .....	11

### ELHS Back Then

**10 years ago:** 24<sup>th</sup> LFC held in Gulf Shores, Alabama, 43 papers, 11 posters.

**15 years ago:** Conference organizers provide ELHS with funds to support to students hoping to attend the 19<sup>th</sup> LFC in Sydney, Australia.

**20 years ago:** 14<sup>th</sup> LFC held at Duke University Marine Lab; 172 registrants, 8 countries, 79 papers, 15 posters.

**30 years ago:** In its first year, ELHS membership numbers 100.

### What's Up with STAGES?

If you are wondering why the October issue is late and combined with the February issue, it is because we had too little content to publish by the October deadline. Please contribute to STAGES!

**Deadline for material to be included in the next issue of Stages:**

**April 15, 2011**

## 2011 Larval Fish Conference

### Call for Abstracts

The 35<sup>th</sup> Larval Fish Conference will be held in historic downtown Wilmington, North Carolina, USA during the week of May 22<sup>nd</sup>-26<sup>th</sup>, 2011. The local organizing committee, consisting of Jeff Buckel (North Carolina State University), Tom Lankford (University of North Carolina – Wilmington [UNCW]), and Fred Scharf (UNCW), invite you to consider submitting an abstract to participate in this year's event.



*The decommissioned WWII battleship USS North Carolina on the Cape Fear River in Wilmington, NC.*

The meeting will begin on Sunday evening with a welcome social along the Cape Fear riverfront. The technical session will start on Monday morning with a special plenary talk delivered by Dr. Ed Houde from the University of Maryland, Chesapeake Biological Laboratory, and will continue through Thursday.

We have already established several theme sessions and are in the process of finalizing others. We're also planning for a separate poster session during one of the afternoons to enable full focus on the poster contributions during a designated block of time. Beyond the welcoming social on Sunday, we also have an evening planned on the fantail of the *USS North Carolina*, a decommissioned WWII battleship maintained in Wilmington. The banquet will be held at the historic Bellamy mansion, a

*...continued on p. 5*

## President's Message



I am delighted to take the helm of the Early Life History Section. I have been a member of this esteemed society for more years than I can remember (25?) and it is by far my favorite scientific society. We have an amazing group of dedicated members who work hard, are highly productive, but also have fun. The general enthusiasm of early life history scientists for their young subjects is remarkable and a continual source of inspiration for me.

I want to thank Jon Hare for his dedicated service as President over the past two years and for guiding me into my new duties. Thanks also to Jeff Buckel, who has agreed to take over the role of treasurer. Our finances will be in good hands with Jeff's supervision.

One objective for the coming year is to increase our membership and bring back to the society those members that have left us. I am working to get our files in order and determine who needs some encouragement to re-join. If you are receiving STAGES but have not paid your dues in a while, please take the time to send in a check

and help support your society. We also need to bring the ELHS to the attention of students that might not know about us. Our group has always provided a friendly, supportive environment for students. If you know new students that have an interest in early life history stages, please invite them to join the section and come to a meeting.

Our next meeting will be in Wilmington, North Carolina, from May 22 to May 26, hosted by Fred Scharf from the University of North Carolina, Wilmington. The abstract submission deadline is April 29. Mark it on your calendars and let's start encouraging students to participate. Wilmington is a beautiful city and the weather in May should be ideal. Expenses for this meeting should be modest, providing an excellent opportunity for students to come and showcase their research. Check out the web site at [www.larvalfishcon.org](http://www.larvalfishcon.org) as plans for Wilmington develop.

Future meetings include a confirmed location of Bergen, Norway for July 2-6, 2012, hosted by Howard Browman and Anne Skiftesvik. Beyond 2012 there are several exciting venues under

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## News from the Regions



### Western Region

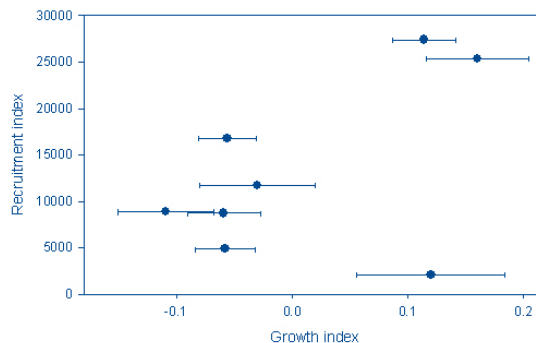
**Dan Margulies**

*From: NOAA Fisheries Service, Southwest Fisheries Science Center, Santa Cruz, California*

Sue Sogard recently completed an analysis of early growth in sablefish collected over an 8-year period at the same location off Newport, Oregon. Sablefish spawn in deep outer shelf/slope waters, but by the time the yolk sac is absorbed the larvae have migrated up to the neuston layer, where they remain for several months. At this stage they are about 8 mm in notochord length. We collected sablefish from 1993 to 2001, a period that included one of the strongest El Niños in recent years (1997-1998), which was followed by an extreme La Niña (1999). Otolith increments were examined to estimate early growth rates. Our previous lab studies had demonstrated a remarkable capacity for growth by juvenile sablefish, matching rates achieved by tropical species in much warmer temperatures. One of the objectives of the otolith study was to

determine if sablefish displayed such fast growth under natural conditions. Another objective was to determine if growth rates during the early neustonic stage influenced cohort success. Sablefish support a large and economically valuable fishery, and fortunately we have excellent stock assessment data for the west coast stock. We hypothesized that variability in large scale physical conditions in the California Current ecosystem drives bottom up processes influencing prey quality and quantity for early stages of sablefish, with consequent effects on survival and ultimately recruitment to the adult stock.

Growth rates estimated from increment widths suggested that natural growth is indeed rapid for the temperatures occupied by small sablefish, averaging 0.4 mm d<sup>-1</sup> to 1.0 mm d<sup>-1</sup> at fish sizes from 10 to 40 mm at temperatures from about 9 to 14°C. Growth increased markedly with both temperature and fish size. Comparison across the time series suggested a prominent role of oceanographic conditions. In a multiple stepwise regression testing several common indices of California Current, two factors accounted for much of the interannual variance

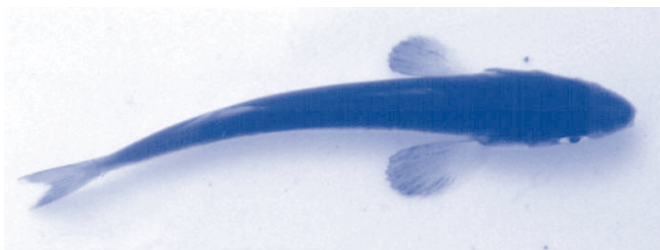


*Recruitment index (number of age-0 fish) from the sablefish stock assessment versus growth index ( $\pm$  S.E.) for early neustonic stage sablefish in years 1993-2001 off Newport, Oregon. Growth index was based on the mean residual of individual fish after regressing increment widths on radius at increment and sea surface temperature at increment.*

in growth. Growth was faster when the February Pacific Decadal Oscillation (PDO) was negative and when northerly Ekman transport in March was low. These two indices reflect the overall, upwelling-driven productivity of coastal waters in early spring. Young sablefish thus appear to respond to oceanographic regimes in the same manner as a broad suite of species from zooplankton to marine birds.

When estimated growth rates (after adjusting for fish size and the temperature at the time of increment deposition) were compared with subsequent recruitment, there was a close correspondence except for 1997. This year had rapid early growth but the lowest recruitment of the time series. The extreme El Niño conditions

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*Juvenile sablefish.*

## Section Officers

### President

Susan Sogard  
NMFS, SW Fisheries Science Center  
Fisheries Ecology Division  
[susan.sogard@noaa.gov](mailto:susan.sogard@noaa.gov)

### Secretary

Catriona Clemmesen  
Leibniz Institute of Marine Science  
Kiel, Germany  
[ccllemmesen@ifm-geomar.de](mailto:ccllemmesen@ifm-geomar.de)

### Treasurer

Jeffrey Buckel  
Center for Marine Sciences & Technology  
North Carolina State University  
[jeffrey\\_buckel@ncsu.edu](mailto:jeffrey_buckel@ncsu.edu)

### President-Elect

### Secretary-Elect

Catriona Clemmesen  
Leibniz Institute of Marine Science  
Kiel, Germany  
[ccllemmesen@ifm-geomar.de](mailto:ccllemmesen@ifm-geomar.de)

**HELP US  
UPDATE OUR  
RECORDS...**

*Verify your email and  
postal address with our  
Secretary.*





## Northeast Region

**Dave Richardson**

This past August the In Situ Ichthyoplankton Imaging System (ISIIS) was deployed multiple times on a Northeast Fisheries Science Center Ecosystem Monitoring (EcoMon) cruise. ISIIS is a plankton imaging system that was developed in the laboratory of Dr. Robert Cowen at the University of Miami's Rosenstiel School of Marine and Atmospheric Sciences (RSMAS) in partnership with Bellamare LLC in California (see image below). The August cruise in the Gulf of Maine and on Georges Bank was just one stop in a busy summer for Adam Greer (Ph.D. student) and Cedric Guigand (research associate), who are responsible for the day-to-day operation of ISIIS. The May to October period also saw them travelling with ISIIS to Santa Cruz, California for a 10 day cruise in Monterey Bay, and to La Jolla, California for a CalCOFI cruise in the southern California Bight.



ISIIS being retrieved onto Delaware II after deployment on Stellwagen Bank.

Stellwagen Basin in the western Gulf of Maine was the location of the first pair of replicate tows with ISIIS on the EcoMon cruise. Stellwagen Basin is a 25-km wide, 90-m deep area between the coast of Massachusetts to the west and the shallow (25 m) Stellwagen Bank to the east. This region, and Stellwagen Bank in particular, are known for supporting productive fisheries and for having large summertime feeding populations of humpback and finback whales. In the summer, a sharp thermocline is present at about 10-30 m depth in Stellwagen Basin. As the tide turns over Stellwagen Bank packets of internal waves form along the thermocline and subsequently propagate westward across Stellwagen Basin. Acoustic studies have previously shown the fine-scale vertical layering of plankton in Stellwagen Basin,

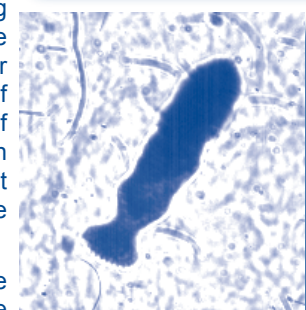
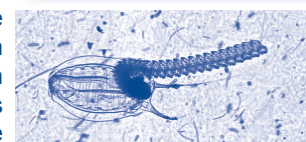
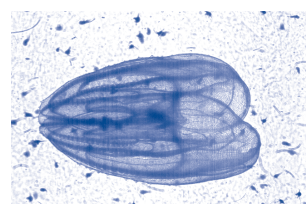
and the responses of these layers to the passage of internal waves. The internal waves in this region also have the potential to transport material, including larval fishes, shoreward. The deployment of ISIIS in Stellwagen Basin was designed to evaluate the distribution of larval fishes relative to the oceanographic features in the region and relative to the thin layers of plankton. The full results of these ISIIS deployments in Stellwagen Basin await processing of the images and the comparison of these images to the plankton samples collected with a bongo net. However a quick scan of the images as they were being collected revealed a number of interesting results. Particularly striking was the intensity and thinness of the vertical layers of plankton in the region, each of which contained a unique assemblage of zooplankton. The distribution of larval fishes within these layers will clearly have a strong bearing on how they interact with both their predators and prey.

The second set of replicate ISIIS tows on the EcoMon cruise went from the shallow waters of Georges Bank to the deep waters off the continental shelf, crossing the shelf-slope front in the process. These tows on Georges Bank likely sampled many of the same species (e.g., silver hake *Merluccius bilinearis*) that occurred in Stellwagen Basin. However, the oceanographic features differed between these sets of deployments, which should provide the opportunity for an interesting comparative study. Particularly notable was the difference in the vertical structure of the water column between the deployments in these two regions. An intense storm occurred between the deployments in Stellwagen Basin and on Georges Bank. This storm partially mixed the water column, and likely contributed to the more gradual thermocline observed during the Georges Bank sampling. Horizontal gradients in hydrography were also evident during the sampling. As ISIIS crossed the shelf-slope front into warmer and more saline water the abundance of plankton appeared to decline. The effect of these changes in hydrography and plankton abundance on the ichthyoplankton community is currently being evaluated. What is already evident from an initial look at the images is the extreme patchiness of larval fishes.

It is clear that the deployment of ISIIS in different regions has the potential to greatly enhance our understanding of how larval fishes interact with physical features of the environment, their prey and their predators. However, much of the motivation for deploying ISIIS on a NEFSC cruise was

to evaluate the potential for integrating this new technology into a monitoring program that has been ongoing for about 40 years. As with many monitoring programs, the expense and time required for sample processing is often a limiting factor in the number of samples that can be collected during a cruise. By combining ISIIS with traditional net sampling it may be possible to increase the spatial resolution of surveys, in the processes increasing the precision of the estimates of the abundance of larval fishes. It is easy to see how over the next decade ISIIS may become an integral tool in regional scale ichthyoplankton monitoring programs, while enhancing our understanding of the interaction of larval fishes with their environment at very fine scales.

If you are interested in more information on studies that are currently underway with ISIIS you can contact Robert Cowen ([rcowen@rsmas.miami.edu](mailto:rcowen@rsmas.miami.edu)) or Adam Greer ([agreer@rsmas.miami.edu](mailto:agreer@rsmas.miami.edu)). Information on ISIIS can also be obtained from Cedric Guigand ([cguigand@rsmas.miami.edu](mailto:cguigand@rsmas.miami.edu)), the Bellamare website ([www.bellamare-us.com](http://www.bellamare-us.com)) or in the publication below.



Images from ISIIS.

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*Northeast Region...cont'd from p. 3*

Cowen, R.K. and C.M. Guigand. 2008. In situ Ichthyoplankton Imaging System (ISIIS): System design and preliminary results. *Limnology and Oceanography Methods* 6: 126-132.

**ISIIS Description**

ISIIS towed platform is designed with the capacity of "self" undulation using motor actuated dive fins. The vehicle frame is divided into four compartmentalized enclosures with imaging and optical equipment seamlessly integrated into ISIIS' ventral housings and environmental sensors and electronics in the dorsal housings. The dive fins are positioned ahead of the vehicle aligned with the tow point and away from the imaging pods. The vehicle is designed to undulate between the surface and a maximum depth of 200 meters.

The ISIIS system utilizes a high-resolution line-scanning camera with a Light Emitting Diode (LED) light source, modified by plano-convex optics, to create a collimated light field to back-light a parcel of water. The imaged parcel of water passes between the forward portions of two streamlined pods (UW housings), and thereby remains unaffected by turbulence. The resulting very high-resolution image is of plankton in their natural position and orientation. When a sufficient volume of water is imaged this way, quantification of density and fine scale distribution is possible. ISIIS is capable of imaging a maximum of 162 L of water per second (when flying at 5 knots) with a pixel resolution of 70  $\mu\text{m}$ .

The imaging data and associated oceanographic data are ported to the surface via 0.322-in copper/fiber optic oceanographic wire and recorded onto a computer-controlled raid array. §

*President's message...cont'd from p. 1*

discussion, with a worldwide range of distribution. Time and Place committee chair Chris Chambers has done a remarkable job of coordinating with potential local hosts to provide us with a great diversity of interesting meeting sites. We have tentative sites and hosts identified through 2017, so the continued success of the Larval Fish Conference is rock-solid.

In closing, I look forward to working with all of you to strengthen our society in the coming years. Please let me know if you have ideas, comments, criticisms, or any suggestions. I would love to hear from you! §

– Susan Sogard, President

*Western Region...cont'd from p. 2*

were evident in the higher temperatures of 1997's summer and fall. However, in late winter and early spring, when larval and juvenile sablefish were resident in the neuston layer, conditions were favorable for growth. This result suggests that conditions after El Niño conditions strengthened had a severe impact on the cohort. The 1998 cohort was resident in the neuston while El Niño continued, and this cohort had both poor early growth and poor recruitment levels.

Interestingly, growth-dependent mortality within sub-cohorts for each year was not clearly evident, despite the apparent importance of rapid growth for survival across years.

Results of this study are currently in press:

Sogard, S.M. in press. Interannual variability in growth rates of early juvenile sablefish and the role of environmental factors. *Bulletin of Marine Science*.

Dr. Stephan Munch recently joined the Early Life History Team (Fisheries Ecology Division, Southwest Fisheries Science Center, Santa Cruz, California) as a Research Ecologist. Steve was an Associate Professor at Stony Brook University and worked there from 2005-2010. His research interests are broad, including the evolution of life histories, natural selection on growth rates, Darwinian Fishery Science, and development of Bayesian nonparametric methods in population analyses. Here in Santa Cruz he will be continuing many of these efforts along with developing a new research program focusing on the importance of life history diversity for population resilience, particularly in threatened salmonid populations.

One initial project will estimate heritability and selection on size, growth, and maturation timing in steelhead trout. Although there are estimates of the strength of natural selection for many species, there are estimates of heritability for far fewer, and the number of species for which we have both is relatively small. In steelhead trout and other salmonids, we have the opportunity to look at lifetime reproductive success, how it depends on choices made during early life history, and how variation in these traits is passed across generations.

We are delighted to have Steve join the team!

*From: Karen Martin,  
Department of Biology,  
Pepperdine University, Malibu,  
California.*

A symposium on "Environmentally Cued Hatching Across Taxa" was held at the Society of Integrative and Comparative Biology (SICB) meeting in January, co-organized by Karen Martin of Pepperdine University with Karen Warkentin of Boston University and Richard Strathmann of Friday Harbor Laboratories, University of Washington. Unlike most embryos that hatch on a predetermined timetable, California Grunion *Leuresthes tenuis* (Atherinopsidae) can prolong the embryonic period up to 300%. These marine teleosts spawn tidally around the highest tides of spring and summer, leaving the eggs to incubate buried in sand, above the water line. Embryos are competent to hatch at 10 days post fertilization (dpf), however they do not hatch until triggered by an environmental cue, agitation in sea water, at the rising of the next spring tides. Because of this adaptation, it is possible to experimentally generate hatchlings on different dates for individuals from the same fertilization date. Individual *L. tenuis* of the same chronological age may be either embryonic or larval, depending on which day hatching occurs. In two forthcoming papers, Martin, Cassadie Moravek, and Alice Walker of Pepperdine University triggered *L. tenuis* to hatch at intervals throughout the extended incubation period, from the time of hatching competence to the time of embryonic death approximately 3 weeks later. Hatchlings of *L. tenuis* that survived extended incubation had decreased yolk reserves and were longer than those hatched when first competent. Longer incubation time significantly decreased embryonic and larval survival. Most aspects of development, including organogenesis and fin development, did not progress during extended incubation, even when incubation time was extended to its upper limit, but there were a few exceptions. This example of heterokairy, different timetables for individual development within a species, may be a useful new model for developmental biology.

Moravek, C.L. and K.L. Martin. in press. Life goes on: Delayed hatching, extended incubation and heterokairy in development of embryonic California grunion *Leuresthes tenuis*. *Copeia*.

Martin, K.L.M., C.L. Moravek, and A.J. Walker. in press. Waiting for a sign: Extended incubation postpones larval stage in the beach spawning California Grunion *Leuresthes tenuis* (Ayres). *Environmental Biology of Fishes*. doi:10.1007/s10641-010-9760-4. §





restored antebellum home built just prior to the start of the Civil War. Primary lodging accommodations will be provided by the Best Western Coastline Inn, with riverfront views from every room. The technical session will take place directly adjacent to the hotel for added convenience and there is a multitude of restaurants, shops, and bars all within walking distance. Wilmington International Airport is serviced by Delta Airlines and USAirways and can be reached from most major US cities with one connection. The airport offers easy access to the historic downtown area via a 10-minute taxi ride.

We are working hard to keep registration costs down, particularly for students, and plan to have the total costs finalized and the registration and abstract submission web links up and running by early January. Registration and abstract submission are scheduled to open on Jan 15<sup>th</sup>. Please check the link for the 35<sup>th</sup> LFC at [www.larvalfishcon.org](http://www.larvalfishcon.org) for regular updates and new information.

#### Theme sessions

The 2011 LFC will have several theme sessions, designed to include a combination of invited and contributed papers on topics of broad interest to members of the section. Each of the sessions is open to contributions by any author whose paper is aligned with the respective themes. If you would like to have your paper considered for inclusion in a theme session, you will be able to indicate a specific theme session during the abstract submission process. Alternatively, there will be an option for general contributed papers.

Climate change and predator-prey interactions – Organized by Tom Hurst, NOAA Fisheries (Thomas.Hurst@noaa.gov)

Description: The impacts of climate change on aquatic ecosystems and fisheries will be expressed through alterations in food web dynamics. As such, food web interactions can be considered both the response of an ecosystem to environmental forcing as well as the mechanism by which the responses of individual species to environmental variation shape ecosystem responses. This session will include presentations that describe how environmental factors regulate the predator-prey interactions of fishes with an eye toward predicting the functioning of ecosystems under future climate conditions. Potential aspects of climate change for consideration may include (but are not limited to): thermal regime changes, disruption of seasonal phenology, alteration of flow fields,

increased stratification, and increasing ocean acidification. Potential aspects of the predator-prey systems for consideration may include (but are not limited to): fish behavior, prey quality and availability, distributional shifts, and recruitment responses. A variety of approaches will be considered including laboratory experiments, field observations, and modeling.

Cephalopod early life history – organized by Michelle Staudinger, University of North Carolina Wilmington (staudingerm@uncw.edu)

Description: The increased demands of global fisheries on cephalopods requires a firm understanding of their ecological role in marine ecosystems, relationships with other fishery resources, and knowledge of the underlying environmental factors affecting growth, distribution, and survival. This theme session is open to all areas of cephalopod early life history, however, topics encompassing the ecology of early life stages, spatial and temporal distributions of paralarvae in the environment, factors affecting recruitment variation, impacts of

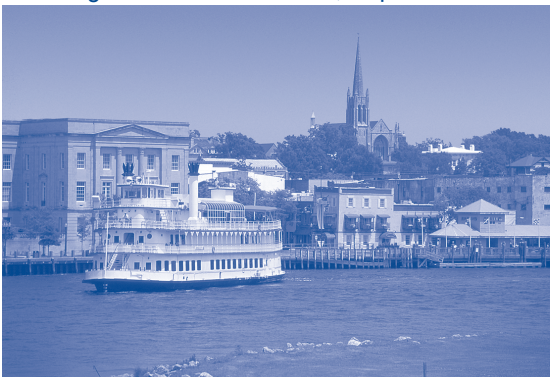
climate change and ocean acidification, use of new techniques for identifying paralarvae, and supporting age and growth studies are especially encouraged. Contributions from field, laboratory, and modeling approaches are welcome.

Understanding reproductive dynamics of marine fishes to inform fishery management – Still under development

Description: The reproductive dynamics of many marine fishes can be highly complex. Specific to informing the management process, comprehensive study of fish reproductive biology can enable: 1) maturity classification to separate fish stocks into sexually immature and mature components, 2) estimation of fecundity to refine stock-recruitment relationships and serve as indices of spawning stock biomass, and 3) identification of reproductive disruptions or failure to spawn regularly (e.g., skip spawning). This session will highlight recent developments in the contribution of fish reproductive biology to understanding stock productivity and toward meeting recent needs for timely assessments of stock status.

The evolution of essential fish habitat: has our view of nursery habitat changed? – Still under development

Description: It's been 15 years since passage of the Sustainable Fisheries Act that required essential fish habitats to be described and identified for protection, and 10 years since a seminal publication by Beck et al. that challenged the application of some widely used metrics to define nursery habitats. Recent exchanges in the primary literature have highlighted the fact that this issue remains contentious and that we may be no closer to achieving consensus on the definition of nursery habitat than we were in 1996. This session will aim to bring together researchers that have made important contributions in this arena during the past decade to determine how views of nursery habitat have changed.



Historic Riverwalk in downtown Wilmington, NC.

We are still finalizing plans for some of the theme sessions and will have updated information related to each session by the time registration and abstract submission opens (Jan 15<sup>th</sup>). In addition, if a member has a specific idea for a theme session that they would like to organize, please contact either Jeff (jeffrey\_buckel@ncsu.edu), Tom (lankfordt@uncw.edu), or Fred (scharff@uncw.edu) to discuss it further. We are looking forward to seeing everyone in May. §

## People

### Jeff Govoni Retires

Dr. John Jeffrey (Jeff) Govoni retired from the National Oceanic and Atmospheric Administration's Beaufort NC Laboratory in December 2010 after 30 years of federal service. He first served as a Research Fisheries Biologist and Ecologist with the National Marine Fisheries Service (NMFS) then as an Ecologist and Oceanographer in the National Ocean Service (NOS). From 1998 to 1999 he spent a year on detail to the Program Planning and Evaluation office of NOS's new National Centers for Coastal Ocean science (NCCOS) in Silver Spring, MD. More recently, Jeff has served as Deputy Director and Chief of the Research Coordination and Administrative support branch of the Beaufort Laboratory.

Jeff was born in Wareham, Massachusetts, and grew up on the "Cape." He returns periodically to his old haunts in the greater Cape area to see a Red Sox game. He obtained a B.A. degree at Saint Anselm College, M.S. at the University of Massachusetts under Dr. Richard Ibara, and Ph.D. at the College of William and Mary under the direction of Dr. John Merriner. After a short period as a research consultant with Dr. Frank Carey, Jeff joined the Beaufort Laboratory on an Intergovernmental Personnel Assignment (IPA) becoming a full-time NOAA employee in 1980.

At that time, Beaufort had a strong early life history research program. Jeff quickly became an essential scientist in that group and rose to become the team leader. In the early 1980's, the Beaufort Laboratory initiated a major coastal oceanic study in the Gulf of Mexico (GOMEX) which focused on the Mississippi River plume and shelf waters interactions. Jeff became a leading investigator because of his interest in fisheries oceanography and the spatial distribution of larvae as shaped by oceanic circulation and hydrodynamics. Jeff was also a lead researcher in an early 1990's study, the South Atlantic Bight Recruitment Experiment (SABRE), conducted along the Southeast coast of the US. More recent efforts have addressed the Charleston Bump and the role it plays in the distribution and transport of larval fishes in the US South Atlantic Bight. While his specific research topics have varied over time as funding and opportunities dictated, Jeff has contributed an

outstanding body of research work on the development of form and function in fishes as it relates to larval adaptation.

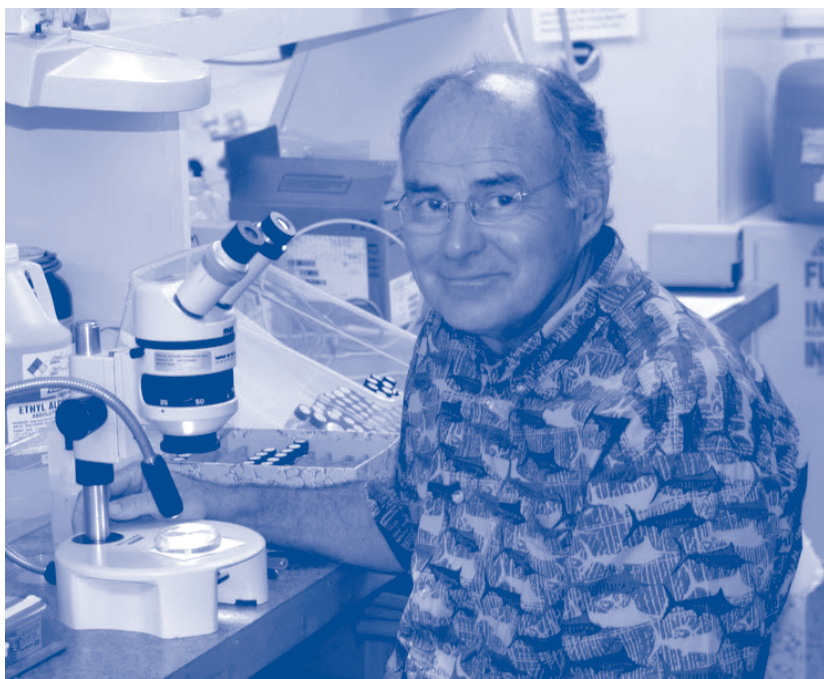
As testimony of his contribution to ELH science, to date, Jeff has been senior author of 27 scientific journal articles and junior author of 11. He authored or coauthored seven symposia articles and three book chapters. He has been senior editor of one book, and junior editor of another. He presently serves as a Scientific Editor on the editorial board of the journal *Scientia Marina*. Several manuscripts are in the works now. He is not retiring, just refocusing on a few more "irons in the fire."

Jeff works enthusiastically with students and younger scientists, spanning high school intern through post-doctoral levels. Several academic appointments have allowed him to chair and serve on graduate committees: Adjunct Associate Professor of Marine Science, The College of William and Mary, School of Marine Science; Adjunct Associate Professor of Biology, University of North Carolina at Wilmington; and Adjunct Associate Professor of Zoology, North Carolina State University.

Jeff has been very active in the AFS Early Life History Section since 1985, serving as President from 1998 to 2000. Since 2000 he has held the position of Historian for the Section. He is a member of the American Society of Ichthyologists and Herpetologists and a Fellow of the American Institute of Fishery Research Biologists. Although Jeff is retiring from government service, we expect to see him at ELH meetings, and he continues to serve as our historian.

On a personal note, Jeff and I (Don) were on many research cruises together. I have fond memories of our adventures at sea, especially our port calls in the Caribbean and along the Gulf of Mexico coast. All of his friends wish Jeff favorable tides and fair winds as he sails into retirement. §

— Don Hoss and John Merriner





## Joan Holt Retires

After 33 years of service to The University of Texas Marine Science Institute and to the City of Port Aransas, Texas, Professor G. Joan Holt has retired from full-time employment at the University. Thankfully, she has agreed to continue on half-time for one year to ease the transition.

Joan earned her bachelor's and master's degrees from The University of Texas at Arlington then moved to College Station for her doctorate in Fisheries Science from Texas A&M University. She joined the staff of the University of Texas Marine Science Institute in 1977 as a Research Scientist Associate, rising through the research ranks and then the academic ranks. In 2001, she took over as Director of the Institute's Fisheries and Mariculture Laboratory and holder of the Perry R. Bass Chair in Fisheries and Mariculture, titles she still holds. During her tenure, she accomplished several significant expansions of the mariculture infrastructure at that 10-acre facility. She also has been an extraordinary contributor to the University of Texas Department of Marine Science and has served as the Graduate Adviser for a record-breaking 11+ years!

Joan has managed a multi-faceted research portfolio, with strong footholds in larval fish ecology and physiology, mariculture, a couple of papers on rodents, and one on a lizard. In all, she has published more than 100 journal articles, 15 book chapters, 20 symposium contributions, and 5 technical reports. She has supervised 20 master's students, 6 Ph.D. students, and 7 postdoctoral fellows, and hosted many visiting scientists from all over the world at her lab.

She and her husband/collaborator Scott blur the line between work and pleasure. Both are avid birders, and together were a driving force in making Port Aransas a major eco-tourism destination, especially for birders. Whether by organizing the annual Christmas Bird count in the area or convincing city officials to create "green" spaces to attract birds (and birders!), they are known throughout the community for their efforts on behalf of fish and game. The City of Port Aransas established the "Joan and Scott Holt Paradise Pond," which boasts an enormous variety of birds during the annual migrations. Joan has also been recognized



through a great many awards from scientific and conservation organizations, including Researcher of the Year from the Texas Aquaculture Association (in 1993 and again in 2007), Harvey Weil Sportsman Trust Award (1999), and the Public Service Award of the Coastal Bend Bays Foundation (2006).

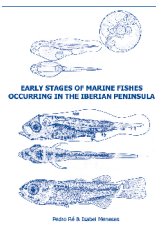
Joan has been a member of the Early Life History Section since very early on. I recall that her first Larval Fish Conference was in Baton Rouge – the 5<sup>th</sup> annual Larval Fish Conference – the first of our meetings to contain presentations on marine fish larvae. She has served as Southern Regional Representative (1982-1984), President-Elect (1984-1986), and President (1986-1988) of the ELHS. For us, she has hosted the 9<sup>th</sup> annual Larval Fish Conference (in Port Aransas, Texas) and co-hosted the 34<sup>th</sup> annual Larval Fish Conference (in Santa Fe, New Mexico). She has also organized sessions for the World Aquaculture Society, the American Fisheries Society, and the Estuarine Research Federation. To honor her many years of contributions to larval fish research and our organization, the ELHS adopted a resolution of congratulations which was printed in the previous issue of this newsletter.

With this long track record in and out of science, I doubt there are many reading this article who don't already know Joan very well. She is a warm, gregarious, and fun-loving person. I have enjoyed working at the same institution over the past 22+ years, and I can tell you that she is just as wonderful at home as she is on the road, professionally and personally. Soon Joan will be joining Scott in retirement, with the world at their doorstep and plenty of time for birding and all the other joys. Happy trails, Joan! §

— Lee A. Fuiman



## Publications



**Available to download:** *Early stages of marine fishes occurring in the Iberian Peninsula*

By Pedro Ré and Isabel Meneses

Published by IPIMAR/IMAR. ISBN-978-972-9372-34-6.

This guide is intended for the identification of the Early Life History (ELH) stages of fishes collected by plankton nets from the marine and estuarine waters of the Iberian Peninsula (Eastern North Atlantic Ocean). The coverage area extends from latitude 34° - 45° N, to longitude 6° - 14° W.

The basic characteristics of the eggs and larvae of 104 species belonging to 45 families are described. The emphasis has been placed on the most diagnostic or easily observed characters in order to facilitate comparisons between taxa.

The descriptive accounts of this guide follow the format of previous ELH guides. Nomenclature follows Eschmeyer (1998) except for more recent changes. Within families, genera are listed in alphabetical order.

Species descriptions are given only for species for which some ELH stages are known. Each species account includes the same basic information (written information on the left-hand page and figures on the facing right-hand page). Written information includes meristic data (fin-ray counts in adults and myomere counts), life-history information (range, habitat, spawning season, ELH pattern), main references and ELH descriptions (eggs and larvae). Measurements of larvae usually refer to standard lengths. Many published illustrations have been redrawn mainly to provide certain uniformity throughout the guide. Sources of illustrations are given for every plate.

The contents of the present guide represent the current knowledge on the development of ELH stages of fishes occurring in coastal waters of the Iberian Peninsula. The authors have been involved, for more than 25 years, in ichthyoplankton research.

More information about this book and a link to download full text as a PDF document are at: [astrosurf.com/re/ichthyo\\_bio.html](http://astrosurf.com/re/ichthyo_bio.html). §

## Other Recent Publications

*Ecology of Anguilliform Leptocephali: Remarkable Transparent Fish Larvae of the Ocean Surface Layer.* M.J. Miller. Published by Aqua-BioScience Monographs. TERRAPUB. 2009.

*Advances in Early Life History Study of Fish.* C. Clemmesen, A.M. Malzahn, M.A. Peck, and D. Schnack, eds. *Scientia Marina*, volume 73S1, Supplement 1. Consejo Superior de Investigaciones Científicas. 2009.

*Reproductive Biology and Early Life History of Fishes in the Ohio River Drainage*

– Volume III, Ictaluridae – Catfish and Madtoms. T.P. Simon and R. Wallus. Published by CRC Press. ISBN 0849319196. 2003; 232 p.

– Volume IV, Percidae – Perch, Pikeperch, and Darters. T.P. Simon and R. Wallus. Published by CRC Press. ISBN 978-0-8493-1920-4. 2006; 648 p.

– Volume V, Aphredoderidae through Cottidae, Moronidae, and Sciaenidae. Edited by R. Wallus and T.P. Simon. Published by CRC Press. ISBN 978-0-8493-1921-1. 2006; 360 p.

– Volume VI, Elasmomidae and Centrarchidae. Edited by R. Wallus and T.P. Simon. Published by CRC Press. ISBN 978-0-8493-1923-8. 2008; 472 p.

*Plankton. A Guide to Their Ecology and Monitoring for Water Quality.* I.M. Suthers & D. Rissik. Published by CSIRO Publishing, 272 pp. 2009. ISBN: 9780643090583.

*Manual of recommended practices for modelling physical*

– *biological interactions during fish early life.* E.W. North, A. Gallego, and P. Petitgas, Jr., eds. ICES Cooperative Research Report No. 295. 111 pp. 2009. ISBN: 978-87-7482-060-4.

*Early Life History of Marine Fishes.* B.S. Miller and A.W. Kendall, Jr. Published by University of California Press. ISBN: 978-0-520-24972-1. 2009.

*Fish Larval Physiology.* R.N. Finn and B.G. Kapoor. Published by Science Publishers. ISBN: 1578083885. 2008.

*Early Stages of Fishes in the Western North Atlantic Ocean: Davis Strait, Southern Greenland and Flemish Cap to Cape Hatteras.* Michael P. Fahay. Published by North Atlantic Fisheries Organization.

*Early Development of Four Cyprinids Native to the Yangtze River, China.* Edited by D.C. Chapman. *U.S. Geological Survey Data Series* 239. 2006. accessible online at [pubs.usgs.gov/ds/2006/239](http://pubs.usgs.gov/ds/2006/239)

*Recent Advances in the Study of Fish Eggs and Larvae.* Edited by M.P. Olivar and J.J. Govoni. Published in *Scientia Marina*, Volume 70S2 Supplement 2. ISSN: 0214-8358. 2006.

*Eggs and Larvae of North Sea Fishes.* P. Munk and J.G. Nielsen. Published by Biofolia Press. ISBN 0849319161. 2005.

*Early Stages of Atlantic Fishes: An Identification Guide for the Western Central North Atlantic.* Edited by W.J. Richards. Published by CRC Press. ISBN 0849319161. 2005.

*Developmental Biology of Teleost Fishes.* Y.W. Kunz. Published by Springer Press. ISBN 1-4020-2996-9. 2004.

*Early Life History of Fishes in the San Francisco Estuary and Watershed.* Edited by F. Feyrer, L.R. Brown, R.L. Brown, and J.J. Orsi. Published by the American Fisheries Society. ISBN 1-888569-59-X. 2004.

*Freshwater Fishes of the Northeastern United States - A Field Guide.* R.G. Werner. Published by Syracuse University Press. ISBN 0815630204. 2004.

*The Development of Form and Function in Fishes and the Question of Larval Adaptation.* Edited by J.J. Govoni. Published by the American Fisheries Society. ISBN 1-888569-58-1. 2004.

*The Larvae of Indo-Pacific Coastal Fishes: An Identification Guide to Marine Fish Larvae.* (2<sup>nd</sup> edition). J.M. Leis and B.M. Carson-Ewart. Published by Brill Academic Publishers. ISBN 90-04-13650-9. 2004.

*The Big Fish Bang. Proceedings of the 26<sup>th</sup> Annual Larval Fish Conference.* Edited by H.I. Browman and A.B. Skiftesvik. Published by the Institute of Marine Research, Bergen, Norway. ISBN 82-7461-059-8. 2004.



## Course Offering: Early Life History of Marine Fishes

Date: 1-19 August 2011

3 credits (600 level)

Application deadline 15 May 2011

Approximate cost (tuition and room) \$3,000

Instructors: Professor Edward D. Houde (University of Maryland Center for Environmental Science), Dr. Dave Johnson (NMNH, Smithsonian Institution), Dr. Nalani Schnell, and Dr. Troy Tuckey (College of William and Mary).

A lecture and laboratory course offering a comprehensive view of the biology and taxonomy of early life stages of fishes. These stages, including pelagic eggs, larvae, and newly-transformed juveniles, are abundant and diverse components of aquatic ecosystems. Their small size, dynamic growth and mortality rates, and dependence on ambient environmental factors, including ocean physics, make these stages vulnerable to variability in climate and to stresses of anthropogenic origin. Level of reproductive success in teleosts, termed recruitment, is highly variable and largely dependent on variability in survival of these early life stages. Knowledge of their morphological development contributes to studies of phylogenetic relationships. Ontogenetic data serve to clarify the complex systematics of teleost fishes, the most diverse and largest class of vertebrates. Early life stages often have specialized adaptations to insure survival in stressful habitats. In the laboratory, larvae of 190 families of teleostean fishes are examined and characters useful in identification are presented. Laboratory exercises on otolith preparation, otolith-aging, and on feeding by fish larvae will be included.

This is a graduate-level course for students with an interest in fish ecology, fisheries science, morphology and biological oceanography. It is presumed that students will have some experience and background in those disciplines. Prerequisites include an undergraduate degree in a biological discipline; permission of the instructors is required to be admitted to the course. No more than 12 students will be accepted. The lectures and laboratories will be held at the Virginia Institute of Marine Science, College of William & Mary. For further information, contact Dr. Schnell (nschnell@vims.edu) or Dr. Houde (ehoude@cbl.umces.edu) or see our website: [web.vims.edu/adv/657](http://web.vims.edu/adv/657)

### Lecture and Laboratory Schedule

Monday, 1 August

Students Arrive before 6:00 PM. Opening reception and dinner.

Tuesday, 2 August

Morning Session – 8:30-10:00; 10:30-noon

Lectures: Overview of teleostean phylogeny (Schnell/Johnson);  
What is a fish larva? (Houde)

Afternoon Session – 1:00 –5:00 PM

Lecture: Identification of Larval Fishes (Schnell/Johnson)

Lab 1: Phylogeny and development of Elopomorpha:  
Elopiformes, Notacanthiformes, Albuliformes, Anguilliformes  
and Saccopharyngiformes (Schnell/Johnson)

Wednesday, 3 August

Morning Session – 8:30-10:00; 10:30-noon

Lectures: Development and Ontogenetic State; Embryology,  
Hatching, Ontogeny and Metamorphosis (Houde)

Afternoon Session – 1:00 –5:00 PM

## Invitation to Contribute to Special Session at 2011 LFC

\*Climate change and predator-prey interactions\* The impacts of climate change on aquatic ecosystems and fisheries will be expressed through alterations in food web dynamics. As such, predator-prey interactions can be considered both the response of an ecosystem to environmental forcing as well as the mechanism by which the responses of individual species to environmental variation shape ecosystem dynamics. This session will include presentations that describe how environmental factors regulate the predator-prey interactions of fishes with an eye toward predicting the functioning of ecosystems under future climate conditions. Potential aspects of the predator-prey systems for consideration are (but are not limited to): fish behavior; prey quality and availability; distributional shifts; and recruitment responses. Potential aspects of climate change that may impact predator-prey interactions are (but are not limited to): thermal regime changes; disruption of seasonal phenology; alteration of flow fields; increased stratification; and increasing ocean acidification. We welcome studies adopting a variety of approaches including laboratory experiments, field observations, and modeling.

Thomas P. Hurst - [thomas.hurst@noaa.gov](mailto:thomas.hurst@noaa.gov)

Fisheries Behavioral Ecology Program

Alaska Fisheries Science Center

NOAA - NMFS

Hatfield Marine Science Center

Newport, OR 97365 - tel. 541-867-0222 office

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Lab 2: Phylogeny and development of Clupeiformes, Ostariophysi, Salmoniformes, and Osmeriformes (Schnell/Johnson)

Thursday, 4 August

Morning Session – 8:30-10:00; 10:30-noon

Lecture: Foods and Feeding (Houde)

Afternoon Session – 1:00 –5:00 PM

Lab 3: Foods and Feeding (Tuckey, Houde)

Friday, 5 August

Morning Session – 8:30-10:00; 10:30-noon

Lectures: Larval Assemblages (Houde)

Physical Processes and Environmental Factors (Houde)

Afternoon Session – 1:00 – 5:00 PM

Lab 4: Phylogeny and development of Stomiiformes and Aulopiformes (Schnell/Johnson)

Saturday, 6 August

Morning Session – 9:00am - noon

Lab 5: Phylogeny and development of Myctophiformes, Lampridiformes, Polymixiiformes (Schnell/Johnson)

Sunday, 7 August

No lectures or labs, reading, study period

Monday, 8 August

Morning Session - 8:30-10:00; 10:30-noon

Lectures: Physical Processes and Environmental Factors (cont.)  
(Houde) ; Age and Growth (Houde)

Afternoon Session – 1:00 – 5:00 PM

Lab 6: Use of otoliths in early-life studies and ecological research  
(Tuckey, Houde)

Tuesday, 9 August

Morning Session – 9:00-noon

...continued on p. 10

*Course offering...cont'd from p. 9*

Lab 7: Phylogeny and development of Paracanthopterygii: Ophidiiformes, Gadiformes, Batrachoidiformes and Lophiiformes (Schnell/Johnson)

Afternoon Session – 1:00 – 5:00 PM

Lab 8: Phylogeny and development of Acanthomorpha (in part): Stephanoberyciformes, Zeiformes, Cetomimiformes, Beryciformes and Scorpaeniformes (Schnell/Johnson)

Evening – 8:00 – 10:00 PM

Larval sampling from the pier (Tuckey, Houde, Schnell, Johnson)

Wednesday, 10 August

Morning Session – 8:30-10:00; 10:30-noon

Lecture: Larval Nutrition, Condition, and Bioenergetics (Houde)

Afternoon Session – 1:00 – 5:00 PM

Lab 9: Phylogeny and development of Smegmamorpha (Schnell/Johnson)

Thursday, 11 August

Morning Session – 8:30-10:00; 10:30-noon

Lecture: Nutrition, Condition, and Bioenergetics (cont.) (Houde); Mortality and Cohort Dynamics (Houde)

Afternoon Session – 1:00 – 5:00 PM

Lab 10: Larval sorting and identification. Phylogeny and development of Perciformes (in part) (Schnell/Johnson)

Evening Session – 6:30 – 9:30 PM

Optional material review (Schnell/Johnson)

Friday, 12 August

Morning Session – 8:30 – 10:00; 10:30 - noon

Lectures: Mortality and Cohort Dynamics (cont.) (Houde); Recruitment Theory and Processes (Houde)

Afternoon Session – 1:00 – 5:00 PM

Lab 11: Phylogeny and development of Perciformes (in part) (Schnell/Johnson)

Evening Session – 6:30-7:30 PM

Guest Lecture: a larval specialist will be invited.

Saturday, 13 August

Morning Session – 8:30 – 10:00; 10:30 - Noon

Lab 12: Phylogeny and development of Perciformes (in part) (Schnell/Johnson)

Sunday, 14 August

No lectures or labs, study period

Monday, 15 August

Morning session - 9:00-noon

Lectures: Ichthyoplankton Surveys; Experimental Culture, Larval Stocking Fisheries Management Applications (Houde)

Afternoon session – 1:30-3:30

Lab 13: Phylogeny and development of Perciformes (in part) (Schnell/Johnson)

Tuesday, 16 August

Morning session - 9:00 – noon

Lab 14: Phylogeny and development of Pleuronectiformes and Tetraodontiformes (Schnell/Johnson)

Afternoon Session – 1:00 – 5:00

Optional material review (Schnell/Johnson)

Wednesday, 17 August

Morning session – 8:30 – noon

Written Exam (Houde)

Afternoon session – 1:00-3:00 PM

Optional material review (Schnell/Johnson)

Thursday, 18 August

Morning session – 10:00-12:00 AM

Laboratory practical exam (Schnell/Johnson)

Closing Session Party

## 8<sup>th</sup> Flatfish Ecology Symposium

The 8<sup>th</sup> International Symposium on Flatfish Ecology will be held in the Netherlands (IJmuiden) from 5-11 November 2011. [www.flatfish2011.nl](http://www.flatfish2011.nl)

Flatfishes are an important component of the demersal fish community in shelf ecosystems around the world, whereas their recruitment dynamics is closely related to processes taking place in the pelagic (eggs and larvae) and benthic realm (life history stages following metamorphosis). Flatfish populations are heavily affected by a variety of human activities. Several species are highly appreciated as food and have been exploited for many centuries. Their close relationship with the sea bed exposes them to pollutants, whereas some species may also be affected by habitat loss due to infrastructural works such as land reclamation or the development of harbours and coastal defense structures. Their peculiar life history characteristics have intrigued researchers for decades. Their easy accessibility in coastal waters make them particularly suitable for ecological research. The triennial Symposia offer a platform to all scientist that share an interest in flatfish biology and ecology, or in the variety of applied research questions in which flatfish play a role.

Overall topic: Connectivity

The 8<sup>th</sup> Symposium will focus on the mechanistic understanding of the population ecology of flatfish species and their role in ecosystem. The overarching theme of the symposium is "Connectivity." Both oral and posters contributions are solicited on the following themes.

Comparative dynamics and latitudinal variation

Review the population biology of flatfish species, or preferably compare the population biology of species with contrasting life histories. The following working hypothesis generated by the previous symposia may provide a suitable framework:

- Recruitment variation is determined in the pelagic phase
- Recruitment variation increases at the edges of the geographic distribution
- Density-dependent processes occur in the post-settlement phase
- Nursery size determines the abundance of flatfish populations
- Location of spawning grounds is determined by the location of nursery grounds

Stock structure

Within the geographic range of a species, one or more subpopulations occur. This topic focuses on stock structure, the factors controlling the structure and the implications of stock structure for the population dynamics and resilience. Contributions are solicited on the stock structure based on mark-recapture experiments or genetic techniques, the population dynamics of subpopulations, the phenotypic or genetic differences in life history characteristics across subpopulations, and changes in stock structure in response to fisheries or other human activities.

Adaptability

The resilience of flatfishes to changes in their environment is governed by phenotypic plasticity and genetic adaptations. Adaptations may occur in different life stages and aspects such as behaviour, eco-physiology, reproduction, growth, body morphology, etc. Contributions are solicited on experimental, field, and modelling studies of the adaptability of flatfish at the level of the organism.

Flatfishes in the ecosystem

Flatfishes play an important role in the benthic ecosystem. In this topic we address the relative importance of top-down (predation) and bottom-up (competition for food) processes. In coastal ecosystems, river inputs may impact flatfish habitats and influence



their productivity. Contributions are encouraged to address processes and mechanisms.

#### Spatial dynamics

Flatfish biology is generally characterized by ontogenetic changes in distribution that are related to stage-specific habitat requirements. For a population to survive, the successive habitats need to be connected. This topic deals with the connectivity between successive habitats, with particular focus on the mechanisms and processes that govern the transport of pelagic eggs and larvae between spawning and nursery areas, the dispersion of the juvenile stage and the migration between the feeding and spawning habitats. Both empirical and modeling papers are welcome.

#### Management

Flatfishes are affected by a multitude of anthropogenic factors such as fisheries, pollution, eutrophication, habitat modification, or climate change. On the other hand, flatfish fisheries may have negative impacts on the marine ecosystem. To take account of the ecosystem impacts of fisheries, fisheries management has adopted the ecosystem approach. Due to the increase in human activities in the oceans and the political wish to conserve biodiversity, fisheries management is faced with the challenge to trade-off sustainable fisheries exploitation with the competing claims originating from nature conservation policies and other human activities such as aquaculture, wind farms, sand and gravel extraction, beach nourishment, coastal protection, mining, shipping, etc. In this topic, contributions are solicited that address management issues which are related to the theme of the symposium (connectivity, stock structure and spatial dynamics).

#### Important dates

- Submission of abstracts: 1 May 2011
- Steering Committee decision: 1 June 2011
- Early registration of participants: 1 September 2011
- Late registration: until meeting
- Submission of presentations of keynotes: 1 week before meeting
- Submission of papers: 11 November 2011

#### Proceedings

Both oral and poster presentations can be submitted for publication in a special issue of the *Journal of Sea Research*. In order to warrant the timely publication, the deadline for submission of manuscripts is set at the symposium (6 November 2011). Papers can be submitted from 1 March 2011 onwards through the EES system of the journal [ees.elsevier.com/seares](http://ees.elsevier.com/seares).

Submissions will be dealt with according to the general procedures of the journal. Editors of the special issue are A.D. Rijnsdorp, R.D. M. Nash and H.W. van der Veer. Authors are requested to constrain themselves to a maximum of 8000 words and to provide names of at least three potential reviewers. Authors may contact the special editors if they feel that the size limit unnecessarily constrain their contribution.

#### Local organizer

Institute for Marine Resources and Ecosystem Studies (IMARES), Wageningen University and Research Centre, IJmuiden, The Netherlands.

#### Contact

Marja Bruisschaart, IMARES, P.O. Box 68, 1970 AB IJmuiden, The Netherlands; e-mail [Marja.bruisschaart@wur.nl](mailto:Marja.bruisschaart@wur.nl); phone: +31 317 487048

— Scientific Steering Committee §

## Announcements

### Postdoctoral Position Available

#### University of Texas Marine Science Institute

This position provides an opportunity to conduct independent research dealing with marine fish behavior, physiology and/or ecology using laboratory and/or field-based methods. The successful candidate will also coordinate activities of existing research projects under the supervision of Professor Lee A. Fuiman. The position requires a Ph.D. degree or equivalent at the start of the appointment, and a strong record of research accomplishments (as demonstrated by publications and/or grants). Preference will be given to candidates competent in experimental methods and quantitative analysis (including statistical design and analysis) of animal behavior, physiology, and/or ecology in both the field and laboratory.

Review of applications will begin on February 15, 2011. Additional information, go to: [www.utmsi.utexas.edu/hr](http://www.utmsi.utexas.edu/hr). §

### Have you paid your 2011 dues?

Please help your society maintain its fiscal health by renewing your membership! Your membership expiration date is printed on the mailing label of every issue of *STAGES*.

If you have already paid your 2011 dues, thank you for your support. If not, you have several options for renewal. If you are an active member of AFS wishing to add (or renew) ELHS membership beginning with the next calendar year, simply check the box for the Early Life History Section on your annual fall AFS dues/subscription statement for the upcoming year and add the \$15 annual ELHS dues to your annual AFS dues and other payments. You can also renew online at the AFS website: [www.fisheries.org/afs/membership.html](http://www.fisheries.org/afs/membership.html). Be sure to add the section dues to your membership fees.

You can also join the section as an affiliate member. You can join online at the website: <https://www.larvalfishcon.org/ELHSAffiliate/affiliate-triage.asp>. Or you can send \$15 along with your name, institutional affiliation (if appropriate), mailing address, telephone and fax numbers, and e-mail address to the ELHS Treasurer:

Jeff Buckel  
Treasurer ELHS - AFS  
NCSU-CMAST  
303 College Circle  
Morehead City, NC 28557  
USA

Affiliate members of the Section are encouraged to participate in Section meetings, committee work, and other activities, but they cannot vote on official Section matters, run for or hold an elected office, or chair standing committees. All members receive *STAGES*, the official ELHS Newsletter.

Please take a moment today to join or renew your membership. Also check your mailing label and send any address corrections to Secretary Catriona Clemmesen ([cclemmesen@ifm-geomar.de](mailto:cclemmesen@ifm-geomar.de)) or President Sue Sogard ([susan.sogard@noaa.gov](mailto:susan.sogard@noaa.gov)). §

## Newsletter Production Team

**Stages** is published in February, June, and October each year. It is assembled by the Newsletter Editor with contributions from several Regional Representatives and other individuals. Please send any articles, announcements, or information of interest to Early Life History Section members or affiliates to your local Regional Representative or to the Editor.

### Newsletter Editor

Lee A. Fuiman  
Marine Science Institute  
University of Texas at Austin  
[lee.fuiman@mail.utexas.edu](mailto:lee.fuiman@mail.utexas.edu)

### Northeast Region

David Richardson  
NMFS, Northeast Fisheries Science Center  
Narragansett, Rhode Island  
[David.Richardson@noaa.gov](mailto:David.Richardson@noaa.gov)

### Southeast Region

Claire Paris  
Rosenstiel School for Marine and  
Atmospheric Science  
University of Miami  
[cparis@rsmas.miami.edu](mailto:cparis@rsmas.miami.edu)

### North Central Region

James E. Garvey  
Fisheries & Illinois Aquaculture Cntr.  
Southern Illinois University  
[jgarvey@siu.edu](mailto:jgarvey@siu.edu)

### Western Region

Daniel Margulies  
Inter-American Tropical Tuna  
Commission  
[dmargulies@iattc.ucsd.edu](mailto:dmargulies@iattc.ucsd.edu)

### Pacific Rim Region

Iain Suthers  
School of Biological, Earth, &  
Environmental Sciences  
University of New South Wales  
[i.suthers@unsw.edu.au](mailto:i.suthers@unsw.edu.au)

### European Region

Audrey Geffen  
Department of Biology  
University of Bergen  
[Audrey.Geffen@bio.uib.no](mailto:Audrey.Geffen@bio.uib.no)

## Join ELHS

Membership in ELHS is open to all persons or organizations interested in furthering ELHS objectives, regardless of membership in the American Fisheries Society (AFS). If you are an AFS member, simply add ELHS membership when you pay your Society dues.

Affiliate membership is open to persons or organizations who are not members of AFS. Affiliate members are encouraged to participate in Section meetings, committee work, and other activities, but they cannot vote on official Section matters, run for or hold an elected office, or chair standing committees. All members receive **STAGES**.

To become an affiliate member, go to <https://www.larvalfishcon.org/ELHSAffiliate/affiliate-triage.asp> or mail your name, institutional affiliation (if appropriate), mailing address, telephone and fax numbers, e-mail address, and dues (US \$15 per year) for the current and/or upcoming year(s) to the ELHS Treasurer (see page 2).

Please specify the membership year(s) for which you are paying dues. Make checks or money orders payable to "AFS-ELHS."

**Remember to check the mailing label for your membership expiration date and renew, if necessary.**

### AFS-ELHS

University of Texas at Austin  
Marine Science Institute  
750 Channel View Drive  
Port Aransas, Texas 78373-5015

