BRIEFS – The Official AIFRB Newsletter Volume 48, Number 2

Dear Members,

As we move quickly into the second quarter, I'd like to provide the status of the goals set early in my term as president and solicit your continued support and flow of ideas to help achieve AIFRB's objectives.

1. ***District revival***. Our active districts continue to engage local members. District directors Greg DeCelles (New England) and Doug Zemeckis (Keystone) are off to productive starts, holding meetings and social events. Look for the announcement of the upcoming Keystone event in this newsletter. Additionally, I'm excited to introduce the Mississippi district through members Sara Pace and Eric Powell of the Science Center for Marine Fisheries—don't miss the feature for SCeMFiS in this quarter's issue! If you want to organize meetings or events on behalf of your district, please let us know how we can help.

2. ***Member services, involvement and participation***. The Board of Directors and its distinguished award committee chairs work year-round to ensure that AIFRB is well-positioned to recognize the value that its members bring to the organization. In our continued efforts to seek and showcase the best fishery scientists, I encourage you to visit our website, connect with AIFRB member and non-member fishery biologists, and even our board members to ensure that you're aware of upcoming awards, events, meetings and issues. Additionally, we have recently enjoyed very positive feedback about our newest board members' creative outreach. A big thank you to Beth Bowers (Newsletter Editor) and Connor Capizzano (Young Professionals Representative), who are developing fresh designs and dynamic media featuring our members' talents. Thanks to those who provide us with your thoughts and ideas. Your involvement as a member is critical to the continued progress of AIFRB.

3. ***Membership and recruitment***. The Board thanks all of our dedicated members who have made their payments for the 2019 fiscal year. If you would like to renew your membership, you may do so through the AIFRB website, or by contacting our Membership Chair, Todd Chapman. Your membership dues are important to our primary mission, which is to recognize the achievements of our members through merit awards, most of which provide financial support for your research. Amongst other operating activities, collection of your dues guarantees a budget for the support of local meetings, annual social held in conjunction with the American Fisheries Society (AFS) and district events.

4. ***Social media marketing and branding***. AIFRB's social media presence and marketing is a work in progress. Please remember to add hashtags to your research posts (suggestions include: #aifrb and #aifrbresearch) and give us some feedback on what we can do to better promote AIFRB. Are you interested in helping develop ideas for marketing (e.g., messaging, artwork)? I'd love your thoughts—please contact me at any time.

5. ***Young Professionals.*** AIFRB recognizes young professionals as the future of not only the Institute, but of fishery science. Your Young Professionals (YP) Representative, Connor Capizzano, has released his new webpages that showcase previous and current YPs within AIFRB. Don't forget to contact Connor if you have nominations for YPs and ideas for broadening this important group of fishery biologists.

6. ***New website.*** If you haven't already done so, check out www.aifrb.org today. We are now presenting a job board page for any member who is seeking, or wishes to post an open position (e.g., volunteer, part- and full-time vacancies, graduate or post-graduate opportunities). You can also pay your membership dues, learn about upcoming AIFRB awards, meet your board members and learn who AIFRB's founding fellows were.

Look out for important announcements via email. In particular, our W.F. Thompson Award Chair, Frank Panek, is currently accepting nominations for ***two*** student papers—one published in 2017 and one in 2018. Please visit our website for submittal directions.

Finally, the Board is seeking to fill a forthcoming vacancy in the AFS-AIFRB Liaison. Sean Lucey will be stepping down from his long-time position as the liaison after this year's meeting in Reno. If you are interested in contributing to AIFRB as a board member and working closely with AFS leadership, please contact Sean or me for more details.

Thank you for your contributions to fishery science and your commitment to AIFRB. I am always available for your feedback and look forward to interacting with you throughout the year.
Sincerely,

Kim Anthony
President
kim.anthony@aifrb.org

If you haven't already done so…

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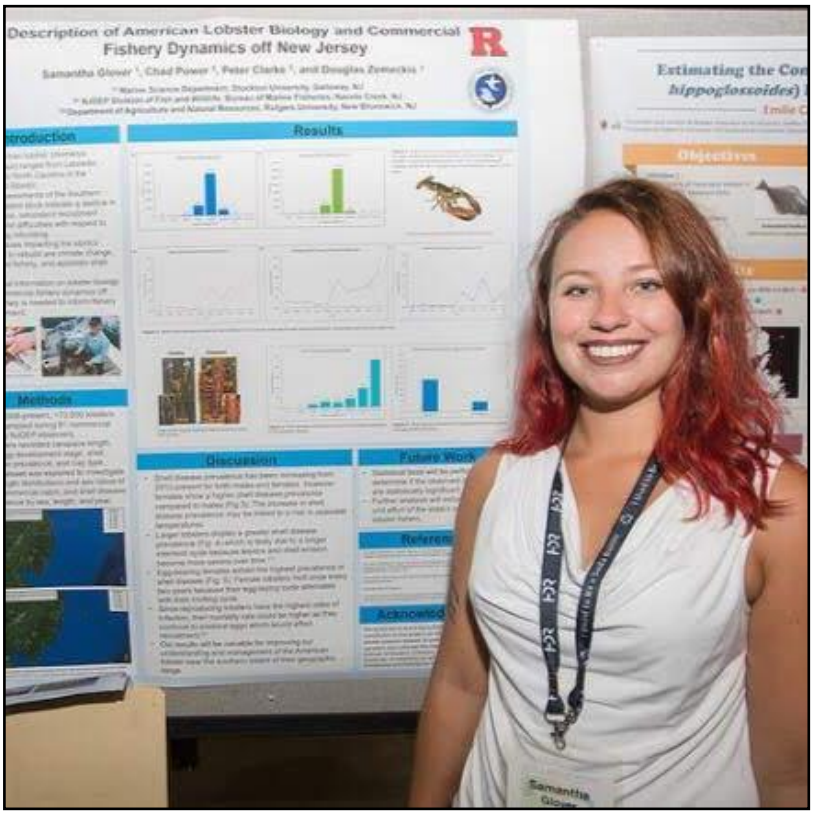
New Member Spotlight

Samantha Glover – Keystone District

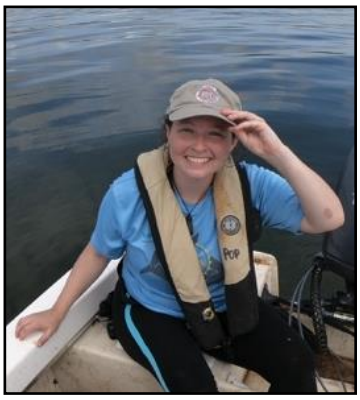
Samantha Glover is a recent AIFRB associate member. She graduated from Stockton University in 2018 with a B.S. in Marine Science (concentration in Marine Biology). During her undergraduate career, she interned for the American Littoral Society fish tagging program and participated in a volunteer shark tagging trip to Belize with the Earthwatch Institute. In addition, during her senior year she was awarded the Stacy Moore Hagan Estuarine Science Scholarship organized by Rutgers University and Stockton University. This scholarship provided the opportunity to work on an undergraduate research project and present a poster at the 2018 American Fisheries Society meeting in Atlantic City. Her poster was titled “Description of American Lobster Biology and Commercial Fishery Dynamics off New Jersey.” The project used a New Jersey commercial lobster fishery observer dataset to investigate the length distributions and sex ratios of the commercial catch, and shell disease prevalence by sex, length, and year.

Samantha has been working as a fisheries technician for the New Jersey Division of Fish and Wildlife Bureau of Marine Fisheries since fall 2017. Her primary responsibility is to conduct the Access Point Angler Intercept Survey to collect catch, participation, and effort data in marine recreational fishing. In October 2018, she was chosen as a volunteer to participate in the NOAA Henry Bigelow fall bottom trawl survey around Georges Bank and the Gulf of Maine. She was able to assist NOAA scientists with counting, measuring, and weighing fish, as well as inputting data and preserving samples. In February, she also started working as an Aquarist-Environmental Educator at the Wetlands Institute in Stone Harbor, New Jersey. Samantha was recently accepted into the Biology Master’s program at Old Dominion University to start in fall 2019. She will be studying Caribbean spiny lobster fishery dynamics in addition to developing an aging technique for this species.

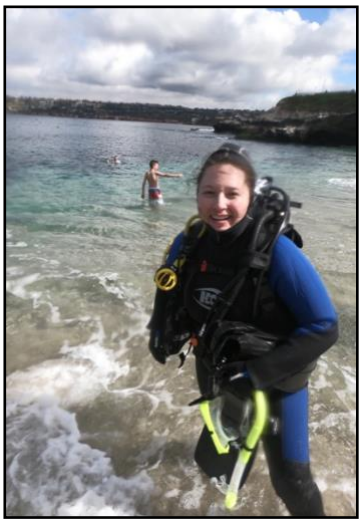


Current Member Spotlight

Emily Markowitz – NOAA Affiliate, Keystone District



Emily Markowitz is focused on marine fisheries and projects that involve modeling, visualization, and mapping. Emily received her Master's in Marine Science from Stony Brook University's School of Marine and Atmospheric Sciences. Her research focused on quantitative fisheries ecology and distributional shifts in Northeast U.S. groundfish with Dr. Janet Nye, working with the NOAA Northeast Fishery Science Center's bottom trawl survey data to forecast regional oceanographic model system (ROMS) data. This, in turn, was used to determine the environmental preferences and suitable habitat of migratory demersal fish at different life stages. She used these models to determine the potential change in availability of these demersal species to help inform fisheries management decisions as the climate continues to change along the Northeast US coastline.



More recently, Emily completed the 2018 John A. Knauss Sea Grant Marine Policy Fellowship. Emily's position assisted the NOAA Fisheries Office of Science and Technology in the Protected Species Science Branch by facilitating science and policy on a national level. Throughout the 2018 Knauss fellowship, she interacted with scientists and policy makers who are working to address global issues concerning the governance of our coasts and oceans. This position exposed Emily to the world of protected species and highlighted the connections between that world and her graduate work through national and international working groups, workshops, and projects. One of her favorite projects involved developing an R Shiny App with the NOAA Fisheries Office of Protected Resources to assess the impact of underwater sound on marine mammal hearing. The app is expected to be launched this summer. These responsibilities

have given her the opportunity to work with people not only in and across NOAA, but also with external collaborators in other federal agencies, in academia, and internationally. Post fellowship, Emily has taken on a position with NOAA Fisheries Office of Science and Technology's socioeconomics group, where she is redeveloping and managing the production of the Fisheries Economics of the US report.

She is excited to be part of this great group!

Young Professional Spotlight

Lynn Waterhouse – Central States Region

What is your current position, with what company/organization, and what is the focus of your research/work?
I work as a Research Biologist in the Daniel P. Haerther Center for Conservation and Research at the John G. Shedd Aquarium in Chicago, IL. The focus of my research is on mesopredators (grouper and snappers) in The Bahamas.

Where did you receive your education, and what helped pave your way to your current position?
I defended my PhD in December 2018 at Scripps Institution of Oceanography with Dr. Brice X. Semmens as my major advisor. Part of my thesis focused on Nassau grouper work in the Cayman Islands with REEF (Reef Environmental Education Foundation) and the Cayman Islands Department of Environment. Brice really emphasizes the importance of communication to the members of his lab. Collectively the lab spends a lot of time helping each other to improve any talks we give – I think this really helped me during my interview. I also have a Master's degree in Statistics from Pennsylvania State University, which I think helps me emphasize my quantitative skills.

How does your work apply to, or influence, fishery management (e.g., stock assessments, sportfishing, commercial regulations, habitat protection, etc.)?
For my current work I will be working towards updating the stock assessment of Nassau Grouper in The Bahamas. Additionally, I plan to work with fishermen and key stakeholder in The Bahamas to collect more data on other commercially important groupers and snappers in order to hopefully complete a stock assessment for them.

What is your professional outlook for fisheries management? In other words, what will the future of fisheries management look like 10-20 years from now. What are we doing correctly, what needs to be improved (e.g., in research, policy, education)?
I hope the demography of fisheries management continues to diversify. As a student, I heard stories of how in just the generation prior to me, some women were the only female in their class. I think we have made some strides with increasing representation from under-represented minorities but there is still a long way to go. It's a bit of a hard sell for me to make sometimes, because it is a difficult career, with limited jobs, and many other careers make a lot more money, but I think we need to continue to work towards increasing the inclusivity and diversity within our profession. By including more people from different backgrounds, we only increase the creative and problem-solving capacity of our profession. Awards, like the Clark Hubb Research Assistance Award, are fantastic in that they can help to increase the accessibility of our field.

What is the importance of young fishery professionals today and for the future of fishery management?

When I think about fisheries management I think about sustainability. Sustainability of the fishery, for the species, and for the role fisheries scientists play in the larger world of all things fish-related. I started as a graduate student in 2007, and even since that time I have seen a large shift towards emphasizing communication of our work with all sorts of different people. I think keeping that dialogue between fisheries professionals and other parties in fisheries is really important for the future of fisheries management.

What drew you to AIFRB, and what does AIFRB do for you and what can it do for other young professionals in this field?

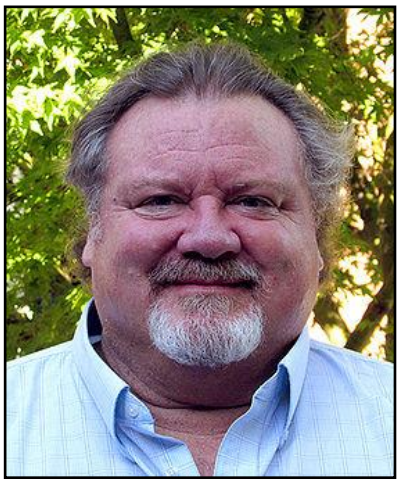
I first heard about AIFRB from another member of the Semmens lab, Lyall Bellquist. I attended some of the Southern California district meetings, were they have a guest speaker and dinner. It was a great opportunity for someone new to the West Coast to learn more about the important fisheries on the West Coast and also hear from many of the wonderful labs doing work in that region. I was fortunate enough to win the Clark Hubb Research Assistance Award which helped me attend American Fisheries Society (AFS) annual meeting one year. AIFRB has also been a supporter of the "Monsters of …" events at 3 past AFS meetings. These events are fundraisers for future student travel award for the Marine Fisheries Section and Estuaries Section of AFS (and in 2017, the Fish Habitat Section). AIFRB offers a great network of fisheries scientists at every career stage. For students, is a great way to look for future collaborators or employment opportunities. AIFRB also provides multiple stages to present your work or be recognized for it.

Please contact Lynn (waterhlz@gmail.com) to continue the conversation!

AIFRB Position Opening

AIFRB President

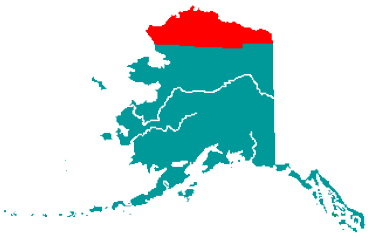
A message from Tom Keegan, Past President



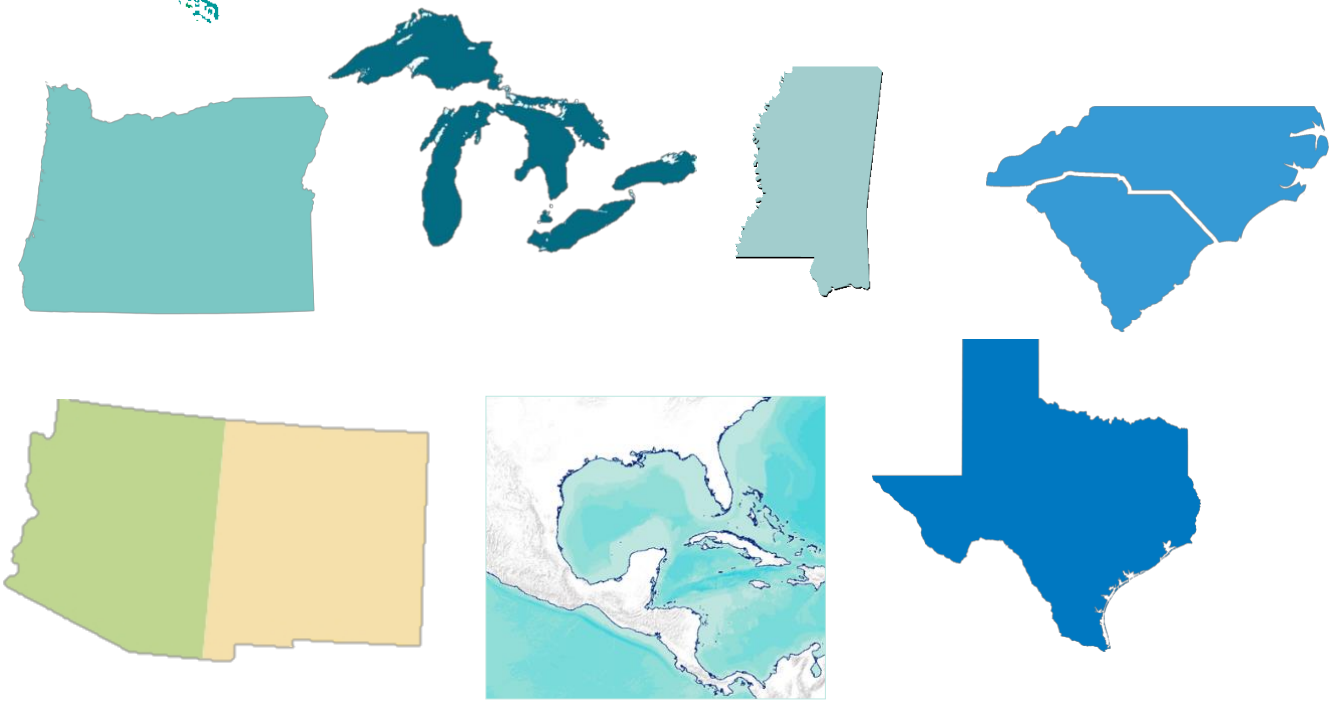
We are currently soliciting nominations for our next AIFRB President as our current President, Kim Anthony, is in her second year of her three-year term. If you or someone you know is interested in guiding our Institute into the next decade, please send Tom Keegan an email with your nomination (or suggested nomination!) at tomk@helixepi.com. Please give some thought to this extremely rewarding experience, working closely with the other Officers of the Institute and District Directors to advance the Mission of our Institute. Our Bylaws state that the next President must be at least Member status and cannot be from the same District as the current President, so that would disqualify Southern California District members from being nominated at this time.

AIFRB Position Opening

AIFRB District Directors



AIFRB is looking for devoted members to lead their region as District Director(s). Vacant positions include Northern Alaska, Southeast Alaska, Oregon, the Great Lakes, Mississippi, the Carolinas, Arizona/New Mexico, the Gulf of Mexico, and Texas. Interested? Contact President Kim Anthony.



AFS – AIFRB Liaison

A message from Sean Lucey, resigning AFS-AIFRB Liaison

"Serving as the liaison between AIFRB and AFS is a rewarding opportunity. It is a great way to bridge your participation in two outstanding organizations at the highest level. For AIFRB, you sit on the Board of Control and have direct impacts on the organization. While for AFS, you report to their Governing Board to keep them abreast of AIFRB activities. Through this position you can link activities between the two organizations and give back to the fisheries profession. The highlight of the position is organizing an AIFRB symposium for the annual AFS conference. The symposium highlights contribution in fisheries science and is a great way to bring together members of the organizations. These symposia can cover a great range of topics which allow you to meet and interact with fellow scientists who have different expertise than you. Several of them have led to special issues in journals and allow you to get some associate editor experience." If interested, please contact President Kim Anthony.

Current Research

What is SCeMFiS?

The Science Center for Marine Fisheries (SCeMFiS) offers a new approach to collaborative fisheries research that advances fisheries science and improves fisheries management. SCeMFiS is a National Science Foundation Industry/University Cooperative Research Center. Learn more here. The purpose of the centers is "to develop long-term partnerships among industry, academe and government." NSF invests in these partnerships "to promote research programs of mutual interest, contribute to the nation's research infrastructure base, enhance the intellectual capacity of the engineering or science workforce through the integration of research and education, and facilitate technology transfer." Learn more here.

The SCeMFiS mission is to utilize academic and fisheries resources to address urgent scientific problems limiting sustainable fisheries. SCeMFiS develops methods, analytical and survey tools, datasets, and analytical approaches to improve sustainability of fisheries and reduce uncertainty in biomass estimates. SCeMFiS university partners, the University of Southern Mississippi (lead institution), and Virginia Institute of Marine Science, College of William and Mary, are the academic sites. Collaborating scientists who provide specific expertise in fish, shellfish, and marine mammal research, come from a wide range of academic institutions including Old Dominion University, Rutgers University, University of Massachusetts-Dartmouth, University of Maryland, and University of Washington. The need for the diverse services that SCeMFiS can provide to industry continues to grow, which has prompted a steady increase in the number of fishing industry partners. These services include immediate access to science expertise for stock assessment issues, rapid response to research priorities, representation on stock assessment working groups, and targeted research leading to improvements in data collection, survey design, analytical tools, assessment models, and other needs to reduce uncertainty in stock status and improve reference point goals.

Figure 1. Hydraulic dredges used to fish for surfclams and ocean quahogs on the vessel used for the federal survey F/V ESS Pursuit.

SCeMFiS's Industry Advisory Board (IAB) is charged with identifying projects for funding and evaluating project performance. SCeMFiS partners include commercial fishing companies, fisheries trade organizations and non-profit groups, and the National Marine Fisheries Service (NMFS-Northeast Fisheries Science Center). The SCeMFiS research portfolio includes research teams focusing on Atlantic surfclams and ocean quahogs, forage fish (e.g. Atlantic and Gulf menhaden, chub mackerel), demersal fish (e.g., summer flounder, black sea bass, scup, Atlantic mackerel),

squid, and marine mammals. IAB meetings occur in April and October. Watch the SCeMFiS website for location, date, and time.

SCeMFiS research on the Atlantic surfclam and the ocean quahog are excellent examples of effective collaborations. These two fisheries are among the nation's largest and most valuable shellfish fisheries. Both species are fished in the Mid-Atlantic Bight (MAB) and on Georges Bank, with key ports being Pt. Pleasant, NJ, Atlantic City, NJ, and New Bedford, MA. The fishery uses large hydraulic dredges with capture efficiencies exceeding 70% (Fig. 1). Bycatch is minimal and gear selectivity limits the landing of under-sized clams (Fig. 2). The two species are unique. The Atlantic surfclam (*Spisula solidissima*) is one of the largest non-symbiont-containing clams with maximum size reaching 20 cm and landing sizes typically 12-18 cm (Fig. 3). Life spans reach 30 yr. The clam is sensitive to summer bottom water temperatures; warming of the MAB has initiated a geographically extensive range shift that continues today, possibly making this clam the world's best example of a biomass dominant on the continental shelf directly influenced by global warming (Fig. 4).

Figure 2. SCeMFiS researchers sort through market-size surfclams caught in the commercial fishing dredge.

The ocean quahog (*Arctica islandica*) is the oldest non-colonial marine animal, with a life span exceeding 500 yr. Ocean quahogs are aged using annual growth increments (Figs. 5, 6). The oldest aged animal caught to date in the MAB was born in 1740. George Washington was eight years old. Thomas Jefferson was not yet borne, and George III was not yet the King of England. Assessing the status of the stock for *Arctica* is impeded by the absence of a recruitment record consistent with the age spectrum of the stock. Most fished animals were borne prior to 1960; the NMFS stock survey began in 1980. The assessment is also impeded by unique growth dynamics. Some living *Arctica* were borne during the Little Ice Age. Growth rates have changed over time as the world warmed; consequently, unlike all other marine animals, one growth curve cannot be used for all animals from a single site, much less the entire population.

Figure 3. SCeMFiS researchers Eric Powell, Roger Mann, Jeremy Timbs, and Chase Long sort surfclam catch into baskets.

What has SCeMFiS done?

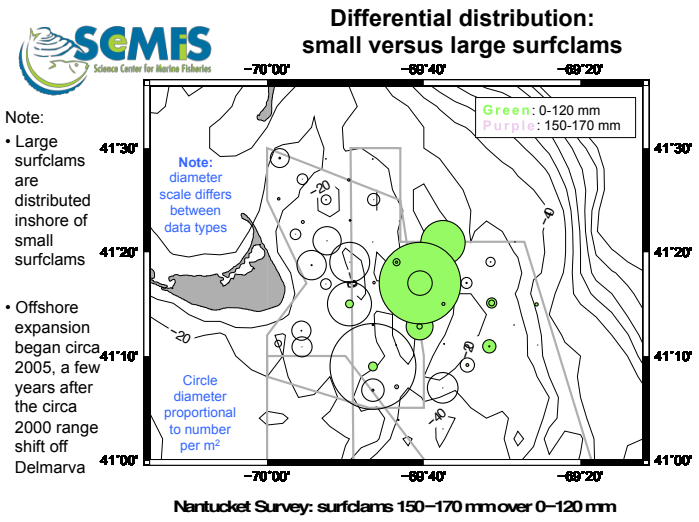


Figure 4. Catch of small (green) and large Atlantic surfclams (purple). Circle diameters are linearly proportional to numbers m^{-2} for surfclams within a size category but are not comparable between size categories. Note that the largest densities of small and therefore young surfclams were found offshore and in deeper water than the larger market size surfclams.

SCeMFiS research focused on Atlantic surfclams has concentrated on issues arising from the impact of warming bottom water temperatures on geographic range and the consequent effects on assessing the status of the stock and on the long-term sustainability of both the stock and the fishery. Surfclams shift their range very quickly (Fig. 4). A recent SCeMFiS study showed occupation in deeper water within four years after the year-2000 regime shift that also produced a mass mortality along the high-temperature southern and inshore range boundary. Initial recruits in deep water grew slowly in suboptimal conditions, but rapid warming of the MAB brought growth rates to regional norms in about five years. How do these clams shift their range so rapidly? A recent SCeMFiS study shows that recruitment capacity is high in most years, with recruitment occurring broadly over the continental shelf including regions inshore and offshore of the present range core. Normally these recruits are wasted, as survival is low in these suboptimal habitats. But, if bottom water temperature shifts, some habitats suddenly become conducive to clam survival and the recruits are already there (Fig. 4). A rapid expansion of the range boundary then ensues.

Figure 5. SCeMFiS researcher Sara Pace sectioning an ocean quahog shell on a tile saw to prepare the animal for age analysis.

SCeMFiS scientists produced the first population age-frequency distributions for ocean quahogs in the western Atlantic Ocean (Fig. 7). Surprisingly, similar age-frequencies are present at each of the four sites studied, off New Jersey, Long Island, southern New England, and Georges Bank and show consistent recruitment over multi-decadal time scales. The nearly coincidental age frequency structure is produced by an astonishingly similar population history in all four locations. *Arctica* was uncommon prior to the late 1800s at the three northern sites and prior to the civil war off New Jersey (Fig. 7). The population expanded dramatically after the civil war off New Jersey and within about 20 years of 1900 at the other three sites, reaching carrying capacity in an amazingly short time. What produced the geographically expansive population explosion is not yet known, but SCeMFiS research has shown that ocean quahogs at one time lived inshore of their present range, suggesting that a rapid offshore range shift, similar to that ongoing now for surfclams, may be responsible. In addition,

evaluation of juvenile ocean quahog growth rates show that growth rates have been increasing consistently since the late 1700s as the Mid-Atlantic warmed. Juveniles now grow upwards of 3 times more rapidly than they did circa-1800. Thus, population productivity has increased dramatically, and reproductive capacity has also dramatically increased (maturity occurs at size and not age).

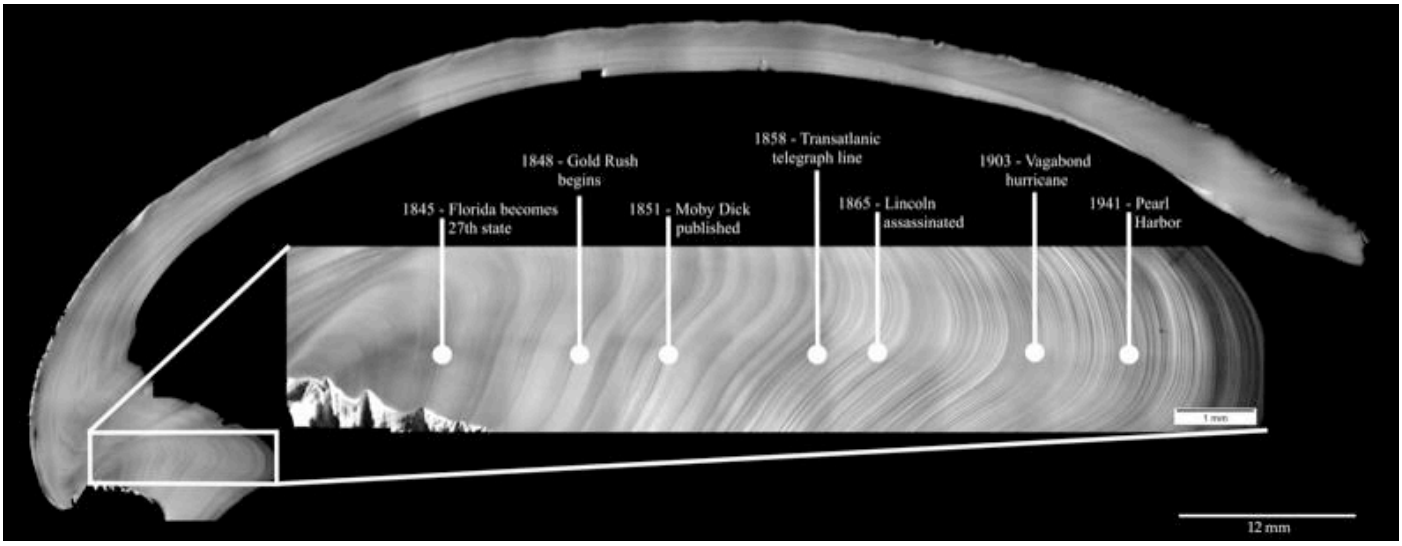


Figure 6. Image of a sectioned ocean quahog shell. Annuli can be counted in the hinge region (inset) or along the entire shell margin. Dots represent particular labeled years.

Our understanding of the population dynamics of these two continental shelf biomass dominants continues to expand, and that is important during a period of rapid ocean warming. Evidence derived by SCeMFiS scientists suggest that range shifts of benthic invertebrate biomass dominants on the U.S. east coast continental shelf are catastrophic in nature, that is, they occur on time scales much shorter than the average species' life span, and thus long-term planning for these eventualities are essential parts of long-range planning by federal managers and by the commercial fisheries.

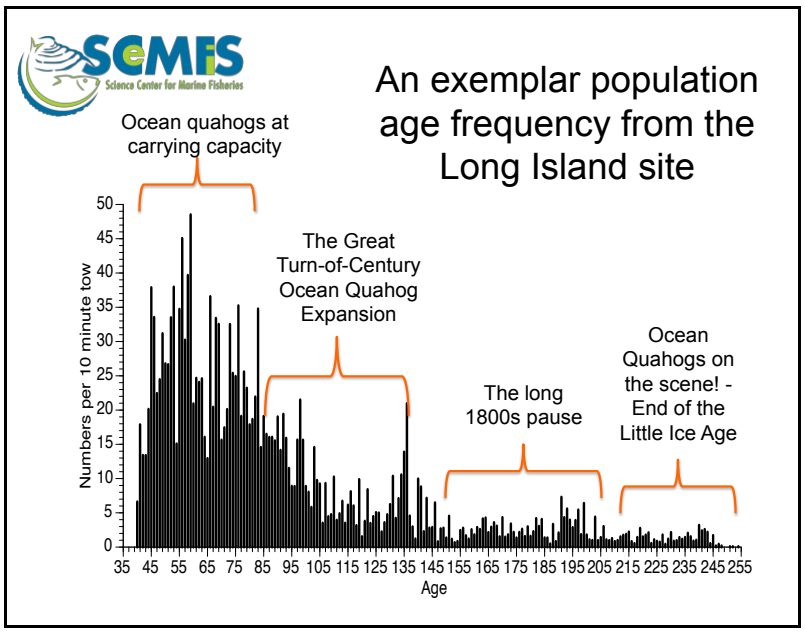


Figure 7. Population age frequency for the Long Island site. This is a typical population age frequency for the Mid-Atlantic region showing low abundance at the end of the Little Ice Age through a portion of the 1800s, and a rapid expansion in the late 1800s to early 1900's, bringing the population up to the densities supporting today's fisheries.

These contributions to shellfish research demonstrate how SCeMFiS presents opportunities to pool resources from the fishing industry and scientists to advance fisheries science. The NSF affiliation offers a process for prioritizing important research topics and reviewing progress toward objectives. The cooperative research supported by SCeMFiS is expected to improve acceptance of science by the fishing industry and government agencies.

The search for an explanation of post-2009 stagnation of Kemp's ridley sea turtle population growth

Charles W. Caillouet, Jr., PhD – Emeritus Fellow, Marine Fisheries Scientist-Conservation Volunteer

Kemp's ridley (*Lepidochelys kempii*) remains the most endangered of the world's sea turtles, despite cumulative conservation efforts that halted its decline to near extinction in 1985, and thereafter set it on a course toward recovery [1-6]. It nests on western Gulf of Mexico (GoM) beaches, primarily on the coast of Tamaulipas, Mexico. Nesting in Tamaulipas was discovered and movie-filmed by Tampico, Mexico engineer Andres Herrera in 1947, but this was not revealed to the scientific community until 1961 by Henry H. Hildebrand [7]. Secondary levels of nesting occur on beaches of Veracruz, Mexico, and tertiary levels of nesting occur on beaches of Texas. Elsewhere along the GoM coast nesting is sporadic, and it is rare on the U.S. east coast as far north as New York.

During 1966–2018, Mexico's federal government conducted annual counts of Kemp's ridley nests (i.e., clutches of eggs laid) and hatchlings released from the Tamaulipas nester-abundance-index beach; this provided annual indices of reproductive effort and output, respectively, used to monitor and model population changes over the years [1-6]. The annual count of nests was increasing at a rate of 19% per year in 2009, but dropped unexpectedly by more than a third in 2010 and since then remained well below levels predicted by the U.S. Mexico recovery plan for Kemp's ridley [3]. No hypothesis offered so far to explain this extraordinary nesting setback has been confirmed. Caillouet et al. (2018) hypothesized that pre-2010 declining GoM carrying capacity for the Kemp's ridley population contributed to this nesting setback. They suggested that pre-2010 contributors to the decline in carrying capacity may have included degradation of the GoM ecosystem, the rapidly increasing Kemp's ridley population, and declining per capita availability of neritic (i.e., post-pelagic) Kemp's ridley food, including natural prey and scavenged discarded by-catch from shrimp trawling. The most recent modeling, conducted by Kocmoud et al. (2019), suggested that the precipitous decline in Kemp's ridley nesting in 2010 might be interpreted as a "pulse" mortality event resulting from the Deepwater Horizon oil spill in northern GoM in 2010, which produced a density-dependent increase in the average interval between nestings in a given year and years later. The data-rich conservation history of Kemp's ridley continues to provide unique opportunities for age-structured demographic and stock assessment modeling of natural and human impacts on an endangered marine species, in the context of decades of cumulative conservation efforts.

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Fellow Spotlight

Mark Maunder – AIFRB Fellow, Southern California

Like the paths that many others have followed, my road to becoming a stock assessment scientist was a series of fortunate events. I spent much of my childhood recreational fishing, but never really had the goal of becoming a marine biologist, mainly because I was unaware the option existed. I moved from a little dairy farming community, where I grew up, to Auckland, the largest city in New Zealand, to do a Bachelor of Science with a double major in zoology and computer science. I chose this unusual combination because, although I liked them both, I preferred zoology, but computer science was more likely to get me a job. The first fortunate event was taking an advanced calculus class in my first year in which the first couple of weeks focused on proving 1 + 1 = 2. I thought this made no sense and was just a complete waste of time, so I dropped the course and took a standard calculus course. After this experience, I took very few math courses during my undergraduate studies. Despite the obvious importance of math in stock assessment, I attribute the success in my career to intuition and creativity that I suspect would have been hindered by math courses. Interestingly, I now attribute some major failings in stock assessment to the reliance on theoretical mathematical ecology.

Mark with the results of his recreational fishing efforts.

The next fortunate event was my inability to get the type of computer science job that I wanted. This was, in part, due to my inability to write essays, in combination with nonacademic pursuits that resulted in somewhat subpar grades. All the zoology midterm tests were short answer questions, but the final exams included paragraph or multi-paragraph answers, and I was unaware that I did not know how to write (some might argue that I still don't). I did not want to be just a computer programmer, so I decided I should continue my education to enable me to get a more interesting job. It was not until my first essay in my MS studies that I realized I could not write. Fortunately, I found an engineering professor who specialized in helping students write better. The fortunate event that turned my path towards stock assessment occurred when I was trying to decide how to continue my education. My cousin had just finished his MS in marine biology, and while I was discussing education options with him, he mentioned that you could use computers to model fish populations. I had absolutely no idea what that meant, but it sounded cool. So, I talked to a professor who did this type of work and he wanted me to model some Australian reef fish populations, but only if Prof. Brian McArdle, a biostatistician, would agree to be on my committee. I did not want to study a small Australian reef fish—I wanted to study a commercially important New Zealand fish. Brian said that if I was his student, I could model anything I wanted. Fortunately, the biology department was having trouble getting MS students, so they let me in even

though my grades were not up to their usual standard. My thesis involved conducting a stock assessment of snapper (*Pagrus auratus*), an important commercial and the most important recreational New Zealand species. This was the first

Mark Maunder dressed as the 1990s version of André Punt (UW postdoc at that time) during Halloween at the 2017 CAPAM workshop on recruitment, standing beside the modern-day UW School of Fisheries and Aquatic Sciences Director and Professor version.

thesis in the biology department that did not include collecting data, and it took a bit of persuasion by my supervisor to convince the head of department that I did not have to collect data to do a good thesis.

Nearing the end of my MS studies, I started looking for job and PhD opportunities; I had a few interviews, one of which was for a fisheries management position at the New Zealand Fishing Industry Board (NZFIB). The interview panel thought that I was completely hopeless for the position, but one member, Paul Starr, was surprised to see someone coming out of a New Zealand university with stock assessment experience and convinced the NZFIB to create a new position and hire me to help him with assessments. Working at the NZFIB is where I met my future UW PhD supervisor, Ray Hilborn, who was working as a consultant for the NZFIB. I also met André Punt, who has been a mentor throughout my career and still is, as well as other UW postdocs and students. I learnt a lot about stock assessment at the NZFIB from the NZ scientists and UW consultants, and I took some distance learning courses in statistics to understand the more technical details.

Paul Crone and Mark Maunder (CAPAM cofounders with UW (Zoology) alumni Brice Semmens) receiving the American Institute of Research Fishery Biology (AIFRB) Outstanding Group Award on behalf of CAPAM from Kim Anthony, president of AIRFB.

Career advancement options in NZ without a PhD were limited, so Paul Starr encouraged me to obtain a PhD. With financial support from the NZFIB and through its connections with UW, Ray Hilborn took me on as a student. To be honest, my goal was not to go to UW to learn, but simply to get my PhD. However, I did learn a tremendous amount—from

Mark Maunder, cofounder and former president of the ADMB foundation, discussing stock assessments with Dave Fournier, the creator of ADMB.

the projects I worked on and the people I worked with, many who were UW students (e.g. Billy Ernst [PhD, 2002] and Murdoch McAllister [PhD, 1995]), and alumni (e.g. Ana Parma [PhD, 1989] and Jim Ianelli [PhD, 1993]). One of these projects was to develop Coleraine, the first general Bayesian stock assessment package programmed in AD Model Builder (ADMB), long dead, but it's influence can still be seen in the widely used general stock

assessment program Stock Synthesis (developed by Rick Methot [BS, 1975]).

After receiving my PhD, I accepted a stock assessment position at the Inter-American Tropical Tuna Commission (IATTC) under the direction of Rick Deriso [UW Biomathematics, 1978], where I still work on stock assessments supervising other UW alumni (Carolina Minte-Vera [PhD, 2004], Haikun Xu [SAFS post-doc], and Juan Valero [MS, 2002; PhD, 2011]) under the direction of Alexandre Aires-da-Silva [PhD, 2008]. This was another fortunate event. My wife and I had lived in Wellington (New Zealand) and Seattle for six years and decided we wanted to move where the weather was a bit warmer. So, I wrote letters to the NMFS in Hawaii and Miami and to the IATTC inquiring about possible options for employment. Unknown to me, when the IATTC received my letter it was in the middle of interviewing for a stock assessment scientist, and so I was brought in for an interview. I was selected for the position, which was fortunate because stock assessment positions at the IATTC rarely become available, and I consider them among the best such positions in the world. My first task was to work with UW alumni George Watters to develop the stock assessment program ASCALA, an ADMB version of Dave Fournier's MULTIFAN-CL, and apply it to the eastern Pacific Ocean tuna stocks.

The connections that I made at the UW remain invaluable. For example, a large part of the success of the award-winning Center for the Advancement of Population Assessment Methodology (CAPAM) stock assessment methodology workshop series is due to the involvement of UW professors, their students, and alumni—particularly, Brice Semmens (UW Zoology) who is one of the other two cofounders of CAPAM, and André Punt who has been a keynote speaker at many of the workshops, has edited the special issues in the journal Fisheries Research, has contributed many publications to the special issues, and has encouraged his students to attend and contribute presentations and papers. In 2020, we are planning to hold a CAPAM workshop on natural mortality in Seattle in collaboration with UW and the NMFS. Similarly, the success of the ADMB Foundation, that I cofounded with John Sibert and Anders Nielsen, was facilitated by people associated with UW, particularly Ray Hilborn who helped us obtain funding to purchase ADMB from the developer Dave Fournier and Rick Methot who helped obtain ongoing funding.

Finally, the most important piece of information I can transfer to current UW students is that working with others is the most effective way to learn. I have been fortunate throughout my education and career, including much consulting work, to work with truly exceptional people. In many cases they had already done the hard work and it was my task to understand what they had done and work with them to make improvements. Without them, I would not know what I know today. In particular, I am grateful to Grant Thompson for putting up with all my questions and model run requests for the Pacific cod assessment over so many years.

Current Events

2019 Bevan Symposium and SAFS Centennial Celebration

The Bevan symposium and SAFS Centennial Celebration will take place in the School of Aquatic & Fishery Sciences at the University of Washington. For more details or to register, please click here.

Upcoming Events

70th Tuna Conference

The 70th Tuna Conference will take place on Monday, May 20th – Thursday, May 23rd, 2019 in Lake Arrowhead, California with the theme: **Data collection: emerging tools that address fundamental challenges in the research and management of large pelagic species**. Registration must be submitted by Wednesday, February 27th, 2019. Student scholarships are available. General conference and registration information and application and applicability for student scholarships can be found here.

Upcoming Events

11th International Flatfish Symposium - Interdisciplinary Fisheries Science & Solutions

AIFRB is sponsoring the 11th International Flatfish Symposium, which will take place on November 15-20, 2020 at Wentworth by the Sea in New Castle, New Hampshire. Since 1989, the International Flatfish Symposium has offered a platform for the exchange of high quality, scientific ideas and results, and for strengthening international cooperation and collaborations (www.flatfishsymposium.com). The 11th International Flatfish Symposium will be focused on interdisciplinary research to solve persistent challenges of flatfish ecology, conservation and sustainable utilization, including climate change, essential habitat, bycatch and population structure. The program is being developed as a single session with keynote speakers for each theme. If you are interested in getting involved, please contact AIFRB members Elizabeth Fairchild (University of New Hampshire, elizabeth.fairchild@unh.edu) or Steve Cadrin (University of Massachusetts, School for Marine Science & Technology, scadrin@umassd.edu) for more information.

Advancements and Best Practices in Quantitative Population Modeling Symposium

Science informs management of living biological resources through population modeling. In both fisheries and wildlife management, a broad array of techniques are used to assess the condition of living resources and advise on sustainable management decisions. These quantitative techniques range in complexity, and the approach used in a given scenario is typically dictated by the available data. As new modeling techniques, data sources, and advanced computing resources become available, the range of available analytical techniques continues to expand. However, with increasing capability comes increasing responsibility to understand what is available, what is appropriate for a given situation, and how the approach should be applied given the available information and scientific understanding.

The goal of this symposium is to explore emerging techniques and best practices in population modeling from marine, terrestrial, and freshwater backgrounds to share successes in resource management and create opportunities for discussion among experts and students from all three fields. We encourage participation in this symposium from government scientists and management agencies, industries, non-governmental organizations, technology-partners, research institutions, citizen-scientists, academics (including students), and other stakeholders with a diversity of experiences.

Upcoming Events

Call for T shirt designs

Design a shirt for the upcoming AIFRB/TWS symposia. Suggestions have been put forth by AIFRB Board members and include a color depiction of both a Lahontan cutthroat trout and cui-ui (lake sucker). These species were suggested because they are found together, especially in Pyramid Lake and the Truckee River, and nowhere else. Additionally, they are federally endangered, cultured by the Pyramid Lake Paiute Tribe and USFWS, of great historical significance to the Paiute Tribe. Moreover, they are beautiful fish. Winners of the T-shirt contest will receive a free shirt and a free, one-year membership to AIFRB! Please contact Beth Bowers to submit a design.

Marking, Tagging, and Tracking of Fish and Wildlife

Fish and wildlife tracking data inform how individual organisms and populations distribute locally, utilize habitat, migrate over larger scales, and evolve over time. Technological advances in tracking systems ignite the development of new questions about the ecology of species where previous tools did not exist to address them. Analyzed carefully, tracking data may indicate changes in climate and land use, biodiversity, invasive species, predict spread of diseases or parasites, and correspond to effectiveness of stocking efforts.

Tracking measures include utilization of physical marking tags, light-level geolocators, acoustic, radio, satellite, and GPS that enable investigation of spatial ecology and behavior of a variety of terrestrial, aerial and aquatic species. Tagging methods vary by size, price, memory and power capacity, scale, and ease of use.

Successful marking and tracking approaches not only involve proper tagging and placement of monitors to detect movements, but also require robust analyses and effective communication of large datasets. This symposium will share technologies, methodologies, findings, analytical approaches, and troubleshooting tips across a broad array of species and objectives to highlight more recent developments and encourage collaboration.

Upcoming Events

Workshop to develop guidelines for addressing catch forecasts from biased Assessments (WKFORBIAS) in Woods Hole, MA (USA)

Participate in a workshop to develop guidelines for addressing ***Catch forecasts from biased assessments*** (WKFORBIAS), to be held at the Northeast Fisheries Science Center in Woods Hole, MA, USA, **11 November – 15 November 2019**. The workshop will be chaired by Larry Alade (USA) and Chris Legault (USA), and the Terms of Reference can be found below. In your role as chair of an ICES working group, we would appreciate if you could circulate this note to extend the invitation to members of your expert group.

The goal of the workshop is to bring together researchers and stock assessment experts to discuss and present a framework for addressing retrospective bias in ICES stock assessments. A central task of the workshop will be to document the extent of the retrospective bias in category 1 and 2 assessments based on data produced by assessment working groups during 2019. Additional objectives are to identify and compile possible causes for retrospective bias and to develop approaches for retrospective bias correction and guidelines for acceptability of a stock assessment with retrospective bias. The outcome of the workshop is expected to be delivered to ACOM and considered for implementation in 2020.

Please let us know if you plan to attend the workshop and can present/propose candidate products for the workshop. As such please send your expression of interest to Colin Millar (colin.millar@ices.dk) stating the following:

a. Name
b. Affiliation
c. Your role as an interested party to the workshop
d. Title of a contributing Working paper addressing any number of the TOR's below (if applicable)

We wish to accommodate as many participants as possible so if you are interested please send your expression of interest by **15 April 2019**. A selection of the participants may be required to ensure that all of the TOR's are addressed. ICES will consider the list of potential participants and inform selected participants by **30 April 2019**.

Feel free to circulate this announcement to your networks. Should you have any questions, do not hesitate to contact the Co-Chairs (Larry Alade: larry.alade@noaa.gov or Chris Legault: Chris.legault@noaa.gov).

Upcoming Events

Ensemble Modeling in Fisheries and Wildlife: Providing Scientific Advice to Natural Resource Managers Can Be a Risky Business!

Providing scientific advice to natural resource managers can be a risky business! In many resource systems, identifying a single best ecological model will fail to capture scientific uncertainty about the true state of nature. In such cases, using a single analytical model will likely result in underestimation or mischaracterization of the actual uncertainty around the scientific advice, which may compromise risk-based decision tools used in natural resource management. However, the understanding and prediction of system dynamics, and therefore resulting scientific advice, can often be improved by analyzing the range of plausible working hypotheses where the scientific advice represents a synthesis across these hypotheses. Ensemble modeling accounts for multiple working hypotheses by employing multiple candidate models to explain and predict outcomes of the target system. Each candidate in the model ensemble makes a distinct claim about system dynamics and process outcomes and represents a unique hypothesis about how the system works. Synthesizing the results of the model ensemble can provide a more accurate characterization of the target system, especially when individual model predictions are unbiased and the covariance between model predictions is low. This symposium includes presentations and discussion of scientific advancements in ensemble modeling approaches, as well as perspectives and case studies where ensemble modeling has been applied in fisheries and wildlife ecology. This includes model selection, model weighting, multi-model inference (including averaging and other techniques), machine learning for ecological predictions, and communicating results of ensemble modeling for robust resource management.

Keystone District Social, April 25, 2019, Highland Park, NJ

The Keystone District (CT, PA, NY, NJ) will be having a social networking event on Thursday, April 25, 2019 from 5:30 – 8:00 PM at Pino's Lounge in Highland Park, NJ. This event will be a great opportunity to network with other AIFRB members and to help recruit new members to the Institute. This social is being held in conjunction with a seminar event earlier in the day when Dr. Nick Dulvy (Simon Fraser University: http://www.dulvy.com/) will be the inaugural distinguished speaker as a part of Rutgers University's Center for Fisheries and Ocean Sustainability. Dr. Dulvy's seminar presentation will be from 4:00 – 5:00 PM on the Cook Campus of Rutgers University, New Brunswick, NJ, and it is open to AIFRB members to participate live on-campus or remotely via webinar.

Please contact Dr. Douglas Zemeckis (Rutgers University), Keystone District Director, with any questions or to RSVP for the social or seminar by Monday, April 22: zemeckis@njaes.rutgers.edu, (732) 349 -1152.

Job Postings

Research Vessel Expeditionary Coordinator – University of California, San Diego

Our venerable ship scheduler at Scripps, Liz Brenner, will soon be stepping down. We have opened a position for her replacement. A brief overview:

The Research Vessel Expeditionary Coordinator (RVEC) serves as the ship scheduler, clearance and permitting officer, and scientific party liaison for the Scripps Institution of Oceanography (SIO) Ship Operations and Marine Technical Support (SOMTS) organization. This position requires congenial and effective interpersonal communication, broad understanding of and literacy in ocean science and technology, and an immense aptitude for solving multivariate puzzles involving many degrees of freedom with rapidly-evolving boundary conditions.

Please check out the job posting and share it with folks who you think may be a good fit.

Independent Peer Reviewer for the 2019 IPHC Stock Assessment

INTERNATIONAL PACIFIC HALIBUT COMMISSION

The International Pacific Halibut Commission (IPHC) invites Expressions of Interest (EOI) from quantitative scientists to undertake an independent peer review of the 2019 IPHC stock assessment, including tactical guidance for the 2019 stock assessment and strategic guidance for future data, modelling and management advice.

Qualifications, experience and expressions of interest (EOI):
The IPHC seeks a qualified individual with expertise in quantitative fisheries stock assessment science, potentially including:
1) Preparation and analysis of complex fishery data sets, 2) Analysis of fishery-independent surveys, particularly those based on longline gear, 3) Spatial modelling and index standardization, 4) Stock synthesis, 5) Maximum likelihood methods, 6) Bayesian methods, 7) Multi-model inference, 8) Other relevant skills.

EOIs from qualified individuals are invited for this contract, and should include:
1) Full name, 2) Contact information, 3) Detailed CV, 4) Details of past stock assessment peer reviews undertaken, 5) Copies of at least 5 relevant journal articles, 6) Three professional references (with contact information)

Application Deadline
EOIs must be received by the IPHC Secretariat via email at secretariat@iphc.int no later than the close of business on 22 April 2019.
Questions may be directed to the IPHC Secretariat at secretariat@iphc.int.

NRC Postdoctoral Associate in Quantitative Fisheries

NOAA Fisheries conducts stock assessments of economically important marine resources to provide scientific information for the regional fishery management councils and other management partners. The statistical models and diagnostic tools used in these stock assessments can differ by region, laboratory, and application; although, many stock assessment approaches have similar mathematical and statistical attributes. The postdoctoral associate will compare and evaluate a minimum of four age-structured assessment packages commonly used by NOAA Fisheries: the Age Structured Assessment Program (ASAP), the Assessment Model for Alaska (AMAK), the Beaufort Assessment Model (BAM), and Stock Synthesis (SS). Comparisons will rely on simulated data typical of fish stocks in various regions of the United States.

Minimum qualifications include a PhD in quantitative fisheries, statistics, applied mathematics, population dynamics, marine ecology, theoretical ecology, or a related field. Strong quantitative skills are required, as are strong programming skills (e.g., in R, AD Model Builder). The successful candidate should be motivated and capable of working independently as well as collaboratively within a team.

The associate may choose their host laboratory from locations in Beaufort NC, Miami FL, Newport OR, Seattle WA, Silver Spring MD, or Woods Hole MA. The associate will have opportunities to travel to the other locations to collaborate with members of the research team.

Annual salary is $56,000 plus benefits, administered through the National Research Council (NRC) postdoctoral program (http://sites.nationalacademies.org/pga/rap/). Postdoctoral support is available for one year.

To apply, e-mail a **cover letter** describing your interest in the position, a copy of your **CV**, and the names and contact information of **two professional references** to Kyle Shertzer (Kyle.Shertzer@noaa.gov). Review of candidates will continue until the position is filled. Short-listed candidates will be invited to submit a full application through the NRC system (NRC deadline is May 1, and if position remains open, the next deadline is Aug 1). Start date is flexible, but ideally work would begin in the summer of 2019.

Informal inquiries regarding the position are welcome. Regional lab contacts are:
Aaron Berger (aaron.berger@noaa.gov) – *Newport, OR*
Liz Brooks (liz.brooks@noaa.gov) – *Woods Hole, MA*
Jim Ianelli (jim.ianelli@noaa.gov) – *Seattle, WA*
Patrick Lynch (patrick.lynch@noaa.gov) – *Silver Spring, MD*
Rick Methot (richard.methot@noaa.gov) – *Seattle,* WA
Skyler Sagarese (skyler.sagarese@noaa.gov) – *Miami, FL*
Kyle Shertzer (kyle.shertzer@noaa.gov) – *Beaufort, NC*

Award Nominations

W.F. Thompson Award for Best Student Paper

Published in 2017 and 2018

Nominations are open for the W.F. Thompson Award, which will be given by the American Institute of Fishery Research Biologists (AIFRB) to recognize the best student paper in fisheries science published during both 2017 and 2018. **An award will be made for each year** and shall consist of a check for up to $1,000 as determined by the Board of Control, a certificate and a one-year membership in AIFRB at an appropriate level. The requirements for eligibility are as follows:

(1) The paper must be based on research performed while the student was a candidate for a Bachelor's, Master's, or Ph.D. degree at a college or university in the Western Hemisphere

(2) The results of the research must have been submitted to the recognized scientific journal in which it was eventually published, or to the editor of the book in which it was eventually published, within three (3) years of termination of student status. The year of publication is the first date of either e-publication or print publication for the paper being nominated

(3) Papers that are nominated for the award must be concerned with freshwater or marine biological resources and/or fisheries science

(4) The paper must be in English

(5) The student must be the senior author of the paper

Nominations may be submitted by professors or other mentors, associates of the students, or by the students themselves. The submission package should include a letter of nomination, the student's curriculum vitae and a copy of the publication. Submissions in MSWord or as pdf documents are required.

The deadline for receipt of nominations is May 15, 2019.

The nominations should be sent to the Chairman of the W.F. Thompson Award Committee

Dr. Frank M. Panek
Fishery and Aquatic Health Associates
P.O. Box 379
Inwood, WV 25428

E-mailed submissions to: fpanek@aol.com are preferred.

Contact Information

President
Kim Anthony
5000 Old Pacific Coast Hwy
San Clemente, CA 92673
kim.anthony@aifrb.org

Past President
Tom Keegan
HELIX Environmental
11 Natoma St., Suite 155
Folsom, CA 95630
TomK@helixepi.com

Past President, Service Kasahara Award
Steve Cadrin
SMAST – UMass Dartmouth
836 South Rodney French Blvd.
New Bedford, MA 02744
scadrin@umassd.edu

Treasurer
Cate O'Keefe
MA Division of Marine Fisheries
836 South Rodney French Blvd.
New Bedford, MA 02744
cokeefe@umassd.edu

Secretary
Mary Blasius
California State University
Long Beach
1250 Bellflower Boulevard
Long Beach, CA 9084
meblasius@gmail.com

Young Professional Representative
Connor Capizzano
UMass Boston
School for Environment
100 William T. Morrissey Blvd.
Boston, MA 02125
connor.capizzano001@umb.edu

Membership Chair
Todd Chapman
ECORP Consulting, Inc.
1801 Park Court Pl., B-103
Santa Ana, CA 92701
tchapman@ecorpconsulting.com

Hubbs Research Assistant Award
Jerry Ault
Rosenstiel School – U Miami
4600 Rickenbacker Causeway
Miami, FL 33149
jault@rsmas.miami.edu

Achievement Award
Dick Beamish
DFO Canada (Retired)
3904 Hammond Bay Rd.
Nanaimo, BC, Canada
rabeamish@shaw.ca

W.F. Thompson Award
Frank Panek
Fishery and Aquatic Health Assoc., LLC
PO Box 379
Inwood, WV 25428
fpanek@aol.com

Investment Chair
Allen Shimada
7909 Sleaford Place
Bethesda, MD 20814
amshimada@gmail.com

Newsletter Editor
Beth Bowers
Biological Sciences
Florida Atlantic University
777 Glades Rd.
Boca Raton, FL 33431
Mebowers5@gmail.com

AIFRB-AFS Liaison
Sean Lucey
Northeast Fisheries Science Center 166 Water Street
Woods Hole, MA 02543
sean.lucey@noaa.gov

BRIEFS, the newsletter of the American Institute of Fishery Research Biologists, is intended to communicate the professional activities and accomplishments of the Institute and its Members.
Comments and written contributions should be sent to Beth Bowers at mebowers5@gmail.com
ISSN-8755-0075

District Directors

British Columbia
Brittany Jenewein
Fisheries and Oceans Canada
#301-1918 McCallum Road
Abbotsford, British Columbia
btjenewein@gmail.com

California, Northern
Thomas Keegan
Senior Fisheries Scientist
Helix Environmental Planning, Inc.
11 Natoma Street, Suite 155
Folsom, CA 95630
TomK@helixepi.com

California, Southern
Danny Heilprin
Senior Marine Biologist
ManTech International Corporation
420 Stevens Avenue, Suite 300
Solana Beach, CA 92075
danny.heilprin@aifrb.org

Capital
Mark D. Chandler
NMFS Science & Technology
1315 East West Hwy
Silver Spring, MD 20910
mark.chandler@noaa.gov

Florida
Bonnie Ahr
Integrated Mission Support Services
Mail Code IMSS - 300
Kennedy Space Center, FL 32899
ahr.bonnie@gmail.com

Keystone
Doug Zemeckis
Cooperative Extension of Ocean County
Dept. of Agriculture and Natural Resources
Rutgers University
1623 Whitesville Road
Toms River, NJ 08755
Zemeckis@njaes.rutgers.edu

New England
Greg DeCelles
Stock Assessment Specialist
MA Division of Marine Fisheries
836 South Rodney French Blvd.
New Bedford, MA 02744
gregory.decelles@mass.gov

Pacific Northwest Super District
(Washington, NW Oregon – SW Washington)
David Hand
Supervisory Fish Biologist
Columbia River Fisheries Program Office
1211 SE Cardinal Court, Suite 100
Vancouver, WA 98683
david_hand@fws.gov

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